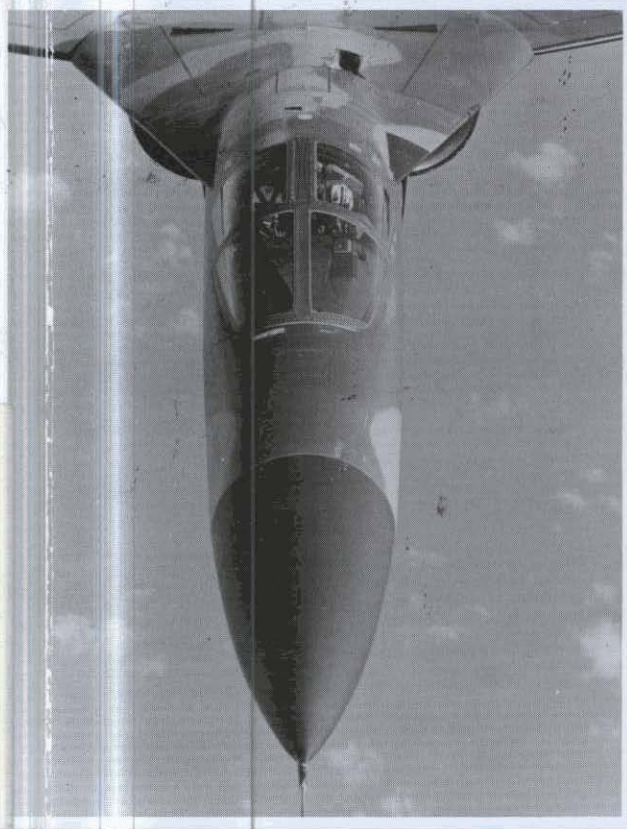
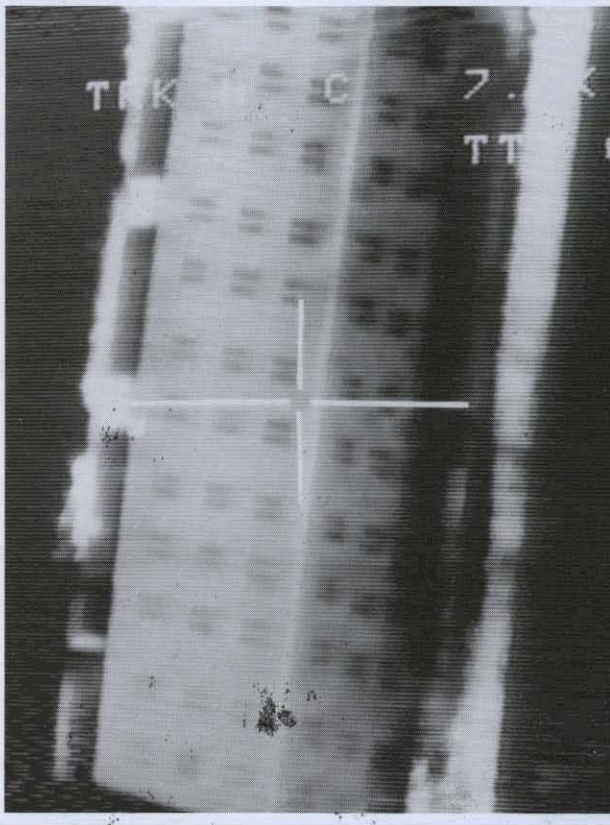
SMALLER BUT LARGER

Conventional Air Power into the 21st Century





Edited by Alan Stephens

RAAF AIR POWER
STUDIES CENTRE
FAIRBAIRN A.C.T. 2600

RAAF Air Power Studies Centre

SMALLER BUT LARGER
Conventional Air Power into the 21st Century

The Proceedings of a Conference held by
the Royal Australian Air Force
in Canberra
25 March to 27 March 1991

Edited by

Alan Stephens

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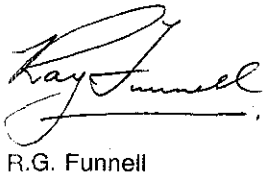
FOREWORD

When I started to think about ways of celebrating the Royal Australian Air Force's 70th birthday, I was determined to include an event which would be of lasting value. We could have held air displays and open days, as we have done so successfully in the past. However, while those events are enjoyable and generate good publicity, they also tend to be quickly forgotten. By contrast, conducting a major international conference offered an opportunity for enduring benefit. Challenging our thinking about our basic business of exercising air power in the national interest could only help to expand our views and, hopefully, project our thoughts into the future. On a personal level, a conference would also be a milestone in my long-held wish to place the operations and activities of the RAAF on a sound conceptual base.

Air power throughout the world, and perhaps particularly in this country, has been frequently undervalued and frequently misunderstood. As the proceedings presented in this volume show, the conference made a significant contribution towards redressing that situation. If we are to meet our obligations as professional airmen, we must continue to question, examine and restate our fundamental beliefs. Again, I believe these proceedings will assist that process. They represent an enduring record for future generations of students of this most complex and critical element of national security.

A conference can only be as good as its participants. As Chief of Staff, I am grateful on behalf of the Royal Australian Air Force that we were supported by such a distinguished group of speakers. Each of them has my sincere thanks. I was also delighted with our association with British Aerospace, who were an ideal sponsor: always supportive, never intrusive.

Those of us who participated directly in the conference have, I believe, gained a clearer understanding of the roles and capabilities, the advantages and limitations, and the potential of conventional air power into the 21st century. I trust that future readers of this volume gain a similar understanding. The challenge for all of us now is to devise the means to ensure air power is used in ways which benefit mankind and enhance humanity.



R.G. Funnell
Air Marshal
Canberra, June 1991

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ABBREVIATIONS

AAM	Air-to-Air Missile
AAP	Australian Air Publication
ABRI	Indonesian Armed Forces
ADF	Australian Defence Force
ADFA	Australian Defence Force Academy
ADFWC	Australian Defence Force Warfare Centre
ADGE	Air Defence Ground Environment
ADI	Australian Defence Industries
ADSC	Australian Defence Studies Centre
AEW&C	Airborne Early Warning and Control
AFS	Aerial Fire Support
AIROP	Aerial Observation Post
AMRAAM	Advanced Medium Range Air-to-Air Missile
ANG	Air National Guard (US)
ANU	Australian National University
ANZUS	Australia/New Zealand/United States Treaty
AO	Area of Operations
AOC	Air Officer Commanding
AP	Air Publication
APSC	Air Power Studies Centre (RAAF)
ARA	Australian Regular Army
ASEAN	Association of South East Asian Nations
ASM	Air-to-Surface Missile
ASW	Anti-Submarine Warfare
ATF	Advanced Tactical Fighter
ATHS	Airborne Target Handover System
AWACS	Airborne Warning and Control System
BVR	Beyond Visual Range
CADRE	Centre for Aerospace Development, Research and Education (USAF)
CAIRS	Close Air Support
CAP	Combat Air Patrol
CAS	Chief of the Air Staff
CDAA	Circularly Disposed Antenna Array
CEP	Circular Error Probable
CF	Canadian Forces
CFE	Conventional Forces Europe
C-in-C	Commander-in-Chief
COMECON	Council for Mutual Economic Assistance
CPX	Command Post Exercise
CSCA	Conference on Security and Cooperation in Asia
CSCE	Conference on Security and Cooperation in Europe
CSIS	Centre for Strategic and International Studies
C3I	Command, Control, Communications and Intelligence
DOA 87	Defence of Australia 1987 (White Paper)
DSD	Defence Signals Directorate
ECM	Electronic Counter Measure
EEZ	Exclusive Economic Zone
EFA	European Fighter Aircraft

ESM	Electronic Support Measure
EW	Electronic Warfare
EWOSU	Electronic Warfare Operational Support Unit
FAC	Forward Air Controller
FFG	Frigate (Guided Missile)
FPDA	Five Power Defence Arrangements
GA	General Aviation
GNP	Gross National Product
HAS	Hardened Aircraft Shelter
HF DF	High Frequency Direction Finding
HOT	High Subsonic Optically Guided Tube Fired (missile)
IADS	Integrated Air Defence System
IAF	Indian Air Force
ICBM	Intercontinental Ballistic Missile
IFF	Identification Friend or Foe
IISS	International Institute for Strategic Studies
IMF	International Monetary Fund
IPTN	Indonesian Aircraft Industries
IR	Infra-Red
IRST	Infra-Red Search/Track
ISIS	Institute of Strategic and International Studies
JSTARS	Joint Surveillance Target Attack Radar System
LANTIRN	Low Altitude Navigation and Targeting Infra-Red at Night
LAPES	Low Altitude Parachute Extraction System
LCA	Light Combat Aircraft
LIW	Low Intensity Warfare
LO	Low Observable
LRMP	Long Range Maritime Patrol (Aircraft)
MOD	Ministry of Defence (UK)
NADACS	National Air Defence and Air Control System
NATO	North Atlantic Treaty Organisation
OCA	Offensive Counter Air (operations)
OTHR	Over-the-Horizon Radar
PGM	Precision Guided Munition
POL	Petroleum, Oil, Lubricants
RAAF	Royal Australian Air Force
RAF	Royal Air Force
RAN	Royal Australian Navy
RCS	Radar Cross Section
RFC	Royal Flying Corps
RNZAF	Royal New Zealand Air Force
RPV	Remotely Piloted Vehicle
RSTA	Reconnaissance, Surveillance, Target Acquisition
RUSI	Royal United Services Institute
R&D	Research and Development

SEAD	Suppression of Enemy Air Defences
SESKOAD	Army Command and Staff College (Indonesia)
SIGINT	Signals Intelligence
SDSC	Strategic and Defence Studies Centre
SLOC	Sea Line of Communication
SSN	Nuclear Powered Attack Submarine
TAC	Tactical Air Command (USAF)
TAOR	Tactical Area of Responsibility
UAV	Unmanned Air Vehicle
UN/UNO	United Nations Organisation
USAAF	United States Army Air Force
USAF	United States Air Force
VNA	Vital National Asset
V/STOL	Vertical/Short Take-off and Landing

PREFACE AND ACKNOWLEDGEMENTS

Papers have been printed as presented by the authors, with only minor changes to achieve some consistency in layout, spelling and terminology. The transcripts of the discussions which followed papers have been edited for relevance, brevity and clarity. Copies of the edited transcripts were sent to all authors for comment before publication.

The compilation of the volume in a relatively short time would not have been possible without the excellent support I received. I am grateful to the following people who assisted with the preparation: from the APSC, Wing Commander Alan Curr; from No 34 Squadron Orderly Room, Flight Lieutenant Wanda Oram, Corporals Trudy Olsen and Jo Helmore, Leading Aircraftmen Mark Valerius and Grant Bowman, and Mrs Tina Ritchie; and from Base Squadron Fairbairn Photographic Section, Corporal David Pang and Leading Aircraftman Glenn Alderton.

Alan Stephens
Wing Commander
RAAF Air Power Studies Centre
June 1991

NOTES ON CONTRIBUTORS

His Excellency the Honourable Bill Hayden, AC

His Excellency the Honourable Bill Hayden was sworn in as the 21st Governor-General of Australia in February 1989. Prior to that he was a member of the House of Representatives from 1961 to 1988, holding at different times the portfolios of Foreign Affairs and Trade, Foreign Affairs, Treasurer, and Social Security. He was Leader of the Opposition from 1977 to 1983.

Senator the Honourable Robert Ray

Senator Ray was born in Melbourne in 1947, and educated at Mentone State School, Beaumaris High School, Mordialloc High School, Monash University and Rushden State College. Before his election as a Senator for Victoria in 1980, he worked as a taxi driver, research officer and technical school teacher.

Senator Ray's appointments in government have included the portfolios of Home Affairs; Immigration, Local Government and Ethnic Affairs; and Defence since 1990. He has been Manager of Government Business in the Senate since September 1988.

Air Marshal R.G. Funnell, AC

Air Marshal Funnell joined the RAAF in 1953 and graduated from the RAAF College as a pilot in 1956. After attending the RAAF Staff College in 1967, he served in a series of staff positions in the Department of Air and on exchange with the USAF. In 1971-72 he attended the USAF Air War College and, on his return to Australia, commanded No 6 Squadron at Amberley, Queensland. Since 1975, Air Marshal Funnell has held several senior staff positions, including Head of Military Project Staff, Australian Defence Force Academy Project; Chief of Staff, Headquarters RAAF Operational Command; Chief of Air Force Operations and Plans; Assistant Chief of the Defence Force (Policy); and Vice Chief of the Defence Force. He was promoted to the rank of air marshal in June 1986 and assumed the post of Chief of the Air Staff in July 1987. Air Marshal Funnell is a graduate of the Royal College of Defence Studies and holds a Masters Degree in Political Science and a Graduate Diploma in Administration.

Associate Professor John McCarthy

After graduating with First Class Honours in History and a University Medal from the University of Queensland, John McCarthy joined the Department of History, University of New South Wales, as a Teaching Fellow. In 1968 he completed a thesis for the degree of Master of Arts and became a Research Scholar in the Department of Political Science, Research School of Social Sciences, Australian National University. His PhD on Australian-British defence relations between the wars was awarded in 1972.

After teaching on the Kensington campus of the University of New South Wales and at what is now the University of Wollongong, he joined the staff of the Department of History, Faculty of Military Studies at the Royal Military College as a Lecturer. Appointed Senior Lecturer in 1973, he now holds the position of Associate Professor in the Department of History, Australian Defence Force Academy. He was foundation President of the Historians of Australian Defence and Foreign Policy Association and has published widely in these and related fields. *Australia and Imperial Defence 1918-1939* was published by Queensland University Press in 1976, and *Australian War Strategy 1939-1945* with J.R. Robertson appeared through the same press in 1985. *A*

Last Call of Empire: Australian Aircrew, Britain and the Empire Air Training Scheme 1939-1945 was published by the Australian War Memorial in 1988. Currently he is writing on social and political aspects of New South Wales history in the 1930s.

Professor Desmond Ball

Professor Ball is Head of the Strategic and Defence Studies Centre, Research School of Pacific Studies of the Australian National University. He has previously been a Lecturer in International Relations and Military Politics in the Department of Government at the University of Sydney, a Research Fellow in the Centre for International Affairs at Harvard University, and a Research Associate at the International Institute for Strategic Studies in London. He is the author of more than 140 academic monographs and articles on nuclear strategy, nuclear weapons, national security decision-making, and Australia's defence policy. His major books include: *Pine Gap: Australia and the US Geostationary Signals Intelligence Satellite Program* (Allen and Unwin, Sydney, 1988); *A Base for Debate: The US Satellite Station at Nurrungar* (Allen and Unwin, Sydney, 1987); *A Suitable Piece of Real Estate: American Installations in Australia* (Hale and Iremonger, Sydney, 1980); and *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration* (University of California Press, Berkeley, 1980).

Group Captain Brent Espeland, AM

Group Captain Espeland has been primarily involved in flying instructional duties since he joined the RAAF in 1966. He is also experienced in tactical transport operations and has flown as wingman and leader of the RAAF Aerobatic Team, 'The Roulettes'. In 1983 Group Captain Espeland became the first RAAF officer to hold the position of Military Secretary and Comptroller to the Governor-General of Australia. He is a graduate of Melbourne University (BSc), the RAAF Academy, Canadian Forces Command and Staff College, and USAF Air War College. He took up his present appointment as Director Air Power Studies Centre in August 1990.

Group Captain A.G.B. Vallance, OBE

Group Captain Vallance graduated from the Royal Air Force College in 1969. He flew Vulcans in the strike and strategic reconnaissance roles in Cyprus and the UK, and commanded No 55 Victor Tanker Squadron in 1983-84. His ground tours have included Personal Staff Officer to the Assistant Chief of the Air Staff (Operations), the Air Member for Personnel and the Chief of the Air Staff. He has written a number of articles on air power issues and attended Queen's College Cambridge in 1987 and 1988 reading International Relations. He wrote a thesis on the evolution of air power doctrine within the RAF, and was awarded an MPhil Degree with distinction. He was appointed Director of Defence Studies for the RAF in October 1988.

Lieutenant Colonel Charles M. Westenhoff, USAF

Lieutenant Colonel Westenhoff is an analyst at the Air Power Research Institute of the US Air University. A graduate of the US Military Academy at West Point, he has served as a calibration pilot, forward air controller, tactics developer, test officer, and flight examiner on four aircraft types. Lieutenant Colonel Westenhoff acted as the Air Attache in Baghdad, Iraq, from April to August 1988. His articles on military subjects have appeared in *Air Power Journal, Military Review, Fighter Weapons Review* and several other professional journals. His book, *Military Air Power*, was published by Air University Press in 1990.

Lieutenant General Charles G. Boyd, USAF

Lieutenant General Boyd was commissioned in 1960 and spent his early career as an operational pilot flying F-100s and F-105s. He began flying combat missions over Laos and Vietnam in November 1965, whilst on temporary assignment to Korat Royal Thai Air Force Base. He was shot down by ground fire over North Vietnam in 1966 after flying 105 combat missions, and remained a prisoner of war in North Vietnam until February 1973.

Since then, General Boyd has served in a number of posts, the most recent of which include Vice Commander of Strategic Air Command's 8th Air Force, Director of Plans and later Assistant Deputy Chief of Staff for Plans and Operations in the Office of the Deputy Chief of Staff for Plans and Operations. He is currently the Commander of the Air University, headquartered at Maxwell Air Force Base, Alabama. General Boyd holds a Master of Arts Degree from the University of Kansas, and is a graduate of the Air War College.

Air Vice-Marshal Tony Mason, CB, CBE

Air Vice-Marshal Mason retired from the RAF in 1989 after holding the appointment of Air Secretary. He has published several books on air forces and defence, including *War in the Third Dimension* and *Air Power: An Overview of Roles*. He is presently Leverhulme Air Power Research Director for the Foundation for International Security, and general editor for the Brassey's series of air power publications.

Air Commodore Jasjit Singh, AVSM, VrC, VM

Air Commodore Singh is the Director of the Institute for Defence Studies and Analyses, New Delhi. He previously served in the Indian Air Force, which he joined in 1954. He has operational experience as a fighter pilot, and an extensive background in staff, command and planning duties. He has specialised in planning the employment of air power. His publications include the book *Air Power in Modern Warfare* (New Delhi, 1985).

Brigadier General Soedibyo

Brigadier General Soedibyo was born in Central Java in 1931. An infantry specialist, he graduated from the Dutch Military Academy in 1956. He is both a graduate of and former instructor at SESKOAD. From 1974 to 1978 he was Military Attache in Moscow; while he later served in the Policy and Plans area at ABRI Headquarters. Following his retirement from the Army, General Soedibyo became a Senior Fellow at the Centre for Strategic and International Studies in Jakarta in 1987.

Dr Benjamin S. Lambeth

Dr Lambeth is a senior staff member of the RAND Corporation in Santa Monica, California, with principal interests and background in the Soviet military field. His articles on Soviet military doctrine and strategy have appeared in numerous journals and symposium volumes, and he has lectured widely on these subjects, including at all of the senior US military service schools. Prior to joining RAND in 1974, he served in the Office of National Estimates at the US Central Intelligence Agency. In addition to his work in the Soviet military area, he has written extensively on tactical air power issues, including 'Pitfalls in Force Planning: Structuring America's Tactical Air Arm', *International Security*, Fall 1985, and 'Moscow's Lessons from the 1982 Lebanon Air War', in Air Vice-Marshal R.A. Mason (Ed), *War in the Third Dimension*, (Brassey's, London, 1986). He received his doctorate in Political Science from Harvard University and is the author of a forthcoming book entitled *The Logic of Soviet Defence Policy*

(Princeton University Press, New Jersey, 1987). He is also a licensed pilot and has flown over 20 different fighter aircraft types with the US Air Force, Air National Guard, Air Force Reserve, US Navy, US Marine Corps and Canadian Forces.

Air Vice-Marshal I.B. Gration, AO, AFC

Air Vice-Marshal Gration enlisted in the RAAF on 26 January 1953 as an air cadet and, following graduation from the RAAF College, underwent pilot training. His flying career included maritime, transport, VIP and instructional duties.

Air Vice-Marshal Gration is a graduate of the RAAF Staff College, Joint Services Staff College, the Royal College of Defence Studies and the University of Queensland. During his career he has held command positions as Commanding Officer RAAF Support Unit Tengah, Officer Commanding Fairbairn and Officer Commanding Richmond, as well as several senior staff positions, including Director General Joint Operations and Plans HQADF, Chief of Air Force Personnel and Head, Australian Defence Staff, Washington. He assumed the position of Air Commander Australia in January 1990.

Rear Admiral K.A. Doolan, AO, RAN

Rear Admiral Doolan graduated from the Royal Australian Naval College in 1956 and, after a period of training at sea, attended the Royal Naval College at Dartmouth, from which he graduated in 1958.

As a junior officer he served in the destroyers *Vendetta, Voyager* and *Vampire*, and the aircraft carrier *Melbourne*. During 1964-1965 he was Aide-de-Camp and, later, Military Secretary to His Excellency the Governor-General. After qualifying as a navigation specialist in England in 1967, he served on exchange with the Royal Navy in *HMS Torquay*.

Following promotion to Lieutenant Commander, he was involved in active service aboard the guided missile destroyer *HMAS Perth* during the Vietnam War. After graduating from the Canadian Forces Command and Staff College at Toronto in 1975 he was promoted to commander and stayed on at the College as a member of the Directing Staff.

Promoted to captain in 1981, his postings since then have been as Director of Naval Officers' Postings (1982-1983), Director of Naval Force Development (1983-1984), Commanding Officer of *HMAS Brisbane* (1984-1985) and Director of Naval Plans (1985-1987). He was promoted to commodore and become Australian Naval Attache (Washington) and Australian Naval Adviser (Ottawa) in early 1987. He took up his present position as Maritime Commander Australia in July 1990.

Major General M.P. Blake AO, MC

A graduate of Royal Military College Duntroon, Major General Blake spent the early years of his career in the infantry. During this time he served in both Australia and South Vietnam, where he was awarded a Military Cross and mentioned in despatches. On his return to Australia in April 1970 he was posted as the Staff Officer Operations, Headquarters 2nd Task Force, until he was appointed Second-in-Command of the Special Air Service Regiment in late 1972. In 1974 he attended Army Staff College at Camberley in the United Kingdom. In 1975-76 he was the Chief Instructor, Infantry Centre, and in 1977-78 Commanding Officer, 5th/7th Battalion, the Royal Australian Regiment. From early 1979 until his attendance in mid-1981 at the Joint Services Staff College he was a staff officer in the Office of the Military Secretary.

He was promoted to the rank of colonel in 1982 and was posted as the Director of Military Arts, Royal Military College, Duntroon. In 1982 he was promoted to the rank of brigadier and was appointed Commander, 3rd Brigade. In January 1985, he assumed the appointment of Director General Coordination and Organisation, Army Office. In 1986 he was promoted to the rank of major general and was appointed Commandant, Royal Military College, Duntroon, on 15 January 1987.

On 23 March 1990 Major General Blake took up the appointment of Land Commander Australia.

Professor Geoffrey Blainey

Geoffrey Blainey was born in Victoria in 1930 and raised in country towns, including Leongatha, Geelong and Ballarat. He completed his education at Wesley College and the University of Melbourne. His first book was a history of mining on the west coast of Tasmania, *The Peaks of Lyell,* published in 1954.

He has written some twenty books, of which the best known are *The Tyranny of Distance, The Rush That Never Ended* and *The Causes of War.*

He was Professor of Economic History at the University of Melbourne form 1968 to 1976, Ernest Scott Professor of History from 1977 to 1988, and is now Professor Emeritus. At one time a member of various federal government committees, he was Chairman of the Australia Council for four years and Chairman of the Australia-China Council for five years.

In the early 1980s he was Visiting Professor of Australian Studies at Harvard University. In 1988 at the United Nations Building in New York he received (with the noted American economist, J.K. Galbraith) the International Britannica Award for excellence in the dissemination of knowledge for the benefit of mankind.

Commodore Sam Bateman, RAN

Commodore Sam Bateman is a 'salt horse' Seaman specialist in the RAN. He has commanded HMA Ships *Hobart, Yarra, Aitape* and *Bass*. His shore postings include service with the Papua New Guinea Defence Force and extensive experience in the strategic and force development planning areas of the Department of Defence in Canberra. He holds the degrees of Bachelor and Master of Economics and has published papers on a wide range of defence and maritime topics. Commodore Bateman currently heads the Maritime Strategic Studies Project.

Brigadier P.L. McGuinness

Brigadier Peter McGuinness graduated from the Royal Military College, Duntroon, in 1966 into the Royal Australian Infantry Corps.

He served in Vietnam as a platoon commander, then in Papua New Guinea in regimental and training appointments. After a number of staff appointments in Canberra and further regimental service, Brigadier McGuinness commanded the 5/7 Battalion, the Royal Australian Regiment.

Brigadier McGuinness is a graduate of the Army Staff College at Camberley, the Joint Services Staff College and the Royal College of Defence Studies.

Dr Ross Babbage

Dr Ross Babbage is Chief General Manager, Consulting Division at Australian Defence Industries Ltd. He has held several senior positions in the Australian Public Service, including Head of Strategic Analysis in the Office of National Assessments, and led the branches responsible for ANZUS policy and force development in the Department of Defence. From 1986-1990 he was Deputy Head of the Strategic and Defence Studies Centre at the Australian National University.

Dr Babbage is author of *A Coast Too Long: Defending Australia Beyond the 1990s* (Allen & Unwin, Sydney 1990), *Rethinking Australia's Defence* (University of Queensland Press, St. Lucia, 1980), and *The Strategic Significance of Torres Strait (Strategic and Defence Studies Centre, Canberra* 1990). He also edited *The Soviets in the Pacific in the 1990s* (Pergamon Brassey's, Rushcutter's Bay, 1989) and *India's Strategic Future: Regional State or Global Power?* (MacMillan, London, forthcoming).

Air Marshal S.D. Evans, AC, DSO, AFC

Air Marshal Evans was Chief of the Air Staff, RAAF from 1982 until his retirement in 1985. His flying background includes participation as a transport captain in the Berlin Airlift; command of No 2 (Bomber) Squadron in Vietnam in 1967-68; and experience on the F-111C. Staff posts included Director General of Plans and Policy; Chief of Air Force Operations; Deputy Chief of the Air Staff; and Chief of Joint Operations and Plans, Department of Defence (Central) in April 1980. He retained that position until becoming Chief of the Air Staff. Air Marshal Evans is a graduate of RAAF Staff College, the Air Warfare Course, and the Royal College of Defence Studies.

Since his retirement Air Marshal Evans has continued to highlight the importance of air power in the defence of Australia. He has written numerous articles on the topic and has participated in many seminars on defence related matters. His book on Australia's defence strategy and planning process, *A Fatal Rivalry,* was published by MacMillan in 1990.

Wing Commander Alan Stephens is the Research Fellow at the RAAF Air Power Studies Centre. He is currently completing a history on RAAF doctrine and strategy from 1921-1991.

OPENING ADDRESS

His Excellency the Honourable Bill Hayden

It is a great pleasure for me as Governor-General holding the Command-in-Chief of the Australian Defence Force, to join you this morning and to officially open this important conference on conventional air power into the 21st century.

There are at least four main reasons why this conference is both timely and relevant to all those taking part - Australian and overseas delegates alike. In the first place, this month marks the 70th anniversary of the Royal Australian Air Force as an independent service. It is, in fact, the world's second oldest separate air force, coming into being only three years after the formation of the Royal Air Force in 1918 towards the end of the First World War.

Three score years and ten is not a bad time to look back on the achievements of a full and productive existence. To do so, in this case, is to realise the astonishing evolution in air power over the nominal span of a single human life. From biplanes made out of canvas and tossing hand bombs haphazardly over the side, we have seen the evolution of supersonic speed, flexibility, concentrated strike power and the pin-point accuracy of laser-guided weapons available to modern conventional air forces. There have also been dramatic developments in unconventional warfare: for example, intercontinental ballistic missiles; nuclear, chemical and biological weapons; and space satellites.

I know it is outside the scope of this conference, but it is probably worth observing that the boundaries between the conventional and the unconventional are constantly shifting. Not long ago, I should have thought, the spectacle of a computer-programmed cruise missile turning left at the traffic lights on its way to a specified target in downtown Baghdad would have been considered extremely unconventional. Or perhaps those reports were only apocryphal.

In any event, as the background papers to the conference point out, these relatively short 70 years have seen the nature of warfare changed forever by the exploitation of the third dimension, if I may quote the Chief of the Air Staff, as a medium for 'manoeuvre, deployment, concealment and surprise'. There can be little doubt that this remarkable evolution in the technology of air power will continue into the next century, together with continual developments in the doctrinal basis of its use and the changing geopolitical, economic, strategic and tactical concepts that go with it.

These issues, of course, go to the heart of the matters you will be discussing over the next three days. I should like to elaborate a little on some of them in a few minutes. But I think it is important to acknowledge that Air Marshal Funnell and the RAAF could have chosen no more appropriate way to celebrate this 70th Anniversary than to initiate such a significant conference as a central feature of Air Force Week. I commend them for it.

The second observation I wish to make is that the development of a coherent, contemporary and reliable body of doctrine on the use of air power from an Australian perspective - one that understands both its advantages and limitations in time and place - has long been at the forefront of Air Marshal Funnell's thinking. I recall his remark in the 1988 Blamey Oration, and elsewhere, that 'air power is the dominant component of combat power in modern warfare': not necessarily the most important or one independent of the other services - hence the focus on joint operations - but

His Excellency the Honourable Bill Hayden, AC
Governor-General of Australia

certainly the most pervasive. He commented: 'You have to know air power and its usage from every possible angle if you are to be successful in modern warfare'. Not many would seriously challenge that statement.

It was on the basis of this reasoning, and concern that service personnel (and indeed the public generally) should think about these issues and become educated in them, that the Air Power Studies Centre was established and which last August published *The Air Power Manual*. It was the first time that the RAAF had formally documented its own conceptual thinking on the use of air power and how best it might be applied in the defence of Australia and the pursuit of our national interests. Previously, the service had relied largely on British doctrine. The manual is a substantial volume covering a vast range of topics - from the nature of war, air power and their maxims, to more specific doctrines of counter air operations, strike operations, aerial reconnaissance, surveillance and electronic warfare, airlift, combat air support, sustainment and co-operation as seen from an Australian approach. That approach is predicated on our current policy of self-reliance and the strategic defence in depth of this island continent.

I know that it does the manual no justice to merely recite the chapter headings in this way. But my time today is limited. What I would say is that, coming so soon after its publication, this conference offers an ideal forum where speakers from the services, the academies and industry can analyse and discuss the many issues it raises.

Perhaps I can add that, while the conference is concerned primarily with the development of air power doctrine rather than the particulars of military hardware, it is undoubtedly true that technological innovation will have a profound influence on the development of future strategy and doctrine. I think, for instance, not just of the missile

turning left at the traffic lights, but also of the successful debut of the Patriot missiles during the Gulf War and the implications they would seem to have now for military planners.

It is not just technology, of course. There are many other variables such as the strategic environment (for the defence doctrine of an island nation may be very different to that required, say, for a land-locked country); regional and global security outlooks; particular theatres of operations; and the nature and scope of a projected conflict.

It follows from this that flexibility of thought is every bit as important as the flexibility of air power itself, for no two situations are ever precisely the same. A very useful book of short essays entitled *RAAF Air Power Doctrine*, published recently by the Strategic and Defence Studies Centre at the Australian National University, makes the point. If I may quote: 'Military doctrine is a body of central beliefs about war that guides the application of power in combat; it is authoritative but only a guide, and requires judgment in its use'. It is the exercise of that judgment not only in an Australian context but also from an international perspective, that is another ground for the importance of this conference.

I am to be followed this morning by the Minister, and later in the proceedings you will hear papers by military and civilian scholars from the United States, the United Kingdom, India, Indonesia and this country. In such company, I am hesitant to say very much. But since I have mentioned the global outlook, can I make two very brief points that I think are relevant to your discussions. Firstly, the transformation in relations between the superpowers has resulted in two apparently contradictory - though not really surprising - streams of thought. On the one hand the easing of East-West tensions, the decline of the Warsaw Pact and the revolutions in Eastern Europe have led many to hope that the opportunity now exists for a permanent reduction in world armaments and military forces - and consequently to rising optimism for the prospects of lasting global peace. I recognise that a start has been made on important moves in this respect. On the other hand, the very ending of the Cold War has brought with it new uncertainties, new instabilities and new risks. Already, long-standing ethnic, religious or territorial rivalries appear to be rising to the surface again in some regions now that the superpower pressures have been lifted.

I scarcely need remind you that the late war in the Persian Gulf was widely seen as the first such challenge - or of the self-evident truth that while we all long for peace, the need for nation states to maintain a flexible and responsive military capability is as important today as it ever was. At the same time, of course, world economic trends and preoccupations are putting limits to the growth of defence budgets.

There are the massive difficulties confronting the Soviet Union and the countries of Eastern Europe as they move away from central command economies and adjust to a more open market, or (to be completely even-handed) the recessionary problems facing many industrialised Western nations at the present time. There are many other economic issues - not the least of them the sheer cost of military equipment. I do not want to go into detail, but I mention these things because it is against this background that the issues with which you will be dealing take their place.

Defence budgets and the overall size of the armed forces may be contracting relative to the whole for a variety of political, strategic and economic reasons. But the need for countries to maintain an effective defensive and offensive capability has not altered. Hence one of the key themes of this conference: the probable greater reliance in the future on air power as the means, if I may quote from your program, 'of maintaining an affordable level of national security'. Hence, too, the conference sub-title, 'Smaller but Larger'.

Most nations have relatively small conventional air forces to project their security interests. The paradox, as you correctly point out, is that while they operate within limited budgets, they often have to achieve extensive national and alliance responsibilities. How best this may be done within differing regional or global emphases, will give you the chance for much rewarding discussion.

I have already mentioned the Gulf conflict. Nobody here, I hope, could be said to welcome war. But certainly one must acknowledge that this conference comes at a very opportune time to consider the military, political and technological lessons of that conflict as they are now emerging. You are far better equipped than I am to analyse such matters. But from a layman's point of view, the sorts of issues that come to mind include the overwhelming importance of air power in this war, and the concurrent maintenance of the three distinct campaigns recognised by Air Force doctrine; that is to say, control of the air, bombardment, and air support for surface combat forces. I think, too, of the high degree of *cooperation* shown, not only between the services themselves but, quite as importantly, between the air forces of the Allied nations. There will be consideration of the new technology used for the first time in battle: not merely aircraft but also the weaponry - and in particular the so-called 'smart bombs' which do appear to have limited civilian casualties significantly, and thus contributed not only to humanitarian objectives but to important political ones as well.

I remarked at the beginning on how dramatically the nature of air power has changed over the 70 years since the formation of the Royal Australian Air Force. But reading an article in the latest edition of the Australian *Defence Force Journal* based on the notebooks of the late Air Vice-Marshal Wrigley who entered the RAAF on the day it was formed in 1921, I was reminded that while the technology may have been transformed, the fundamental precepts of air power remain much the same. As the authors comment: 'The terminology may have changed, but concepts such as offensive operations, concentration of force, specialisation, substitution, the importance of establishing air superiority, joint operations, balance, the ability to conduct concurrent campaigns . . . and independence, have not'.

It is for these reasons - to celebrate continuity and innovation in the RAAF, to consider the doctrine contained in *The Air Power Manual*, the implications of the extraordinary recent developments in the world's strategic, political, economic and co-operative prospects, and the particular responses flowing from the Gulf conflict - that I say this conference comes at a most relevant time.

May I therefore welcome all of you here today. I trust that your discussions will not only be enjoyable and stimulating, but that they will genuinely enhance mutual understanding and goodwill as we move into the last decade before the millenium. Once again I thank you for the invitation to join you. And in congratulating the RAAF and Air Marshal Funnell for their initiative in calling this conference, it is my great pleasure to formally declare open the proceedings, 'Conventional Air Power into the 21st Century'.

KEYNOTE ADDRESS

Senator the Honourable Robert Ray[1]

Air power has received a great deal of prominence of late. I am pleased to have the opportunity to address you on this subject at this time. There are two themes for your discussion: the global trend towards smaller defence forces; and the increasing reliance on air power as a means for achieving national security. I will touch on both in the points that I wish to make concerning air power and the defence of Australia.

There is a direct relationship between cost and the capability of defence forces. New technology can make armed forces far more capable for some defence tasks. But it can also mean they are more expensive to equip, train and operate. Decisions on defence force capabilities are made by governments. We must balance security concerns against political and economic considerations. I would like to suggest that in a more pressing economic environment, and where security conditions are no less favourable, governments will be looking for a cost benefit from new technology. And that will mean smaller but more capable forces.

Considering the impact of technology alone, clearly more massive firepower can be concentrated in the hands of fewer individuals. And it can be delivered more rapidly and with greater precision. Much of this is due to the part played by air power. I refer of course not only to the weapons it uses but also to the diverse roles it undertakes, such as surveillance, electronic warfare, command and control and air mobility for ground forces. Air power will be critical in most combat environments. This is recognised in the role air power is given in contemporary military doctrine world wide. However, I will leave it to the Chief of the Air Staff to argue that air power is the dominant component of combat power!

The papers to be presented to this conference and your discussions here will cover matters of defence strategy and military planning and doctrine. They are not just technically complex but also conceptually difficult. The difficulty of the task makes the work done by the RAAF on air power doctrine all the more impressive. The publication of *The Air Power Manual* has generated a great deal of interest.

The Gulf War has now given us a convincing demonstration of the decisive part which air power can play in achieving victory - with the appropriate political and operational setting. There are many lessons to be learned from the conflict, and a mountain of data still to be analysed. You may wish to draw on those lessons as you consider developments in air power. But if you are to do so, and wish to apply the results to the use of air power in Australia's unique strategic environment, then you must be very clear of your purpose and careful how you go about it.

The Coalition forces were facing what was the fourth largest army in the world across a land border. They had good reasons to be apprehensive of its defensive capabilities. Members of this audience would particularly be aware that the Coalition's leadership elected in the first instance to attack those capabilities with concurrent Control of the Air and Air Bombardment campaigns. They then delivered the final blow using the concept of the Air/Land battle - a US joint military doctrine developed to fight a conventional battle in Europe against a numerically superior force.

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1 In Senator Ray's absence, his paper was read by General P.C. Gration, Chief of the Defence Force.

Senator the Honourable Robert Ray
Minister for Defence

However, the strategic and military circumstances of the Gulf conflict could not be more different from those which our geostrategic environment make more credible. And our defence planning should and does recognise this. Clearly, Australia shares no land border with any country. And no country in our region has the offensive capabilities and intent of Iraq. However, there may be lessons for Australia and for small air forces in general at the tactical level. There may be lessons also for air forces with equipment similar to that used in the Gulf. I would further suggest that the air campaigns of the Gulf should reinforce or challenge our laid down doctrinal principles of how we employ air power to its best effect. But I would stress that any valid analysis for this nation must be set fairly and squarely within Australia's strategic circumstances.

Almost five years ago my colleague Kim Beazley delivered the keynote address at a major air power conference conducted by the Australian National University. At the time he had recently received Paul Dibb's review of Australia's defence capabilities. He commented that: 'There is a growing recognition in our nation that defence self-reliance in credible circumstances is achievable. And there is a growing recognition that advances in air power technology in particular will play a central role'. Since then the government has continued to analyse our strategic environment. We are now well advanced towards developing or acquiring those defence capabilities the White Paper outlined for meeting credible military and strategic situations. And as Kim foreshadowed, enhancements to Australian air power were an important part of the strategy.

I wish to make three points concerning that strategy and our steps to implement it. The first also concerns our contribution to the Coalition forces in the Gulf. The White Paper stressed that we must be capable of reacting positively to calls from our allies or

friends for military support further afield - should we judge our interests require it. It argued that the capabilities being developed for national defence would give a range of practical options - subject to other national requirements at the time. Those capabilities would also allow us to contribute usefully to peace-keeping operations and on a scale appropriate to our circumstances. But the White Paper also made it clear that the possibility of deployment beyond our region should not determine the structure and capabilities of the ADF.

The Opposition has called for a review of the basis of our defence policy. They have claimed that events in the Gulf show the policy to be too narrowly based; that it does not provide the flexibility needed to support global and regional security. Self-reliance means that force structure and capabilities must give priority to the needs of national defence. We must be capable of looking after ourselves. Not only do we have an obligation to the Australian people to be able to do so, but clearly also to our allies. This need must have first call on our defence resources.

We have also continued to develop practical and effective measures of cooperation with regional neighbours to promote shared strategic interests. Making our air assets available to enhance the security of our neighbourhood has been an important part of this. We are involved in the Integrated Air Defence system with Malaysia and Singapore under the Five Power Defence Arrangements. And our maritime surveillance flights provide a valuable contribution to regional surveillance efforts. So my first point is that our defence strategy of self-reliance means developing the ability to defend ourselves. But it also allows us to support collective security and the United Nations.

The second point I wish to make is that there has not always been sufficient intellectual discipline in Australia's defence planning. We have not always kept in mind the links between strategy, force structure development and geography. And I refer here to planning decisions at the political level particularly. It is fair to add past governments have been slow to develop military doctrine appropriate to the defence of Australia. I am pleased to see changes in this area. We now have higher command and control levels within the ADF better attuned to our national defence. There is greater emphasis now on joint operations and joint forces. And underlying our joint forces are the single services working away at tailoring their own doctrines to the national need. I am especially pleased to see this reflected in *The Air Power Manual.* To quote from it: 'Without doubt, the essence of successful joint operations is cooperation between the services. Success in joint operations will also demand sound joint doctrine'.

My third point concerns the development of our defence strategy. The need to exploit advanced technology given Australia's unique geographic and strategic setting was particularly identified in the White Paper as essential to self-reliance. The White Paper confirmed the importance we attached to the development of air power in its broadest sense as part of a comprehensive strategy for the defence of Australia. For example, control of the air/sea gap is the central element in our strategy of defence in depth. This fundamental fact directs our priorities for the use of air power. It demands that we give priority to air power in maritime surveillance, strike and interdiction and air defence. So in applying our air power we must exploit the advanced technology of airborne systems. They will allow us to control the conduct of air defence operations successfully. They also extend our maritime strike capabilities in this environment. To give one important example, our Hornets, P-3s and F-111s all operate Harpoon.

Many of the steps taken to enhance ADF air power are complete or approaching completion. F/A-18s are operational from Tindal, and the bare bases at Learmonth and RAAF Curtin have been used in major exercises. Arrangements for the third bare base, RAAF Scherger near Weipa, are well under way. The conversion of four Boeing 707s for air-to-air refuelling is nearing completion. We have awarded contracts to

upgrade the avionics of our F-111s and to enhance the electronic warfare capabilities of our P3C Orions. The Jindalee over-the-horizon radar represents a quantum leap in our tactical surveillance capability. This puts it at the front line of our efforts for the self-reliant defence of Australia. We have now decided on the supplier and work will proceed to establish the network of radar sites in Queensland and Western Australia.

ADF air power is not, of course, the exclusive province of the Air Force. Delivery of the Seahawk helicopters to the RAN in now almost complete. They will give our FFGs enhanced surveillance and targeting capabilities. Delivery of the Blackhawk Helicopters to the ARA has been completed. Combined with the use of other air and land transport options, they offer considerable tactical mobility. By these means and appropriate decisions on northern basing, we have established the foundation for flexible deployment of land force elements in the defence of Australia.

Let me just say this in conclusion. The development of the right force for this country takes 20 to 30 years. It demands a clear perception of basic priorities and the consistent application of them. This morning I have given examples with air power in mind. I could have used others. But they all show that this government has not backed away from its duty to proceed with appropriate force structure decisions.

This does not mean that either force structure or strategy should be set down in tablets of stone. For it is the job of government to create the climate for rigorous, but not inflexible, defence planning decisions. The Hawke Government has done that job. It has presented the national defence strategy in the 1987 White Paper - a document received with almost universal approval - and established a clear and coherent framework for the continuing review of defence planning. And, again, it is the job of conferences such as this to debate Australian defence thinking in the light of the full range of developments affecting international security. I congratulate Air Marshal Funnell for organising this conference on the 70th anniversary of the RAAF and look forward to examining your findings.

THE ESSENTIAL PLACE OF CONVENTIONAL AIR POWER IN AN UNCERTAIN 21ST CENTURY

Air Marshal R.G. Funnell

Air power is the dominant element of combat power in modern warfare. This is a statement I make consistently to conferences, staff colleges and wider community groups whenever I am asked to speak on warfare as it is now and how it might be in the future. It is a bold statement but it is easily sustainable. More importantly, it is a statement which must be accepted and used if military forces are to be employed effectively in the modern world. Moreover, there is nothing on the technological, political or doctrinal horizons which would in any way alter this fact as far ahead as we can see. Air power has an essential role to play in the uncertain century that lies ahead.

Let us not be confused by this bold assertion. Let us be certain of what is not being asserted. It is not to say that air power is more important in any specific instance than land power or sea power; it is not to say that, in the Australian context, the RAAF at any specific time should be given greater resources than the Australian Army or the RAN; it is not to say that air power can achieve victory by itself.[1] Rather it acknowledges the fact that air power has transformed the way in which wars are fought.[2] In modern warfare, no planner and no commander can be successful who has not considered very carefully his opponent's air power, his own air power, and their potential interactions, and factored those considerations into his plans and into his operational schemes.

The evidence in support of my contention abounds. Consider some of the conflicts of the last 30 years: Confrontation, Vietnam, Afghanistan, the South Atlantic, and the numerous Middle Eastern conflicts (1967, 1973, 1982, 1991). Air power - albeit in often very different forms and with very different effects - played a major part in each. In some conflicts air power has played no part or an insignificant part either because neither side possessed air power (Cambodia) or because, despite air power's potential to alter the course of the conflict, neither side was willing to risk attrition and the symbolic loss of its air power (Iran/Iraq). These examples could not, however, be considered to offer general examples of modern and future warfare. The evidence strongly suggests that most nations involved in modern warfare will possess air power and will use it.

For those who remain unconvinced or sceptical about the dominance of air power, I ask that they look carefully at modern military equipment and modern military operational concepts and tactics. Take modern ships; look at their array of sensors and weapons; consider their operations and tactics. Take a modern land force; look at its weapons; consider its operations and tactics. Whether you look at the way modern military forces plan and act offensively, the way they plan and act defensively, the way they achieve mobility (strategic and tactical), or the way they are supported logistically, air power almost always plays a part. That part is always important and on many occasions it is pre-eminent.

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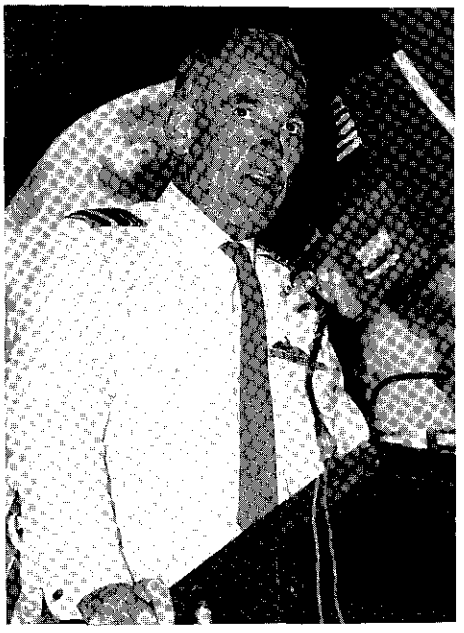
1 A similar assertion is made in 'Air Power in the Defence of Australia', the 1988 Blamey Oration, an edited version of which is contained in Gary Waters (Ed), *RAAF Air Power Doctrine: A Collection of Contemporary Essays*, Canberra, 1990, esp. pp 76-7.

2 This point is made and well-developed by Group Captain Timothy Garden in 'The Air-Land Battle', in Air Vice-Marshal R.A. Mason (Ed), *War in the Third Dimension: Essays in Contemporary Air Power*, London, 1986.



Air Marshal R.G. Funnell, AC
Chief of the Air Staff, RAAF

The broad acceptance of the dominant place of air power in modern warfare is a comparatively recent phenomenon. With many people the acknowledgement may be as recent as this month. Others, however, have accepted the point for some time. Mike Armitage and Tony Mason in their powerful and seminal work of 1983, *Air Power in the Nuclear Age,*[3] open that work with a chapter entitled The Dominant Factor. They quote Lord Tedder at the University of Cambridge in 1947, Winston Churchill at the Massachusetts Institute of Technology in 1949 and Field Marshal Montgomery at the Royal United Services Institution in 1954 making that very point.[4] Lest, however, you think that the predictions of air power proponents are invariably correct they also quote Major J.D. Fullerton of the Royal Engineers prophesying in 1893 that future wars might well start with a great air battle and that 'the arrival of the aerial fleet over the enemy capital will probably conclude the campaign'.[5] Recent events over Baghdad demonstrate that we are not yet at that point and almost certainly never will be.

Air power is a most complex form of combat power. The definition used in the RAAF has been developed from that of Armitage and Mason and states that air power represents the ability to project military force in the third dimension, which includes the environment of space, by or from a platform above the surface of the earth.[6] (More

3 Air Marshal M.J. Armitage and Air Commodore R.A. Mason, *Air Power in the Nuclear Age*, London, 1983.

4 *ibid*, pp 1-2.

5 *ibid*, p 2.

6 RAAF, *The Air Power Manual*, Canberra, 1990, p 21.

broadly we contend that air power should be thought of as the sum total of a nation's aviation and related capabilities. That is a thought to which I will return later in this paper.)

Captured within the definition are many means of applying force in the third dimension. It includes the capabilities traditionally associated with air forces: air defence, strike, anti-shipping and anti-submarine warfare, offensive air support, and strategic and tactical airlift. It also, however, includes capabilities in those and other military activities which may be part of a nation's army and its navy. With the Australian Defence Force, all three armed services include air power elements. This reflects a situation which is common throughout the armed forces of the world. In fact our powerful friend and ally, the USA, possesses four distinct and essentially autonomous air forces which can deploy a vast and formidable range of air capabilities, a fact which has been stunningly evident in the recent Gulf War.

In all this - the armed forces of the world and the ways in which they are employed - we see the breadth of capabilities that inhere in air power. Aircraft with their speed, range, flexibility and ubiquity can be used for a wide variety of purposes. Air power can be used to indicate concern, to threaten and deter, to construct a defence, to confuse, to deploy forces and then to give them mobility, to support others both operationally and tactically, to support all types of forces logistically and administratively and, if needs be, to concentrate and strike. This is not to indicate that air power is without its limitations. These are acknowledged and are well set out in the RAAF's *The Air Power Manual.*[7] The wise commander accepts these limitations and works to overcome them or minimise their effects. This frees him to exploit the wide range of air power's capabilities to gain combat power which he can exploit to advantage.

In modern warfare, it is the flexibility and ubiquity of air power which are so attractive to political leaders and military planners. When almost anything is possible but almost nothing is probable, flexible, multi-role weapons systems have special importance. This has been the situation for Australia for many years. In the post-Cold War world, many other nations are having the point emphasised within the new environment in which they now reside.

We Australians can assure others that military planning in a no threat or low threat environment is quite a challenge. When and where a threat is both evident and substantial, a nation must counteract that threat. Moreover, the size and type of force needed is relatively easy to determine. Resources permitting, specific military capabilities are acquired, deployed and prepared. Where there is no such threat, not only are resources more constrained but also the capabilities needed for the broad range of possible conflicts become less specific. In those circumstances - and especially where warning and defence preparation times are short - aircraft with their speed, versatility and powerful weapons systems are almost always the capability of first resort.

Community expectations also play a prominent role. Whatever the size of the so-called peace dividend in different countries, there can be no doubt that communities, and especially those of the Western democracies, are expecting a shift in emphasis and resources from weapons to social programs. They are expecting a force structure which costs less and yet gives higher capability. Unfortunately, with defence as with most other activities, you generally get only what you pay for.

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7 *ibid*, pp 30-1.

There is another financial factor which plays a major part in force structuring, namely, the sheer cost of modern aircraft. All modern military equipment is expensive; the technology deployed on the modern battlefield ensures that this is so. Tanks are expensive, ships are expensive, even relatively minor items like rifles and clothing are expensive, but with weapons platforms, kilogram for kilogram, pound for pound, there is probably nothing more expensive that a modern aircraft.

In terms of effectiveness, efficiency and versatility in the application of combat power, nothing rivals the modern aircraft but they are so expensive that few can be afforded. With the present generation of aircraft the reaction of most nations to the cost/capability dilemma has been to acquire platforms with multiple capabilities. With Australia, our acquisition of F-111s and F/A-18s demonstrates the point. We have been able to acquire a wide range of capabilities within a limited defence budget. However, as we approach the beginning of the next millenium a new element of the cost factor is emerging.

Previously the cost of air power platforms was generally affordable by most nations. The next generation of platforms promises to be so expensive (even if they are magnitudes greater in capability) that few nations will be able to afford to acquire and operate them. There comes a time for small nations when the number which can be afforded for a specific capability is less than that needed for viability. How many aircraft constitute a strike capability - 18? - 10? If you can only afford three, what do you do? How many aircraft constitute a minimum force for an air defence system for a country like Australia - 70? - 30? What if you can only afford 20, what do you do? Our friend and ally, New Zealand, has had to contemplate such questions seriously. We in Australia must begin to address them.

In addressing them, we - and this applies to most if not all other nations - must accept the fact that air power is not well understood in our various communities. Views of it are coloured by all sorts of misconceptions. Air power and its use has also been affected by considerable prejudice, frequently by self-styled military experts. This must be corrected, for, if air power is to be used effectively, it must be better understood within the broad community. That understanding must include soundly-based conceptions of what air power can do and what it cannot do. The recent, highly-publicised events in the Gulf may help in this regard but what is also important is that the community at large appreciates not only the capabilities but also the cost of acquiring those capabilities.

Although cost of equipment has always played a prominent part in force structuring, now it seems that it may play such a predominant part that affordability will in the future determine not only what you buy but also and more importantly what your national security policy must be. Neighbours of rich and powerful nations may have either to accept hegemony or become integrated allies. The course for isolated nations such as Australia is more difficult to determine. I will return to that issue later in this paper.

This contemplation of the future leads me to address the other major section of my topic, the 21st century. The task is essential but it is not easy. As a wise man (I think it was Anon) once said 'It is difficult to prophesy, especially about the future'. He was probably the one who also said: 'Prediction is not difficult provided you steer clear of the future'. We have had much recent evidence of this in world affairs. Go back just five years to 1986 and try to recall anyone who was then predicting with even a mild degree of certainty the world as we know it now in March 1991. The conventional and widely-held views then of the future of the USSR, NATO, the Warsaw Pact, the PRC, Iran, Iraq and many parts of the world were very different from today's reality. But even in more recent times, after the Cold War had ended, after the Berlin Wall came down,

after Tiananmen Square, after the conclusion of the Iran/Iraq War, who at this time last year was predicting the Gulf War, who was predicting the events of recent months in the Soviet Union? So, with some trepidation I contemplate the next millenium.

There seems little doubt that the USA will remain the most powerful nation on earth and that the Soviet Union will remain a powerful and dominant force in Euro-Asia. Whether the Soviet Union will be a true superpower, by which I mean a power comparable to even if less powerful than the USA, is more doubtful. However, even if it does teeter between chaos and repression as asserted by Henry Kissinger,[8] it will continue to be powerful, difficult to deal with, and nuclear-armed. Germany and Japan will be major economic forces, and the European Community will be even closer knit and, therefore, even more economically and politically powerful than it is today. In fact, it is interesting to speculate on how closely knit and how powerful Europe might become in the first quarter of the next century. The common interests and, to a lesser extent, the shared heritage of the European nations provide bonds which will hold them together.

While the death of ideology has been prematurely announced many times in the past, it is probable that its death knell has been sounding in the last few years. Certainly it seems that, with communism, Humpty Dumpty will not be put back together again, even assuming that someone would want to try. Pragmatic almost cold-blooded consideration of shared national interests appears to be the major organising principle for international relationships in the emerging world order.

Recent events in the Gulf give some cause for optimism when regarding the United Nations Organisation. Equally, however, we might have to wait another 40 years before the Security Council acts so swiftly and concertedly. It would be a great pity if that were to be so for swift, concerted and well-coordinated action by the major powers in opposing aggression is the great hope of smaller nations such as Australia.

Along a somewhat similar line, a fervent hope of the smaller nations is that national self-interest, narrowly defined, does not become the over-riding guiding principle in world affairs. The current world recession is exposing the tendency for nations to adopt stances of the 'beggar-my-neighbour' style with long-term considerations being swept aside as short-term imperatives for self-protection take over.

As we view the 21st century there is one thing of which we can be certain, there will be military conflict. Notwithstanding the potential of the United Nations and other collective security arrangements and the positive steps towards mitigation of the effects of conflict through promoting concepts of restraint such as the Law of Armed Conflict, warfare with its bloody and highly damaging effects seem to be no less certain in the future than it has been in the past.

There is no evidence that the human race has yet discovered or is even close to discovering the path to eternal peace. All the evidence points in the opposite direction. In this century, war has been virtually a constant in human interaction. Somewhere, everyday, military conflict is occurring. Even a small and isolated nation like Australia, occupying its own continent, sharing a land border with no other nation, and located well away from the foci of international competition has been frequently engaged in conflict. The two World Wars, Korea, Malaya, Confrontation, Vietnam and the Gulf War have seen Australia engaged because we decided that our national interests were involved. So, even though uncertainties abound about the events of the next century, the possibility of armed conflict is not one of them. For the certainty of armed conflict we all need to be prepared.

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8 *The Australian*, 27-3-90.

Arguing along similar lines in 1988 when I was delivering the Blamey Oration, I stated that 'Vietnam is not the last armed conflict in which Australian forces will be engaged'. I went on to say that the next time Australia would be engaged in armed conflict was 'less likely to be associated with the defence of Australia than it (was) with the fulfilling of an alliance commitment'.[9] I claim no great prescience for making those statements but it is comforting to know that sometimes you get some things right.

Conflict is certain but what form will conflict take in the 21st century? Will nuclear war be more likely? I think not but the keys are to stop the proliferation of nuclear weapons and to reduce their numbers. The aims should therefore be to reduce the number of nations who possess the weapon to the two present superpowers, and then to work through the process of mutually-agreed reductions. In the post-Cold War world there seems little point to nations like the United Kingdom and France possessing nuclear weapons. Understandably, neither of those nations is likely to scrap those weapons until we achieve a stabilised new international order. However, with proliferation, the United Kingdom and France are hardly the problem. One would have to be more concerned about the PRC possessing the weapon or about long-standing rivals such as India and Pakistan. Even more worrying would be possession by Iraq or Libya. The more nations that possess the weapon the more likely it is to be used and, once used, it is difficult to predict the effects which would flow on, but none is likely to be beneficial.

By way of example, if Iraq had possessed nuclear weapons, Saddam Hussein may well have used them in the Gulf War. Certainly, if he had possessed them the planning of the multinational force would have been greatly complicated.

In any nuclear war, air power is likely to play a major role. Nevertheless, I consider that there are grounds for real optimism on the nuclear front and I doubt if nuclear war is more likely in the future than it is now.

Insurgency is at the other end of the conflict spectrum. So prevalent has been this type of conflict in the last 60 years that it would be a brave man indeed who forecast a reduction in its frequency and significance. Yet it does seem that the conditions which have produced the seeds of insurgency and then helped to sustain the ensuing conflict are less likely to apply in the future than they did during the last six turbulent decades.

Be that as it may, air power, properly used, has its place in combating insurgency. However, unlike the use of air power in other forms of conflict, its most effective use is not in attempting to engage with high power weapons a fleeting adversary of low visibility and discernability but in providing ground forces with the strategic and tactical mobility they need to counteract the insurgents.

The most likely form of military conflict in the future is conventional warfare between regular forces. I use the term regular to distinguish such forces from irregulars, not from reservists. Professional military forces of the future will be a judicious mix of permanent and part-time members with nice judgments being required of the political and military leaders of individual nations to determine the appropriate size of the reserve and its operational role.

The recent Gulf War offers us a good example of the style of conflict with which we may have to cope in the future, although all of us would hope that nothing as bloody, as destructive and as stupid could possibly be the norm of future conflict. Also, one

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9 Waters, *op. cit.*, pp 73-4.

should always guard against over-emphasis on recent events when attempting to make general statements about the future. The Gulf War does, however, offer so much information about modern conflict that it cannot be ignored.

The war itself can be seen in three phases: the first was to gain control of the air, the second to destroy the Iraqi operational infrastructure, and the third to defeat Iraq's forces in the field. In all phases, air power played a major part. In the first two phases, air power was the dominant and almost exclusive instrument of allied combat power; in the third phase, air power enabled land power to be used with startling effect and supported it strongly throughout its 100 hours.

Consideration of the prelude to the conflict also illuminates the impact and efficacy of air power. The initial response to the Iraqi invasion of Kuwait was to contain the aggression by dispatching a holding force to the Gulf, most importantly to Saudi Arabia. This force had obvious military value but, more importantly, by indicating will and resolve, it was a powerful deterrent. The speed and responsiveness of air power enabled a swift insertion of both ground forces and air defence forces to bolster the local air and land forces and the US and British naval forces already deployed in the region. Any temptation the Iraqis may have had for further adventures was immediately complicated. That holding force allowed the build-up of military forces in the Gulf as the politics in the UN and elsewhere were played out.

Eventually military force was applied with devastating effect. Over a period of five weeks, air power was applied relentlessly. As Clausewitz and others[10] have pointed out, we learn more from our defeats than our victories. Here, there was no policy of gradualism; here, there was acknowledgement that military power is a rather blunt instrument that is difficult to use with delicacy and finesse. Here, there was no easing of the air war or halts to the bombing while negotiations took place. Instead, there was relentless pressure, day and night. It was incessant, insistent, powerful, and seemingly limitless; the stuff which destroys morale and removes the will to fight. Here too was what air power had promised but had never been able previously to deliver throughout an entire campaign: the ability to identify and strike targets, even small targets, with power and precision.

By the time the ground phase of the war began the Iraqi Army was a mere shell of that which had confronted the multinational force just 38 days beforehand. Bereft of equipment, will and structure, an army of formidable size collapsed in a matter of days. Air power played a prominent role in supporting the land forces as they forced the Iraqis into a pocket and then mercifully ceased the fire.

It would be difficult to imagine a more convincing demonstration of the efficacy of air power in modern warfare. Inevitably, lessons will be drawn from it, and we should all be wary of such lessons. As I indicated above defeat not victory is the better teacher. Also, I have found from previous personal experience that both military professionals and civilian analysts can be highly selective in collecting data and forming judgments about military conflict. It will be interesting to see how many people's opinions are changed as a result of the Gulf War. A common tendency is to extract data and form conclusions which accord with one's preconceptions.

On the issue of lessons from the Gulf War, the joint statement by the Secretary of the Air Force, Donald Rice and the Chief of Staff, USAF, General 'Tony' McPeak, to the House Armed Services Committee of the US Congress on 26 February 1991 is worth considering. They said:

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10 See, for example, Edward N. Luttwak, *Strategy: the Logic of War and Peace*, Harvard, 1987.

> We will carefully study the lessons of this war to prepare for the next conflict. So will our potential adversaries. In future, air defenses will likely become more robust and effective; conventional targets more hardened and dispersed. We need to be prepared for the future - to learn from this war, not repeat it.[11]

With this as background, I hesitate to extract lessons from this most recent of conflicts. Instead - and perhaps euphemistically - I will make some observations.

Control of the air is crucial to success in modern conventional warfare. With it, almost anything is feasible; without it, everything is difficult. As yet the data available are too thin to reach positive conclusions on how control of the air was achieved so quickly and so completely but a combination of high quality aircraft flown by well-trained crews using electronic warfare (EW) and precision guided munitions (PGMs) intelligently would appear to be at the heart of it. This equates to one of the imperatives for the RAAF which we have described as the 'Qualitative Edge'. In *The Air Power Manual* the 'Qualitative Edge' is defined as 'the relative advantage gained from the cumulative effect of excellence in how an air force operates, the assets it uses and the inculcated attitudes of its personnel.'[12] That seems to encapsulate the way in which the air forces of the multinational force gained control of the air over Iraq and Kuwait.

My second observation on air power from the Six-Week War concerns all of its phases but particularly its second phase, the destruction of Iraq's operational infrastructure. Enormous damage was done to Iraq's combat capability with the loss of very few allied combat personnel. From the first strikes on 17 January until the ground phase began on 24 February, one of the most powerful military forces in the world was all but destroyed with the loss of less than 50 personnel. Never has there been a more complete or convincing demonstration of what I term the relative military effect of air power.[13] Above all other types of combat power, air power has the ability to wreak enormous damage on your opponent while committing very few of your own combat troops. It is a characteristic which is of increasing importance in modern warfare.

My final observation on the Gulf War is that victory was achieved not by air power but by the well coordinated application of the three forms of combat power: land, sea and air. Sea power was necessary not only to provide the platforms for the naval air arms but also and very importantly to enforce the economic sanctions imposed on Iraq and to provide the major medium through which the allied force was built up and sustained. Land power ultimately delivered the *coup de grace.* It could be argued that if Saddam Hussein were a rational man he would have accepted all the UN Security Council resolutions before the ground phase commenced. That is beside the point. Wars like the Gulf War are seldom waged by rational leaders. The point to emphasise is that, without the land power deployed by the allies, Saddam Hussein could have stalled and delayed, perhaps for months. He knew how pitifully thin his defences were; hence his desperate attempts to bring about a cease-fire before the ground phase got underway. However, unless he was put to the test by ground forces, he could have and almost certainly would have allowed his poor subjects and especially his battered and demoralised land forces to be subjected to more and more punishment.

Air, sea and land power each has its characteristics and success in warfare now and in the future will be the result of combining the three elements of combat power in ways which are appropriate to the operational environment and the political objectives.

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11 FY92 Air Force Posture, Presentation to the Committee on Armed Services, House of Representatives, by the Honourable Donald B. Rice, Secretary of the Air Force, and General Merrill A. McPeak, Chief of Staff, USAF, 26-2-91.

12 *The Air Power Manual*, p 99.

13 Armitage and Mason, *op. cit.* p 3.

Perhaps too with the evidence of the Gulf War clearly before us, we will now see the end of air power's struggle for acceptance as a powerful military medium in its own right. Air power can be a powerful supporter of armies and navies, but it also has its own very important roles. As he has so often done over the years, Tony Mason has put it elegantly and succinctly by pointing out that 'air power is neither independent of nor subordinate to war at sea or on land'.[14] By accepting these facts and combining air, sea and land power in ways which utilise their separate characteristics to complement each other, victory in warfare can be obtained. The challenge for commanders, both political and military, is to devise structures and processes which combine effectively the various forms of combat power. That is a very real challenge for all national commanders, political and military, as we finish this turbulent century and venture into the uncertain 21st century.

I will conclude this paper by picking up some points from earlier parts of it. These points apply particularly to smaller nations and smaller air forces.

Air power as it is developed and applied by large air forces such as the USAF is very different in form from that of smaller air forces like the RAAF. The underlying precepts which govern the effective application of air power are the same for all but the way in which they are given effect are very different with the smaller air forces. For example, the 'qualitative edge' referred to earlier is an imperative for all air forces but its application varies considerably. The technological advantage the USA possesses through the B-2 is neither feasible nor necessary for most other air forces. In a reverse example, the F-111 aircraft provides the RAAF with a qualitative edge in its regional environment for as far ahead as we can see, whereas the USAF has (correctly I believe) decided that its equivalent F-111s (F-111A, F-111G) are inappropriate to its future needs.

With smaller nations air power needs to be considered in quite a different way. Air power in the sense that we have been considering it here with its enormous combat power may have little or no applicability for them. This is an issue which I addressed in a paper which I presented at Asian Aerospace in Singapore last year.[15] The classic air power campaigns of air bombardment and control of the air have little applicability for nations such as the small Pacific nations. For them, the definition of air power as the ability to project military force in the third dimension has little saliency. A broader definition with air power being described as the capability that a nation possesses to use aviation activities to achieve national objectives has greater relevance to them.

Again I raise here, as I did last year in Singapore, that perhaps the time is right for all nations to view air power in this more expansive way, to see it as a major resource with high utility in both war and peace. Air power is then seen as a national resource that is comparable to national communication networks, electricity generation and distribution networks and national banking systems. Certainly, this broader view of air power must not allow the obscuring of air power's essential role in warfare, but that is unlikely to occur. Rather, the opposite is more likely with both the characteristics and the value of air power being better understood and its application more readily accepted.

With military air power, I return to an issue which I raised earlier in this paper, its enormous cost. For small nations this is a seemingly intractable problem. With high technology equating to high cost, what do you do if your potential opponent has high technology equipment and you cannot afford the equipment to counter it? It is in the

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14 Mason, *op. cit.*, p 3.

15 Air Marshal R.G. Funnell, 'Air Power and the Smaller Pacific Nations', Unpublished paper presented at Asian Aerospace 90, Singapore, February 1990.

very nature of modern high technology military equipment that, no matter how skilful and able your forces may be with their lower capability equipment, it just will not do the job. Turning the sky black with Wirraways is no response to an opponent equipped with modern strike and fighter aircraft.

The answer may well be for like-minded small nations to cooperate more closely than they ever have before and band together to purchase and operate the equipment they need but which individually they cannot afford. Along similar lines, self-reliance may need to give ground to greater dependence on collective security especially through alliances with powerful friends who can provide the capabilities which are needed but unattainable. Both of these possible approaches mean giving up a measure of sovereignty but that may be the price which small nations will have to pay to secure their futures.

The 20th century has certainly been the century for air power. Less than eight years after the Wright brothers first flew a heavier-than-air machine, the first combat missions by aeroplanes were flown by the Italians in Libya. These were very basic reconnaissance and bombing missions using the human eye for reconnaissance and grenades thrown overboard for bombing. The contrast between the use of air power in that campaign and what the world has just witnessed in South West Asia is enormous. But, even more significant for the future is that the pace of development of air power's capabilities is accelerating. Air power has come of age. Its potential, which has always been vast, has until recently promised more than it could deliver. The potential continues to expand but now the promises are also being fulfilled. The challenge for those of us who both think about and use air power is to devise the means to ensure that air power is used in ways which benefit mankind and enhance humanity. This may seem paradoxical for a form of military power of such destructiveness. However, if used judiciously to deter and to defend, conventional air power will have not only an essential place in an uncertain 21st century but also a role in diminishing and containing the human costs of modern warfare.

DISCUSSION

[A comment was made from the floor on the cost- effectiveness of using air forces in peace-keeping or policing roles in large, sparsely populated areas. That led to a discussion of the technique known as 'Air Control' or the 'Air Method', which was used by the RAF in the 1920s and 1930s to police territories and protectorates in the Middle East and the North West Frontier.]

Air Marshal Funnell: The whole notion of air control developed by the RAF in that period is well known, I'm sure, to some of the RAF officers in the audience. Also I think RAND Corporation has published a paper on the subject in recent years.

Group Captain A.G.B. Vallance (RAF): I think the paper you are referring to is Mark Lorell's essay on the French use of air power in peripheral conflicts.[16] Perhaps I can outline Lorell's paper because I think it is a very relevant one. He covers the French intervention operations in Chad from 1965 to 1986. Lorell points out that in the initial intervention operation the French used land forces as their primary force element. As the operations progressed they increased the proportion of their air forces and reduced the proportion of their land forces. By the final intervention in Operation *Epervier* in 1986, it was the French Air Force which provided the leading force element while the French Army operated in support. The Joint Force Commander was an airman. It is the ease of insertion and extraction, and the limited liability involved in a

16 See Mark Lorell, 'Air Power in Peripheral Conflict: Lessons From the French Experience', in Group Captain A. Vallance (Ed), *Air Power: Collected Essays on Doctrine*, MOD, Director of Defence Studies, 1990.

large scale air force action supported by small scale ground forces, which made that such an attractive option for the French. I think in that context it's worth noting that air power has the ability to dominate a vast, sparsely populated area. And in the situation where you have a very low force to space ratio and low population density - just like you had in Iraq in the 1920s and 1930s - air power really comes into its own.

Air Marshal Funnell: Thank you very much, Andy.

Air Commodore N. Ashworth (RAAF, Retired): One of the themes not covered in your presentation which I hope will come out during the conference is that of the political implications of using air power. As you said, air power is a very powerful weapon and also a very blunt weapon. The weapons it uses can have very significant side effects. I think the side effects are a matter of great importance to a government, particularly in a liberal democracy. If you have a government that is very ruthless, willing to use air power without observing the consequences, then air power can be very potent. However, for liberal democracies there are limits to what you can do: not necessarily military limits, but political limits. I think an example in the Gulf War was the bombing of the Al Amiriya bunker in Baghdad, which itself had significant political implications well beyond the military events of that particular raid. I believe that the use of air power from a political point of view is something that both national political and military leaders have to learn.

Air Marshal Funnell: Perhaps someone might like to take Norm's [Ashworth] point further, because there has been considerable comment following the Gulf War - indeed, the issue was referred to by the Governor-General in his opening address - on the ability of air forces to apply a very significant amount of combat power with such precision as to limit collateral damage.

Air Vice-Marshal R.A. Mason (Foundation for International Security): I think that is a very important point, as the attack on the bunker was probably the closest the Allied campaign came to being flattened during the entire six weeks. But I think we should distinguish between two very important issues highlighted by that attack. The first one was the fact that, although that bunker was hit very precisely with disastrous loss of life, the shops and the neighbouring areas were completely untouched. And the tragedy of that bunker arose, I believe, partly from lack of intelligence. That was admitted by General Lee when he observed the following day that had the Coalition known there were 300 civilians within the bunker they would not have attacked it.

In the aftermath of that incident we saw two kinds of publicity. We saw the instant media coverage of the very tragic, horrendous scenes of bombed civilians, and Air Commodore Ashworth has mentioned the effect that had politically. But counter to that we had 'evidence' that it was used as a communications bunker. We all assumed that the evidence was SIGINT. The following week, *Aviation Week*, which is not known for its left wing liberal sentiments, made a very pertinent point in its editorial. It said eight years ago, in the aftermath of the 007 incident - the Korean airliner - the Pentagon instantly released a SIGINT tape which unequivocally indicated the Russians knew it was an airliner and knew they were hitting it. *Aviation Week* made the point that in these circumstances we should be rethinking the natural, logical military sensitivity about releasing highly classified military information when there was a much broader political and psychological factor at work. So, I very strongly endorse Air Commodore Ashworth's concerns. I would also support your view that we are entering the threshold of precision guided munitions which can reduce collateral damage and enhance the use of bombing by reducing the political and psychological risk. But the presence of the international, instant media does mean that we do have to take a long look at what is purely military and what is political.

Air Marshal Funnell: I'll pick up on this subject. I referred in my paper to some self-styled military experts. I'll just read some of the things they were saying, including in our local newspaper, *The Canberra Times*. Before the war started, it was stated that it was 'unlikely that Mr Bush genuinely contemplates taking military action against Iraq', and that by 'driving Saddam into a corner the Western powers could provoke a conflict which would not only devastate the Middle East, but destroy the state of Israel'. One of that commentators' stable-mates was equally perceptive. He dismissed the talk of surgical strikes and a blitzkrieg that would defeat Iraq in a few short weeks, perhaps even days, with the comment that: 'I guess if they say it often enough, people will start believing that sort of rubbish. The theory that air power could crush Saddam's air force before it could leave the ground is pure fantasy'. There was another commentator who concluded that 'the front line Iraq forces are well trained and well led and many will fight with the grim determination of their predecessors. The Americans are untried and untested'. He went on to say we could expect at least 10,000 Allied casualties in the first week with anything ranging up to a further 50,000 in the following two months; and that it was inconceivable that the conflict would last long without Israel being drawn into the fight. So the fact that it turned out to be a one-sided affair was not something that journalists and self-styled military experts - and even some retired military officers - were predicting in the days beforehand.

It would have been a much different affair if the air power that was available had been used by the other side; and an air war in which two opponents of relatively equal capability are pitted against one another is a very different affair indeed. It won't be one-sided. It may well be protracted and it will certainly be destructive. But once again I hark back to what I said in my paper that in those circumstances it is the qualitative edge - particularly the qualitative edge that comes from training, and the attitudes you inculcate - which may make the difference. It's interesting that General Tony McPeak, Chief of Staff of the US Air Force, in one of his summary comments on why the US Air Force performed so well, referred to 20 plus flying hours per month together with Red Flag. I think most people in the audience will know of Red Flag and similar exercises. They are air power exercises which are extremely realistic, and the US and other Allied forces deployed in the Gulf had, through their training, developed capabilities and capacities which the other side just did not have. I believe any future war in which the opponent is much more formidable in real terms than the Iraqis were will be different, but the qualitative edge may well be that which tips the balance in your favour.

Group Captain Vallance: The measurement of quality between two air forces is a very complex business, and it's clearly not just a function of technology. I think General McPeak's observation here is correct. Training is of critical importance, and in the final analysis it's the man in the cockpit and the doctrine by which he operates which is probably even more important than the high technology of the weapons. We've seen examples of that. Perhaps I can mention that RAF Hawk Combat Trainers have on occasions beaten F-15 fighters simply because more experienced people were flying them. If we take that into a wider context, we find that the quality of the whole air force makes a lot of difference when it's committed to the air. I think General McPeak made another good comment in his briefing on CNN News about a week ago, and that is, having a second best air force is like having a second best poker hand. It's all right as a bluff, but when it comes to the call you lose every time. In the air it's a sudden death play-off, winner does take all and there are no prizes for coming second.

Mr G. Austin (Sydney Morning Herald): In a war between more equally matched opponents, I think the political dimension would become far more important. The political dimension of a war between sides which are more equal, if you want to put it that way, would operate at several levels. It would operate in terms of the way the campaign is planned, and it would operate in the way the body politic of the countries

involved influenced the campaign. I think it's quite uncharacteristic of warfare for the military to be given such a free hand as they were in the Gulf. That was possible only because it was a war of such unequal sides.

The demonstration effect of the Gulf War was a very important factor, in my opinion, in the United States' decision to go to war. The fact that they could achieve victory was an important element in that decision. And I don't think it should be overlooked that, included in our Prime Minister's statement of the six reasons why Australia went to war, was the fact that an achievable result was there on the books the day the war started.

Air Marshal Funnell: Thank you Greg [Austin]. I think you can also link attrition to the political considerations of war. I think that if losses on your side were quite large, it would have immediate and perhaps disproportionate political effects; and I think we need to factor that into considerations of what we might learn from recent events.

AIR POWER AS HISTORY: LOOKING BACKWARDS TO LOOKING FORWARD

Associate Professor John McCarthy

In 1921 Giulio Douhet pondered the nature of future war and with his passionate advocacy of the efficacy of air power to fulfil a national strategy, concluded that the past would teach nothing useful.[1] Seventy years later, and that much air power history behind us, few might agree. As it seems that a coherent national strategy, defined in its broadest terms as the employment of resources for the attainment of a pre-determined end, must include air power as a means to implement it, then the past can only be ignored at peril. So often it seems have air resources been unwisely developed and employed to achieve ends which were muddied by events or were never quite understood by decision makers at the outset let alone those who actually did the fighting or were killed in the process of it.[2]

It was the conceived ability of air power to provide the means to impose a nation's will which gave rise to the still continuing air power debate. No other weapons system has bred such acrimony, and there is little need for surprise. If the primacy of the air power proposition argued by Douhet and a cluster of other inter-war air power theoreticians were accepted, land and naval operations would be greatly reduced, budgets naturally be drastically cut, and promotion chances and the associated opportunity to exercise power would be lost.[3] Such human failings aside, however, the penalty for being wrong if the theoreticians were right was awesome: the rapid and total loss of a state's territorial integrity.

For some, the logic of the strategic air power argument was relentless. Basil Liddell Hart, in his first important book conjured a haunting vision:

> Imagine for a moment, London, Manchester, Birmingham and half a dozen great centres simultaneously attacked, the business localities and Fleet Street wrecked, Whitehall a heap of ruins, the slum districts maddened into the impulse to break loose and maraud, the railways cut, factories destroyed. Would not the general will to resist vanish, and what use would be the still determined factions of the nation, without organisation and central direction?[4]

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1 Giulio Douhet, *The Command of the Air*, (trans. Dino Ferrari), London, 1942, p 27.

2 David Divine, *The Blunted Sword*, London, 1964, remains a useful if depressing study of weapons procurement policy particularly in relation to the Royal Air Force. For a different and more optimistic view as it pertained to Fighter Command in 1940 see John James, *The Paladins: A Social History of the RAF up to the Outbreak of World War II*, London, 1990.

3 The highly political Smuts Report of 1917 more than hinted at the primacy of air power in future operations. By 1918, the first Chief of the Air Staff of the Royal Air Force was trespassing on a major role of the Royal Navy by arguing that *the existence of the British Empire would depend primarily on an air force and air power fleets of 'aerial dreadnoughts'* protecting the Dominions. See 'Review of Air Situation and Strategy for the Information of the War Cabinet', Memorandum by Sir Frederick Sykes, 27 June 1918, printed in F.W. Sykes, *From Many Angles: An Autobiography*, London, 1942. The best concise examination of British air power thinking is Robin Higham, *The Military Intellectuals in Britain: 1918-39*, New Jersey, 1967. Opinion in the United States is very well analysed in Michael S. Sherry, *The Rise of American Air Power, the Creation of Armageddon*, New Haven, 1987. German theory followed a different path. For a harsh criticism see Williamson Murray, *Luftwaffe*, London, 1985.

4 B.H. Liddell Hart, *Paris and the Future of War*, London, 1925, pp 47-8.

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Influential Royal Air Force opinion agreed. There is a certain consistency of thought running from Cyril Newall, who commanded the first strike force in France during 1917 and who became Chief of the Air Staff in 1938, to Trenchard, to Arthur Harris when he became C-in-C Bomber Command in 1942 strongly backed by Charles Portal.[5] The emphasis given to area attacks on German cities from May 1942 reflected it. In the 1950s, the Vulcan, Victor and Valiant squadrons became operational in response to the requirement 'to place still greater emphasis . . . on the Royal Air Force because of the need to build up a strategic bomber force'[6] Air Chief Marshal Sir Donald Hardman, appointed to the British Air Council after two years as Australian Chief of the Air Staff, went a little further: echoing Douhet, the air force was the only worthwhile service to employ either for defence or offence.[7] The development of the American Strategic Air Command in the 1950s followed the ideas of the Air Corps Tactical School of the 1930s which refined those of Brigadier General William Mitchell. In time, they led to the B-17 and its employment by Generals Arnold and Spaatz and the B-29 which mounted the fire raids against Japanese cities from March 1945. The use of the atomic weapon against Hiroshima and Nagasaki only seemed as a further vindication of those who had prophesied the primacy of air power. The *Linebacker* operations of 1972 were designed to impose an American will on North Vietnam.

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5 Although Sir John Slessor, one of the best thinkers produced by the Royal Air Force, argued in 1954 that between the wars, 'No responsible airman ever claimed that air forces could win a war unaided', 'Air Power and the Future of War', *Journal of the Royal United Services Institution*, icix, August 1954, p 346, there was always, in fact, the thought that an army would occupy territory on a march order rather than an order of battle.

6 Cmd 9075, Statement on Defence, 1954, printed in *Brassey's Annual 1954*, pp 373-93.

7 See John McCarthy, *Defence in Transition, 1945-54*, Defence Studies Publication No 2, Canberra, 1991.

In the bomber's Valhalla, Douhet would no longer dismiss the past. But how would it be interpreted, would it provide any guide for action into the 21st century? Firstly, it might have to be conceded that expectations were never quite met, and that short of aircraft employing nuclear weapons they are not likely to be. Quite rightly, Air Chief Marshal Sir David Craig argues as Chief of the Air Staff, RAF: 'It is no longer possible to dismiss (the) fighting and deterrent potential (of air forces) solely by reference to their failure to deliver what was promised half a century ago'.[8] Yet what was promised was a quick and relatively cheap way of gaining victory, and that lure remains. The mounting of powerful, pre-emptive, 'surgical strikes' is an appealing contemplation of applying contemporary strategic air power. Into the 21st century, however, air power planners must restrain from attacking civilian populations with 'precision' or otherwise in the expectation that a breakdown in morale will be followed by capitulation.

Limited examples must suffice. The Luftwaffe bombed London for almost every night from October 1940 to the end of January 1941. By September 1941, more than 30,000 civilians had been killed, far more British people than those in uniform. The inhabitants of Liddell Hart's 'slum districts' showed enormous courage, and morale, though fragile at times, never broke.[9] Between 18/19 November 1943 and the end of January 1944, 14 large raids were mounted on Berlin by a total of 7403 heavy aircraft. As early as 25 November, Goebbels noted that some 400,000 city dwellers were homeless.[10] The expectation, held by Harris that as a result Germany would surrender by April 1944 at the latest was not realised. Instead it took a massive Russian land assault over a year later with the city being defended partly by 15 year old boys and 70 year old men with hand held anti-tank weapons. In the first of the *Linebacker* operations, 300 strategic sorties daily were being flown against North Vietnam. *Linebacker II* from December 1972 resulted in 10 nights of B-52 attacks which delivered 15,000 tons of bombs mostly on or around Hanoi. Although the resulting peace treaty is open to various interpretations, an American victory through air power is not considered one of them.

Two years before his death in 1930, Douhet wrote:

> The study of war, particularly the war of the future, presents some very interesting features. First is the vastness of the phenomenon which makes whole peoples hurl themselves against one another, forgetting for a time that they all wear the aspect of human beings, that they belong to the same family of humanity striving towards the same goal of ideal perfection, to become wolves and throw themselves into torment and a bloody work of destruction, as though possessed of blind folly.[11]

For Douhet, the object of war was to harm the enemy as much as possible, the weapon of annihilation, aircraft armed with high explosive, incendiaries and poison gas. Restraint, morality, was finished. Even to speak of it was simply 'demagogic' hypocrisy.[12] Clausewitz would not approve. War is not a single unified act and a weapons system is not employed in the political vacuum conjectured by Douhet. Many

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8 Air Chief Marshal Sir David Craig, 'The RAF's Contribution Today', in *The Future of United Kingdom Air Power*, Philip Sabin (Ed), London, 1988, p 2.

9 See Winston G. Ramsey, (Ed), *The Blitz Then and Now*, Vol II, London, 1988, esp. pp 580-1 for the results of some interesting new research. One should not be surprised, however, to find that the smaller the urban area attacked the more vulnerable was morale.

10 Quoted in Dudley Saward, *'Bomber' Harris*, London, 1984, p 222. Contrary to most other opinion, Saward argues that the Battle of Berlin was a huge success. But then he had served on Harris's staff during the war!

11 'The Probable Aspects of the War of the Future', in Douhet, *op. cit.*, p 119. Originally published as a monograph under the title 'Probable Aspects of Future War'.

12 *ibid*, p 147. AAP 1000, *The Air Power Manual*, RAAF, Canberra, 1990, p 70, when discussing the Law of Armed Conflict, argues that strike operations are designed to produce 'the maximum possible hurt to the enemy', and at once realises the dangers. Perhaps this part of the manual needs a little reconsideration. After all, the political result should be paramount.

states today have ceased being a sporting and exploitive preserve of the privileged classes and this development may well continue. The influence of popular opinion on foreign and defence policy will mean that decisions will not be endorsed for long if they result in non-combatants becoming prime targets.[13] Already perhaps this has been realised even in states which have a lower level of popular involvement in government. In such religious/political conflicts as the Indo-Pakistan war of 1965 and that of 1971, the Arab-Israeli wars of 1967 and of 1973, and the Iran-Iraq war which began in 1980, the use of air power did not result in any reported sustained attacks upon cities.[14] When one's air force friends speak of 'going downtown' in future conflict perhaps they should be reminded of this.

The point has recently been convincingly made that '. . . almost every conceivable air strategy and tactic known today was employed between 1914-1918'[15] Long range weapons delivery, interception, medium strike and interdiction, close support over the battlefield, combined attacks on ground targets with the contest for air superiority, maritime reconnaissance and anti-submarine operations. When aircraft became more powerful, airlift capacity could be added to give a further tactical dimension. Witness, for example, the logistic use of air power in Vietnam. It was, however, aircraft working in conjunction with artillery which gave air power its most important function on the Western Front. Air battles were fought to gain space for observation and air power was tied to land power.[16] This connection continued, remains, and is likely to do so into the 21st century. *Blitzkrieg* is one point of departure; Coningham's use of fighter-bombers in the Western Desert from mid-1942, or the order of battle at Kursk in 1943 are others.[17] That nearly 36,000 *Stormovik* types were built adds credence to Stalin's remark that they were as vital to the Russian army as 'oxygen and bread'.

Too much was expected of strategic air power; future planners should not make the same mistake when considering its tactical role. Korea showed very well that even sustained interdiction campaigns will fail unless delivered and maintained at the forward edge of battle. Neither could air power save Dien Bien Phu once Viet Minh forces controlled the battlefield. Since then French experience has shown that air power can only make a decisive contribution in peripheral conflicts when it is combined with aggressive joint land operations.[18] It is doubtful if heavy bombers are battlefield weapons. At Cassino, pre-attack air bombardment impeded the ground forces by creating holes, mounds of rubble and excellent concealed infantry positions. With the Canadian 1st and British 2nd Armies held up by a series of village strong points north of Caen in July 1944, the area was attacked by 467 heavy aircraft which dropped 2276 tons of bombs. Supported by an artillery barrage, the ground attack found the advance most difficult and opposition intense. The raid was repeated on 18 July with a force of 942 Lancasters and Halifaxes. A total of 6800 tons of high

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13 The death of over 20,000,000 civilians in the Second World War will be remembered as will the television coverage of the Vietnam War.

14 Lon O. Nordeen, Jr, *Air Warfare in the Missile Age*, Washington, 1985, gives a day to day chronicle at least for these short wars.

15 Air Commodore Ian Westmore, 'Air Power and the 1914-18 War', Paper presented to Air Power and National Strategy seminar series, University College, University of New South Wales, ADFA, March 1990.

16 J.C. Slessor's *Air Power and Armies*, London, 1936, written by a future Chief of the Air Staff deserves to be remembered as a classic text on close support.

17 For Coningham's innovations see Vincent Orange, *Coningham: A Biography of Air Marshal Sir Arthur Coningham*, London, 1990, pp 95-110.

18 Mark Lorell, 'Air Power in Peripheral Conflict: Lessons From the French Experience', in Group Captain A.G.B. Vallance (Ed), *Air Power: Collected Essays on Doctrine*, MOD, Director of Defence Studies, 1990.

explosive was delivered and although the ground operation made a good start, it soon ran into difficulties. These attacks, carried out at low altitude, in perfect weather conditions and with complete air superiority were less than an unqualified success.[19]

Such operating conditions are rare. Air warfare has been generally expensive in men and machines. Anti-aircraft defences are almost as old as aircraft themselves. Searchlights operating with guns, sound and height indicators, balloons, and defensive barriers were all introduced in the 1914-18 war and partly foreshadowed the Kammhuber line which represented such a threat to Bomber Command's operations from the start of 1942 and the interlocking Arab air defence system which proved so effective in the Yom Kippur War. For operational aircrew life has generally been hazardous and expectancy short. With the opening of the Battle of the Somme in July 1916, the RFC employed its aircraft at very low levels to deliver attacks with machine guns and light bombs.[20] Even without a major battle, RFC aircrew carried out two or three patrols a day.[21] The introduction of the Albatross type in the Spring of 1917 saw a British loss rate of some 30%. By the end of the war, Germany had lost 5853 pilots killed, 7302 wounded and 2751 either taken prisoner or listed as missing. British figures were a little higher with 6166 killed, 7425 wounded and 3212 taken prisoner or missing.

If air to air fighting was relatively limited in the second war, and reasonably safe, ground attack sorties remained most dangerous.[22] In 1943, it was expected that only 7% of crews flying strike sorties on Beaufighters would complete their operational tour. The high casualty figures in Bomber Command cannot be disguised. Of the 74,797 deaths caused by injury among members of the Royal Air Force to May 1945, just over 66% came from that operational command. The chance of an individual surviving the two tour requirement while serving in it was one in 14.[23] Examples of more recent air warfare might suggest that prospects of survival have not improved. India claimed to have destroyed 94 Pakistani aircraft in the 17 day war in 1971. Sources conflict, but Israel claimed to have destroyed 442 aircraft and to have lost 'several hundred' to Arab opposition in the 19 day Yom Kippur War. During the *Rolling Thunder* air campaign in Vietnam to 1968, the United States lost more than 900 aircraft to North Vietnam defences.[24] The Falklands fighting resulted in an Argentinian attrition rate of between 15% and 22% of sorties flown.[25] Given this record, one certainty we can accept when considering the use of conventional air power into the 21st century is that in an air war in which both sides have large quantities of sophisticated weapons, both sides will suffer heavy losses in men and equipment.

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19 Details can be found in Martin Middlebrook and Chris Everitt, *The Bomber Command War Diaries: An Operational Reference Book*, 1939-1945, London, 1985, pp 539, 544.

20 The best first-hand accounts of such attacks and their dangers are Cecil Lewis, *Sagittarius Rising*, London, 1936; and Sholto Douglas, *Years of Combat: The First Volume of the Autobiography of Sholto Douglas*, London, 1983.

21 See Denis Winter, *The First of the Few: Fighter Pilots of the First World War*, London, 1982. The term aircrew was not used in the first war as far as I know, and I use it here for sake of brevity.

22 For some of the dangers see the bitter operational memoirs by Pierre Clostermann, *The Big Show*, London, 1951.

23 For these and related figures see John McCarthy, *A Last Call of Empire: Australian Aircrew, Britain, and the Empire Air Training Scheme*, Canberra, 1988, pp 105-9.

24 These figures from Nordeen, *op. cit.*, pp 39, 108, 163.

25 Neville Brown, *The Future of Air Power*, London, 1986, p 27. The claim made at time of writing that in the current Gulf War 65,000 sorties have been flown for the loss of 18 aircraft, giving a loss rate of .02769% must bear further future analysis.

Oddly enough, however, the problems of maintaining morale among aircrew in future war seems hardly to warrant a mention, let alone a through examination, by modern analysts of air power. Granted that admirable study, AAP 1000, the Royal Australian Air Force's *Air Power Manual* already cited touches the problem, but hesitates when it does. One reason is probably not far to seek. Images of air power have largely projected the 'cult of the individual': the 'intrepid aviators'; the concept of the 'Ace' and the 'press on regardless types' of the Second World War. Now the ideal appears to be personified in popular entertainment by a 'Top Gun'. The *leit motiv* is aggressive masculinity and naturally this has a place in war. A considerable number of studies have shown, however, that even those fully endowed with it are certain to be broken.[26] The obvious fact remains: without human beings to operate them, most modern aircraft are simply useless pieces of very expensive technology.[27] In future war, aircrew morale will prove the most precious asset and it must be carefully protected.

Precedents exist. An erstwhile neglected Australian air power theoretician noted in 1927 that the person who would win the next war would be '. . . probably some student of psychology and of human nature . . .'[28] Perhaps with some euphemisms, the British Air Ministry told all medical officers in May 1939 that a vital prerequisite for the functioning of the Royal Air Force in war was '. . . the individual possession of those controlling forces which inhibit the free expression of primitive tendencies'.[29] The maintenance of operational effectiveness among aircrew became a major pre-occupation in the British service between 1939-45.[30] There was cause: the incidence of flying stress was 22.3 per thousand in No 5 Group Bomber Command in 1942.[31] Those planning for a future air war expect a surge in sortie rates and one should not be surprised if aircrew rapidly become psychologically disabled. Operating in a relatively simple cockpit environment and in familiar air space, the Royal Air Force single-seater pilot was exhausted and mentally drained after three short sorties a day in 1940. While it was possible for *Luftwaffe* crews to carry out two sorties a night at the height of the Blitz, one was enough for RAF Bomber Command crews given the opposition surrounding even short penetration targets. Although Air Vice-Marshal John Walker of the Royal Air Force feels that a 'lot of nonsense' surrounds the issue of 'attrition' he does concede a figure of 5% at 'typical' sortie rates. Rightly he

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26 John Ellis, *The Sharp End of War*, London, 1982, has a most interesting study of the stresses placed upon the front line infantry soldier and can postulate his breaking point with considerable conviction.

27 The expense of maintaining a modern air force naturally has received wide discussion and has led some observers to suggest that costs will almost make air forces too expensive to maintain and operate. United Kingdom program costs covering development and production of 385 Tornado GR1, F2 units is quoted at 9200 million pounds sterling at 1985-6 prices while the annual running costs as 1986 prices of operating one squadron is 19 million pounds. See Keith Hartley, 'The Affordability of Air Systems', in Sabin, *op. cit.*, Table 5.2, p 111. The counter argument is that most modern states cannot afford not to have a modern air force. Politically this is certainly so. I leave the costing to the economists, the juggling of opposing interests to others.

28 *The Decisive Factor: Air Power Doctrine by Air Vice-Marshal H.N. Wrigley*, Alan Stephens and Brendan O'Loghlin (Eds), Canberra, 1990, p 21.

29 Air Ministry Pamphlet No 100, 1st Ed, May 1939, sighted in the Public Record Office.

30 See Air Vice-Marshal Sir Charles Symonds and Wing Commander Denis J. Williams (Eds), *Psychological Disorders in Flying Personnel of the Royal Air Force Investigated During the War of 1939-1945*, London, 1947. This collection should be essential reading for any commander of operational aircrew.

31 S.C. Rexford-Welch, *The Royal Air Force Medical Services*, Vol II, Commands, London, 1955, p 123. See also John McCarthy, 'Aircrew and "Lack of Moral Fibre" in the Second World War', *War & Society*, September 1984, for a fuller discussion of this related aspect.

concludes, '. . . it is the generation of sorties which counts most'.[32] He neglects to say who will fly them. It may be this consideration which makes the argument for unmanned strike aircraft so attractive, albeit at the cost of an air force mystique.[33]

The history of air power is very much an exercise in the history of ideas. At times, these ideas have overreached their grasp. Nevertheless, the traditional strengths of the air weapon - flexibility, mobility, adaptability - will remain. Douhet argued in 1928, 'The war in the air is the true war of movement, in which swift intuition, swifter decision, and still swifter execution are needed'.[34] This will remain true in 2028, and therein lies a danger particularly for smaller powers who might lack the resources to recover. The need for rapid action should not cloud wisdom, and perhaps an historical understanding of how air power arrived at the 21st century will help it be retained.

DISCUSSION

Air Marshal Funnell: I don't think anyone would disagree that there is food for thought in John's presentation.

Air Marshal S.D. Evans (RAAF, Retired): John, I think you know that I agree with you entirely, and we've discussed this before, about not bombing civilians. It is totally unacceptable. However, what happens if people like Saddam Hussein exploit that attitude by putting civilians on battle targets? In the end it's going to get back to political courage to make the decision, but if Hussein had put civilians on all his airfields, or if a future enemy does, what do we do?

Professor McCarthy: Perhaps the thrust of my argument was that militarily, attacks on civilians are not effective. I did not discuss the moral dimension. Personally, I think it is morally indefensible to attack unarmed non-combatants. Before the First World War, any commander who suggested that a civilian target - a hospital, a five year old girl, a mother, a boy kicking a football - was interchangeable as a target system with a barracks or a front line, would have been regarded as insane and unfit to hold command. I don't think morality is divisible. I think if an enemy puts its civilians in a vulnerable position, we have to wear it. I don't know how, and I'm quite certain we wouldn't, but I think we should.

Air Vice-Marshal G.W. Neil (RAAF): I believe that we are not really placed in a vulnerable position. We have the protection accorded to us by the Geneva protocols to attack whatever targets are necessary, irrespective of where the enemy places them. We recently saw instances in the Gulf where the enemy quite deliberately located people in target areas.

Professor McCarthy: The protocols of Geneva make any target legitimate if it's in fact on the battle field. That's a return to the old pre-1914 system. That makes it legal, but whether it makes it right is another matter.

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32 Air Vice-Marshal John Walker, 'Deep Interdiction and Offensive Counter-Air After the Year 2000', in Sabin, *op. cit.*, p 163.

33 Given that the command of air forces is largely the prerogative of pilots, a custom stemming from Trenchard who insisted that all officers should learn to fly, one wonders how far the manned aircraft is maintained in obedience to the pilot ethos. As was noted in a recent paper: 'However lethal the weapons, a handful of pilots will still emerge as exceptional in the air combat arena. They will be the ones with the mysterious ability to extract, retain, and project more from the available information than their fellows. They will be the ones with the ace factor'. Quoted in Squadron Leader Mark Lax in 'Why, Given the Technological Advances of the Past Forty Years, have manned Strike Aircraft Survived?'. Paper presented to Air Power and National Strategy seminar series, University College, University of New South Wales, ADFA, September 1990. As Squadron Leader Lax, however, convincingly makes the point, a good deal more work is required on the UAV concept for it to turn into a viable strike proposition.

34 'Probable Aspects of the War in the Future', *op. cit.*, p 167.

Unidentified: I'd like to raise two points. First of all I don't see any real difference between the bombing of civilians and the bombing of civilian infrastructures - it'll kill just as many people. If you look at the recent war with Iraq where their infrastructure was wiped out, people are now dying in numbers comparable to the actual direct bombing. That is politically acceptable. Secondly, you said there's no military value in bombing civilians. There's a historical precedent to suggest otherwise. By provoking the Germans into launching the blitz on London, the RAF's bombing raids against civilians forced the Germans to divert assets both to respond and defend. That in itself militarily assured the survival of Britain.

Professor McCarthy: First point, yes, if you bomb drinking water and it's contaminated and the people who drink it die of typhoid, it seems to me strategic bombing anyway. I think we just have to be a bit careful which parts of the infrastructure we attack. Second point, I'd love to debate with you about who won the Battle of Britain. Because if the Germans actually wanted air superiority over the invasion beaches, they had it. It may have been an accidental spin-off that the attack upon German cities did provoke the Germans into attacking London. We could debate the Luftwaffe tactics for a long time.

Group Captain A.G.B. Vallance (RAF): John, I have a couple of difficulties with your paper. One is with strategic bombing. It seems to me that you're extrapolating Douhet's doctrines to the current day. Current doctrines on strategic bombing are very different from those envisaged by Douhet. Douhet saw strategic bombing as a stand-alone strategy, something which would win the war by itself. We now see it as an integrated element of a theatre campaign; one of the three campaigns we wage, the counter air campaign and the anti-surface campaign being the others. We look at target sets we can attack with strategic bombing, and they do not include civilians. There are many reasons for that. There are moral reasons because, as you have said, it is morally repugnant. Also, it is arguably against international law. There are practical reasons, because experience has shown that if you attack civilian populations it strengthens their resolve and actually brings their support behind the government. Another practical reason is that there are far too many targets.

The difficulty you face these days with waging war on a modern industrial society is that national strategic capabilities and military capabilities are so closely intermixed you cannot afford to leave some target sets alone, so you attack power sources, because they power the industry which makes the shells which will kill your own troops. At the same time, it can deprive a civilian population of the power source which pumps water, as has happened around Baghdad. This is one of the difficulties you face at the moment, and you have to ask yourself the moral question: is it right to pass up this option and allow your own troops to die because there is a risk of consequential civilian deaths? I also make the point here that in the Gulf War, civilians were deliberately not targeted. There were some tragic instances where civilians died, like the Al Amiriya bunker; but it was targeted as a communication centre, not as a civilian shelter.

I'd like your comment on my point that we have evolved our doctrines of strategic bombing since Douhet's time, to the extent that they bear no relationship to Douhet.

Professor McCarthy: I agree entirely. The stand-alone ideas of Douhet, the notion in fact that the one battle plane can do the job, are no longer applicable. I certainly wasn't arguing that. I suppose the thing that worries me is that it's all very well for us sitting here to say no, we will never target civilians, but in the stress of war, I wonder. It might be very tempting to go to down town Baghdad and take it out. That's the terminology of nuclear attacks: to 'take something out'. So I still think it might be tempting for some - I think it was said of General LeMay that he was the sort of man who wanted to fly the aircraft but not necessarily plan the campaign.

On the second point, you're getting back to what now goes by the euphemism of 'collateral' damage. All I can say, then, is that air forces aren't good enough. If the smart bombs are so smart they should be able to take these targets out. What worries me a little bit is the kind of propaganda we had in the Second World War. In those films, a crew would go out in their Wellington, fly half way across Germany, destroy a power station and fly back again - what a marvellous operation. We know that attacking forces simply were not getting within five miles of the target area even when it was built-up. So, all right, let's improve the technology so we can take out one transformer.

Group Captain Vallance: John, can I come back to you there. On the 13th and 14th of May 1943, in a raid on Pilsen where the RAF achieved an 'extraordinary concentration of forces at the time', 95% of the bombs fell within three miles of the aiming point. Today we can get the same proportion of our bombs within five feet of the aiming point. Now that indeed gives you what you are asking for.

Professor McCarthy: Indeed. However, iron bombs constituted by far the greater percentage of ordnance dropped in the Gulf, and they are not nearly so accurate.

Air Commodore J. Coward (RAF, Retired): You implied that the efforts of Bomber Command were ineffective. Albert Speer said after the war that if Bomber Command had been able to mount five raids in a row on the scale of the attack on Hamburg, Germany would have collapsed in 1942. Furthermore, without the raids on Germany, the invasion of France would have been almost impossible. The fact that there was no German opposition in the air came about largely because they were quite incapable of providing their air force with fuel. We must also remember when we talk about the effect of bombing on wars that the war in Japan was finished by an air raid.

Professor McCarthy: All these points are, of course, debatable. On the Hamburg attack, a freak combination of weather conditions and concentration caused a terrible fire storm. With the pre-invasion targets, Bomber Command's attacks in France did in fact help considerably. If more effort had been put into the attacks on oil instead of Harris's area attacks against cities, they may have been even more successful. Were the fire raids upon Japan necessary? Probably not. Certainly, I'm convinced that the atomic attacks were not because, to use your argument, Japan had about six weeks supply of oil left when those attacks were made. You might argue that Japan could have continued fighting with bamboo spears, but I wouldn't have liked their chances. So, all this is very debatable.

Lieutenant General C. Boyd (USAF): We're drawing our moral distinctions and we're cutting them pretty fine. I'm curious to get your view on a society that is totally mobilised for war, in much the manner that Ho Chi Minh did in 1966. As the leader of the people you decree that you are totally mobilised for war - that is to say, every man, woman and child is a soldier. Regardless of whether you are 18 years of age carrying an AK-47 and wearing Michelin tyres on your feet, or whether you are in a rice paddy supplying rice so that the 18 year old with his AK-47 can continue to fight, you are by the decree of your leader all mobilised for war. Now, how do we make our fine distinction between the combatants and the non-combatants, the civilians and the military? It's a tough one it seems to me.

Professor McCarthy: I can only give a personal view. I don't want to change the world, I just don't want the world to change me. And if Ho Chi Minh decrees that a five year girl is a combatant, I choose the right to disagree and fashion my actions accordingly.

Mr G. Austin (Sydney Morning Herald): I've never been and am not now a member of the Royal Australian Air Force, but I feel I must disagree with your rather extreme presentation of what air power has and hasn't achieved. And in particular, just

because President Bush says that the war against Iraq will now put the Vietnam experience behind us, it doesn't mean that the Vietnam experience didn't achieve some notable successes. It's a long bow to draw but, as Air Marshal Funnell said in his presentation, communism is dead. One of the reasons that communism is dead - and I say this as a student of communist politics for between 15 and 20 years - is because the US opposed it in a number of ways on a global scale. The Vietnam War was just one battle in that global confrontation. The strategic bombing of Vietnam was as much a political signal to communist countries globally - to the USSR and China - as it was a military act in the attempt to destroy guerrillas and conventional Vietnamese forces. In that context, you said that air power doesn't kill too many guerrillas or terrorists. But while it doesn't kill them as rapidly as troop concentrations, it does prevent or affect the transition from guerrilla warfare to conventional warfare.

Having defended the air force on one point I'd like to come back from the other angle. According to a press report of a United States Air Force general in Australia, only 25% of all munitions used by the United States Air Force in the Gulf were precision guided munitions, and of those only 75% could have been considered as accurate. I'm not sure that those figures are correct. But I think the point is an important one because it is linked to the statement that you made, Professor, that there were no sustained attacks on cities in the Iraq/Kuwait war. I don't believe that to be the case, and I don't think it is appropriate for that myth to be perpetuated. According to the former United States Attorney General Ramsay Clark, the United States did conduct what could only be described as a sustained attack on Basra, not to mention Baghdad.

Professor McCarthy: Could I just come in there to correct a misapprehension about what I actually said. I was quoting the Iran/Iraq war for sustained attacks upon cities, not the latest Gulf crisis.

Mr Austin: If I could make a final comment. The point you made about aircrew morale being the most important asset that must be carefully protected is one which I think applies to the three services, and which the Australian Government would do well to take some account of in considering cuts to the Australian Defence Force.

Air Vice-Marshal R.A. Mason (Foundation for International Security): Could I just pick up Professor McCarthy's critically important closing observation that in a small country with a small air force, manpower losses and, by association, morale, are extremely important. I think we are in danger of overlooking that conclusion which is so vital. But may I respectfully suggest, sir, that if we are in danger of overlooking it, a large part of the rest of the paper is responsible.

I would like to start with the man of straw around whom you built your paper, Douhet, who has been read many, many more times by defence academics than he has by soldiers and airmen. In the Luftwaffe, he had been looked at in translation, and he was formally abandoned in 1936 by General Edward Milch, when the heavy bomber program was suspended. The Germans who taught the Russians did not take Douhet with them. In the Royal Air Force neither Jack Slessor nor Bomber Harris had read Douhet, although Slessor did confess to having 'heard of him'. And there was never any copy of Douhet in the RAF Staff College Library. I don't know if there is now but there certainly wasn't between the wars. There was one copy of Douhet's *Command of the Air* at the Army Air Corps Tactical Training School at Langley Air Force Base. It was bought in 1923, and between 1923 and 1939 it was taken out once, in 1928. Now I make those points because a lot of airmen have been hung with Douhet; and yet they either hadn't read him, or if they had, they would have disagreed with him just as strongly as you have. And I feel that by starting off pinning a lot of your paper on Douhet, you did tend to weaken your conclusions to a certain extent.

As far as selectivity of facts is concerned, you've corrected one by commenting on the biggest single use of heavy bombers in an interdiction campaign, which was of course the one which Rommel and Runstedt complained very bitterly about in 1944. As an aside, if you are convinced that the Germans actually had air superiority over the beaches in the Channel, you'd have had pretty unanimous disagreement from the Luftwaffe, the German Navy and the German Army at the time.

When one moves on to the Iran/Iraq War, there certainly were not any manned bomber attacks, but there was a thing called a missile war of the cities. To engage in that missile war, both sides sought to extend the range of their Scud missiles. Several thousand civilians were killed and the Iranians still will not announce any figures for civilian dead in Tehran alone. That war was certainly marked and scarred by a failed war of the cities.

On attrition rates, you refer specifically on two occasions to the Yom Kippur War and to the densely and thoroughly co-ordinated air defence belt established in the Sinai at the beginning of that campaign. As a result of that campaign, in the first 48 hours the Israeli attrition rate was just over 2%, and at the end of the 48 hours the static co-ordinated defences had been taken apart, first by the Israeli Air Force, subsequently by ground counter attack with the assistance of EW kit from the United States. Finally on attrition rates, you comment on the Royal Flying Corps' losses in the Somme offensive. I'm sure you will be familiar with Trenchard's correspondence with the then young Squadron Leader Hugh Dowding, who was commanding a squadron at the time of the Somme and was complaining about the loss of nine aircrew. Trenchard, as a major general commanding the Flying Corps at the time, had just seen the loss of 60,000 troops before lunch. You could well understand that the loss of nine aircrew didn't cut a lot of ice with him. When we talk about morale and attrition rates in air forces as anywhere else in armed services, we have to measure the value of those individual lives lost against the political, and hopefully, other democratic objectives which are to be gained. And I say for that reason, I'd hate your important conclusion on morale to be lost because of some of your previous arguments. And I apologise for being so direct. Thank you.

Professor McCarthy: I have the right to reply? Firstly, Douhet, of course as is well-known, wasn't translated in the 1930s. I use the word as a kind of shorthand for 'Douhetists', and there were the British ones as well: Brigadier General Groves, Trenchard himself, and I've already mentioned Liddell Hart. It was a common form of thought, so when I mention Douhet I am in fact using the term as a shorthand. I take your other points: you call them facts, I call them debatable points. Attrition rates in the Yom Kippur War were 2% - whose figures? And so it goes. Certainly the German Air Force didn't embrace strategic bombing. But so, some did, some didn't. When they did try it of course, they did not have the equipment. But I don't think that alters my argument.

Air Marshal Funnell: John, thank you very much for a most stimulating survey of the past, and a projection of some of your thoughts gleaned from the past to our future.

AIR POWER IN THE REGIONAL BALANCE MAINTAINING THE PEACE IN SOUTH EAST ASIA

Professor Desmond Ball

Air power is the leading edge of the defence of Australia.[1] In part, this is simply a reflection of the impact that the decision to acquire 75 F/A-18 *Hornet* aircraft - the largest single procurement project in Australia's history - has inevitably had on a defence force the size of the Australian Defence Force (ADF). As the Minister for Defence, Mr Killen, stated when announcing the F/A-18 decision, it was 'a selection which, to a large extent, will determine the shape of the Royal Australian Air Force into the next century'.[2] In fact, the ramifications of the project necessarily extended beyond the RAAF to impact heavily on the capabilities of the ADF as a whole, including the force structures of the Royal Australian Navy (RAN) and the Army. More fundamentally, air power has been accorded the pre-eminent role in the defence of Australia because of our geostrategic circumstances. As the Minister for Defence, Mr Beazley, stated in July 1986: 'Air power, defined in the broadest sense, can provide the strategic and technological solution which our geography demands'.[3]

Given the enormous area of Australia's 'direct military interest'[4] and Australia's limited population and fiscal resources, air power provides the only practicable means of exerting independent military power in any timely or comprehensive fashion. Together with the Navy's submarines and surface combatants, Australia's strike and fighter aircraft provide a credible and visible ability to destroy enemy forces in the air and sea gap to Australia's north. These strike and fighter aircraft also provide the means of achieving air superiority to enable strike, interdiction and ground operations to proceed untrammelled by enemy air activity. Air power also provides Australia with its only significant offensive capability in an otherwise defensive posture. In sum, air power provides a major contribution to deterrence; it is critical to the defence of the air/sea gap if deterrence fails; and it provides the principal means of exerting military power directly against an adversary to force him to cease and desist on Australia's terms. The first section of this paper provides an explication of these assertions.

Although the fundamental premises of Australia's defence planning derive from our geostrategic circumstances, our planning must also take into account strategic developments in our area of 'primary strategic interest', which encompasses South East Asia and the South Pacific generally.[5]

The second part of this paper provides an assessment of Australia's regional security environment. It is an environment characterised by rapid change, increasing complexity of security concerns, and great uncertainty. An increasing number of actors from further afield - more particularly, Japan, China and India - are acquiring significant power projection capabilities and evincing a willingness to exercise these in

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1 Desmond Ball, 'The Future of Air Power in the Defence of Australia', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, Sydney, 1988, p 620. See also P.J. Criss and D.J. Schubert, *The Leading Edge: Air Power in Australia's Unique Environment*, Canberra, 1990.

2 D.J. Killen, 'Tactical Fighter Force: Ministerial Statement', *Hansard* (House of Representatives), 20 October 1981, p 2203.

3 Kim C. Beazley, 'Australian Defence Policy', in Desmond Ball, *op. cit.*, p 10.

4 Paul Dibb, *Review of Australia's Defence Capabilities*, Canberra, 1986, pp 3-4.

5 *ibid.*, p 4.

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pursuit of their national interests in the region. Many of the states within the region are themselves engaging in significant defence build-ups involving the acquisition of new weapons systems incorporating advanced technologies. Air power is central to these developments. It is the most important means by which the outside actors are projecting their military capabilities into the region; and it is aerospace systems which are at the forefront of the defence acquisition programs within the South East Asian region itself.

These regional developments have direct implications for Australian defence planning. Most importantly, they are inevitably and irreversibly eroding the 'technological margin' which is necessary to offset Australia's relatively small population base.[6] At the least, this means both that the defence preparation time that would be available to the ADF should the strategic circumstances in the region deteriorate will be compressed, since any regional threat would be developing from a less inferior technological base; and that in any prospective regional conflict (including contingencies involving the defence of Australia itself), the ADF will not be the only party employing advanced technology weapons systems.

However, the implications of these changes in the regional security environment go well beyond those of direct military import for the ADF. They are likely to increase tensions and the prospects for conflict within the region. Air power is inherently offensive. The quantitative and qualitative enhancements of air power in the region

6 *ibid.*, p 45.

could trigger unanticipated and undesired arms acquisition competitions. It is therefore imperative that these acquisitions are accompanied by measures to promote confidence and security interdependence in the region.

The third part of this paper is thus concerned with a discussion of possible mechanisms involving air power for achieving greater regional cooperation and security more broadly. This includes a discussion of the future role and scope of the Five Power Defence Arrangements (FPDA) and the Integrated Air Defence System (IADS), as well as of other particular regional security regimes and more particular measures of enhancing regional cooperation and security.

Air Power in the Defence of Australia

The capabilities and operational concepts for the defence of Australia derive from Australia's geostrategic circumstances, population and material resources, and assessments of possible contingencies.

The area of Australia's direct military interest, where we should 'seek to exert independent military power', is enormous. It stretches over 4000 nautical miles from the Cocos Islands in the west to New Zealand and the islands of the South West Pacific in the east, and over 3000 nautical miles from the archipelago and island chain in the north to the Southern Ocean - or about 10% of the earth's surface.[7] Air power provides the only means by which a population of 16 million people could possibly 'exert independent military power' over this enormous expanse in any timely or comprehensive fashion. While submarines and surface combatants provide a necessary complementation, Australia's resources are simply insufficient to allow coverage of this expanse by naval forces alone. And we lack the population to rely on land forces for defence of the continent itself.

The basic strategic concept endorsed by the government is that of 'defence in depth', which has been defined as follows:

> Defence in depth gives priority to the ability of the ADF to mount operations capable of defeating enemy forces in our area of direct military interest. This means that we must have forces capable of tracking and targeting the adversary, mounting maritime and air operations in the sea and air gap to our north, capable of offensive strike and interdiction missions, having a comprehensive range of defensive capabilities - including air defence, mine countermeasures, and protection of coastal trade - and embodying mobile land forces able to defeat hostile incursions at remote locations.[8]

The strategic concept envisages, in effect, a 'series of interlocking barriers' or 'layers', consisting of the following elements:

1. High quality and comprehensive intelligence about military developments in our region, as well as surveillance capabilities to detect and track hostile intruders in the sea and air gap.[9]

The Australian defence establishment possesses a variety of complementary large-area air and surface surveillance capabilities for monitoring air and naval movements and other activities in the air and maritime approaches to Australia. Many of these capabilities are currently being further enhanced.

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7 *ibid.*, pp 3-4.

8 Kim C. Beazley, *The Defence of Australia 1987*, Canberra, 1987, p 31.

9 Dibb, *op. cit.*, p 51.

To begin with, the long-range capability of the P-3C Orion LRMP aircraft makes it well suited to the surveillance role, and successive Australian governments have placed emphasis on surveillance patrols by these aircraft. The capabilities of the P-3Cs are currently being enhanced through the acquisition of modern electronic support measures (ESMs) which facilitate the detection and classification of electronic emissions.[10]

Secondly, the Defence Signals Directorate (DSD), which is generally acknowledged as being Australia's most impressive intelligence agency, possesses a well-developed and highly sophisticated capability to monitor radio and other electromagnetic signals emanating from emitters throughout a wide range of the Indo-Pacific region. Over the past decade or so, state-of-the-art equipment has been installed at the DSD stations in Hong Kong and at Shoal Bay near Darwin for monitoring regional satellite communications, and this capability will be significantly enhanced when the Australian Defence Satellite Communications Station (ADSCS) currently being constructed at Kojarena, near Geraldton in Western Australia, becomes operational in 1993.[11] New Plessey Circularly Disposed Antenna Array (CDAA) high frequency direction finding (HF DF) systems have been installed at the DSD stations at Shoal Bay, Pearce Air Force Base (WA), and Cabarlah (Qld), and a further one or two CDAAs are to be installed at the new station which is expected to be operational near Wagga by 1998.[12] These DSD operations are able to provide a comprehensive monitoring of all activities in the air and maritime approaches to Australia which involve communications or which employ radar systems, fire-control systems or other electronic emitter systems.

With respect to the future, it seems likely that the Project Jindalee Over-the-Horizon Radar (OTHR) system 'may meet much of the requirements for broad-area real-time surveillance coverage of the northern approaches, particularly in respect of air incursions, by the 1990s'.[13] The Jindalee system will consist of three stations, located near Alice Springs (NT), Laverton (WA) and Longreach (Qld), with a network coordination centre at RAAF Edinburgh (SA), and is expected to be operational by the mid-1990s.[14] Although there are still important areas of uncertainty which need to be resolved in the project, it is already clear that the system will provide air surveillance out to ranges of about 2000-3000 km and possibly even a capability to detect surface ships over the same range.[15]

2. The capacity to destroy enemy forces in the air and sea gap.

This has been described by Paul Dibb as 'a priority requirement'[16] and by the Minister for Defence as 'a priority capability'.[17] It is in fact the only practicable way of defending Australia.

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10 'Australian P-3s Receive Major ESM Upgrade', in *Defence Electronics*, January 1991, p 18.

11 See Desmond Ball, *Australia's Secret Space Programs*, Canberra, 1988.

12 The CDAAs at Shoal Bay, Pearce and Cabarlah are described in Jeffrey T. Richelson and Desmond Ball, *The Ties That Bind: Intelligence Cooperation Between the UKUSA Countries - the United Kingdom, the United States of America, Canada, Australia and New Zealand*, Sydney, 1985, pp 209-210. The plans for the new station to be constructed near Wagga are described in Notice of Intention for the Relocation and Modernisation of the Naval Communications Station Canberra, issued by the Navy in October 1990, pp A6-A9.

13 Dibb, *op. cit.*, p 117.

14 'Government Approves Construction of Jindalee Over the Horizon Radar Network', Department of Defence Press Release No 201/90, 20 December 1990.

15 See Donald H. Sinnott, 'The Jindalee Over-the-Horizon Radar System', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, Chapter 10; and Report of Options for Over the Horizon Radar, (Prepared for Secretary and Chief of Defence Force, Department of Defence, Canberra, May 1986).

16 Dibb, *op. cit.*, p 51.

17 Beazley, *The Defence of Australia 1987*, p 32.

Defending the air/sea gap is the responsibility of the RAN's submarines and surface combatants as well as the RAAF's P-3Cs, F-111s and F/A-18s. The Oberon class submarines are 'the most formidable sub-surface strike force in our region',[18] but there are only six of them to cover a frontage of more than 4000 nautical miles. And in the case of the surface fleet, 'even were it assumed that nearly all RAN vessels were deployed to the north, on average each ship would need to cover some 300 km of the maritime approaches or, more realistically, each group of 3-4 RAN ships would need to protect a 900-1200 km frontage'[19] - an impossible task, even with on-board helicopters.

It can, however, be managed by air power. The 19 P-3C Orion LRMP aircraft 'are among the most advanced in operational service in the Pacific theatre and rank with the best in the world'.[20] Equipped with Harpoon anti-ship missiles, they are able to conduct strike operations over a radius of some 2000 nautical miles - assuming a benign air environment.[21] The F-111s and F/A-18 Hornets are also now configured to conduct Harpoon strikes.

In higher level contingencies, defence of the air/sea gap is best achieved not just through the destruction of enemy air and naval forces attempting to transit the gap, but also through strikes against the enemy's bases and support facilities.[22] These would be conducted by both the F-111s and F/A-18s.

In order for these operations in the air and sea gap to be prosecuted successfully, the ADF would need to achieve air superiority. Control of the air is as vital to the success of strike operations in the air and sea gap as it is to the success of land operations in the event of enemy lodgements on Australian territory. As Air Marshal Newham argued in 1986:

> Air superiority, or the more descriptive term air control, provides the environment for successful land and maritime operations. Possession of air superiority, to the degree necessary, confers on land, sea and air commanders the freedom of action and tactical flexibility needed to pursue their missions. On the other hand, loss of air superiority forces them to devote their efforts to their own defence, to surrender the initiative and to constrain their operations.[23]

Air superiority can be achieved in a variety of ways, including air-to-air combat, but the most cost-effective way is through counter-air operations against the enemy airfields and supporting infrastructure.[24] The logic of achieving air superiority through offensive counter-air operations is well appreciated by Australian air power strategists. Air-to-air combat, in which air superiority is gained essentially through attrition, is not a viable option for a small force like the RAAF. As Air Marshal Newham has stated:

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18 Dibb, *op. cit.*, p 117.

19 Ross Babbage, *A Coast Too Long: Defending Australia Beyond the 1990s*, Sydney, 1990, p 71.

20 Rear Admiral I.W. Knox and Air Commodore T.W. O'Brien, 'Maritime Surveillance', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, p 423.

21 Air Vice-Marshal E.A. Radford and Rear Admiral I.W. Knox, 'Land-based Air Power in Maritime Operations', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, pp 496-7.

22 Dibb, *op. cit.*, p 51; and Beazley, *The Defence of Australia 1987*, p 31.

23 Air Marshal J.W. Newham, 'Air Power in the Defence of Australia', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, p 140.

24 See Desmond Ball, 'The Future of Air Power in the Defence of Australia', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, pp 631-2.

> The most economical means of achieving air superiority is by counter-air operations against aircraft on the ground, air bases and supporting facilities.[25]

And as Air Marshal Funnell has stated:

> Without a doubt, the best means of gaining control of the air is to destroy your opponent's air forces on the ground.[26]

In other words, offensive counter-air operations against enemy air bases and facilities is likely to be a pre-condition of defence of the air/sea gap. As Air Marshal Newham has argued:

> If effective air and naval strikes are called for, then it is most likely that *prior* over-land air strikes will be needed to obtain the conditions for success.[27]

3. Defensive capabilities to prevent enemy military operations in our focal areas or shipping lanes or on our territory.

It is most unlikely that Australia's air and naval forces could render the air and sea gap impenetrable in all circumstances. Rather, depending on the nature and level of the contingency, there could well be substantial 'leakage'. For operations closer to our shores and on the littoral, the ADF therefore requires surface ships, mine countermeasures capabilities, air defence assets, and mobile forces capable of being deployed rapidly and pre-emptively.[28]

Air power is required in this 'layer' to conduct strikes against enemy forces operating in our focal areas, to provide strategic and tactical transport for the ground forces and their equipment, and to provide control of the air to permit these defensive operations by the ADF.

4. Denial of enemy operations on Australian territory.

The ADF requires the ability to protect our population centres and military infrastructure from enemy attack. In particular, it requires 'a demonstrable capability for highly mobile and dispersed ground force operations'.[29]

Air power is critical to the support and conduct of these operations - to transport the ground forces to and within the areas of operation (AOs), to conduct ground attack and interdiction operations, and to provide control of the air for the ground operations.

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Given Australia's geostrategic circumstances and current and foreseeable trends in conventional military technologies, the concept of 'defence in depth' makes eminent strategic sense. It should be the centre-piece of Australia's defence posture.

There are, however, important deficiencies in this posture - in terms of both concepts of operations and particular force structure requirements.

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25 Air Marshal J.W. Newham, *op. cit.*, p 143.

26 Air Marshal R.G. Funnell, 'Air Power Strategy', in Desmond Ball (Ed),*Air Power: Global Developments and Australian Perspectives*, p 106.

27 Air Marshal J.W. Newham, *op. cit.*, p 143.

28 Dibb, *op. cit.*, p 51.

29 *loc. cit.*

With regard to the force structure requirements, the ADF has acquired or is in the process of acquiring most of the necessary capabilities. The 72 F/A-18s, the 23 F-111s and the 19 P-3Cs comprise the most advanced and potent air power capabilities in the region. In addition, the ADF possesses a variety of helicopters, strategic and tactical transport aircraft, the HS-748 surveillance and electronic warfare aircraft, the Pilatus Porter and Nomad light aircraft, the Macchi MB-326H and the CT-4A trainers, etc. These assets are supported by effective and efficient long-range technical intelligence collection systems; a fairly effective Coastwatch coastal surveillance organisation; a modern and active aerospace industry; a substantial general aviation (GA) industry; and navigation, air traffic control and communications capabilities under the authority of the Civil Aviation Authority and the Department of Transport and Communications.

Nevertheless, there remains much room for further substantial and cost-effective improvements. There are several significant gaps in the posture which warrant urgent consideration. The most important of these is some airborne early warning and control (AEW&C) systems. As the RAAF has argued, such a capability is *'essential'* in Australia's geostrategic circumstances.[30] There is also a variety of lesser acquisitions which would add greatly to the overall effectiveness and efficiency of the 'defence in depth' posture, including electronic warfare capabilities, some close air support capability, an additional RAAF base in the Cape York area, and better means of protecting our air bases and supporting facilities.[31] And improved machinery needs to be developed to better coordinate the various service and civil air assets and supporting infrastructures so as to produce a more effective and efficient national air defence and air control system (NADACS).[32]

Conceptually, the most critical deficiency in Australia's strategic posture is the failure to develop adequate concepts for the *offensive* employment of the ADF beyond the air and sea gap. Australia's strategic posture is patently defensive. Nevertheless, it contains significant offensive elements, of which the most important is the F-111 force, and there are generally acknowledged requirements for counter-offensive operations. Firstly, as discussed above, counter-air operations against enemy air bases and supporting facilities is the most cost-effective means of obtaining the necessary *control of the air over the air and sea gap. Secondly, the ability to attack enemy forces* at their embarkation points and to attack enemy lines of communication (including logistic support) at their source greatly alleviates the problems of defending the air and sea gap and of defeating enemy lodgements on Australian territory. Third, a demonstrable capability to threaten targets in the enemy's homeland is a critical element of *deterrence* . And, finally, the ability to take the battle to the adversary is essential for war termination on Australia's terms. As Air Vice-Marshal R.A. Mason has argued:

> Concentration solely on a defensive posture, which is politically and economically attractive, especially in a democracy, by definition leaves a potential opponent free to concentrate all his resources on offence, to plan both strategy and tactics secure in the knowledge that he will not need to divert resources or be overly concerned about disruption of his plans and operations . . . the military instrument must be forged in such a way that it can be actively turned against an aggressor . . .

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30 Air Marshal S.D. Evans, 'Air Power in the Defence of Australia: The Strategic Context', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, p 130; and Air Marshal J.W. Newham, *op. cit.*, p 147.

31 See Desmond Ball, 'The Future of Air Power in the Defence of Australia', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, pp 625-44.

32 *ibid.*, pp 644-6.

> It is a truism of war that a good defence can avert defeat, but seldom if ever impose a political solution upon an enemy or, more simply, secure a victory.[33]

The ADF and Australian defence planners need to unabashedly accept that offensive operations are a necessary component of the concept of 'defence in depth' as well as a necessary complementation to the concept. Air power is inherently well suited for offensive operations. This is the case not only with respect to higher level contingencies, but also in the case of low and escalated low level contingencies - as demonstrated in both the command post exercise (CPX) and the National Defence Exercise which attended Kangaroo 89, in which the F-111s were employed at a relatively early stage in the scenario to force 'Kamaria' to cease and desist. The development of viable operational concepts for the conduct of offensive operations is necessary to codify these realities. Without them, the defence of Australia is being gratuitously degraded.

The Changing Regional Security Environment

For those concerned with the changing security environment in the Asia Pacific region, there are two fundamental issues. The first is conceptual and concerns the need to develop concepts and analytical techniques for coherently addressing the myriad of disparate factors and trends which constitute this emerging new environment. I believe that the current security developments can best be analysed under three progressive heads - change, complexity, and uncertainty. The second issue concerns policy making - how can policies and institutional machinery be designed and constructed to manage these disparate and complex developments in order to enhance regional security?

The Dynamics of Change

The most important change is economic. Economic strength has become the single most important index of national power, eclipsing over the long haul even the possession of significant quantities of nuclear weapons. During the 1970s, the Soviet Union achieved strategic nuclear parity with the United States - indeed, the Reagan Administration was concerned in the early 1980s that the Soviet Union had achieved strategic superiority - but it was the inability of the Soviet economy to maintain real growth and to support technological modernisation in the 1980s that dictated the Soviet withdrawal from the superpower competition. It is the ability of national economies to sustain high levels of real growth, to generate and capitalise on advanced technological products and processes, and to engage competitively and energetically in the international marketplace that will determine rankings in the national power lists at the turn of the century.

The determinate role of economic factors in shaping the architecture of security in the Asia/Pacific region has been recognised by US defence planners. For example, Paul Wolfowitz, the Under Secretary of Defence for Policy (USDP), testified to the Senate Armed Services Committee on 19 April 1990 as follows:

> You've got to recognise the name of the game in the Pacific is economics . . . I don't think we should be under any illusions that 10 years from now the US role is going to be determined by our military posture. It's going to be determined most of all by our economic competitiveness and by the kinds of trading and economic relationships we have out there.[34]

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33 Air Vice-Marshal R.A. Mason, 'Current Air Power Developments', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, pp 50, 57.

34 Testimony of Dr Paul Wolfowitz, Hearings of the Senate Armed Services Committee, 19 April 1990, (transcript), p 18.

Over recent decades, the North East Asian economies have grown more rapidly for longer than any others in world economic history. As a result, there has been an historic shift in the centre of gravity of economic production and power towards North East Asia. North East Asia's share of world production is now about 25%, about equal with that of each of North America and Western Europe; the region's real purchasing power now exceeds that of each of North America and Western Europe. North East Asia has become the main source of dynamism in international trade, and the largest source of surplus savings for international investment.[35]

On the other hand, this economic dynamism is somewhat fragile. It is dependent upon energy resources and raw material from outside the region. Sea lines of communication (SLOCs) are very long and quite vulnerable.

The most obvious geostrategic change is the relative decline of the presence and influence of the two superpowers and the transition from bipolarity to some as yet undefined form of multipolarity.

The Soviet Union is quite clearly receding northward. Most of the military capabilities which it has maintained in Vietnam over the past decade have been removed in the past few years - the MiG-23 fighters, about half the Tu-16 Badger bombers and Tu-142 Bear long-range maritime surveillance and anti-submarine aircraft, and about half the naval surface combatants and submarines. The Soviet Union could even be seriously considering a complete withdrawal from Cam Ranh Bay - apart, perhaps, from its communications and signals intelligence (SIGINT) facilities. Soviet naval ship-days throughout the Pacific have been reduced markedly.

It should be stressed, however, that the capabilities of the Soviet Pacific fleet have not been reduced, although the fleet is increasingly bound to home waters. Indeed, in terms of ship tonnages, quality, and nuclear armaments, the strength of the fleet has increased in the past few years.

The future of the US presence in the region is somewhat uncertain. Much depends on the outcome of the negotiations over the US bases in the Philippines. It is most likely that the US will remove some of its bases and facilities from the Philippines, if it is not forced to remove all of them, by the mid-1990s. Some of these will be redistributed elsewhere in South East Asia and the Pacific, but some will be withdrawn from the region entirely. Whatever the outcome of the Philippines bases negotiations, the US capabilities will suffer some reductions - at a minimum, a decline of some 20% over the next few years.[36] The reduction in capabilities in the Pacific will almost certainly include one aircraft carrier and possibly two, several squadrons of aircraft, and several tens of thousands of army personnel from Japan and South Korea.

There will be an increasing number of actors in the region. Japan is already involved in maritime operations out to 1000 nautical miles, which takes it down almost to the Philippines. In regional terms, Japan already has a substantial and very modern naval force, including some 120 maritime aircraft, 56 major surface combatants (39 destroyers and 17 frigates) and 14 submarines. It is planning to acquire tanker aircraft to extend the range of its air coverage, and is considering the acquisition of 'defensive' aircraft carriers. There will be an increasing Japanese presence in South East Asia and the South Pacific through the 1990s.

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35 See Ross Garnaut, *Australia and the Northeast Asian Ascendancy*, Canberra, 1989, pp 3-5. The North East Asian region is defined here to include China, Japan and Korea.

36 See US Department of Defence, *A Strategic Framework for the Asia Pacific Rim: Looking Forward to the 21st Century*, Mimeo, 19 April 1990.

The Chinese Navy is growing, as is its presence in the South China Sea. It is improving the amphibious capabilities of its South Sea Fleet, constructing an air base in the Paracels, and acquiring an air-to-air refuelling capability for its naval air forces. Chinese interest in the South Pacific is also increasing.

India's naval expansion will also reach into South East Asia and the South Pacific. India plans to acquire another aircraft carrier, more surface combatants, more Dornier 228 long-range maritime patrol aircraft, and a modern conventional and nuclear-powered submarine fleet. It is also gradually developing its naval and air facilities on the Andaman and Nicobar Islands - which are only 80 nautical miles from the north coast of Sumatra.

Within the South East Asian region itself, the most important geopolitical change concerns the role of Vietnam. Since the 1950s, Vietnam has been the locus of conflict and war in the region. The withdrawal of Vietnamese forces from Cambodia, the possibility of a settlement of the conflict in Cambodia, and the prospect of normalisation of diplomatic relations with Hanoi, augur a fundamental transformation in this central geopolitical condition.

These developments are having a major impact on ASEAN. Already, the perceived reduction of the US presence in the region is raising the profile of differences between the ASEAN countries. The normalisation of relations with Vietnam will greatly exacerbate this trend. The fundamental rationale, albeit implicit, of ASEAN has been the common determination to resist communism and particularly the perceived threat of Vietnamese political and military expansion. This basic rationale is in the process of being removed. It is not implausible that the differences in strategic perspectives and reactions to these developments could lead to the collapse of the Association.

Most of the ASEAN countries are currently engaged in major arms acquisition programs, involving the modernisation and enhancement of air and maritime capabilities. There are perceived security requirements. In particular, there is the requirement for them to monitor and police activities in their Exclusive Economic Zones (EEZs). The remarkable economic growth of the region permits an increasing allocation of resources to defence programs. There is prestige attendant on the acquisition of modern technology. There is the perceived draw-down of the US presence in the region and the perceived need to compensate for this. And the acquisition of advanced weapons systems is an important means of keeping abreast of new technological developments.

All the ASEAN countries (with the exception of the Philippines) are transforming their naval capabilities from essentially surface warfare oriented patrol boat/coastal forces to navies with greater range and a broader spread of capabilities.[37] For example, they are now all (again, except for the Philippines) equipped with Harpoon and/or Exocet anti-ship missiles. They are also acquiring modern (albeit limited) fighter aircraft, which can be used in maritime attack roles. Indonesia, for example, has recently bought six Harpoon-capable *Van Speijk* class frigates and is acquiring 12 F-16 aircraft. Singapore has fitted six of its 24 fast attack craft with Harpoons and has acquired 12 F-16s.[38] Thailand has equipped its two *Ratanakosin* corvettes with Harpoons, and is acquiring 18 F-16s. Malaysia has acquired Exocets for its two *Kasturi* frigates and its

37 See Carlyle A. Thayer, *Trends in Force Modernization in Southeast Asia*, Working Paper No 91, Peace Research Centre, ANU, Canberra, September 1990.

38 It is interesting to note that 'Singapore, concerned that its . . . F-16 purchase might worry its neighbours, stored its new F-16s in the US until taking delivery in January 1990 so that is would not be seen as the first country in the region to possess the advanced fighters'. See Tai Ming Cheung, 'Shoulder to Shoulder: ASEAN Members Strengthen Defence Ties', *Far Eastern Economic Review*, 22 March 1990, pp 25-6.

eight missile patrol craft, and is planning to buy some 28 Hawk light attack aircraft.[39] Brunei is also likely to acquire 24 Hawks.[40] (The Commander of the Philippines Air Force announced in June 1990 that the Philippines planned to acquire 12-20 F-16s, but the resources are probably lacking for any such acquisition in the near future).[41]

Table 1 lists the advanced air capabilities in present inventories or under acquisition in the South East Asian region - including the air power projection capabilities of countries adjacent to the region. (A more comprehensive tabulation of regional air forces is provided in Appendix 1.)

Table 1

New Air Power Acquisitions/Deployments, South East Asia

1.	F/A-18 *Hornets*	Australia	72
2.	F-111s	Australia (updated with Harpoons and Pave Tack)	23
3.	F-16 *Falcons*	Singapore	12
		Indonesia	12
		Thailand	18
		(Philippines	12-20)
4.	*Hawks*	Malaysia	28
		Brunei	24
5.	P-3 *Orions*	Australia	P-3Cs 19
		New Zealand	P-3Ks 6
		Japan	P-3Cs 46
		Thailand	P-3Bs 3
6.	E-2C *Hawkeyes*	Singapore	4
		Japan	10
7.	*Dornier*-228 LRMP	India	11

The changing strategic situation represents a mixed picture. There is much to be welcomed, including the relaxation of superpower tensions, the withdrawal of Soviet forces to home territory, and the general economic growth in the Asia-Pacific region.

However, conflict and military competition in the region is not going to go away. Indo-China has a history of invasion, involving both outside powers (eg, China, France and more recently the US intervention) and the countries within the region (eg, the Thai and Vietnamese invasions of Cambodia). There are numerous other areas of current or potential conflict, such as the North Solomons (Bougainville) in Papua New Guinea; the Iran Jaya/Papua New Guinea border; the Spratly and Paracel (Xisha) Islands in the South China Sea; and disputed island and continental shelf claims in the Gulf of Thailand. Instability in the Philippines and the South West Pacific is also likely to increase.

39 'Malaysia Buys Hawks', *Interavia Aerospace Review*, January 1991, p 9; and 'Hawks Trainers and Fighters for Malaysia', *Defence Electronics*, February 1991, p 18.

40 Andrew Lorenz, 'Soaring Hawk Sales Lift BAe', *Sunday Times*, London, 22 July 1990, p IV-2.

41 See Thayer, *op. cit.*, p 5; and John McBeth, 'A Fighting Chance', *Far Eastern Economic Review*, 19 July 1990, p 20.

The Increasing Complexity of Security

Security developments are also becoming much more complex. In part, this arises from the increasing numbers of actors involved in the region. Security issues in the 1990s will involve a dozen actors - the ASEAN countries, Vietnam, China, Japan, India, the United States, the Soviet Union, and Australia. The primary interests of many of these actors are extra-regional; for these the stability of the region is a secondary concern.

A more profound source of complexity, however, is the broadening of the concept of security itself. Security is becoming more multidimensional. Military concerns will of course remain - the strength of insurgent and separatist forces in Burma, Cambodia, the Philippines, Papua New Guinea, etc; the steady expansion of the naval and counter-maritime capabilities of Indonesia, Malaysia, Singapore and Thailand; and the increasing power projection capabilities of Japan, China and India. However, these military concerns will be increasingly supplemented by issues of economic and environmental security.

Economic security at the broadest level involves the maintenance of economic growth and of the dynamism of the economic power centres of North East Asia and increasingly also of ASEAN. There is a multiplicity of contentious issues relating to economic security - such as the protection of trade links; protection of sea lines of communication (SLOCs); rights of transit through straits and internal waterways; competing claims to off-shore islands, reefs, and seabed and ocean areas; and the protection and exploitation of marine resources. The Indonesian 'restrictions' in 1988 on passage through the Lombok and Sunda Straits illustrates the potential for significant disruption of merchant shipping through the region. In the South Pacific, the island states rank military threats far below the destruction of fish stocks through drift-net fishing as threats to their future well-being and security.[42]

Environmental security issues are also becoming more salient. Global pollution, desertification, deforestation, and the greenhouse effect, with the attendant issue of rising sea levels, are all real problems in this region. Large scale oil spills in the Malacca Straits or the South China Sea could do irreparable damage to marine life and other off-shore resources. Bangladesh faces a loss of the top soils on which its subsistence agriculture depends. Deforestation in Malaysia and Kalimantan is already portending adverse environmental effects in South East Asia. Rapid industrialisation is causing a dramatic increase in carbon dioxide emissions. In the South Pacific, one island (Nauru) may have to be abandoned because its soil has been worn out by uncontrolled mining of its phosphate resources. On others, wastes have dangerously contaminated the water supplies. Global warming threatens the physical survival of several South Pacific island states. The highest points in the Marshall Islands, Tokelau and Tuvalu are only four metres above sea level. It is possible that a 1-2 degrees Celsius increase in average temperatures would cause a sufficient rise in sea level to in turn cause these islands to effectively disappear. In many other islands, although the maximum altitudes are hundreds of metres, the primary economic activity occurs on the coastal lowlands which could well be drowned. In other cases, the greenhouse

42 See David Hegarty and Peter Polomka (Eds), *The Security of Oceania in the 1990s - Vol 1: Views From the Region*, Canberra, 1989, pp 4-6.

effect will alter rainfall patterns - to the extent that desertification of most of Papua New Guinea, for example, is a possibility. In the South Pacific, these environmental issues represent the real security problems of the next couple of decades.[43]

In addition, environmental issues will become an increasing source of international disputation. The externalities of environmental degradation are not confined to the national borders of the countries in which the noxious activity is generated; the external costs are frequently borne by those who receive no benefit from the activity. The South Pacific states, for example, are essentially innocent victims of the build-up of carbon dioxide produced by industrialisation elsewhere. The portended loss of top soil in Bangladesh is primarily due to uncontrolled deforestation in Nepal. Conflicts will increasingly occur over attribution of responsibility for off-shore pollution and damage to marine resources, desertification, acid rain, rising sea levels, and 'environmental refugees'.

The military, economic and environmental aspects of security are not easy to reconcile. The military requirements of counter-insurgency operations in the Philippines, for example, exacerbate the difficulties of economic reform and development. The adverse environmental costs of deforestation are now widely recognised but, nevertheless, Malaysia, Indonesia and Papua New Guinea remain heavily dependent on timber resources for employment and foreign exchange.

The increasing complexity of the emerging regional security environment demands a multidimensional approach to regional security management, in which the military factor will have to be closely complemented by economic, diplomatic and environmental considerations. This is an extremely challenging task, and we should not be complacent about the possibility of the region getting its act together.

Uncertainty

Uncertainty is endemic to the international system. It is an inevitable product of sovereignty as the defining characteristic of nation states. As the extent and rapidity of change increases, and the complexity of regional security developments also increases, then so too will the essential uncertainty and unpredictability of the regional security environment.

Several current developments contribute more particularly to this uncertainty. The US-Soviet global relationship is in transition, with consequences for regional security which remain unforeseen. The improvement in that relationship is leading to reductions in US and Soviet arsenals; a movement to naval arms control and disarmament in the Pacific is a distinct possibility. On the other hand, major weapons acquisition programs are already underway within the region, and power projection into the region from elsewhere in North East and South Asia will increase further.

Uncertainty has also been introduced by the break-down of ANZUS. It is possible to make too much of this development, since the New Zealand element of the alliance was always the least important. In a very real sense, ANZUS has been less a tripartite arrangement than two bilateral arrangements, structured around Washington-Canberra and Canberra-Wellington axes; these axes have, on balance, been strengthened in

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43 See Peter Hulm, *A Climate of Crisis; Global Warming and the Island South Pacific*, Port Moresby, 1989; J.W. Zillman, W.K. Downey and M.J. Manton, 'Climate Change and Its Possible Impacts in the Southwest Pacific Region', (Paper prepared for the Tenth Session of the World Meteorological Organization Regional Association), Singapore, 14/24 November 1989; and J.C. Pernetta and P.J. Hughes, *Studies and Reviews of Greenhouse Related Climate Change Impacts on the Pacific Islands*, Association of South Pacific Environmental Institutions, for Intergovernmental Meeting on Climate Change and Sea Level Rise in the South Pacific, Majuro, Republic of the Marshall Islands, 16-20 July 1989.

recent years. Nevertheless, many of the South Pacific states have undoubtedly become more apprehensive about the protective umbrella which they believe ANZUS has historically provided.

The future of ASEAN stands out as a central question. Although invariably underplayed as a regional security arrangement, ASEAN has in fact been an extremely successful such arrangement. It represents an example of successful confidence building in its own right. The mechanisms for dialogue which have been instituted under the umbrella of the Association are, as a whole, far more advanced and functional than those extant elsewhere in Asia.

It is clear, however, that ASEAN will not long remain in its current configuration and terms of reference. One possibility is that the current and prospective economic growth, together with the national self-confidence being generated by the acquisition of advanced military technologies, will produce an Association willing and able to manage regional security developments in a positive and coherent fashion. On the other hand, it is also possible that with the reduction of the US presence in the region, and most particularly a US withdrawal from its bases and facilities in the Philippines, ASEAN will become less cohesive. It will be a more diffusive security environment, with the potential for the ASEAN member states to each pull in different directions. There is a real possibility of the demise of ASEAN as an institutionalised regional entity.

Air Power and Cooperative Security in the Region

Increased regional cooperation is imperative for several reasons. To begin with, it is necessary to prevent the possible disintegration of ASEAN. The ASEAN states are increasingly taking different positions on important regional security issues - whether it be support for different factions in Cambodia or the acceptance of US bases and facilities to replace those in the Philippines. Competition for markets in Indo-China is likely to be intense.

As discussed above, Thailand, Malaysia, Singapore and Indonesia are currently engaging in major advanced weapons acquisition programs. There are various reasons for this - insofar as the acquisition programs are a reflection only of their increased economic and financial strength, or a means of acquiring new technology, they provide little cause for concern. Indeed, the contrary can be argued - that the national self-confidence which is generated by the acquisition of these advanced capabilities is itself a source of confidence building in the region. It is critical, however, that these acquisition programs do not lead to a regional arms race. Uncertainty and alarm can be prevented by transparency. Prior declaration of intentions and plans, the articulation of rationales (such as provided by Paul Dibb's *Review of Australia's Defence Capabilities* in 1986[44] and the subsequent Ministerial statement on *The Defence of Australia 1987*[45] and dialogue and exchange of views between neighbours are critical to this exercise.

A second reason pertains to the more specific development of air power capabilities in the region. As noted above, air power is the principal means by which countries outside the region are able to project power into it, as well as being at the forefront of the force modernisation programs of the ASEAN countries themselves. Because air power is inherently offensive, it is particularly important that these developments take place in a context of regional dialogue and transparency.

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44 Dibb, *op. cit.*

45 Beazley, *The Defence of Australia 1987.*

Third, increased regional cooperation is necessary to provide a combined counterweight to the intrusions of other powers into the region. A failure to develop common perspectives and policies for addressing the increasing Indian maritime presence in the region, for example, can only lead to dissension and fuel for a regional arms race.

Fourth, the increasing rapidity of change and the relatively novel nature of emerging security problems demand an unfettered flow of ideas and dialogue on policy initiatives and means of addressing common problems. Time is being compressed to the point where uncoordinated trial and error efforts cannot be afforded.

Fifth, many of the current and prospective regional security developments can only be addressed on a cooperative basis. The environmental issues, in particular, are amenable only to international effort.

And, sixth, the promotion of multilateral security and confidence building arrangements provides Australia with a significant role in the region. Although most of the initiatives for regional security cooperation quite properly come from the ASEAN and South Pacific capitals, there is an unabashed recognition within the region that Australia is the principal repository of the experience and skills necessary to convert the various notions into viable operational regimes. Australia should not be diffident about capitalising on this important opportunity for regional involvement.

The Building Block Approach

The most grandiose concept for security cooperation in the Asia/Pacific region is that of a Conference on Security and Cooperation in Asia (CSCA), similar to the Conference on Security and Cooperation in Europe (CSCE), which the Australian Foreign Minister, Gareth Evans, proposed for consideration in July 1990:

> We should now be looking ahead to the kind of wholly new institutional processes that might be capable of evolving, in Asia just as in Europe, as a framework for addressing and resolving security problems. In Europe, wildly implausible as this would have seemed even just a year ago, the central institutional framework for pursuing common security has become the Conference on Security and Cooperation in Europe. The CSCE is made up of all countries in NATO and the Warsaw Pact. Why should there not be developed a similar institutional framework, a Conference on Security and Cooperation in Asia, for addressing the apparently intractable security issues which exist in the region?[46]

The regional reaction to the CSCA proposal has been generally negative. For example, Singapore's Foreign Minister, Wong Kan Seng, has stated:

> The situation in Europe has facilitated the concept of the CSCE. The same kind of conditions have not been obtained in Asia.
>
> The countries are so culturally, ethnically, and politically diverse that perceptions have to be harmonised. There has to be common ground before security issues can be discussed.[47]

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46 Gareth Evans, 'What Asia Needs is a Europe-Style CSCA', *International Herald Tribune*, 27 July 1990, p 6.

47 'ASEAN Wary of Pacific Security Plan', *The Australian*, 8 October 1990, p 8.

And Indonesia's Foreign Minister, Ali Alitas, has stated that although the ASEAN countries welcome more dialogue on security issues, the Asia/Pacific region is not ready for a formal body. According to Alitas:

> We have to be careful not to think that certain things that work in one region ought to be transplanted to another. We would be rather cautious in proceeding too fast to an overall security conference.[48]

The concept of CSCA is too ambitious and premature. There are too many outstanding issues of territorial claim, sovereignty and governmental legitimacy - in Indo-China, the South China Sea, the two Chinas, the Korean Peninsula, and the Northern Islands - to be resolved beforehand. The Asia/Pacific region is too large and too disparate - in national capabilities, threat perceptions and security interests - to be addressed as a single entity.

This is not to say that the notion of CSCA has no utility. However, it is best regarded as an ultimate objective, not one to be actively pursued at this stage. Rather, the appropriate agenda for the 1990s is the establishment of 'building blocks' - a multiplicity of sub-regional arrangements dealing with various security issues and involving various memberships. Having put these in place, a CSCA will arise naturally.

Two points need to be stressed with respect to the 'building block' approach. First, the Asia/Pacific region is really a collection of sub-regions, each with different geostrategic circumstances - North East Asia, South Asia, South East Asia, and the South West Pacific - and security cooperation is best approached at this sub-regional level.

The second point is that, even at the sub-regional levels, the political conditions are generally not conducive to formal arms control agreements at the present time. More modest cooperative arrangements and confidence-building are essential first steps towards the creation of more amenable political conditions. The agenda for the next decade will be not so much arms control, let alone arms reduction, but enhanced dialogue, limited cooperative arrangements and confidence building measures designed as a precursor to subsequent controls and reductions.[49]

Notwithstanding the relatively modest character of this agenda, there are a variety of 'building blocks' which might be considered as means of enhancing dialogue, cooperation, and confidence in the South East Asia and South West Pacific regions, and which would contribute significantly to regional security.[50]

Air power provides the bases of several of these, and must figure centrally in others.

(i) *Transparency*

The first and most basic need is to encourage much greater transparency with respect to major arms acquisition programs and strategic objectives. With a dozen major arms acquisition programs underway in or impacting on the region, there are real prospects for suspicions, tensions, and imitative and offsetting programs leading to arms races.

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48 *loc. cit.*

49 See Desmond Ball, 'Towards Arms Control and Reduction in the Pacific', Report of Workshop 1, Fourth Asia-Pacific Roundtable, Institute of Strategic and International Studies Malaysia, Kuala Lumpur, 17-20 June 1990.

50 See Desmond Ball, 'Building Blocks for Regional Security', Paper prepared for Ministerial Seminar on Regional Security, Department of Foreign Affairs and Trade, Canberra, 1 March 1991, pp 10-14.

Tensions are already being induced in the region by attempts by some countries to discern the purposes and intentions of their neighbours. For example, the espionage controversy which damaged relations between Malaysia and Singapore in late 1989 was reportedly due, at least in part, to Singapore's efforts to collect information on Malaysia's 'recent $1.6 billion arms deal with Britain'.[51] Given differences in threat perceptions, with some countries being concerned about Indian power projection,[52] others about increasing Chinese capabilities, and others about the plans and intentions of their nearest neighbours, transparency is necessary to prevent misunderstandings and unanticipated and unfortunate reactions.

Various official Australian government statements over the past half decade provide something of a model for the sort of public disclosure which is both possible and necessary. Paul Dibb's *Review of Australia's Defence Capabilities* provides a detailed and comprehensive explanation of the basis and rationale of the structure of the ADF.[53] The policy information paper on *The Defence of Australia 1987* provides a comprehensive overall explanation of the basis of Australian defence policy and planning, including the concepts of self-reliance and 'defence in depth'.[54] In December 1989, the Minister for Foreign Affairs and Trade, Gareth Evans, issued a major statement on *Australia's Regional Security,* which describes Australia's regional security interests and policies, including not just the military but also the diplomatic, economic and development assistance dimensions, and explains the Australian policies of 'comprehensive engagement' for South East Asia and 'constructive commitment' for the South Pacific.[55] The Air Force itself issued *The Air Power Manual* in August 1990, which describes the basic doctrine and operational concepts for the employment of air power in the defence of Australia.[56]

Australia should encourage the publication of similar statements by regional governments - while being mindful of the limitations which some regional socio-political cultures impose on open government. Australia could offer to provide assistance to regional defence planners with respect to planning methodologies and techniques, such as program budgeting and five year (and more forward) defence planning.

The development and publication of long-term defence plans and their conceptual bases would allay some of the uncertainty in the region. The RAAF could further extend its assistance to regional air forces with respect to the development and articulation of air power doctrine and operational concepts. Inter-action between regional air forces at this level can do much to enhance mutual understanding and cooperation.

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51 See Suhaini Azuam, 'Neighbourly Interest: Spy Accusation Reveals Regional Suspicions', *Far Eastern Economic Review*, 21 December 1989, pp 20-6; and Holman Jenkins, 'Dwindling Support Throws Status Quo Into Sea of Change', *Insight*, 14 January 1991, pp 26-8.

52 Thai defence officials have reportedly stated privately, for example, that Thailand's recent acquisition of F-16s and frigates is 'aimed at meeting a potential threat from India - a concern rooted in possible competing claims over the delineation of economic zones off Thailand's west coast'. See Tai Ming Cheung, 'Shoulder to Shoulder: ASEAN Members Strengthen Defence Ties', *Far Eastern Economic Review*, 22 March 1990, pp 25-6. The Malaysian Defence Minister, Tengku Ahmad Rithaudeen, has also cited 'a growing 'threat' from India' as a reason for Malaysia's recent acquisitions. See Holman Jenkins, 'Dwindling Support Throws Status Quo Into Sea of Change', *Insight*, 14 January 1991, pp 26-8. See also Michael Richardson, 'India: South-East Asia Wary', *Pacific Defence Reporter*, February 1990, p 42.

53 Dibb, *op. cit.*, p V.

54 Beazley, *The Defence of Australia 1987*, pp VII-X.

55 Gareth Evans, *Australia's Regional Security*, Department of Foreign Affairs and Trade, Canberra, December 1989. For a critical review of the statement, which provides further explication of the assumptions and implications of Australia's regional security policy, see Greg Fry (Ed), *Australia's Regional Security*, Sydney, 1991.

56 Royal Australian Air Force, *The Air Power Manual*, Canberra, August 1990.

(ii) A Regional Maritime Surveillance and Safety Regime

One more particular concept for institutionalising security cooperation is that of a Regional Maritime Surveillance and Safety Regime, which has recently been floated by the Institute of Strategic and International Studies (ISIS) Malaysia. The concept remains inceptive, with several key issues still to be thought through. What would be its purpose? What would be its scope? What particular 'threats' might it usefully address? How might it be implemented? While protection of the sea lines of communication (SLOCs) through the archipelago and the South China Sea would be too ambitious an objective at this stage, such a regime would provide a useful mechanism for monitoring unregulated population movements and the illicit transfer of drugs, and to assist in combating piracy. It might also contribute to fulfilling the perceived need to establish a presence in the area to avoid the notion that a vacuum was developing. It is important that, insofar as monitoring, policing and safety operations are required, they not be conducted in an uncoordinated fashion by various countries. That would be unnecessarily duplicative, could lead to residual 'holes', and would have the potential of tripping each other up. Dialogue and cooperation would be minimal requirements. A first step should be the delineation and acceptance of common objectives, with operations conducted on a national basis. Expansion of the present trilateral regime (Singapore, Indonesia and Malaysia) in the Straits of Malacca provides a possible route of implementation. Establishment of a multinational surveillance force might later evolve as experience permits and circumstances warrant.

Australia could make a significant contribution to such a multinational surveillance force. The RAN already maintains a continuous presence in South East Asian waters (albeit generally consisting of only a single vessel). The RAAF P-3C Orions undertake regular ocean surveillance of the region from the eastern Indian Ocean across to the South West Pacific (with stop-overs at Butterworth in Malaysia). Consideration might be given to instituting some coordination of these ocean surveillance flights with those of Singapore's E-2C Hawkeyes and Thailand's P-3B Orions (when they are acquired), as well as to relatively unfettered exchange of the ocean surveillance information collected by these flights. In addition, the RAN has a wealth of experience in the conduct of multinational operations which would be immensely useful for establishing and maintaining such a regional regime.

(iii) An Airspace Surveillance and Control Regime

Consideration might also be given to the establishment of an Airspace Surveillance and Control Regime involving the ASEAN countries and Australia. Civil air control mechanisms are already in place. In addition, Malaysia, Singapore and Australia presently maintain the Integrated Air Defence System (IADS) with a joint air traffic control purview. There have also been advances in over-the-horizon radar (OTHR) technology which offer the promise of wide area surveillance over the South West Pacific, the South China Sea, the archipelago and the eastern Indian Ocean. The ingredients are present for a regional regime for controlling air traffic, monitoring air movements, and even providing early warning of hostile air activity.

Consideration should be given to the longer-term evolution of IADS as the basis for such a regional regime. IADS, and the Five Power Defence Arrangements (FPDA) of which it is the principal component, has functioned very successfully over recent

years. Both Singapore and Malaysia continue to regard both FPDA and IADS as 'an alliance that contributes to peace and security in the region' and hence as important to their national security.[57]

The contribution of FPDA and IADS to regional security goes beyond their military value. The sharing of doctrine and experience promotes mutual confidence. At a more general political level, the FPDA/IADS connection provides Australia with access to senior defence officials and military officers who have a considerable influence in the national affairs of Malaysia and Singapore. The self-interest of the defence establishments in maintaining access to the advanced technology and skills of the ADF helps ensure that ties with Australia are maintained despite occasional difficulties in other foreign policy relations (as is the case with Malaysia at present). From an Australian point of view, FPDA/IADS is thus as important for its political value as it is for its military value.

Indonesia, of course, does not share this view. Several prominent Indonesians have argued, with increasing vehemence in recent years, that FPDA/IADS is not only obsolete but is also divisive in terms of regionalism and an impediment to the further development of regional security cooperation. For example, Dr Mochtar Kusuma-Atmadja, who served as Indonesia's Foreign Minister from 1978 to 1988, has recently stated:

> We in Indonesia understand the FPDA to be an insurance against Indonesia's possible reversion to her old ways, exemplified by her confrontation campaign against Malaysia in the early 1960s. A better insurance or guarantee would be to include Indonesia herself in a sub-regional defence arrangement.
>
> The abandonment of the FPDA would immeasurably strengthen the political and psychological basis for a more formalised tri-lateral defence arrangement between Indonesia, Malaysia, and Singapore. In this regard, there would be no reason why each of these three countries would still not be able to continue with joint exercises with Australia or New Zealand as friendly neighbouring countries.
>
> The abandonment of the FPDA could be done gradually, say, over the next five years, simultaneous with the maturing of a three-power Asean defence arrangement.[58]

Some elements of the Australian government have gone even further, contemplating the eventual evolution of FPDA/IADS into a wider regional security arrangement. As the Minister for Foreign Affairs and Trade, Gareth Evans, stated in December 1989:

> It would make sense for us to work, in a low-key and incremental way, towards the establishment of complementary kinds of defence cooperation with Thailand and Indonesia. This will, however, take time.
>
> It might eventually prove possible and appropriate to subsume such arrangements in a wider new regional security community arrangement.[59]

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57 See for example, Lieutenant Colonel Lim Kwong Hoon, 'FPDA's Contribution to Stability', *Asia-Pacific Defence Reporter*, Vol XVII, No 8, February 1991, pp 14-15. See also Beazley, *The Defence of Australia 1987*, p 16; and Evans, *op. cit.*, p 20.

58 Mochtar Kusuma-Atmadja, 'Time For A Three-Nation Asean Defence Arrangement', *Trends*, Singapore, No 1, September 1990, p 1.

59 Evans, *op. cit.*, p 20.

The FPDA/IADS has been 'revitalised' in recent years.[60] However, it would be surprising if a security relationship which was instituted some two decades ago, in much different regional strategic circumstances, remained perfectly applicable in all its detail and character to the circumstances of the 1990s. Both Malaysia and Singapore have recently put forward proposals for strengthening FPDA/IADS. For example, Singapore's Second Minister for Defence (Services), Brigadier Lee Hsien Loong, proposed at the IADS Air Defence Seminar in Singapore in November 1989 that the member air forces train together more often and more realistically; that a contingency command organisation be developed for FPDA; and that greater emphasis be accorded joint (air, sea and land) operations by the parties.[61]

There are additional ways in which FPDA/IADS might be strengthened and broadened. Since the inception of IADS, Australia has been the lead partner, as reflected in the practice of appointing a senior RAAF officer to command the system. Rotation of command between senior officers of the Malaysian and Singaporean Air Forces as well as those of the RAAF would give the system a more regional image.

More broadly, membership of FPDA/IADS might be extended to include other ASEAN countries. Malaysia is interested in extending the purview of coverage to include exercises and operations over Sabah and Sarawak, and in this context has raised the possibility of Brunei joining the Arrangements. In March 1990, Brunei attended a meeting of the Chiefs of Staff of the FPDA countries as an observer.

Thai membership also warrants consideration. As discussed below, the acquisition of F-16s by the Thai, Singaporean and Indonesian Air Forces provides a basis for greater cooperation with respect to air defence. Australian F/A-18s on rotational deployments to Singapore and Malaysia have also visited Thailand, and there are good prospects for including the Thai P-3Bs in the cooperative maritime surveillance activities which the RAAF currently maintains with Malaysia.

The eventual inclusion of Indonesia in a regional air surveillance and air defence regime also warrants consideration. In recent years, Indonesia has joined with Malaysia and Singapore in several relevant initiatives. For example, Indonesia and Singapore have agreed to the use of the Siabu air weapons range in Sumatra; air defence exercises between Indonesia and Singapore have been expanded to include Singapore's E-2C Hawkeyes and the deployment of Indonesian Skyhawks from Singapore's Payar Lebar airfield; Malaysia and Indonesia have agreed to conduct joint air surveillance patrols over the Straits of Malacca, using facilities at Butterworth and Medan, possibly using the F-5 aircraft of both countries;[62] Indonesia has agreed to cooperate with Singapore and Thailand with respect to F-16 pilot training;[63] Australian F/A-18s have recently visited Indonesia in conjunction with their deployments to Singapore and Malaysia.

These possibilities for broadening FPDA/IADS must be considered with the utmost sensitivity to the views of not just the present regional members (ie, Singapore and Malaysia) but also those of Indonesia. Singapore and Malaysia would be particularly concerned that a broadening of the membership might lead to a dilution of its central

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60 *loc. cit.*

61 See Brigadier General Lee Hsien Loong, '. . . And From Singapore', *Pacific Defence Reporter*, February 1990, pp 23, 33. See also Lieutenant Colonel Lim Kwong Hoon, 'FPDA's Contribution to Stability', *Asia-Pacific Defence Reporter*, February 1991, pp 14-15.

62 'KL Calls for Expansion of Defence Ties With Jakarta', *The Straits Times*, 9 January 1991, p 14; and Paul Jacob, 'KL and Jakarta to Jointly Keep Tabs on Straits', *The Straits Times*, 18 January 1991, p 17.

63 See Tai Ming Cheung, 'Shoulder to Shoulder: ASEAN Members Strengthen Defence Ties', *Far Eastern Economic Review*, 22 March 1990, p 25; *Pacific Defence Reporter*, May 1990, p 34; and *Pacific Defence Reporter*, June 1990, p 20.

core. The responsibility for any initiatives in this direction must lie with these parties. In the longer term, however, the arguments for a broader regional arrangement are likely to prevail. The various bilateral and multilateral building blocks which are currently in place or in the process of being instituted will provide a sound basis for such a broader arrangement.

(iv) A Technology Monitoring Regime

Some institution might be established for monitoring and coordinating the introduction of new technology into the region. Throughout the region, new technology is seen as the key to industrialisation, economic growth and national development more generally. In Malaysia, the importation of new technology together with the development of processes and procedures for technology transfer is regarded as the most practical means of acquiring new technological capabilities. In Indonesia, on the other hand, the emphasis is more on the indigenous development of new technology as an essential ingredient of the concept of *Tannas* or 'national resilience'. Many new technologies being acquired are avowedly military - such as F-16 aircraft and Harpoon anti-ship missiles - although it is the new technology itself which is as important as the military capability.

An institutional means for informing all countries in the region of prospective technological acquisitions and developments and for discussing their rationales and possible implications could not only alleviate unwarranted fears but also lead to cooperative projects, leading in turn to the long-term enhancement of regional security.

(v) A South West Pacific Sovereignty Surveillance Regime

Within the South Pacific, most of the island states are unable to maintain surveillance over their enormous maritime resource zones. The resources required to surveille and police these areas are simply beyond their independent capacities. Yet it is activity in their maritime zones - albeit non-military activity - which is perceived to be the greatest security concern in the region. The protection of fish stocks and other marine resources, and the impact of climate and environmental changes, are critical concerns.

Air power, employed on a cooperative basis, provides a means of instituting a sovereignty surveillance regime for the region. Most air surveillance over the region is presently conducted by the Australian P-3C and New Zealand P-3K Orions, but these are not optimally equipped or deployed for monitoring the sorts of activity of most concern to the region. In addition to radars and imaging systems for monitoring surface activity, sensors are required to monitor the locations and movements of fish stocks, and changes in weather patterns, ocean currents, ocean temperatures, and sea levels - ie, laser depth sounders, infra-red and microwave radiometers for observing sea surface temperatures, wind speeds and atmospheric water vapour, and altimeters for monitoring ocean surface topography. A cooperative venture providing daily coverage of priority areas and weekly coverage of all areas would require five or six aircraft and cost perhaps half a billion dollars (including aircraft acquisition) over a 10-year period - ie, about $50 million per year. This air component would, of course, have to be complemented by surface patrols and hydrographic and oceanographic research activities.

In addition to sovereignty surveillance, air power in its broadest sense can also contribute to the security and prosperity of the South Pacific region through the provision of tactical transport (for movement of ground forces and logistic support of

maritime deployments); VIP transport; rapid communications and liaison; search and rescue; and reaction to natural disasters. Affordable and effective capabilities can be maintained through 'mutual cooperation within a systems approach'.[64]

(vi) Strengthening and Expanding Bilateral Cooperative Arrangements

There are a wide range of bilateral and multilateral security arrangements involving air power already extant in the region. Many of these derive directly or indirectly from FPDA/IADS. In addition to providing for the air defence of Malaysia and Singapore, FPDA/IADS provides a vehicle for dialogue at both policy-making and operational levels, for joint exercises and training, and for sharing experiences and thoughts.

The fact that three ASEAN countries have acquired F-16 fighter aircraft (with the Philippines also intending to acquire some) provides a further basis for cooperation. For example, the Thai, Indonesian and Singapore Air Forces agreed in principle in February 1990 to establish a joint training base, with F-16 flight simulators, for their F-16 fighter pilots.[65] Indonesia and Singapore are reportedly also planning to establish a joint air combat manoeuvring and instrumentation range, to be located in Indonesia, to practice 'dissimilar air combat under realistic conditions'.[66] It would be logical to extend these arrangements to other areas, such as joint airframe and engine maintenance facilities; a joint research and development program designed to address technical problems (such as structural fatigue) peculiar to F-16 operations in the South East Asian environment; common production plants for high-usage spare parts; and joint logistic support services. Although Australia's geostrategic circumstances dictated acquisition of the F/A-18 Hornets rather than F-16s, Australia possesses an enormous wealth of skill and experience in maintaining advanced aerospace systems, organising and conducting state-of-the-art research and development programs, and in training pilots capable of exploiting the full potential of modern fighter aircraft - much of which would be valuable to the F-16 programs.

Other Australian involvement in the region already includes training of Malaysian, Indonesian and Singaporean officers in maritime air surveillance at the ADF Warfare Centre at Williamtown; training of air force officers from Singapore, Malaysia, Indonesia, the Philippines, Thailand and sometimes Brunei at the RAAF Staff College at Fairbairn; the development with Indonesia of a framework for bilateral surveillance cooperation in the Timor and Arafura Seas; visits by senior RAAF officers to other countries in the region, and by senior regional air force officers to Australia; cooperation with Indonesia on the Nomad program, including facilitation of commercial contacts, training and consultancy assistance; and connections between the Australian and regional aerospace industry more generally. Although this summary of cooperative activities concerning air power is far from complete, it remains the case that these activities are less extensive than those involving the RAN in the region. In the last couple of years, the Navy has been particularly active in promoting cooperative activities in the region. I have no doubt that the RAAF could also do more in this area.

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64 See Air Marshal R.G. Funnell, 'Air Power and the Smaller Pacific Nations', Unpublished paper presented at Asian Aerospace 90, Singapore, February 1990, p 15.

65 See Tai Ming Cheung, 'Shoulder to Shoulder: ASEAN Members Strengthen Defence Ties', in *Far Eastern Economic Review*, 22 March 1990, p 25; *Pacific Defence Reporter*, May 1990, p 34; and *Pacific Defence Reporter*, June 1990, p 20.

66 *Asian Defence Journal*, December 1990, p 108.

Conclusion

There are two principal contending approaches to the maintenance and enhancement of national security. One, represented by the more extreme versions of self-reliance, emphasises independent military strength to the effective exclusion of other dimensions of security - the 'peace through strength approach'. The other emphasises collective security and the tailoring of defence capabilities to some common security framework. The first is expensive in terms of resources, stimulates regional tensions and arms competition, and leads to a degraded regional security environment and hence to a diminution of national security broadly defined. The second puts national security hostage to the vagaries of alliance relationships. As with most aspects of life, the most sensible policy is to pursue some middle path, based on some combination of elements from these contending approaches.

In other words, Australia's security policies and defence posture should consist of a carefully designed admixture of, on the one hand, the minimal military capabilities required for self-defence in the event of credible contingencies, recognising that this would include certain offensive capabilities; and, on the other hand, of a network of more or less institutionalised mechanisms for the enhancement of common security in the region. Air power has a central part to play in this mixture. Precisely because it is the leading edge of the defence of Australia, and comprises most of the (limited) offensive capability required for our defence, it is essential that it be structured and employed to promote regional cooperation and common security. The task for air power is clear; it only requires imagination, sensitivity and will to manage it successfully.

DISCUSSION

Air Commodore N. Ashworth (RAAF, Retired): Professor, could I take up two points from your presentation. The first one is that you suggested that perhaps an idea for co-operation would be to export to our regional neighbours some of the Australian defence and security management procedures and processes. I could think of no better way to confuse the defence forces of our neighbours that to have our procedures. The second point is perhaps a little more serious. You opened up by stating that air power had a dominant place in the developments in the future of South East Asia. Yet when I look at the region - and you made this observation yourself - the two most significant military developments are the build up of India's navy and China's navy. It doesn't seem to fit in with your opening comments about the importance of air power. Would you care to comment.

Professor Ball: I'm not really sure on the first point whether you do want a serious answer Norm. While we all have criticisms and objections, and in some cases constructive suggestions, for improving the mechanisms and planning procedures in the Australian defence establishment, the fact is that they are streets ahead of what exists elsewhere in the region. One of the problems in the region is that in many cases, you do not even have central defence policy bureaux, able to put some coherence into what they themselves are doing. And that leads not just to uncertainty amongst regional neighbours, it leads to uncertainty within the defence forces in those regions themselves. Some of the services not only don't know what their sister services are doing but cannot explain to outsiders what their sister services are doing, and that's a recipe for tensions. While the arguments which you might have about incoherence in Australian defence planning may have some merit - indeed, I used to make those arguments myself for 15 or 20 years - I believe that over the past five years we've achieved a coherence in our defence planning, starting off with general strategic objectives, concepts such as defence in depth, the development of operational concepts within the Defence Department and ADFHQ, linking those down to force structure, which is probably unparalleled in the world. The fact that we don't

have the coherence which you and perhaps others might want, is really not an Australian fault. I think we have now got our defence planning capabilities together in a way which is quite remarkable. And I am serious in suggesting that we do try to assist our neighbours in the region with some of those concepts and techniques. I believe that kind of cooperation would be very valuable in the process I've called 'transparency' in this paper, in allowing our neighbours to take long term perspectives, to articulate perspectives, and to develop force structures on the basis of those perspectives.

Regarding the question of whether the major build ups in our region are naval or air, my paper covers both aspects, because major new changes are taking place in both areas. I did mention on the anti-shipping side the introduction of Harpoons and Exocets in all of the regional naval forces other than the Philippines. I would hesitate, though, to say that the most important strategic developments that have taken place in the region are either the increasing Indian naval presence or the Chinese naval presence in the South China Sea. Undoubtedly those developments would be included in any list of changes, but I would hesitate to rank them at the top. Any list has to include a dozen or so significant developments. For example, you would have to look at the impact of the decreasing American presence, which is as much an air presence as a naval presence. There is the decreasing Soviet presence, which involves air forces more than naval forces. And there are the new technologies which are being introduced into the region, such as E2Cs and F-16s, and all of the other technological baggage that comes along with those. Overall, I think you have to rank the impact of the changes in the air technologies and systems ahead of the maritime ones. The picture I'm trying to make is one of a complex interaction between all of those elements. Air power figures centrally and, more importantly, has to be a central consideration in the development of solutions to regional security issues.

Corporal M. Andrew (RAAF): You said air power is inherently offensive, that harks way back to the 1932 Disarmament Conference, when the world spent two years deciding whether air power was defensive or offensive. It depends what range your aircraft have got and where your bases are. I'd like to take up your point about offensive counter air as being cost effective. Every country that's ever employed OCA, except perhaps during Desert Storm and Operation Barbarossa, has experienced very high attrition rates. I don't think we have the capacity to sustain a high attrition rate.

Second, the F-111 is the only aircraft with any range/payload which we could use to go to another person's country. The F-111 could probably carry at the most eight anti-runway munitions and possibly two HARMS, if purchased. You also said that the other regional countries are exploiting higher technology for their defence. Alternatively, that could be seen as offensive, as F-16s have a range/payload comparable to the F/A-18, and the other countries are much smaller than ours.

Regarding the Harpoon and Exocet missiles which are being acquired, until the countries also acquire over-the-horizon targeting, they are really not much better than the Styx missiles which Indonesia had.

Professor Ball: By making the point about the offensive nature of air power as explicitly as I did, I didn't mean to imply that air power is only offensive. Air power can be used as defensively as any other capability. It does, though, have what I believe is unique in the Australian defence context, and that is an offensive capability to complement its defensive capability, and it's that offensive side which I believe we have to capitalise on. The reason I believe that is because I consider 'defence in depth' without offensive capabilities is not the whole answer to our defence problems. Indeed, if all we can do is just bat the ball back to an adversary whenever he bowls one down, sooner or later we're going to get bowled out. Where I believe the government is remiss is in not providing us with some of those offensive capabilities as they exist in air power. For example, the concept of 'deterrence' is not really talked

about in any government statements, it sometimes is used as a throw away line. Having an offensive deterrent capability has always seemed to me to be an essential adjunct to any defensive posture. In the end it is the ability to conduct offensive operations which decides any conflict, whether it's high or low level. And as I argued, we'd be very remiss if we denied ourselves the ability to force the termination of a conflict, which under any assumptions I can imagine, would have been started by the other side.

I simply don't accept your argument about counter air operations either being historically unworkable or not workable in our environment. Indeed, I believe that historically the contrary is overwhelmingly true; that the most cost effective way, the most fundamental way that air superiority has been achieved in the past, has been through offensive counter air operations. And when I look at what air bases, disembarkation points, air defence facilities and other infrastructure exist in this region, I don't have any doubts at all about the ability of the RAAF, particularly with F-111s, to conduct very, very successful offensive counter air operations.

Group Captain B. Espeland (RAAF): Professor, you said you believed that the government had failed to articulate an offensive capability within the context of the defence in depth strategy. Why do you think the government has failed to deliver in that area?

Professor Ball: It's a lot easier to pretend that one is totally defensive even when one isn't - you don't cop as much flak either from your own public or from your neighbours. However, I don't believe that in the end it fools anyone other than yourselves. Our neighbours are quite aware of our offensive capabilities; you don't have to go to Jakarta, for example, you can read it in Indonesian newspapers which are delivered to Canberra. They know that we've got these systems. Contributors to the Australian defence debate appreciate that we have these systems. I believe that what we need to do is simply explain why we have them and then articulate the operational concepts for their use. There are many reasons why people just don't like to talk about offensive capabilities, but my argument is that by not talking about them you only hurt yourself.

***Kompas* Journalist**: Professor Ball, in your paper you mentioned drawing a sort of vague line about the friendly nations and not so friendly nations, and then advocated developing relations with the friendly nations through bilateral arrangements and so forth, but adopting more offensive policies towards the unfriendly ones. With the slowing down of the power struggle between the two superpowers, are you trying to advocate that the Australian Defence Force should try to fill in the vacuum when the Americans start pulling out of the region?

Professor Ball: Am I implying or arguing that Australia should have an increased role in the sense of replacing the superpowers as they withdraw and filling the vacuum? No, I'm not at all. For one thing I don't believe that Australia has anywhere near the capabilities to do that: I believe it's difficult enough for Australia to even put together a force posture which can defend this continent and its air and sea approaches, let alone the development of capabilities for more forward operations. I've argued for about a quarter of a century now that, because of our limited resources, we have to decide whether we focus on the defence of Australia or forward operations. My answer is a very categorical one, that the proper focus of our resources and our planning efforts is on the defence of Australia.

That doesn't mean that I don't recognise that perhaps the most likely contingencies which are going to involve the ADF are not contingencies involving Australia. The so-called more 'credible' contingencies in the north are, to be frank, pretty incredible. I accept that the more likely contingencies could well take place in the region, but I would argue that we shouldn't be designing our capabilities and force structure for those contingencies. I believe that our defence planning system has got it right with

the formula that says we acquire capabilities, we design our capabilities for defence in Australia, but we do allow an option for some forward use, though in fact it's very difficult to see any forward operations which I would myself support. I've been an opponent of most overseas commitments of the Australian Defence Force, and unless I saw very direct Australian national interests being threatened by events overseas, I would continue to oppose the use of our capabilities in forward areas.

But that's not all I'm either arguing for or what I believe we should do. We are sitting on the edge of a region which, regardless of what happens at the superpower level or in Europe, is going to be acquiring arms of various sorts for the foreseeable future. I don't think there is any doubt about that. Whether it's just to acquire the technology, whether it's simply because of the enormous economic growth that's taking place, or whether it's the wish of many countries to be able to carry out surveillance and policing in their exclusive economic zones, there is going to be increased arms acquisition in the region. In my view, that is going to create some tension and uncertainty. I believe that those tensions and uncertainties are going to be compounded by another dozen different developments in the region, which I've also tried to articulate in my paper. All I'm saying is that while our capabilities should be designed for the defence of Australia, we need to recognise that our broader security interests encompass instability in the region, and in the face of these various developments, we can play a role through bilateral, and in some cases multilateral, efforts to try to smooth things, to try to keep things together, to try to get a dialogue and exchange of ideas going. That's a very different thing from us trying fill any American vacuum in the region.

APPENDIX 1

REGIONAL AIR FORCES

Source : The International Institute for Strategic Studies (IISS), *The Military Balance 1990-1991,* Brassey's, for the IISS, London, 1990.

CHINA

470,000 personnel, including strategic forces and 220,000 air defence personnel (160,000 conscripts); some 5,070 combat aircraft and a few armed helicopters.

7 Military Air Regions, with headquarters in Beijing.

Combat elements organised in armies of varying numbers of air divisions (each with 3 regiments of 3 squadrons of 4- 5 aircraft, 1 maintenance unit, some transport and training aircraft). Transport aircraft are formed in regiments.

Bomber aircraft:

Medium: 120 H-6 (some may be nuclear-capable). Some carry C-601 air-to-surface missiles (ASM)

Light: Some 350 H-6 (some with C-801 ASM)

Ground attack fighter aircraft: 500 Q-5

Fighter aircraft: estimated at 4000 including 400 J-5, some 60 regiments with about 3000 J-6/B/D/E, 500 J-7, 50 J-8

Reconnaissance aircraft: estimated at 40 HZ-5, 150 JZ-5, 100 JZ-6 aircraft

Transport aircraft: Some 600, including 18 BAe Trident 1E/2E, 30 Il-14, 10 Il-18, 50 Li-2, 300 Y-5, 20 Y-7, 25 Y-8, Y-11 and Y-12

Helicopters: 400, including 6 AS-332, 4 Bell 214, 30 Mi8, 24 S-70, 250 Z-5 and Z-6, 15 Z-9, 8 SA-342 (with HOT) on trial

Training aircraft: includes CJ-5/-6, HJ-5, J-2, JJ-2, JJ-4/-5/-6

Missiles:

Air-to-air missiles (AAM): PL-2/-2A, PL-5B *Atoll*-type, PL-7

Air-to-surface missiles (ASM): HOT ('high subsonic optically guided tube fired'), C-601 subsonic air-launched cruise missile (ALCM) (anti-ship, perhaps HY-2 SSM derivative); C-801 surface skimmer

Air defence artillery: 16 divisions utilising 16,000 35mm, 57mm, 85mm, 100mm guns and 28 independent air defence regiments (100 surface-to-air missile [SAM] units with HQ-2/-2B, HQ-2/-2J [CSA-1], HQ-2/-61 SAM)

INDIA

110,000 personnel; 833 combat aircraft, 12 armed helicopters. Five Air Commands.

Bomber aircraft: 1 light bomber squadron with 9 *Canberra*

Ground attack fighter aircraft: 26 squadrons
- 3 with 48 *Ajeet* (to be re-equipped, 1990-91)
- 5 with 80 *Jaguar* IS
- 1 with 20 *Marut*
- 8 with 108 MiG-21 MF/PFMA
- 4 with 64 MiG-23 BN/UM
- 5 with 80 MiG-27

Fighter aircraft: 22 Squadrons
- 12 with 200 MiG-21 FL/bis/U
- 4 with 65 MiG-23 MF/UM
- 3 with 50 MiG-29/UB
- 3 with 46 *Mirage* 2000H/TH

Maritime attack aircraft: 8 *Jaguar* with *Sea Eagle*

Attack helicopters: 12 Mi-25

Reconnaissance aircraft: 3 squadrons
- 1 with 8 *Canberra* PR-57
- 1 with 6 MiG-25R, 2 MiG-25U
- 1 with 4 HS-748

Maritime reconnaissance/survey aircraft: 2 *Gulfstream IV* SRA, 2 *Learjet* 29

Transport aircraft: 13 squadrons
- 2 with 30 An-12B
- 6 with 108 An-32 *Sutlej*
- 1 with 16 BAe-748
- 1 with 10 DHC-3 (to re-equip with Do-228)
- 1 with 10 DHC-4
- 1 with 10 Do-228
- 1 with 12 Il-76 *Gajraj*

Transport helicopters: 11 squadrons with 80 Mi-8, 50 Mi-17, 10 Mi-26 (heavy transport)

VIP aircraft: 1 headquarters squadron with 2 Boeing 707-337C, 4 Boeing 737, 7 BAe-748

Liaison aircraft: flight and detachment: 16 BAe-748, C-47

Training aircraft: 24 BAe-748, 20 *Canberra* T-4/-13/-67, 120 HJT-16, 57 *Kiran* II, 20 HPT-32, 60 HT-2, 20 *Hunter* T-66, 5 *Jaguar* 1B, 44 TS-11

Training helicopters: 20 *Chetak*

Missiles:

Air-to-surface missiles (ASM): *Akash*, AM-39 *Exocet*, AS-7 *Kerry*, AS-11B (anti-tank guided weapons [ATW]), AS-30, *Sea Eagle*

Air-to-air missiles (AAM): AA-2 *Atoll*, AA-7 *Apex*, R-550 *Magic*, Matra *Super 530D*
Surface-to-air missiles (SAM): 20 battalions; *280 Divina V75SM/VK* (SA-2), SA-3

INDONESIA

25,000 personnel, with 81 combat aircraft and no armed helicopters. Two Air Operations areas.

Ground attack fighter aircraft: 2 squadrons with 28 A-4 (26 A-4E, 2 TA-4H); 1 with 12 F-16 (8 F-16A and 4 F-16B)

Fighter aircraft: 1 squadron with 14 F-5 (10 F-5E and 4 F-5F)

Counter-insurgency aircraft (COIN): 1 squadron with 12 OV-10F (see also training)

Maritime reconnaissance aircraft: 1 squadron with 3 Boeing 737-200, 2 C-130H-MP, 4 HU-16

Tanker aircraft: 2 KC-130B

Transport aircraft: 4 squadrons
2 with 19 C-130 (9 C-130B, 3 C-130H, 7 C130H-30), 1 L-100-30
2 with 1 Boeing 707, 7 C-47, 5 Cessna 401, 2 Cessna 402, 7 F-27-400M, 1 F-28-1000, 2 *Jetstar*, 10 NC-212, 1 *Skyvan* (survey)

Helicopters: 3 squadrons
1 with 12 UH-34T (updated to S-58T standard);
2 with 2 Bell 204B, 2 Bell-206B, 12 Hughes 500, 7 NAS-332, 12 NBo-105, 13 NSA-330, 3 SE-3160

Training aircraft: 4 squadrons with 40 *AS-202*, 2 *C-47*, 2 Cessna 172, 5 Cessna 207 (liaison), 15 *Hawk* T-53[1] (training/counter-insurgency), 23 T-34C, 10 T 41-D

Airfield defence: 5 battalions

JAPAN

46,400 personnel in the Air Self-Defence Force; 387 combat aircraft (plus 50 in store), no armed helicopters. Six combat air wings; 1 combat air unit; 1 reconnaissance group; 1 airborne early warning (AEW) group.

Ground attack fighter aircraft: 3 squadrons with 70 F-1 and 1 with 8 F-4EJ (anti-ship)

Fighter aircraft: 10 squadrons
7 with 135 F-15J/DJ
3 with 72 F-4EJ (to be upgraded): 50 more in store

Reconnaissance aircraft: 1 squadron with 10 RF-4EJ (4 more in store)

Airborne early warning aircraft (AEW): 1 squadron with 10 E-2C

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1 Training aircraft counted by the IISS as combat capable.

Electronic warfare aircraft (EW): 1 flight with 1 C-1, 4 YS-11

Aggressor training aircraft: 1 squadron with 20 T-2, 2 T-33

Transport aircraft: 5 squadrons
3 with 30 C-1, 10 C-130H, 10 YS-11
2 heavy-lift helicopter squadrons with 6 CH-47J

Search and Rescue
Aircraft: 1 wing (10 detachments) with 30 MU-2
Helicopters: 24 KV-107, 6 CH-47J

Calibration aircraft: 1 wing with 2 MU-2J, 1 YS-11

Training aircraft: 5 wings and 10 squadrons: 40 T-1A/B, 50 T-2,[2] 40 T-3, 50 T-4, 10 T-33A (to be replaced by T-4)

Liaison aircraft: 11 *Queen Air* 65

Test aircraft: 1 wing with C-1, 3 F-4EJ, F-15J

Missiles:
Air-to-surface (ASM): ASM-1
Air-to-air (AAM): AAM-1, AIM-7 *Sparrow*, AIM-9 *Sidewinder*

Air defence:
Aircraft control and warning: 26 groups; 30 radar sites
Surface-to-air missiles (SAM): 6 air defence missile groups (18 squadrons) with 180 *Nike-J (Patriot* replacing)
Air base defence group with 20mm *Vulcan AA* guns, Type 81 *Tan*, *Stinger* SAM

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF

70,000 personnel; 716 combat aircraft and 60 armed helicopters.

Bomber aircraft: 3 light regiments with 80 H-5

Ground attack fighter aircraft: 10 regiments
5 with 150 J-5
3 with 100 J-6
1 with 40 Q-5
1 with 20 Su-7 and 20 Su-25

Fighter aircraft: 12 regiments
2 with 80 J-5
2 with 60 J-6
1 with 40 J-7
4 with 120 MiG-21
2 with 46 MiG-23
1 with 30 MiG-29

Attack helicopters: 60 Hughes 500

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2 Both the 40 T-1A/B and the 50 T-2 are counted by the IISS as combat capable.

Transport aircraft: 10 An-24, 5 Il-14, 5 Il-18, 4 Il-62M, 2 Tu-134, 4 Tu-154, 250 Y-5

Transport helicopters: 1 Hughes 300C, 20 Hughes 500D, 6 Hughes 500E, 100 Mi-2, 70 Mi-8/-17, 40 Z-5

Training aircraft: Including 120 CJ-5, 30 CJ-6, H-5, 50 MiG-15UTI, MiG-19U, 10 MiG-21U[3]

Air-to-air missiles (AAM): AA-2 *Atoll*, AA-7 *Apex*

Surface-to-air missiles (SAM): 4 brigades (12 battalions, 40 batteries) with 72 SA-2 in 45 sites; 2 regiments with an estimated 32 SA-3 and 2 regiments with an estimated 72 SA-5

KOREA, REPUBLIC OF

40,000 personnel; with 469 combat aircraft, and no armed helicopters. Seven combat and 2 transport wings.

Ground attack fighter aircraft: 18 squadrons
2 with 48 F-16, (36 F-16C and 12 F-16D)
16 with 204 F-5 (44 F-5A and 160 F-5E)

Fighter aircraft: 4 squadrons with 128 F-4 (64 F-4D and 64 F-4E)

Counter-insurgency aircraft (COIN): 1 squadron with 23 A-37B, 6 T-28D

Forward air control aircraft (FAC): 20 O-1, 10 O-2A, 25 OA-37B

Reconnaissance aircraft: 1 squadron with 27 RF-4C, 10 RF-5A

Search and rescue aircraft: 1 helicopter squadron with 15 Bell UH-1B, 2 UH-1N

Transport aircraft: 2 wings, 5 squadrons: 2 BAe 748 (VIP), 1 Boeing 737 (VIP), 9 C-54, 1 C-118, 10 C-123J/K, 3 Commander, 10 C-130H

Transport helicopters: 7 Bell 212, 3 Bell 412, 5 UH-1D, 5 UH-1H

Training aircraft: 25 F-5B, 35 F-5F,[4] 25 T-33A, 40 T-37, 20 T41-D

Missiles:
Air-to-surface (ASM): AGM-65A *Maverick*
Air-to-air (AAM): AIM-7 *Sparrow*, AIM-9 *Sidewinder*

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3 The H-5, MiG-19U and MiG-21U are counted by the IISS as combat capable.

4 The F-5B and F-5F are counted by the IISS as combat capable.

MALAYSIA

12,000 personnel; 67 combat aircraft with no armed helicopters. Four Air Commands.

Ground attack fighter aircraft: 2 squadrons with 35 A-4 (29 A-4PTM and 6 TA-4)

Fighter aircraft: 1 squadron with 14 F-5E, 2 F-5F

Reconnaissance aircraft: 1 reconnaissance/operational conversion unit squadron with 2 RF-5E, 2 F-5F

Maritime reconnaissance aircraft: 1 squadron with 3 C-130HMP

Transport aircraft: 4 squadrons
1 with 6 C-130H
2 with 14 DHC-4
1 with 2 BAe-125 (VIP), 1 *Falcon*-900 (VIP), 2 HU-16 (1 transport and 1 VIP), 11 Cessna 402B, 1 NAS 332 helicopter

Transport helicopters: 4 squadrons with 31 S-61A, 25 SA-316B (liaison)

Air-to-air missiles: AIM-9 *Sidewinder*

Airfield defence troops: 1 squadron

PAKISTAN

30,000 personnel; 470 combat aircraft and no armed helicopters.

Ground attack fighter aircraft: 14 squadrons
1 with *Mirage* (15 IIIEP [some with AM-39 air-to-surface missiles], 3 IIIDP [training])
4 with 58 *Mirage* 5 (54 *Mirage* 5PA/PA2 and 4 *Mirage* 5DPA/DPA2)
9 with 135 Q-5

Fighter aircraft: 12 squadrons
9 with 150 J-6/JJ-6
2 with 39 F-16 (27 F-16A and 12 F-16B)
1 with 40 J-7

Reconnaissance aircraft: 1 squadron with 12 *Mirage* IIIRP

Transport aircraft: 2 squadrons
1 with 12 C-130 (5 C-130B and 7 C-130E), 1 L-100
1 with 3 Falcon 20, 2 F-27-200 (1 with Navy), 2 Beech (1 *Travel Air* and 1 *Baron*)

Search and rescue aircraft: 1 helicopter squadron with 4 SA-316

Transport helicopters: 1 squadron with 12 SA-316, 4 SA-321

Training aircraft: 12 CJ-6, 30 JJ-5, JJ-7,[5] 25 *Mashshaq*, 6 MiG-15UTI, 10 T-33A, 53 T-37B/C

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5 The JJ-7 is counted by the IISS as combat capable.

Air defence aircraft: 7 surface-to-air missile (SAM) batteries; 6 each with 6 *Crotale* and 1 with 6 CSA-1(SA-2)

Missiles:
Air-to-surface missiles (ASM): AM-39 *Exocet*
Air-to-air missiles (AAM): AIM-7 *Sparrow*, AIM-9 Sidewinder, R-530, R-550 *Magic*

PHILIPPINES

15,500 personnel; 26 combat aircraft and 71 armed helicopters.

Fighter aircraft: 2 squadrons with 9 F-5 (7 F-5A and 2 F-5B)

Counter-insurgency (COIN):
Aircraft: 1 squadron with 8 T-28D
Helicopters: 1 wing with 55 Bell UH-1H/M, 16 AUH-76 (S-76 gunship conversion)

Maritime reconnaissance aircraft: 2 F-27M

Reconnaissance aircraft: 3 RT-33A

Search and Rescue: 4 HU-16 aircraft and 10 Bo-105C helicopters

Presidential Aircraft Wing:
Aircraft: 1 F-27, 1 F-28
Helicopters: 1 Bell 212, 2 S-70A, 2 SA-330

Transport aircraft: 7 squadrons
1 with 3 C-130H, 3 L-100-20
2 with 3 C-47, 7 F-27
2 with 10 Bn-2, 9 N-22B

Transport helicopters: 2 squadrons with 15 Bell 205, 17 UH-1H

Liaison aircraft: 6 Cessna 180, 2 Cessna 210, 1 Cessna 310, 5 DHC-2, 15 U-17A/B

Training aircraft: 3 squadrons
1 with 5 T-33, 3 RT-33
1 with 20 T-41D
1 with 14 SF-260MP, 9 SF-260WP[6]

Air-to-air missiles (AAM): AIM-9B *Sidewinder*

SINGAPORE

6000 personnel (3000 conscripts); 193 combat aircraft and 6 armed helicopters.

Ground attack fighter aircraft: 5 squadrons
3 with 62 A-4S/SI, 13 TA-4S/SI
1 with 24 *Hunter* F-74, 4 T-75
1 with 8 F-16 (4 F-16A and 4 F-16B)

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6 The SF-260WP is counted by the IISS as combat capable.

Fighter aircraft: 2 squadrons with 31 F-5E, 9 F-5F

Reconnaissance aircraft: 4 *Hunter* FR-74

Airborne early warning aircraft (AEW): 1 squadron with 4 E-2C

Armed helicopters: 6 AS-350

Transport aircraft: 2 squadrons
1 with 4 C-130B (tanker/transport), 6 C-130H
1 with 6 *Skyvan* 3M (transport/search and rescue)

Transport helicopters: 3 squadrons
1 with 19 UH-1B
1 with 4 AB-205, 5 Bell 205
1 with 22 AS-332M (including 3 SAR)

Training aircraft: 3 squadrons
2 with 30 SIAI S-2111[7]
1 with 26 SF-260 (14 SF-260MS and 12 SF-260WS)

Air Defence: 4 battalions; 3 surface-to-air missiles and 1 artillery
1 with 28 Bloodhound 2
1 with 10 Rapier (with Blindfire)
1 with 6 Improved HAWK
1 with 35mm Oerlikon (towed) guns

Airfield defence: 1 field defence squadron (reservists)

Air-to-air missiles: AIM-9J/P *Sidewinder*

TAIWAN

70,000 personnel; 504 combat aircraft, no armed helicopters, 5 combat wings.

Ground attack fighter/fighter aircraft: 14 squadrons with 8 F-5B, 220 F-5E, 55 F-5F, 8 F-104D/DJ, 120 F-104G, 33 TF-104G

Reconnaissance aircraft: 1 squadron with 3 RF-104G

Search and rescue
Aircraft: 1 squadron with 8 HU-16B, 12 S-70
Helicopters: 12 UH-1H

Transport aircraft: 8 squadrons
2 with 8 C-47, 2 C-54, 1 C-118B, 1 DC-6B
3 with 35 C-119G, 10 C-123B/K
1 with 12 C-130H
1 with 12 Beech 1900
1 VIP with 1 Boeing 707-720B, 4 727-100

Transport helicopters: 5 CH-34, 1 S-62A (VIP), 14 S-70

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7 The SIAI S-2111 is counted as combat capable by the IISS.

Training aircraft: Includes 60 AT-3,[8] T-28A, 30 T-33A, 42 T-34C, 40 T-CH-1

Training helicopters: 10 Bell 47G, 6 Hughes 500

Missiles:
Air-to-surface (ASM): AGM-65A *Maverick*
Air-to-air (AAM): AIM-4D *Falcon*, AIM-9J/P *Sidewinder, Shafrir*

THAILAND

43,000 personnel; 158 combat aircraft, no armed helicopters.

Ground attack fighter aircraft: 1 squadron: 9 F-5A, 4 F-5B. 12 F-16A, 4 F-16B delivered; 2 more due by 1991

Fighter aircraft: 2 squadrons: 40 F-5E, 3 F-5F

Counter-insurgency aircraft (COIN): 8 squadrons
1 with 15 A-37B
1 with 7 AC-47
3 with 24 AU-23A
1 with 15 N-22B
2 with 25 OV-10C

Electronic intelligence (ELINT) aircraft: 1 squadron with 3 IAI-201

Reconnaissance aircraft: 3 RF-5A, 3 RT-33A

Survey aircraft: 1 *Commander* 690, 3 *Learjet* 35A, 2 *Merlin* IVA and 2 *Queen Air*

Transport aircraft: 3 squadrons
1 with 3 C-130H, 3 C-130H-30, 3 DC-8-62F
1 with 10 C-123B/-K, 6 BAe-748
1 with 10 C-47
VIP: Royal flight: 2 Boeing 737-200, 1 *King Air* 200, 1 Merlin IV aircraft; 2 Bell 411 helicopters

Training aircraft: 24 CT-4, 16 *Fantrainer* V-600, 8 Grob G109, 16 SF-260, 10 T-33A, 13 T-37B, 6 T-37C, 11 T-41

Liaison aircraft: 3 *Commander*, 2 *King Air*, 30 O-1, 3 U-10B

Helicopters: 2 squadrons
1 with 18 S-58T
1 with 22 UH-1H

Air-to-air missiles (AAM): AIM-9B/J *Sidewinder*

Air defence (AD): *Blowpipe* SAM. 1 anti-aircraft battery; 2 *Skyguard* radar, each with 4 units of 2 x 30mm Mauser guns

8 The AT-3 is counted by the IISS as combat capable.

VIETNAM

12,000 personnel; 250 combat aircraft, 37 armed helicopters (plus many in store).[9] 4 Air Divisions.

Ground attack fighter aircraft:
1 with 30 Su-7B
1 with 30 Su-17
1 with 40 Su-22

Fighter aircraft: 5 regiments with 150 MiG-21 bis/PF

Attack helicopters: 20 Mi-24

Maritime reconnaissance aircraft (MR): 4 Be-12

Anti-submarine warfare (ASW) helicopters: 17 Ka-25

Survey aircraft: 2 An-30

Transport aircraft: 3 regiments with some 135 aircraft, including:
12 An-2
9 An-24
40 An-26
8 Tu-134
11 Yak-40

Helicopters: 1 division (3 regiments) with 200 units including 5 Mi-6, 25 Mi-8

Training aircraft: 3 regiments with 53 aircraft including L-29, L-39, and MiG-21U[10]

Air-to-air missiles (AAM): AA-2 *Atoll*

9 The serviceability of this equipment is counted by the IISS as being in doubt.

10 The MiG-21U is counted by the IISS as combat capable.

CURRENT DOCTRINE DEVELOPMENT

PANEL ONE

Group Captain B.J. Espeland, Group Captain A.G.B. Vallance, Lieutenant Colonel Charles M. Westenhoff

Group Captain B.J. Espeland

Just as doctrine lies at the heart of military activity, there are a number of compelling principles that are at the core of the development of doctrine. Perhaps the best way I can broach some of these imperatives is by referring to a recent letter to the editor of an Australian defence periodical, the *Asia-Pacific Defence Reporter*. The letter stated that it was time the RAAF stopped trying to promote itself as equal to the Army and Navy. In particular, the writer claimed that the present-day RAAF should accept the view held by its founding father, Air Marshal Sir Richard Williams, that its natural role is to support land and sea forces.

The fact is that, in April 1925 Williams presented a highly detailed 70 page strategy for the defence of Australia. Contrary to proposals of the time to spend 5 million pounds - a fortune in the mid 1920s - setting guns in cement to defend Australian ports, Williams' paper was based on substituting air power for land and sea power where it could be more effective and efficient. Its central judgment that Australia should be defended in the air/sea gap to the north was a clear expression of the same strategic approach which, of course, some 60 years later resurfaced in the current White Paper, *The Defence of Australia 1987*.

As I mentioned previously, there are a number of imperatives relating to doctrine development that are well illustrated by this story. The first principle it brings to mind is the need for doctrine to be explicit, and to the greatest extent possible, unclassified. That such a distortion of Williams' strategic thinking could be presented in good faith is partly the RAAF's fault for failing to articulate air power's proper role in national defence. It is only through wide and open debate that airmen can hope to ensure that air power is properly understood and valued both in defence circles and the community at large.

A further imperative of doctrine development reflected in the Williams story is the need for doctrine to be indigenous. Certainly, it should be eclectic, but unless it is shaped by the realities of national defence policies, which are in turn based on factors such as geostrategic circumstances, it is of little use in other than an abstract sense. For example, in Australia's case, air power, with its inherent flexibility, reach, and responsiveness, has a vital role to play in defending the continental approaches.

So far in my account of Williams' paper I have failed to mention the outcome of his submission. Not much to report I am afraid. Essentially, it foundered on the rocks of inter- service rivalry. For, at the time, there was little recognition of the need to search for a consensus within the profession of arms as to the best employment of naval, land and air forces in war. The rebuttal to Williams in this instance was to deny the verity of effective modern warfare, namely, the fully fledged integration of the unique forms of land, sea and air power in a sense of cooperation.

Group Captain Brent Espeland, AM
Director, RAAF Air Power Studies Centre

But, more to the point, the matter begs the question of how to develop the doctrine that will guide the joint application of those forms of power in combat. Full sensitivity to the joint imperative comes with the realisation that joint doctrine does not materialise out of nowhere; it must be based squarely on single-service doctrine. In no way does this suggest that one form of doctrine is superior or subordinate to another but rather that they are complementary and interdependent. The aim is to ensure that joint and single-service doctrine are consistent with each other through an iterative process based on coordination and cooperation. Australia has revitalised this process through initiatives such as the ADF Warfare Centre's current review of Joint Service Publications, the Australian Army's rewrite of *Fundamentals of Land Warfare,* and the RAAF's publication of *The Air Power Manual.*

The final point about the development of air power doctrine that I wish to draw from Williams' paper is the apparent dichotomy between innovation and continuity. On the one hand, extraordinary changes in technology can offer the prospect of doctrinal change. On the other hand, many concepts of air power application are enduring. Indeed, it is worthwhile noting that all but two contemporary roles of air power - electronic warfare and air-to-air refuelling - were first carried out in World War I, albeit in different form than we know them today.

The key to this issue lies with the understanding that there is only one level of doctrine - the philosophical level. Air power doctrine is a *conceptual* foundation and framework for the proper application of air power in the defence of a nation. Many of these concepts are largely drawn from the unique characteristics of operating in the third dimension and it is only when technology can significantly bend these characteristics

that we are likely to see doctrinal change. The point here is that to artificially describe levels of doctrine as, say, operational or tactical, imparts a bias that may distort the philosophical nature of doctrine and thus obscure some of its enduring concepts.

One difficulty here is that there is a need for operational commanders to issue their own guidance and there is therefore the question of what to call it. Some slippery semantics will fix that, but the real difficulty is the development of the form and characteristics of that guidance. And, indeed, this is the point at which air power doctrine development is presently at in Australia. Some progress has been made, particularly in relation to air defence and strike operations, but there is still some way to go in this regard.

Perhaps some members of the audience may wish to pursue further the matter of doctrine as issued by operational level commanders. Or it may be that others wish to canvass the explicit, indigenous, or philosophical nature of air power doctrine, or its relationship to joint doctrine. For, it is evident that my thoughts on these doctrinal development imperatives have been somewhat less than expansive, and that my purpose has not been to subject those issues to rigorous scrutiny, but rather to put them forward for further discussion.

Group Captain A.G.B. Vallance

'Air power', Sir Winston Churchill once pointed out, 'is the most difficult of all forms of military force to measure, or even to express in precise terms'.[1] Perhaps it has been the growing appreciation of the truth of this remark - and the realisation that technology alone cannot provide all the answers needed for future air power development - that has led in recent years to an important flowering of doctrinal thought and the production of new doctrine manuals by many of the world's air forces. These include the recently re-issued United States Air Force basic doctrine manual AFM 1-1, the German Luftwaffe's manual LDV 100 and the RAF's doctrine manual AP 3000. Outside NATO, the Royal Australian Air Force has led the field by establishing an Air Power Studies Centre and publishing its own doctrinal statement, AAP 1000. And in many other countries - most notably perhaps Holland and Norway - excellent doctrinal work is also being carried out.

Significant though they are, these developments represent more of a beginning than an end. No doctrinal statement can be definitive, and if we are to build on the foundations already established we need to be clear about the future direction that doctrinal development should take. In this context there are, I believe, two issues of central importance: the nature of the air power contribution to joint service capabilities and the use of air power in crisis management.

The Air Power Contribution to Joint Service Capabilities

The principal problem we face in exploiting to the full the air power contribution in the joint battle is that many armies and navies continue to see air power essentially as a supporting capability to surface force action. This is patently quite wrong.

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1 *The History of the Second World War*, Sir Winston Churchill.

Group Captain A.G.B. Vallance, OBE
Director of Defence Studies, RAF

Even in World War II, air power was often used as the principal force element in joint action. This was perhaps most obvious in maritime/air operations, particularly in the Pacific where - from the Japanese air attack on Pearl Harbour to the destruction of Hiroshima and Nagasaki by air-delivered atom bombs - air power was throughout clearly the dominant factor. But there were also many occasions in which air power was used as the principal force element in air/land operations. While air power could not be used to occupy ground physically, it was often used to destroy enemy land forces and deny, hold and take ground.[2]

And since World War II, the developing capabilities of air systems have far outstripped those of surface systems. Perhaps this is best illustrated by a recent assessment of the Soviet Union's Academy of Sciences which concluded in 1989 that 'if 45 years ago 100 aircraft could destroy 1000 combat vehicles on the average in 35 days, they can now perform a similar mission in 36 hours'.[3]

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2 Three examples from World War II clearly illustrate this. In 1943, the Italian fortress islands of Pantelleria and Lampedusa (garrisoned by 11,000 men) surrendered after concentrated Allied air attack before any assault troops were landed. In France, in August 1944, Allied air power attacked German forces (numbering 30,000 men) south of the Loire which - although at no time engaged by sizeable Allied ground forces - were forced to surrender, in fact, to an air force - the USAAF 19th Tactical Command. In January 1945 air power was used to take the fortified town of Gangaw in Burma from the Japanese. In his book *Defeat into Victory*, the commander of the British 14th Army in Burma, Field Marshal Viscount Slim, remarked 'Gangaw was taken by the air force and occupied by the Lushai Brigade - a very satisfactory affair'.

3 *Disarmament and Security, 1987 Year-book*, Oleg Amirov et al, Novosti Press, 1988 p 364.

Air power is now - and has been for many years - an equal partner with land power and sea power in joint action. Air and surface forces work together synergistically, offering each other mutual support to achieve joint objectives. In some operations the air forces will act in support of the land and sea forces; in others - as for example in the recent Gulf War - air power will be the principal force element and the surface forces will operate in support.

Moreover, in developing joint service doctrine, it must never be forgotten that the use of air power is not restricted purely to joint action. It can also be employed largely independently of the surface forces both for strategic bombing operations to damage the enemy's will and ability to wage war and for counter-air operations to deter, contain or defeat the enemy's air forces. Both of these independent applications of air power are strategic in their nature as they can have a major effect on the course and outcome of a conflict.

In the Gulf War air power was used for all of these purposes simultaneously. Allied air power swept the Iraqi Air Force from the sky; it destroyed the Iraqi nation's ability to sustain the war; it crippled the Iraqi Army as a cohesive and effective fighting force before the start of the land-force attack and it helped to spearhead the physical liberation of Kuwait. Throughout the Gulf War, air power was the decisive factor; for the Allies it was *the* great life-saver and without it Kuwait could probably not have been liberated.

The importance of recognising this ability of air power to act as the principal force element in joint capabilities is as valid for lower intensity conflicts as it is for high intensity conflicts. And here the French experience in Chad provides a highly illuminating case study. During their four interventions in Chad between 1965 and 1986 the French learned that there were marked advantages in using air power rather than ground forces as the principal force element.

In each successive intervention, the French increased the air element in their joint force. In their last intervention - the highly successful Operation Epervier in 1986 - the air formed the principal force element with ground forces acting in its support. Ease and speed of insertion and extraction, limited human, financial - and thus political - liability, and the ability to dominate vast and sparsely populated regions, proved to be key attributes. They will probably be no less relevant to any future lower intensity air/land operations.

Insufficient time prevents me from examining possible solutions in the depth that they deserve, but a useful first step would, I suggest, be to dispense with terms such as close air support, offensive air support and tactical air support for maritime operations which are essentially obsolete and pejorative. The power of such terminology on our thinking should not be underestimated; by implying that air action can only be in support of surface action, they tend to channel our thinking and constrain the vision needed to exploit to the full the expanding potential of air power in joint capabilities.

I should now like to turn to my second topic, the use of air power in crisis management. Clearly, it is far better to contain a crisis and avert a conflict than it is to go to war. Much thought has been devoted to the use of air power in conflict, but relatively little doctrinal work has been done to work out guide-lines for the use of air power in crisis management. Yet the unique ability to generate and project military power rapidly, over long distances and unimpeded by surface features makes air power an ideal instrument for this purpose. Indeed, air power offers the political decision-maker a very wide spectrum of options for averting conflict and promoting international stability and security.

Air power can obviously help to give timely warning of an intended aggression and thus allow appropriate preventive action to be taken.[4] But it can also be used to signal, support, deter or coerce without actual recourse to violence. Overt increases in air power readiness states can be used to send a clear political signal and thus help to remove uncertainty over intentions and reduce the danger of miscalculation.[5] Air power can also be used to support allies under threat or attack. This need not necessarily involve combat forces. Indeed, resupply and surveillance can in many circumstances be more useful than combat capabilities.

Transport aircraft clearly carry smaller payloads than surface transport systems, but this is far less important in crisis management situations than the ability to get to the crisis area quickly. For example, during the 1973 Yom Kippur War, although only 26% of US aid was sent by air, none of the 74% that was sent by sea arrived before the fighting stopped.[6]

Moreover, the deployment of reconnaissance or surveillance aircraft can have a salutary deterrent effect on potential aggressors by warning them that their actions are being watched and could provoke a response.[7] And clearly - because such specialist aircraft can enhance the fighting power of in-theatre forces and prepare the ground for reinforcing combat forces - they can also be used to span the 'options gap' between low-profile 'dissuasion' - as the French would put it - and higher-profile deterrence.

So far as these higher profile forms of deterrence are concerned, air power can be used in both defensive and offensive senses. Periodic rapid air reinforcement exercises[8] are a most effective form of 'defensive deterrence' because, by proving a capability in peace-time, they help to ensure that capability never has to be used in crisis or conflict. It is certainly arguable that, had it been possible for the international community to divine Saddam Hussein's intentions earlier, the rapid deployment of air power to Kuwait before the Iraqi invasion might well have defused the Gulf crisis before it had really developed.

So far as offensive deterrence is concerned, the proven ability to exact rapid retribution, strike deep into the enemy's airspace and deny the aggressor the assurance that his homeland can be kept safe from attack can exert a powerful deterrent effect upon a would-be aggressor. Indeed, in many crises, air power will be the only instrument at the disposal of a government which has the speed and reach to get to the crisis area in time - and with sufficient force - to deter aggression.[9] And

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4 The detection of Soviet ballistic missiles in Cuba in 1962 by U-2 aircraft was an example of this.

5 For example, during the 1973 Yom Kippur War, the US declaration of a DEFCOM 3 alert state - the highest peace- time alert state and one which involved the redeployment to the United States of over 200 B-52s for regeneration into the nuclear role - was a clear warning to the Soviet Union that the US would not tolerate direct Soviet military involvement on the ground in the Middle East.

6 *The Air Force and National Security: Global Reach - Global Power*, US Department of the Air Force Document, June 1990, p 11. In her autobiography, Golda Meir - the then Israeli Prime Minister - comments: 'The airlift was invaluable. It not only lifted our spirits, but also served to make the American position clear to the Soviet Union, and it undoubtedly served to make our victory possible'. *My Life*, p 431.

7 During the last few years the US has made frequent use of such 'low-profile' deterrence (or 'dissuasion' to use the French term): the deployment of AWACS aircraft to Saudi Arabia, Egypt and Chad in the 1980s were all examples. See *Global Reach - Global Power*, p 15.

8 For example, the UK carries out the periodic Falklands Islands Reinforcement (FIRE) Exercises.

9 The deployment of Allied air forces to the Gulf within a few days of the invasion of Kuwait - and the implied counter-threat they posed - provided the key element in deterring the apparent Iraqi threat to Saudi Arabia. Other examples include the rapid deployment of RAF Harriers to Belize in 1972 and 1977.

finally in this context, air power can be used as an instrument of coercion either to force an aggressor to climb down[10] or to exact retribution for an injury, for example, for an act of state-sponsored terrorism.[11]

These are just some examples of air power's very great potential as an instrument of crisis management. In essence, they are based on three characteristics: responsiveness, flexibility and mobility. These characteristics are to a large extent inherent in air power but they also need to be developed if they are to give full effect. That in turn has force structure and training implications, and it also has educational implications for both service and political senior decision-makers. It is no good having such capabilities unless we know how to use them properly. Hence the importance of developing sound doctrinal guide-lines for their employment.

Summarising, doctrinal development has progressed rapidly in recent years, but we still have a long way to go. Two key areas for the future are likely to be the air power contribution to joint service capabilities and the use of air power in crisis management. It is perhaps in these two fields where the most important and difficult challenges lie.

Lieutenant Colonel Charles M. Westenhoff

A few years ago, a Marshal of the Soviet Union described how hard it is to understand the United States Air Force. He said the doctrine of the American Air Force is a vexing problem. According to him, our manuals say practically nothing, and what little they do say is useless as a guide because no-one in the USAF reads them anyway. To honour that analysis, I will not describe USAF doctrine in detail but instead will talk about doctrine's most enduring challenges as I see them.

For a military doctrine overall, the problem is that people keep learning. New events and new analyses of old events challenge our written doctrine and require their revision. If we could only remain stupid we would not need to revise. Now, for air force doctrine, there is an additional concern. A faulty prescription of air power's roles may impose constraints which could restrict or destroy the characteristic identified by Field Marshal Montgomery as air power's greatest asset, namely, its flexibility.

Air power's flexibility is perhaps most evident at the level of war we now call the 'operational', and which in the recent past was most commonly referred to as the 'theatre' level. Perhaps the finest demonstration of air power at the operational level, and the one that we have used as our paradigm for understanding the operational level of war in the USAF, was the defence of Australia in 1942. If you will pardon my temerity, I shall provide my analysis of that operation and its meaning for doctrine development.

In the United States Army Air Force (USAAF) in 1942, the following doctrine assumptions were common:

> the critical task for an air commander was selecting targets for his bombers,
>
> fighters were effective primarily in the air defence role,

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10 When American soldiers were attacked by axe-wielding North Koreans in 1976, the rapid and ostentatious deployment of US air power over the area of the incident - and the threat it implied - forced the North Koreans to make a formal apology.

11 The US Operation *El Dorado Canyon*, involving UK-based F-111 attacks against Libya in 1986, was an example of this.

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airlift was used for speeding critical resources to well secured bases, and

because of those 'doctrinal tenets' and their differences in performance, transport, bomber and fighter aircraft were best used separately.

As I shall explain, that doctrine and the assumptions on which it was based were rejected by the Commander of the Allied Air Forces in the South West Pacific Area, General George C. Kenney.

The factor that dominated most air power planning in World War II, and still does, was of course choice of targets. The ability of aircraft to go anywhere within a reasonable operating radius carrying any available weapons gives air power its tremendous flexibility. However, with air forces of finite size it is logical to conclude that there will always be more targets than aircraft to attack with. And for the operational commander, the key decision is where and what to attack (of course the assumption here is that attack missions will be worthwhile and prudent).

Commanders at the operational level have far more options than their tactical commanders. General Kenney could not only choose how to fight, he could choose how not to fight. The allies were flying with heavy combat loads in marginal weather; consequently, over half of their attrition came from accidents rather than enemy action. It was therefore essential to undertake only worthwhile operations.

Examining the sortie figures for the Allied Air Forces in 1943, we find that less than 3% of the fighter sorties were attack missions. One of a commander's options at the operational level - and it is an option peculiar to that level - is to deny or limit battle

until a positive object or opportunity makes the effort worthwhile. In other words, an important variable available to the operational commander is *tempo*. Kenney took that option.

In the face of the Japanese air attack, Kenney also adopted a flexible basing posture. He established a theatre reserve which reduced vulnerability and also enhanced offensive potential. Normally he kept about one-third of his forces at forward bases, another third were in reserve, and the remainder stayed behind, training or recovering from operations. For major efforts the reserve forces could move from Australia forward to New Guinea for brief periods. My point here is that an audacious operational commander may modify or discard established operational norms or doctrines to fit circumstances. Kenney's basing actions suggest a second variable at the operational level which can be called *posture*.

General Kenney also modified aircraft and weapons to change his air force's *capabilities*. He directed, for example: modification of A-20 attack aircraft to increase their range; local development of medium bombers packed with forward firing guns ('commerce destroyers'); low altitude skip bombing; and attacks with 'parafrag' bomblets (which foreshadowed modern cluster bombs).

Significantly, each of those developments was introduced on a large scale to reap the full benefits from its initial use. Had those developments been tried out on a tactical scale, surprise might have been lost and Japanese forces could have adjusted their plans for the new threats. While tactical commanders might have had the means to develop those techniques on a small scale, only the operational commander had the means to gain decisive results from their employment. The operational commander, then, has the authority to direct, guide and exploit technical and tactical adaptations to create success on a large scale.

Throughout the campaign, Kenney developed operational level solutions to compensate for his shortfalls in resources. He could never forget that the Allies' strategy of winning the war in Europe first - that is, before the war in the Pacific - was always going to limit his resources profoundly. Not only were replacements few, they were also uncertain in number, schedule and quality. Kenney's response was to reject a widely held assumption of contemporary air power doctrine. In early 1943, at a time when other air commanders considered fighter escort operations impractical, over half of Kenney's fighter sorties were escort missions. Fighter escort tended to preserve forces by massing them together and increased the likelihood of success for the mission being flown. The ratio of escort sorties increased when Kenney went on the offensive: then, escort operations accounted for over 75% of the fighter sorties. Allied fighters escorted not only bombers, but also transports. Kenney's use of a disparaged employment option, fighter escort, shows that the operational commander can influence events by combining tactical forces and departing from accepted doctrine.

It seems fair to say that Kenney made a common practice of discarding doctrinal precepts as circumstances required. Should we therefore conclude that developing doctrine is a fruitless task, as many of our doctrine writers in-training would suggest? The answer must be an unequivocal 'no'. Indeed, it is air power's very flexibility that demands sound doctrine. As air power's capabilities grow constantly, so too do the temptations to misapply it. There is a constant temptation to use air forces piecemeal rather than to use them in accordance with a long term joint plan. Our doctrinal objective must be to best utilise the air weapon's flexibility through a consistent strategy, which itself is an integral part of government policy. That challenge, which was described by Sir John Slessor over 40 years ago, defines our task today.

DISCUSSION

Air Marshal Funnell: Ladies and Gentlemen, you have before you three experts in the field of doctrinal development. I don't think it would be immodest in Australia's case to state that, as far as the English speaking nations are concerned, the three air forces represented here have been at the forefront of doctrinal development in recent years. So you have here an ideal opportunity to discuss with three experts some of the basic issues associated with getting a sound philosophical basis for the employment of air power, and I throw the floor open to you to discuss doctrine with them.

Group Captain A. Titheridge (RAAF): We have seen numerous examples in the past of the problems associated with inflexible doctrine. I'd appreciate the panelists' views on how we insure that our doctrine remains as flexible as the force it is supposed to serve.

Group Captain Espeland: I think that the short answer to that question Alan [Titheridge] - and I'm sure that Andy [Vallance] will wish to add to this - is that the flexibility comes from not hiding the topic, but ensuring that there is open, active debate, so that all the arguments are put forward.

Doctrine is not just a matter of putting forward what we should do and why, but also bringing into consideration all the advantages and disadvantages and, with the knowledge of that full range of reasons, why to do things and why not to do things. It may well be that changed circumstances shift the emphasis to the point that your doctrine can change. It is not sufficient to know the subject by rote: what is really needed is the deep understanding which comes from a wide and on-going debate.

If I could add just one point to Lieutenant Colonel Westenhoff's talk about General Kenney's New Guinea campaign - this is something I can't let pass as an old trashy - Kenney was also very innovative in terms of airlift. He was responsible for airlifting significant elements of the 126th and 128th US Regiments from Brisbane to Port Moresby, an operation which he organised in a couple of days using to a great extent civilian air assets. The airlift was one of a number of initiatives which helped to swing the position at Port Moresby at a critical time.

Group Captain Vallance: We define doctrine as fundamental principles which guide the actions of military forces, and as a rider to that it is authoritative but requires judgment in application. Now the key words here are 'fundamental principles', 'guide', and 'authoritative but requires judgment in application'. So doctrine is not holy writ, and it's not set in tablets of stone, it's our best estimation of the best way to use military forces in general and air forces in particular when we talk about air power doctrine. Over the years we've got better and better at it. In the early days of the formulation of doctrine, doctrine was mainly theory with a little bit of practical experience to leaven it. Doctrine is always a combination of theory and practice. Today we have a far, far greater data base of practical experience on which to draw and on which to test our theories against. So whereas one could say the strategic bombing doctrine of the 1930s proved to be inadequate in the conflict that followed, we can now be a lot more confident of our doctrines in the future. But the fundamental point about doctrine is that it is not fixed, it is developing; and we must always seek to develop the fundamental aspects of air power. And of those fundamental aspects, as has been said by air power philosophers time and again, flexibility is undoubtedly the key capability.

Lieutenant Colonel Westenhoff: If I might offer a practical suggestion in that direction, perhaps a radical one. When I was working on tactical doctrine we fortunately had an infusion of money into the program, so our solution to the problem of doctrine revision

was to schedule, every year and a half, a complete, thorough analysis of all of our doctrine books, from front cover to back cover. That's an expensive proposition, but if you think that doctrine will remain the same, you're kidding yourself.

Air Marshal Funnell: I might add a personal view here. When we set out to write our doctrine in the Royal Australian Air Force, I sought with all the force at my disposal to point out to the writing team that, too often in the past, doctrine has been a statement, whereas I wanted it to be seen as a process. That process is now set down for all to see in the last chapter of our manual. But like doctrine itself, it's just there for people to comment on and for us to improve.

As I also said when we published our air power manual, that it was the first word on air power in the RAAF rather than the last. And one task I placed on Group Captain Espeland when he took over the Air Power Studies Centre - and this was even before the first edition of the manual was published - was that as soon as he settled in, he was to give to me the program for publishing the second and much improved edition. If we start to think in terms of doctrine being a process that should be subject to continual improvement, then I think that the flexibility that is an inherent characteristic of air power can flow through into the processes for doctrinal development.

Mr R.W. Howe (Industry): I'm a little bit confused about some of the definitions used here. Looking at the title, we talk about conventional air power and the 21st century. But I note the conference is sponsored by British Aerospace, and I find the term 'aerospace' a little difficult to correlate with air power. I understand that the United States Air Force is going into the fourth dimension of space. Accepting that each country has indigenous doctrines, I would like to ask each of the panelists where space fits into the definition of air power, and how that is being looked at in a doctrinal sense.

Lieutenant Colonel Westenhoff: In the on-going revision of the United States Air Force basic doctrine manual, we were charged with welding space into what we have in the past called air power doctrine. It is aerospace doctrine. In fact we've gone a long way towards defining the roles and missions and the employment possibilities for space power as a part of aerospace power as a whole. I don't see that it gains anything to define air power as exclusive of space. In fact some of the better definitions of air power have included space power. So when I use the term air power I mean to say aerospace power, and I think that's what we are all talking about to greater or lesser degrees as our space programs go along. To cut space off from the air force would be a mistake.

Group Captain Vallance: It seems to me that there are two approaches one could take on this. The first approach argues that space is a natural extension of the third dimension above the surface of the earth, and therefore we can talk about aerospace doctrine as one verified set of guiding principles. The other approach takes a rather different line. It argues that air power differs from land power and sea power because the environment in which it operates is very different, and each form of military force - air, land and sea - therefore has quite distinct, specific characteristics; and if we take that approach then it's a bit difficult to extend air power into space, because space has patently different characteristics from air. Space vehicles operate differently, they don't have the manoeuvrability and the flexibility of air vehicles. Not yet, not in the foreseeable future. And certainly when we were formulating the RAF's new air power doctrine we considered space and we considered its impact, but we didn't feel able to go all the way and go for aerospace doctrine like the United States has. Not only because obviously we don't have the capabilities or anything like them that the United States has, but also because there is still a philosophical question mark about whether air is aerospace or whether air and space are different environments and should be considered separately.

Group Captain Espeland: I mentioned before that doctrine is shaped by the realities of national defence policies, and it is clear that at least for the foreseeable future there are certain aspects of space operations, offensive and defensive, that Australia is not looking to get involved in. However, having said that, there is obviously considerable scope for the use of space by the Australian Defence Force; for example, surveillance, intelligence, and even things like the provision of meteorological services. I think it would be fair to say that we at the Air Power Studies Centre have not come firmly to grips with the question, but we are certainly moving down the path towards it. This year we have under our auspices two research fellows, both at squadron leader rank, who are looking at ADF applications of space. And as part of their research and work they will be considering doctrine.

Air Commodore N. Ashworth (RAAF, Retired): Can I make a couple of points about *The Air Power Manual* and congratulate you on the manual itself. I think it's an excellent development and not before its time. The manual as I read it is aimed at explaining air power to other people. However, as it stands at the moment, I see it as document written by operators for operators, in other words, it is a document that explains air power at the operational level. I see a need also to explain air power to the politicians, to explain air power to the political level or as you would like to call it, the 'grand strategic level'. And in order to do so, I think there is a need at the same time to understand the political implications of the use of air power. I think that's one area in which the document as it stands is deficient.

My second point is that I think there is a missing link in the development of doctrine. Group Captain Espeland mentioned in his presentation the idea of joint doctrine and single service doctrine virtually going side by side. That notion doesn't quite fit with my understanding of the scheme of things. To my mind the term 'joint' is probably outdated and we should throw it away. What you need, and what I would could call a missing link in the doctrine development process, is a doctrine of combat power, if in fact your air power is part of combat power along with sea power and land power. I believe there is a need to develop somewhere within the scheme of things a concept of combat power which should replace that of joint operations. In my opinion, so-called joint doctrine tends to deal with the procedures of working together, rather than being a doctrine as such, even though it is called so.

Perhaps I could make a third point. *The Air Power Manual* tries to give air power an Australian flavour, which is an excellent move. To do so, it takes as a starting point DOA 87, and that probably is reasonable since that is the prime statement by the government in the public arena of its strategic guidance. However, unlike Professor Ball, I don't have much of an opinion of *Defence of Australia 87*. It is a document a bit like the Bible, you can read what you like out of it. I think that in presenting aspects from DOA 87 in the manual, there's been a certain amount of selective reading.

Group Captain Espeland: On the first point, *The Air Power Manual* represents doctrine as endorsed by the officer responsible for single service doctrine, in this instance, the Chief of the Air Staff. But having said that, the point I'd make is that it is doctrine which is philosophical; it's a rigorous analysis which sets down, documents and codifies those elements of guidance which are necessary to direct the use of air power. We don't like to confine our approach to developing doctrine by labelling it as 'basic' or 'operational' doctrine, but I think as you read through it you'll see we come down through the various levels of war in terms of the application of air power. I think the structure of the manual itself is very thorough. It looks at war in the general sense and then in the Australian context, before doing the same for air power. The manual then fleshes out our particular conceptual framework. The hierarchy of air power places particular emphasis on the very basis of joint operations - that is, co-operation - and, as the CAS said, is completed by a section on the doctrinal review process.

The point you make of combat doctrine and joint doctrine is interesting. I think that you are quite right: that in the past joint doctrine really has been joint procedures; and I think that would be acknowledged by the ADF Warfare Centre. As I mentioned in my presentation, they are trying to come to grips with that. The Warfare Centre realises that joint doctrine doesn't materialise out of nowhere, it is based squarely on single service doctrine. So we are all working to make their product real joint doctrine and, in the sense that you were talking about, to make the application of combat power the synergistic effect of the three unique forms of combat power.

The final point I would make is that it is necessary for doctrine to be shaped by the realities of national defence policy and, as such, *The Air Power Manual* does fit within strategic guidance. That is the only way it can be of any lasting value. If strategic guidance changes then we may need to go back and rethink many of those precepts.

Air Marshal Funnell: Thanks for that Norm [Ashworth], I would just like to add a couple of comments to those of Brent's [Espeland]. I agree with both of you that our joint doctrine in the past has been essentially procedural rather than conceptual. Air Commodore Les Fisher and his team in the ADF Warfare Centre have set out to correct that and we wish them well. We'll co-operate with them to the fullest in changing the situation.

I've also read some of your thoughts on junking the term 'joint operations' and concentrating on the development of a doctrine for the application of combat power. I think we could usefully pursue that, and I hope you will with the Air Power Studies Centre. Terminology can sometimes deflect peoples' thinking and generally not in positive ways. Far too often, terminology from the past carries with it intellectual baggage which befuddles present day thinking and I think that's true in the case of joint operations. It is interesting to consider sometimes that, were it not for the advent of aircraft, joint operations would be a matter of minor professional significance. It is air power, particularly with its pervasiveness, which has changed all that and so much of the history of doctrinal development since the advent of the aeroplane has had to do with the ownership and allocation of air assets. In this country as in others we still haven't firmly come to grips with the philosophical basis on which we are going to decide the questions that those particular points raise.

Mr I.M. Westmore (ADI): I know to an extent you are trying to provoke us with your paper Brent, but I would like to take up some of your points and look at them from the view of maintaining the dynamics of doctrine. It seems to me that because we called the AAP 1000 *the* air power manual, we have inferred that the only people who can have worthwhile thoughts about air power doctrine are those at the Air Power Studies Centre, or similar specialist centres. I totally refute that. As an example, I'd like to refer to the AAP 1000's thesis that there is only one level of doctrine. We've had a good example from history of General Kenney's flexible approach to doctrine, where he influenced strategic doctrine through his operational doctrine. My central thesis is that any commander who has some thoughts, some guide-lines, even some philosophy to put before the people he commands, and who puts his signature to those thoughts, has *ipso facto* issued doctrine.

If we do not have an operational and a tactical level of air power doctrine I put it to you that, as was the case with joint and single service doctrine, some people will claim a monopoly on wisdom. Their doctrine will become immutable. If you've got to wait until you're CAS, or the Director of the Air Power Studies Centre, or one of the other fortunate people who goes out to Fairbairn and works at the APSC, then it's going to be a very steep learning curve. Just as *The Air Power Manual* takes its strategic level guidance from DOA 87, the Air Commander must be guided by the AAP 1000, but surely he has some doctrinal contribution to make at the operational and tactical levels of war.

Group Captain Espeland: I don't necessarily disagree with anything that you've put forward, I think it's all quite relevant. As I said, there is a need for operational level commanders to issue guidance in a doctrinal sense, but perhaps before CAS has something to say, the Air Commander would like to comment.

Air Vice-Marshal I.B. Gration (RAAF): What Ian [Westmore] says is absolutely correct, and in fact the procedure he proposed is already in place. Brent [Espeland] mentioned two of the documents which have already been authorised by my signature, one concerning the air defence of the north and the second the use of strike reconnaissance aircraft in low level contingencies. So in the sense that [Westmore's] described, that is operational level doctrine as far as I'm concerned. It has my signature and it has my endorsement, and I'm encouraging the Force Element Group commanders to continue that work so it remains alive and well.

Air Marshal Funnell: One point I'd like to add to the discussion concerns the way in which we regard *The Air Power Manual*. I don't believe it should ever be regarded as immutable. As I said previously, it's a document which is freely available throughout Australia and anywhere else, and we really encourage and seek feedback from anyone who has some serious thoughts to offer about air power in general or the manual itself.

Group Captain Vallance: I would just say that when the RAF looked at formulating its doctrine, we talked very closely with the Air Power Studies Centre, and we also talked to CADRE [Centre for Aerospace Development, Research and Education], and looked at the two different approaches. I think the approaches essentially are similar, notwithstanding the different labels used. Fundamentally you get down to three levels of doctrine: basic or strategic level doctrine; operational level doctrine; and tactical level doctrine. That hierarchy is needed, not because if you have strategic level doctrine on its own it becomes immutable, but because it can become isolated. If it becomes isolated then it will be ignored, so there has to be a continuum, a doctrine continuum where you can actually see doctrine going through the various levels of war and appearing as something hard and usable at the front line - specific instructions of what to do. Different labels can be used, but essentially I think we are talking about the same thing.

Lieutenant Colonel Westenhoff: I would say probably the best doctrine that's ever been written, or could be written, would be compiled from the informal discussions of experienced, informed professionals. People do talk about doctrine and they do talk about tactics, but in general they never take the trouble to write their thoughts down. Speaking as a doctrine developer, when I'm researching, trying to find the best answer, the best expression and the best analysis, if someone has bothered to write and has made a clear statement in a professional journal or elsewhere, I'll pull that off the shelf and that will become my primary reference. As a matter of fact, our new doctrine manual specifies four roles for air power employment, and that concept came from an article in a magazine. So I believe that as long as we have professional journals to go to we'll keep on developing better doctrine.

Lieutenant Colonel M. Faulkner (ARA): Regarding professional journals, the September '90 issue of the *Military Review* suggests broadly that there is really no doctrine at the operational level of war. It suggests that at the strategic level, doctrine is the translation of national goals into military strategy; and that at the tactical level of war it is the application of military strategy. Comments please.

Lieutenant Colonel Westenhoff: I think that to follow through here in my analysis of General Kenney's operations, a way to describe what he did was that at the operational level he took forces that had been organised, trained and equipped to fight and he re-organised, retrained and re-equipped them to a degree for the

circumstances at hand. That in fact is the subject of operational level doctrine - how you not only structure forces but adapt them, and that is what we try to put in our doctrine manuals.

Group Captain Vallance: I agree with that. I think we should be clear on what we mean here by strategic level or basic doctrine, operational doctrine and tactical doctrine. Remember, when we talk about strategic level doctrine we mean fundamental and enduring principles; when we talk about operational doctrine we are talking about applying those fundamental and enduring principles to broad capabilities and missions; and when we refer to tactical doctrine we are talking about applying strategic and operational doctrine to specific weapons systems and their employment. If you look at the orders and instructions that exist at the moment, we do in fact have operational doctrine in most air forces, regardless of whether or not it is labelled as such. The classic example often given is that a principle of strategic doctrine is that 'it is important to achieve the necessary degree of control of the air at the earliest stage in an operation'. The operational doctrine linked to achieving control of the air would be that you need to take a combination of offensive and defensive actions such as airfield attack, air defence operations, combat support operations, early warning, etc, to achieve the strategic doctrinal aim. If you apply that down to the tactical level, we might talk about flying pairs of fighters in combat air patrols to carry out intercept missions. So the continuum is there. It just isn't explicitly defined at the moment.

Air Marshal Funnell: Ladies and Gentlemen, that completes our activities for this afternoon. I think you've seen from our panel discussion that our doctrinal developers are not all of one mind, they're not stamped out of the same mould. But they're all knowledgeable and articulate and are available to you over the next several days to discuss ideas associated with air power.

UNITED STATES AIR POWER INBOUND TO THE 21ST CENTURY

Lieutenant General Charles G. Boyd

Let me begin by stating how pleased I am to have been invited, along with several colleagues, to take part in this symposium honouring the 70th anniversary of the RAAF. Let me also echo the hopes of our chief of staff that the USAF will prove to be as well respected professionally on the occasion of our own 70th anniversary.

When Air Marshal Funnell extended his invitation back on 16 July, we at the Air University, in cooperation with our Air Staff, were nearing the end of an extensive effort to refine the basic doctrine of our Air Force. I sensed immediately that this symposium could prove helpful to us in this effort. Then came the 2nd of August (the Iraqi invasion of Kuwait), and later the 16th of January, followed by the brief 100-hour surface campaign at the end of February. As I write now in mid-March, Allied forces have achieved a remarkable victory. It will take a while to sort out all the lessons from these endeavours, but I intend to suggest some later in my remarks.

That much said, however, if we go back briefly to last July and the view of the likely future then beginning to surface as a result of reduced tensions between the United States and the Soviet Union, there is much to commend Air Marshal Funnell's suggestion for our focus. Specifically, that a key issue to be addressed 'will be the apparent friction between the general global trend towards smaller defence forces, and the probable greater reliance on flexible, increasingly capable air power as the means of retaining an affordable level of national security'. In that respect, there can be little question that our two air forces share common concerns.

However seductive hopeful assumptions about a less dangerous future may be, it is unlikely that the nature of man will fundamentally change in the next decade or so, resulting in a more peaceful world. Twenty-four centuries have passed since Thucydides wrote to inform, as he said, '... those who want to understand clearly the events which happened in the past and which (human nature being what it is) will, at some time or other and in much the same ways, be repeated in the future'.[1]

While the types and orientations of the threat may change, we can expect the security interests of the United States throughout the world to remain potentially at risk. Nor is the United States unique in having world-wide interests. We live in an age of an increasingly interdependent world economy, one in which economic prosperity is closely tied to stability. In this respect, the United States differs only in scale, owing to its economic size and the degree to which it is integrated with the rest of the world. Thus, what I say here may have some relevance for others in attendance at this symposium. The problems we face are in may ways similar. The solutions, at least as I see them, may hence have some applicability.

My overall thesis is simply stated: that air power will - in fact, must - dominate the US effort to protect its far-flung vital interests. My reasoning in support of this thesis has two main points. The first deals with the maturity of air power and the nature of modern warfare. The second concerns the nature of this potentially dangerous new world to which I alluded and the consequent importance of *time*. I shall deal with each in turn.

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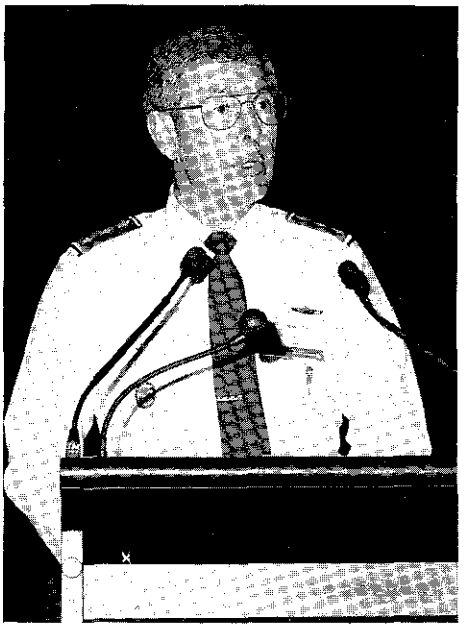
1 Thucydides, *The Peloponnesian War*, (trans. Rex Warner), London, 1954, p 24.



Lieutenant General Charles G. Boyd, USAF
Commander, Air University

As we look to the future, airmen must be the first to admit that the history of air power is replete with too many promises of too much too soon. The early prophets of air power - notably Giulio Douhet (1869-1930), William 'Billy' Mitchell (1879-1936), and Hugh Trenchard (1873-1956) - based their visions on the very limited air power experience of World War I. Their visionary reach, I would submit, exceeded their technological grasp by many years. As a result, they seemed to promise quick, cheap victories from the air.[2] This was certainly true of General Douhet, given his insistence that achieving 'command of the air' would be both necessary and sufficient for victory. And let there be no doubt that he was certain of himself:

> In spite of the close reasoning by which I have arrived at these affirmations, I am sure they will seem extravagant to many. That does not affect me in the least ... Such stubbornness leaves me absolutely unaffected, because I have the mathematical certainty that the time will come when air forces of nations everywhere will conform exactly to the concepts described above.[3]

These are not the utterances of an ambivalent man. The same was often true of General Mitchell, especially after his court martial in 1925. It was perhaps less true of Lord Trenchard, and certainly less true of Sir John Slessor and your own Air Vice-Marshal H.N. Wrigley.[4] Nonetheless, many assumptions and promises of the air

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2 See David MacIsaac, 'Voices from the Central Blue: the Air Power Theorists', in Peter Paret (Ed), *Makers of Modern Strategy from Machiavelli to The Nuclear Age*, Princeton, 1986, pp 624-47.

3 Giulio Douhet, *The Command of the Air* (trans. D. Ferrari), Washington, 1983, p 129.

4 A. Stephens and B. O'Loghlin (Eds), *The Decisive Factor: Air Power Doctrine by Air Vice-Marshal H.N. Wrigley*, Canberra, 1990.

power prophets fell short. That is not to suggest that there was anything wrong with their prophecy - as prophecies go. Technological shortcomings regarding lift capacity, speed, range, weapons accuracy, precision navigational equipment, etc, played a part in this. But so also did a lack of experience in applying air power. Airmen had to learn *how* to find and attack the enemy's vital centres, *how* to conduct an effective interdiction campaign, *how* to organise, train, equip, command, and control air assets - along with how to take best advantage of emerging technology, and more importantly, how to drive and channel the pursuit of new technology. They also had to learn that the enemy had a capacity to interfere with air operations, and that air war also involved friction, fog, uncertainty and ambiguity - all the classic characteristics of war that Clausewitz described.

Shortcomings in both technology and experience meant that victory in World War II came neither quickly nor cheaply. As one result, many soldiers, sailors and some among our civilian masters, came to view the history of air power as a series of unrealised - and perhaps unrealisable - dreams. Airmen, in short, paid a price in credibility for the expansive and premature visions of the early prophets.

In truth, the history of air power has been a gradual maturation process over a period of some 80 years. 'Gradual' might even be too hard a word; compare the centuries required for gunpowder weapons to replace the sword and pike; or the decades required for motorised vehicles to outnumber horses in modern armies.[5] Today, after 80 years of experience extending across the spectrum of conflict, and after stunning technological development that has largely solved many of the problems that previously limited air power, we are in a far better position to make the case that air power has come to dominate modern warfare. Consider the following:

> Surface forces have great difficulty operating in the face of strong, hostile air power.[6] After seeing the litter along the road from Kuwait City to Basra, the whole world now has an image of how difficult it is to do anything - even to run away - when the opponent's air commands the skies.
>
> Surface forces operate more effectively and efficiently with help from strong, friendly air power. General Patton's Third Army sped across France with its southern flank - as well as its overhead 'flank' - protected by air power;[7] one could even say Patton's aggressive reliance on air power set the pace for his army's offensive drive. While defensive operations give up much of air power's advantage in using the initiative, the United Nations' defence of the Pusan perimeter in the summer of 1950 was decided by air power as was the defence of the Khe Sanh in 1968.[8]

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5 For one example of the latter, when the vaunted panzer armies of the Wehrmacht invaded the Soviet Union on 22 June 1941, they took with them 625,000 horses and only 600,000 motorised vehicles.

6 I am aware that not everyone in Australia agrees with me on this, and certainly not Lieutenant M.L. Bailey, RAN. See 'The Medium Power Air Force - What Need to Exist?' in *Defence Force Journal*, No 83, July/August 1990, pp 50-8.

7 As the Allies gathered momentum after the Normandy invasion, General George S. Patton 'turned over the task of protecting TUSA's [Third US Army's] southern flank to XIX TAC [Nineteenth Tactical Air Command]'. Wesley F. Craven and James L. Cate, *The Army Air Forces in World War II, Vol 3, Europe: Argument to V-E Day*, Washington, 1983, p 247.

8 The commander of Eighth Army, General Walton S. Walker characterised air power's effectiveness this way: 'I will gladly lay my cards right on the table and state that if it had not been for the air support that we received from the 5th Air Force we would not have been able to stay in Korea'. Quoted in Robert F. Futrell, *The United States Air Force in Korea 1950-1953*, Washington, 1983, p 146.

> Modern navies have virtually become naval air forces, whether we refer to the carrier as queen of the fleet, or to the new role of surface ships armed with cruise missiles - where, again, power is projected through the air. Even submarines are increasingly threatened by air power, and in my view are almost certain to become visible from overhead in the future.

Air power's attributes provide ways to fight asymmetrically, a quality that applies not only to fighting different types of forces, but to different forms of warfare as well:

> In what has been called the low intensity conflict environment, air power provides the few advantages available to modern surface forces when fighting enemies using guerrilla tactics; specifically, mobility, aerial reconnaissance, and quick response firepower.
>
> In conventional war, only air power can rapidly strike every type of target - strategic, operational, and tactical. Desert Storm targets, such as military command centres in Baghdad, the bridges near Basra, and Iraqi tanks, illustrate these categories clearly.
>
> Aerospace power is, of course, the *sine qua non* of strategic nuclear war.

In short, it seems clear that armies and navies have become increasingly dependent on friendly air power. And yet at the same time, and to a greater extent than is generally acknowledged, air power retains its capacity to operate independently of surface forces. This combination of factors leads directly to the conclusion that air power - especially in its extended form as aerospace power - has come to dominate warfare.

None of this should be taken to denigrate the importance of surface forces, for whom many tasks remain, some of which (occupation and extended presence are two examples) air power cannot now and probably never will achieve. Rather, the dominance of air (and aerospace) power requires new ways of thinking about warfare, new planning paradigms, new ways of organising, structuring, and commanding our forces.[9] The results of Desert Storm suggest that while we are making progress in these respects, we confront major new challenges on which to focus.

I suggested up front that my second point had to do with *time*. One reason that the time factor has assumed increasing significance is that the threats to American vital interests are much more diffused in our brave new world. We no longer, for example, have the luxury (as it were) of preparing for the well-defined, worst-cast scenarios that characterised the bipolar world. The general relaxation of East-West tensions could encourage regional aggressors of all sorts, nations with increasingly dangerous military capabilities - the ability to move quickly, achieve an objective and consolidate their gains before any but the quickest can respond with positive effect (as we have so recently seen!). Triggers for such eventualities are legion: age-old ethnic and religious hatreds, attempts to monopolise markets or resources, irredentism, religious fervour, dreams of greater power and glory for individuals and/or nations, etc. Such threats could arise almost anywhere and could involve formidable foes. And we surely need no further instruction about how quickly events can move.

The *where*, the *when*, and the *by whom* are among the crucial *unknowns* regarding future threats. What *can* be known in advance is that response time will often be the most important factor in deterring a threat and attempting to contain a crisis situation.

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9 For new USAF thinking on these matters, see General Merrill A. McPeak, 'For the Composite Wing', *Airpower Journal*, IV, 3, Fall 1990, pp 4-12.

Recent history in the Gulf region provides a clear example. Monday morning quarterbacks now suggest Saddam Hussein's swift attack against Kuwait should have been anticipated. But in the months leading to Iraq's invasion of Kuwait, Saddam's verbal attacks increased in intensity and, in fact, extended beyond Kuwait to neighbouring Gulf nations. Saddam's pan-Arab rhetoric assumed an aggressive tone before his armies moved. But no nation, to my knowledge, believed there was a high probability he would attack. He surprised us.

Once Iraq's forces moved, they secured their first objective in Kuwait very quickly and they almost certainly would have resumed their march in a short time. (By the end of the Iran-Iraq War, Iraqi forces had demonstrated they could launch successive major campaigns in less than a month.) Iraq thus had the motive and opportunity to extend its gains, and was organising its means, when the Coalition responded. And, of course, the only form of power that could be quickly brought to bear was air power.

Thirty-four hours after they were ordered to deploy, the first squadron arrived in Saudi Arabia - from the United States. In the Desert Shield build-up, airlift duplicated the movement of the 400-day Berlin Airlift every forty days or so; it did this five times, if you will, without pause.[10] The rest is history. The United States fortunately had the capability to respond rapidly with air power, to throw the Iraqis off balance, to provide the deterrent, the breathing space, until a full array of forces could be deployed and the Coalition could deliberately choose the method by which the aggression would be rolled back.

The global spread of near-instantaneous information highlights the requirement to adapt to rapidly changing circumstances, something which air power does so well. The results of Iraq's Scud campaign were televised as they occurred with unforeseen political impact. While that campaign had virtually no military value, because of its great political potential it had to be dealt with immediately. The rapidly improvised 'Great Scud Chase' and swift marriage of Patriot missiles to rapid surveillance and cueing systems again showed air power's advantages in flexibility and responsiveness as well as its unique capabilities.[11] Air power thus brought our policy-makers distinct capabilities, discriminating means, and desirable options for rapid response.

And so, to punctuate the point, when time is of the essence, as it increasingly is in this world, air power is not only the weapon of choice, it is the only means by which we can:

> respond anywhere in the world, directly from the United States, within hours;
>
> deliver massive firepower upon arrival; and
>
> deliver surface forces anywhere in the world within hours, as witness the aluminium bridge between the US and Saudi Arabia early in the Iraq crisis.

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When one puts together my two main points - the increasing maturity of air power, resulting in its dominance over surface warfare, and the significance I attach to time, or responsiveness - it should be clear that the results of Operation Desert Storm provide several strong hints about the future.

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10 General Merrill A. McPeak, Department of Defence News Briefing, 15-3-91, (Initial transcript), pp 1-2.

11 '... we put about three times the effort that we thought we would on this job ...' (of hunting and attacking Scud missiles). *ibid*, p 5.

> First, technology works and saves lives, on both sides. The long-lingering quality-vs-quantity debate should finally be put to rest. The idea that 'because our equipment is sophisticated, it therefore is unlikely to work' has been effectively disproved.[12]
>
> Second, low observable (LO) technology is here to stay. The ability to penetrate enemy defences safely without unwieldy force packaging, long a goal, has been demonstrated.
>
> And third, precision-guided munitions (PGMs) work and, given some ideas still on the drawing board or in early development, will reach even more spectacular heights of capability in the future. The marriage of PGMs to LO platforms provides enormous leverage, especially in terms of the level(s) of force required to attain specific objectives.[13] This marriage also helps us with another problem - that the American public is loathe to accept high casualty rates, whether among our own sons and daughters or the enemy civilian population.[14] PGMs help enormously to hold down both types of casualties.

My personal view might be summed up as follows: the strategic air campaign against Iraq, combining forces of the US Air Force, Navy, Marines, and Army - as well as the air forces of the Coalition powers - provided the cutting edge of the war effort for 40 days. By the time the brief ground campaign began, the ability to hear, to see, and to resupply had all been denied to the enemy; in addition, a month or so of battlefield preparation from the air against enemy ground positions had largely removed the will to fight from the deployed Iraqi forces. There was simply little fight left in the dog.

However all that may be, I do want to apply a necessary flash of speedbrake to my emphasis on *time* and rapidity of response capability. In doing so, I call to my assistance the late Air Vice-Marshal Wrigley, who warned us more than 60 years ago that in all we do we must be on guard to 'foresee the possible danger that the *precipitate* use of the air force may *bring about* a war'. As the editors of his papers note:

> This is a significant observation. In the middle of his discourse on the causes of war, Wrigley notes that the immediate trigger of a conflict may not truly represent the underlying causes, and, in that context, sounds a warning that the careless use of air power could lead to 'precipitate' hostilities. Wrigley's logic for that judgment is central to doctrines of air power employment, for it arises from the aircraft's singular speed, flexibility and capacity to concentrate force.

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12 In World War II, after a lengthy maturation of maintenance and supply practices, the US Army Air Force achieved an in-commission rate of 55%; in Desert Storm, the USAF maintained a 93% in-commission rate. In other words, out-of-commission rates of the comparatively simple and far less potent World War II aircraft exceeded present rates by over six times. *Aviation Week and Space Technology*, 18 Feb 91, p 40; Craven and Cate, Vol VI, *Men and Planes*, p 396.

13 The leverage that low observable aircraft using precision weapons can apply, in combination with other force multipliers, may be inferred from two figures: F-117s comprised a mere 2.5% of Coalition aircraft involved in air attacks; their targets were generally air defence operation centres, communications, and command and control. Total Coalition combat losses in the air effort of 109,876 sorties were 14 aircraft. *ibid*, pp 4,6,9,10,12.

14 Reduction in human risks as a result of better technology and sound practices is one of air power's great success stories. The Tactical Air Command (TAC) combat loss rate during Desert Storm was just about 8 aircraft per 100,000 flying hours. In my days as a lieutenant, TAC lost 14.6 aircraft per 100,000 flying hours just doing peace-time training. Central Command Air Forces lost one aircraft every three days in Desert Storm - while in the days of the F-86 we lost one of those aircraft a day, every day, for three years - just in training.

> One of his major themes, recurrent and firmly stated, is that of the three forms of combat power, the air is the most suited to offensive action. An air force which is forced to defend tends to disperse and react; one which is on the offensive can concentrate, control and initiate.

Wrigley warns that such a weapon must be handled with care.[15] I could not agree more, and so hope that my emphasis on providing a *capability* for rapid response is not taken to imply any casualness of thought regarding the *implications* of providing such a capability.

While we must guard against being too quick off the mark, we must be careful not to be too late. To argue otherwise would be tantamount to dismissing judgment from the art of war.

In today's world, subject to the caveat just spelled out, and given continuing advances in precision, and above all selectivity, 'air power [can] be a ubiquitous arm of the first hour, and thus escape the need to be employed as a weapon of last resort'.[16]

It is unlikely the case I have attempted to make would have been advanced by a sailor or soldier. My lifelong fascination with air power and the tools of that profession cannot be easily concealed. My friends from the other two power disciplines are free to disagree. Indeed, I *expect* them to advance views of their own about the evolving nature of their own forms of military power. Out of the ensuing debate will grow ever more effective combinations of joint power for national security. That is why symposia such as this one are so important and potentially fruitful.

DISCUSSION

Brigadier General D. Kinsman (CF): An interesting experience we in Canada are going through is exercises in force structure realignment. One of your main theses, which was the importance of response time in the future, indeed creates a dilemma in force structure exercises. As one weighs the money available and the force it will allow you to maintain, invariably response time and readiness come into the equation; and there's a natural tendency to decrease response times or readiness in order to maintain larger forces. It strikes me that as we take a look at conventional air power into the 21st century, one of the largest dilemmas we all face will be response time versus quantity and quality of the forces that we maintain.

Lieutenant General Boyd: I couldn't agree more, it's going to be a terrible tug and pull. Air Marshal Funnell yesterday quoted my own Chief as saying that 20 hours a month and Red Flag gave us our performance in Iraq.

In shaping the force structure that we bought at the expense of readiness in the late 1970s, we made decisions between modernisation and readiness-and-sustainability. Because we didn't have enough money for both, we opted for modernisation. And then when the Reagan go-go years came along, we gave the kids 16, 17 sorties a month to get their skills up to snuff. Maybe time wasn't quite so important then: now we are having to go through that same kind of wrenching decision process. I would say two things. First, the world moves faster now than it did 15 years ago, and so it seems to me that we are going to have to keep some part of the force ready, perhaps at the expense of another portion of the force. Second, it brings to mind the Goldwater/Nichols Act that came into effect in 1986 in my country. Among other things, that law took a lot of the decision-making process concerning acquisition out of the

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15 Stephens and O'Loghlin, *op. cit.*, pp 6,8.

16 Air Marshal M.M. Armitage and Air Vice-Marshal R.A. Mason, *Air Power in the Nuclear Age*, Urbana, 1983, p 257.

hands of the services. By that law, unified commanders play a greater role in the resource allocation process today than they did 15 years ago. It is not clear to me that a unified commander will ever opt for modernisation at the expense of readiness and sustainability. He is interested in a war they are going to fight on his watch, he is not interested in a war that you are going to fight 10 years from now, 15 years from now. So it is not yet clear to me that we can organise, train and equip a force now like we were able to do in the late 1970s and the early 1980s.

Unidentified: You suggest that air power is the major component in the future of defence of any country and thus all future wars will be conducted in the air. Yesterday a gentleman mentioned that a second best air force will always lose, thus the effort to achieve superiority in the air war will accelerate and intensify. My question is, do you see any danger in the one party system wherein there is no position to balance this scale ...

Lieutenant General Boyd: The case that I made for air was for my own country and the kind of warfare that we are likely to be involved in. I don't think I've said, and I certainly didn't intend to imply, that the formula I see for my own country is necessarily the best for all countries and all defence and security needs. I don't know what different kinds of contingencies your nation might have to face, for example.

A second best air force is like a second best poker hand; it's all right for bluffing but it's no good for the call. I can't conceive of my country being successful in the kind of warfare that I would anticipate us having to be prepared for, without having the best air force, because we have become so dependent upon all aspects of air power. I didn't mean to say that a country without air can't in some circumstances - for example, a low intensity conflict - be successful. They can, especially if their opponent uses air forces ineffectually. So I don't have an answer to your question. I would just say that my assertions relate to the kind of warfare I anticipate the United States may become involved in, not necessarily for every other country on the planet.

Mr M. Buckham (Ferranti International): General, you made an elegant case for your assertion that air forces have demonstrated dominance in operations Desert Shield and Desert Storm. I don't have a Kipling with me, but I suspect he also wrote words to the effect that for every measure, a counter measure is developed. Is it not likely that the same technology which was so demonstrably successful in Desert Storm may now be applied to develop more effective air defence systems?

Lieutenant General Boyd: To the best of my knowledge there has always been a counter measure developed. That's why I said low observable's here for the foreseeable future. I have no illusions about low observable technology giving you immunity forever. I don't know what the counter is going to be or how long it will take, but certainly there will be one. We won't build another aeroplane without low observable technology for a while, but there will be a counter to it. We didn't put a scratch on the F-117 as I am sure you know. Two and a half per cent of the air force carried 31% of the target load on the first day of the Gulf War, the one where we expected the losses to be the highest. We put a lot of reliance on that aeroplane and it came through like a champion. That's first generation, model-T technology; we're into the fourth generation of LO technology now. But your point is well taken. If you're going to depend on high technology as your leverage then you have got to continue to make the investment. That's the way we do it, we structure ourselves to that assumption.

Group Captain A.G.B. Vallance (RAF): Just to follow on from that question sir, stealth is here to stay you suggest. It is very expensive. Your own Congressional Research Service suggests about 106 million dollars per copy program cost for the ATF, and about 840 million dollars per copy program cost for each B-2 bomber. Now clearly that is going to limit how many you can get. F-117A was used in the opening Desert

Storm operation essentially as a path finder, sweeping the way for less stealthy aircraft. To what extent is there a trade off between defence suppression, hard and soft kill? Are there economies to be made in this?

Lieutenant General Boyd: I suspect so. You're not going to build a whole fleet of fighter aircraft at 100 million dollars per copy. But all of them are going to have the low observable technique supplied, and they're all going to be stealthier because it doesn't really cost that much more. If you want to build an ATF that's not low observable and still want that kind of performance, it's going to be a very, very expensive aeroplane. So the fact that it is stealthy gives you the ability to qualitatively shift how you use that power, in a sense, make trade offs.

Air Vice-Marshal B. Graf (RAAF): Regarding costs of technology, it's just not a simple issue of whether we can afford a few high tech aeroplanes. The country has to have the infrastructure to maintain them. I think that's a more important issue in the end. That means small countries - and I would include us in that definition - may be able to afford to buy some very high tech aeroplanes but if you don't have that kind of infrastructure and you haven't got the support, then they are not going to be of much use to you in the end.

Lieutenant General Boyd: Let me just say one thing. You're talking about more than flight line skills, I'm sure, but some of these high tech aeroplanes are getting easier to maintain. For example, the F-16s are a heck of a lot easier to maintain than the F-4 was.

Squadron Leader L. Neist (RAAF): There is a lot of emphasis on the cost of the primary platform here, and perhaps we should be thinking more along the lines of technology insertion into current platforms. Everything we fly doesn't have to look like it comes out of Isaac Asimov's books. Is there a case for encouraging industry to look at inserting modern technologies into current platforms?

Lieutenant General Boyd: Sure, and we are doing that. That raises a challenge for the industry representatives who are here today. Rather than coming up with all the nifty menus of technology that may or may not be what the operator wants, why don't you apply your skill and cunning to figure out how to make things a lot cheaper? I remember Tom Marsh - those of you who have been around the US defence business would know Marsh, I'm sure - making a very good point. He said in 1973 he bought a hand held calculator that was about six inches high and about four inches wide and it had about four functions and it cost about 100 dollars, and now you can walk into any drug store and you buy one that's about credit card size and it's got 12 functions and it costs about six bucks. Far greater capability, far cheaper. I can't think of very many things that you guys in the defence industry have come up with that have given us great increases in capability with great decreases in cost. There's the challenge.

AIR POWER IN EUROPE: FUTURE COMPLEXITIES

Air Vice-Marshal R.A. Mason

The precise future of air power in Europe is, after many years of relative predictability, uncertain. That uncertainty is a product of changing political priorities and objectives within Europe and beyond; of economic constraints and competitive priorities; and of procurement program complexity.

The Stability of Confrontation and its Implications for Air Power

For over 40 years the dominant influence on the evolution of air power was the East-West confrontation, with its central focus in Europe. Each side had one potential opponent in a relatively small area. Air power was an obvious component in national security. There can be a difference in perception between national security and the projection and protection of interests. But in Europe, air power had a very obvious importance. Debates about defence expenditure were about the extent, not over the basic principle. Procurement, concepts, training, deployment, force structure and lessons from elsewhere were all driven by 'the threat'. Even the USA, with world wide interests, had most of its procurement programs driven by factors in Europe. Conversely, Russian procurement was driven almost entirely by the 'NATO threat'. Conflict elsewhere was provided for and fought on the back of provision for Europe. Air power evolved in and for Europe even though paradoxically Europe was the only arena in 45 years in which air warfare did not take place.

The Erosion of Defensive Certainty

During the 1980s, however, that defensive certainty began to erode. Equipment cost increases accelerated as micro-circuitry, computer and composite material technologies were incorporated in aircraft and weapon systems. At the same time, manpower also became more expensive, partly as a result of competition from the market place, partly because of training costs, and partly because of expectations among servicemen and women. The problem was compounded by decreasing manpower availability, again caused by market competition but also by demographic trends and in some countries a reduced inclination among younger people to choose a military career. A Soviet air marshal recently observed in Moscow that even within the five years since Mr Gorbachev came into power, the interest in the Soviet Armed Forces and even in the Soviet Air Force had dwindled to the point that they no longer had sufficient people from whom to select. Putting that into perspective, when Belenko defected in the mid-1970s the Russian PVO Air Defence Command was able to select one pilot from 100 volunteers.

The current environment is one of competing national economic priorities in many countries, not just Australia. It is manifest in the Soviet Union and increasingly so in the United States itself. With programs such as the B-2, the dominant questions will be not how important is it, but can the country afford it and what are the competing economic priorities? The answers in Europe at least will be influenced by decreasing public sympathy with sustained levels of defence, a tendency which accelerated after the onset of the Gorbachev peace offensive.

The Collapse of Confrontation 1989-90

After the progressive undermining in the 1980s of defensive certainties, between 1989 and the first half of 1990 confrontation visibly collapsed. Virtually overnight, Eastern Europe was politically transformed with the extinction of the communist satellite regimes. There was the unification of Germany, the beginning of the Soviet Union's troop withdrawal from Hungary and Czechoslovakia, the negotiations for the timetable of withdrawals from Germany and the arguments about them in Poland. The CFE agreement had little impact on NATO air forces but further circumscribed those of the Soviet Union. The Warsaw Pact ceased to function as an entity capable of coordinating and launching an offensive against Western Europe. In London in July 1990, NATO announced that it was going to reduce its forces, reduce 'readiness' states and place greater emphasis on reinforcement and reconstitution. It would not expand any forces or installations into what had been Eastern Germany or Eastern Europe. This period as a whole was marked by uncoordinated force reductions on all sides, including the Soviet Union.

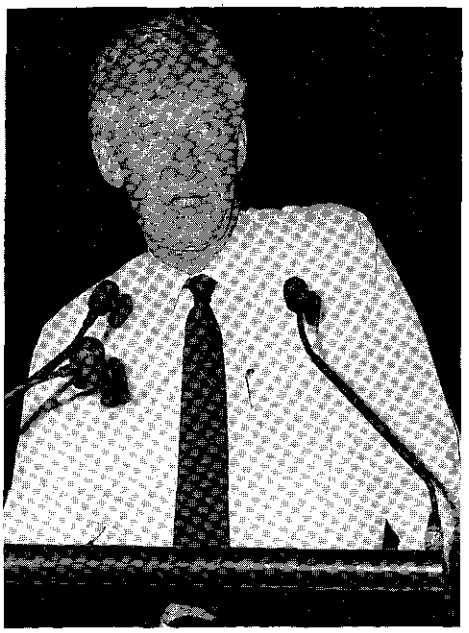
The Onset of Disillusion 1990-91

In early 1990, the euphoria of the previous 12 months began to dissolve. The West realised that the Soviet Union was cheating on the CFE agreement. Air Force squadrons, and armoured divisions, were 'redeployed' to the Soviet Navy. Numbers declared at Vienna fell far short of NATO's own intelligence assessments. Reformers in the Soviet military were divided over both objectives and methods. Announcements of doctrinal reform lacked both substance and consistency. The only coherent military group appeared to comprise those who were opposed to both reform and restructuring. It was uneasily noted that within that group air force generals were prominent, and that leaders of the right wing *Soyuz* organisation were also air force officers believed to have influential contacts in the military hierarchy. It did not seem coincidental that the Soviet Union was taking great care to sustain its air power in the face of both economic and political pressure.

Not surprisingly therefore, the newly 'independent' countries of Eastern Europe are seeking to establish their own security framework. They are feeling very vulnerable with the Soviet Union behind them and a Western alliance in front of them which is sympathetic but unwilling to extend formal commitments to defensive assistance.

Finally, disillusion spread beyond Europe when even the most optimistic liberal democrat had to acknowledge that Saddam Hussein did not necessarily share his principles. The remote, 'possible', 'out of area' contingency became an unpleasant reality.

In sum, Europe experienced a long period of 45 years when defensive considerations were reasonably straightforward. During the last decade some of the underlying substance of the previous stability began to be eroded. There followed an accelerating collapse from 1985 onwards culminating in the events of 1989/90. Then to compound the confusion, the diminution of the Soviet threat was checked, while the reality and relevance of 'out of area' crises were dramatically emphasised.



Air Vice-Marshal R.A. Mason, CB, CBE
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The Implications for European Air Power

The implications for European air power are extensive and complex. First of all, NATO has got to preserve a guard against any residual Soviet Union power. And here, we must not become captives of 45 years of traditional threat appreciation. Perhaps we should look a little bit further in history at the way Hitler used his Luftwaffe between 1936 and 1939. Its presence and potential were manipulated and exaggerated in support of German foreign policy. German combat aircraft cast a shadow over the diplomatic negotiations which preceded and failed to avert World War II. At the turn of the century it will not be necessary to amass an army on a frontier to bring pressure to bear. The presence of long range squadrons on Soviet airfields will contribute to the syntax of diplomacy.

Secondly, regardless of NATO declarations and Soviet sensitivities, the power vacuum in Eastern Europe forces the preparation of contingency plans. If there were a crisis would NATO respond by reaction for example in Polish air space; would Soviet ground forces be allowed to enter Poland, apparently en route further west, without NATO opposition? NATO obviously cannot ignore the vast political-military vacuum which exists in Eastern Europe.

There is a need to maintain a protective air defence framework. If armed forces require reconstitution and reinforcement, future opponents may not be as accommodating as Saddam Hussein and allow five months of unimpeded build up. Even though one's strategy is based on reconstitution and reinforcement it requires some protection while it is being put in place.

Several NATO members have important interests beyond Europe: 'out of area'. Already political moves are afoot to construct a basis for international military cooperation to protect mutual interests. A further requirement is therefore a force responsive enough to react quickly to crises outside the European region. In that concept is the inherent, prudent need to consider possible reciprocal action. Aircraft and missiles can move in both directions. While still perhaps a long way away, the time may come when events in Europe become 'out of area' interests for countries elsewhere. The air power implication is that air defences in Europe will sooner or later have to take seriously into account missile and long range aviation activities much further afield.

The final implication of these rapidly changing circumstances arises from the operations in the Gulf. The extraction of 'lessons' should proceed with great caution. Lessons are all very well as long as one knows who the next examiner is going to be and where the exam is going to take place. Maginot drew some important lessons from World War I, but he was examined not by another exponent of defensive positions but by Generals Guderian and Runstedt. Early analysis of events in the Gulf suggest that there were few surprises for the air power theorists and operators. Rather, well formed tenets and recent forecasts have been confirmed. The doubters, rather than the believers, have been confounded.

Command of the air, long reach, rapid response, centralised control, concentration of force, flexibility, the overwhelming influence of EW, the need for 24 hour all weather capability, and for real time reconnaissance have all been confirmed from the litany of air power. Real time reconnaissance will become even more important, particularly in Europe. One reflection concerns static targets. With the arrival of PGMs with such accuracy and destructive power, we may be approaching, if not already arrived at, the stage when vulnerability of a static target depends not on any protective measures but on simply how many resources an opponent wishes to allocate to destroy it. If that should be the case, exclusive questions need to be asked about the relative longer term advantages of heavily protected static positions and those which include mobility in their defensive suite.

The Way Ahead

In sum therefore, in Europe we have circumstances familiar to an Australian audience: a combination of threat uncertainty in region, unforeseen circumstances out of area, continued economic and manpower constraints and increased unit and per capita costs. They present difficult problems to air power planners.

Answers expressed in terms of aircraft and specific weapons are still premature but some general guide-lines are already discernible. For example, there are two overriding principles whatever options are chosen in a number of countries.

The first is the familiar idea of flexibility. It is inherent in air power, but it does not work if it remains an abstract concept of doctrine without operational flesh and blood. The second principle is force multiplication. Force multiplication has been fashionable for several years, but too often in practice it has prompted optional extras after heavy investment in airframes and weapon system programs. It is time to reconsider those priorities.

There are three areas of concentration in flexibility. The first relates to multi-role platforms in which as much commonality in airframe and engine as possible is sought from the outset. Thereafter incremental improvement of mission systems becomes an evolutionary process. The F-15, Tornado GR1 and possibly Su-27 Flanker are examples of combat aircraft with long evolutionary lives still ahead of them. In the next generation in Europe, the European Fighter Aircraft (EFA) will assume pivotal

importance. As a multi-role aircraft it will exploit the concept of operational flexibility; as an incremental airframe it has the potential to remain at the leading edge of operational requirements over a long period of time.

In the 'heavy' aircraft category five roles offer prospects for commonality in airframe and engine: transport, tanker, AWACS, maritime reconnaissance and the specialist categories of SIGINT, JSTARS etc. With enhanced resources, most air forces would welcome the procurement of specialist aircraft such as the C-17 which combines strategic reach with short field capability. In practice, few will be able to afford them. Acceptable compromise may well be sought by expanding the number of occasions when civilian stock is adapted, but as a sustained principle from the outset of requirement specification, rather than expedient in the face of economic adversity.

The second way of exploiting flexibility is by ensuring that all combat aircraft, from the outset, can discharge all their roles in all weathers and at night. In the Gulf War some highly rated aircraft, including the F-16, were operationally restricted by adverse weather. Their capabilities were enhanced by strap-on LANTIRN pods but the combat aircraft of the 21st century must not depend on such battlefield modification. Aircraft are now far too expensive, and potentially far too operationally significant, to be left in a HAS or elsewhere on the ground when conflict has begun. In Europe, daylight hours comprise only 50% of the year; of those a further 50% are likely to be marked by bad weather or low cloud. Ground forces will not stop fighting at night or in rain or snow. Neither, increasingly, will helicopters. Fixed-wing 24 hour capability is therefore not a luxury; without it air power becomes a cost ineffective part-time luxury and will rightly be identified as unreliable by ground force commanders. All-weather capability is not, I believe, any longer a subject for negotiation.

The third source of flexibility lies in multi-mode weapon systems. In the Gulf War, the effectiveness of optical and thermal imaging satellites, as well as smart weapons which relied on similar areas of the electromagnetic spectrum was degraded by mist, rain and low cloud. Radar imaging was not vulnerable to those conditions, but lacked the imaging detail to compensate fully. Construction of multi-mode weapons systems which would combine the broader acquisition and definition of radar with the precision of the optical/thermal would undoubtedly be expensive in unitary costs, but such costs should be placed against savings elsewhere in the force structure. The contribution of the F-117 in the Gulf War has been compared to that of 95 F-105s in Vietnam. A general principle may be extracted from that comparison, regardless of the accuracy of the figure. The unit and in-life costs of the F-117 must be offset against the accompanying reduction in provision for personnel, logistics and maintenance support costs which collectively are far more expensive in 'conventional' squadrons. Nor is there any reason why increased weapon systems should continue to become more expensive. The application of computers and micro-circuitry has driven down costs in many areas of civilian industry while effecting major savings elsewhere. Those benefits have yet to accrue to military aircraft.

There is however another side to the coin. The loss, or non-availability of one F-117 also equals the loss or non-availability of 95 F-105s. In a revised numerical equation of weapon systems and support costs, potential vulnerability and serviceability must be given an appropriately high premium.

Force Multiplication

There are several ways in which we can multiply the effectiveness of forces which are reduced overall in size and cost. The first is in our preparation for high command. From this war we will have an absolute model: in the exercise of high command. It was a model in the identification of the military instrument to support the political objective; in evaluating the relevant factors. The outcome of the war was never in doubt; the questions were how quickly, how to reduce Allied casualties to a minimum

and how to deny propaganda victories to Saddam. They were not easy problems but were resolved. Coalition leadership was based on operational experience, enriched by considerable strategic and historical depths and political sensitivity, which were not accrued by accident. Nobody joins an air force to become a lateral thinker. Such breadth is the product of study, of education and training and it requires a heavy investment, but it is inseparable from the intellectual and operational mastery of the environment upon which everything else depends. No government can seek to cut corners in its provision for the preparation of its military leaders.

Then there was the realistic training of aircrew, exemplified by the Red Flag exercises and reinforced by regular, pressurised tactical evaluations. On the ground, maintenance crews and other support staff were highly qualified, thoroughly trained and well-motivated. Professionalism at all ranks was encouraged and developed by the application of rigorous standards in recruitment, training and promotion. The principle may be compared with that not just in Iraq, but in the USSR and elsewhere where nepotism and political reliability are rated more highly than professional expertise - with similar operational results. Good aircraft can be bought off the shelf. People comprise the only element in air power whose value appreciates, rather than depreciates, over time.

The second force multiplier is electronic warfare. EW offers an opportunity to harness the fog of war and redirect it against an opponent. EW itself is neutral; in the Gulf War it favoured the offence, but it will swing with the overall pendulum of technology. The USA will learn how to nullify an opponent's stealth technology and incrementally a small advance in EW will affect a disproportionate enhancement of one's own weapon systems and the degradation of an opponent's. Moreover, the greater the dependence on modern technology, the greater the vulnerability to EW.

The third factor is equipment reliability and sustainability. The impact on the Gulf War of serviceability rates in excess of 93% was considerable: not just in available aircraft but in reduction of manpower effort and maintenance and logistic costs. For at least 10 years air forces have been seeking such levels, but not always with associated priorities when identifying programs and placing contracts. Now we know that we really must insist on it from the outset, if necessary inserting penalty clauses in the original contracts.

Fourth is in-flight refuelling: no longer something to be considered after the construction of the front line force, but before it. In-flight refuelling converts a tactical fighter into a strategic instrument, confers distance and time enhancement, imparts attacking range and route redundancy, sustains combat air patrols and specialist systems, eg, AWACS, recce and Wild Weasels. In-flight refuelling is no longer a marginal, supplementary activity, but fundamental to future air operations, whatever the size of a country.

Fifth is reconnaissance. The greater the manoeuvre, the greater the space, the more mobile the targets and the fewer the friendly resources, the greater the need for real time target intelligence and battle damage assessment. How else can weapon carriers be used cost effectively? The alternative is targets missed or unnecessarily attacked more than once: quite apart from the requirements of friendly forces for timely information about hostile movements. No matter how clever a satellite, it will never get below cloud cover.

My last two suggestions for force multiplication are rather more general. The first is 'complementary force composition': increasing the impact of the whole by careful, complementary integration of the parts. At tactical level it means full coordination of fixed and rotary wing activities, even where different colours of uniforms are involved. It involves the composition of joint force packages which train together on a regular basis, working to common concepts. It means ensuring that all elements of an

organisation which are likely to fight together can talk to each other, as was the case with the spectacularly successful AWACS and E-8 in the Gulf. That could, when costs are tight, mean choosing between equipment which would enhance one system, perhaps in one service, when greater composite effect could be achieved by investing in other equipment with reduced unitary effectiveness.

At a higher and broader level, opportunities for greater international operational cooperation in Europe are being examined. The example of the NATO AWACS squadron is being studied, and offers good lessons of both benefits and drawbacks of the concession of national sovereignty as well as perceived compromise of national standards to reduce national costs in high value systems procurement. The international force packaging so successful in air operations in the Gulf also merits further study. There can be no complete operational substitute for an AWACS, EW, tanker or any other squadron flown and commanded by a single air force. The question arises when the alternative is the inability to fund such squadrons independently, 75% of a loaf being better than none.

Finally, the equations involving the conversion of civilian resources require re-evaluation. In Europe, with the reduction of front line squadrons, there may be scope for a greater contribution by reserves, although their costs should not be under-estimated. Greater numbers of civilian transport aircraft could be notified for emergency conversion to tankers, cargo airlift and carriage of self- contained C3 units. In both the Falklands and the Gulf Wars, manufacturers demonstrated the speed with which aircraft could be modified and systems integrated. How much more quickly if contingency plans and preparatory work had been completed as a matter of course beforehand.

Conclusions

Peace is now, like war, the province of uncertainty. Uncertainty provides the opportunity for imagination, reevaluation and realistic application of principles and practices not restricted by unique circumstances. If air power exponents cannot take advantage of such an opportunity, they will deservedly be excluded from the formulation of strategy into the 21st century.

Now however, the uncertainty is not peculiar to the world beyond Europe and the North Atlantic. Europe has hitherto been the source of most air power thinking, confidently rooted for 45 years in the realities of East- West confrontation. The collapse of that confrontation has led to uncertain political futures, compounded by economic and other resource constraints forcing choices in priority, themselves made more problematical by the complexity of 'lessons' flowing from recent conflicts. In other words, the problems now faced by European air power have much in common with those faced elsewhere. There are no easy answers, but perhaps just two broad guide-lines. We justly emphasise the flexibility of air power: on that we must capitalise. Second, cost effectiveness in air power is measured not in terms of individual aircraft performance, but in the contribution of the total instrument. That entails reduction in costs, but multiplication of effectiveness.

DISCUSSION

Mr L. Gillard (Air Force Scientific Adviser's Branch): I would like to extract a point from your talk Tony [Mason], one from General Boyd's this morning, and one from the Minister's yesterday. You mentioned the absolute essentiality of the supreme command, its effectiveness, its understanding and its cohesion. General Boyd made the point that if we are going to apply air power, we must apply it quickly but not too quickly. We must think before we leap. Yesterday, the Minister made the point that constabulary actions - or whatever you might call them - are not necessarily

determinants in a national force structure, but nevertheless we must consider them. Given the recent results in the Gulf, we might reasonably expect to see more United Nations-led military actions, as distinct from peace- keeping. If those actions are to be effective, the United Nations needs to understand the capabilities and limitations of the military power it will exercise, but the United Nations has no permanent military staff. How then, ought we to inculcate into the higher reaches of the United Nations Organisation some understanding of the potentialities and limitations of military power?

Air Vice-Marshal Mason: I think there is in fact provision for a military staff in the United Nations. I find it difficult, though, to envisage arrangements other than those which have already taken place in Korea and the Gulf, where the country which made the greatest contribution dictated operations. And therefore I would have thought the creation of a permanent military staff in the United Nations is a long way off. What you do have is an increasing number of precedents to follow. I think that we have got a very, very good one here and we have all learnt a great deal. I go back to the comment I made relatively flippantly, that we're probably going to need to react much more quickly. When I say react, I mean not just put the aircraft in as we did, but actually do some fighting quite quickly, because other people might not give us five months to work up.

Air Vice-Marshal I.B. Gration (RAAF): I think you've touched on a point in relation to the United Nations which has signalled a change. Those of us who have been involved with the UN in a military sense over the last few years are well aware of all the political difficulties - not to mention the actual manning difficulties - of establishing a permanent military staff. And yet what we've just seen in the Gulf suggests that the UN may be taking new steps by setting up coalitions; and if that is the direction we are taking then a military staff may well turn out to be not only necessary but feasible.

Unidentified: It was good to see you raised in your talk the importance of the 'people' part of the air power equation. You addressed the significance of training, and with that comes the question of experience. Part of the history of air warfare has shown the importance of experience in both combat effectiveness and getting the maximum combat capability from the kit we employ. Just how much emphasis should we be placing on the experience factor, both in trying to retain people in the forces and continuing their employment in reserve forces after they've left, such as the Americans did to a significant extent in the Gulf in their Air National Guard Squadrons with the F-16 and their Airlift Command?

Air Vice-Marshal Mason: That again is a very big question, and it is obviously one that preoccupies us all sooner or later. I think we are all familiar with the fact that in the exercises and the competitions over the years in which the ANG and reserve squadrons take part they invariably do extremely well, and frequently win; but there is a very large price paid for that. The investment of the American defence budget in the reserves and the ANG is by our standards and by third world standards very, very high indeed. While it is in American terms a complement to the front line, in our terms it could only be an alternative to the front line. Certainly in Britain we've looked at this often over the last 10 years. So as I say, if we are going to place a greater emphasis on reserve forces then it can only be at the expense of the front line, and if we are going to allocate fuel, weapons training, range time and all the other practical aspects of operational training to reserves, then that's going to reduce front line time even more because those resources are finite as well.

My own view is that in the future - and this has been touched on by other speakers in other contexts - most of us are going to see variable levels of readiness in armed forces. We may even see variable levels of combat readiness in the regular part of the air force. A lot depends on the size. I'm thinking, for example, of the practical problems in Europe of maintaining forces which can respond quickly; and again as we've heard and as you all know, you are not going to turn a five hour a month pilot

into an operational pilot in the 24 hours it takes to deploy him from Langley to the Gulf. If he hasn't been flying the 20 hours a month and if he is not combat ready, he is not going to be combat capable when he gets there. But how do you then blend the requirement for combat readiness with a reduced overall state? It seems to me that the only way you can do it is either by rotation within the regular force or, as I say, by drastically cutting the front line, and nobody wants to do that. So when we come now to the first point you made, the question of experience and training, yes I do believe there is no substitute at all. You cannot call up a pilot in the same way you call up a Swiss Guardsman and tell him to bring his rifle out of the attic and report to point 'B' in 24 hours, ready to fight. So yes, we have to maintain combat readiness, but whether we can do it all the time with all the regular forces, and how far the regular force/reserve force blend is taken, depends on national circumstances.

Dr B. Lambeth (RAND Corporation): Just to amplify on one point Tony [Mason] developed regarding the experience pool outside the active force structure, there is another model that is worth contemplating, and that is the one the Israeli Air Force follows. As most of you know, the Israelis do not maintain a reserve force structure as does the United States Air Force. However, the Israeli Defence Forces recognise that their greatest experience pool is outside of the active force structure, and those aircrews in reserve elements maintain the same mission currency and event currency that active pilots do, not on a day to day basis but on several concentrated days per month. And those elements are ready to go to war tomorrow morning in case of national emergency. Now how you would translate that model into a local context and deal with the organisational and personnel problems that attend to it is a question that I'm not qualified to even begin to address here in Australia, or elsewhere in the region, but I would suggest that it is a model worth contemplating.

Air Vice-Marshal Mason: That's a very good additional model, I agree. It's much easier to identify problems by translating that experience elsewhere, because in Israel you do have a nation in arms and you have a nation at war. You also have a nation which depends for its defence budget heavily on another country, which is not a position that many of us find ourselves in. Having said that, I would comment more positively and agree that there may be general lessons - for example, I think that most of the IAF pilots are civilian aircrew. You have got to consider those people as a national resource. Bearing in mind the fact that you are only going to have finite resources regardless of how you allocate them, I think that's an idea that should be looked at long and hard.

Mr K. Kirkpatrick (Boeing Aerospace): Returning to your comments on the US National Guard and reserve. This arrangement has been structured for a number of years with the idea that we would like to have a total force of 'X' wings of 'X' whatevers, but we can't afford everything we want. So, it's generally conceded that the cost of maintaining a reserve or our National Guard Force is something about 30-50% of a regular, depending on whose numbers you accept. The great majority of the pilots are airline pilots. I realise that you don't stay as proficient flying a 727, or a 767 or a DC-9 as you do an F-16; however, these people have an inordinate amount of free time, they get a lot of flying time, and they are very highly skilled. And of course the average age of the ground crews is up around 40 years, they've got 20 years experience. I submit that in the future, maintaining some sort of a civil force, whatever you want to call it, may very well be the least expensive way to go.

Air Vice-Marshal Mason: I think the ANG and the American Reserve system is absolutely superb. I think the use of the reservist, or whatever we call supplementary forces, must be the way we go. All that I wanted to do was point out that the rest of us couldn't just say 'that's a great way to go' and have both strong reserves and regular forces. We would have to reduce our front line at the same time as we built up the reserves.

Lieutenant General C. Boyd (USAF): Regarding the cost of the air reserve component, be very careful. When you do your accounting accurately - and we rarely do - it turns out that for a given activity level or for a given combat capability level, our reserve forces are just as expensive as regulars, and often more so because the manpower is more expensive. So be very, very careful about this. In my country we like reserve forces for reasons that fit into our national psyche. That I think would probably go all the way back to Lexington and Minute Men and what have you. But that's not a formula I should think would be useful for very many. Certainly it should not be entered into with the idea that you are going to save money because I think that is wrong.

I would like to add one point concerning a comment you made in your paper Tony [Mason]. I'm not exactly sure what the Pentagon official was talking about in terms of F-16 down time, but the utilisation rates for the F-16 throughout the Gulf War were the second highest and only a fraction lower than A-10s. They were much higher than the all-weather pieces of gear that we have over there. Utilisation rates were 46.9 for the F-16, 47.5 for the A-10 and everything else was considerably lower than that. We did also have LANTIRN F-16s as I'm sure you are all aware. Be careful of those Pentagon officials that are quoted saying things, having been a Pentagon official I know.

Air Vice-Marshal Mason: I stand corrected - I was using an 'Aviation Leak' source. Perhaps I should separate the aircraft from the principle: there are still a fair number of aircraft flying around the world that can't operate 24 hours in all-weather and I think that point remains valid.

INTO THE 21ST CENTURY - SMALLER OR LARGER AIR POWER: A REGIONAL VIEW

Air Commodore Jasjit Singh

Any attempt at looking into the future is inevitably influenced by the clouding and misting of the vision the farther we look; and prudence guides wise men to stay away from such exercises even at the best of times. To attempt to do so with regard to air power with at least two fundamental parameters - political context and technology - in a state of rapid change may even appear to be rash. But the right stuff which inspires practitioners and theorists of air power also drives the need to look ahead, sometimes even at the cost of not keeping the tail clear. Under the circumstances, I could do no better than commence with a quotation from a presentation made by Air Marshal Sir Roger Palin, AOC-in-C, RAF Germany and Commander NATO Tactical Air Force at the RUSI, London on June 5, 1990:

> What do I see for air forces of the future? Quite frankly I see from the viewpoint of an air force commander, a very rosy future: smaller air forces certainly, driven by budgetary, demographic and arms control pressures, but air forces covering the full spectrum of tactical roles; air forces packing tremendous punch with sufficient reach to be able to react in whatever region of NATO or theatre of the world required, with high quality crews trained to a very high standard and used to operating multinationally and globally; and all backed by lean but highly cost-efficient logistical support organisations. In short, I would argue that the era of tactical air power with strategic reach has arrived.

Strategic or Tactical

This, of course, was stated in the context of NATO and essentially the Central European theatre; but remains substantively valid throughout the world. However, it needs to be noted that the conclusion that 'the era of tactical air power with strategic reach has arrived' hides the reality that while this may be so in the NATO context, in the world beyond the Central European theatre, air power essentially retained its primarily strategic implications. This may appear paradoxical; but the reality is that the primary role of air power in its totality has been closer to strategic rather than tactical. The world wide tendency to treat air power in an essentially tactical framework arose out of the sharp though artificial division of air power with nuclear weapons as *strategic and the rest as 'tactical'. In fact the introduction of nuclear weapons which in* many ways validated the basic theories concerning the role and impact of air power, tended to distort the perceptions of conventional air power. Based on past experiences, and relating them to the East-West military paradigm which has dominated strategic and military thought and literature, air power which was not designated for nuclear war fighting was inevitably relegated doctrinally, conceptually and even structurally to the tactical dimension. Our discussions are focussed on conventional air power into the future. The nature of air power and its role outside Europe in future, therefore, must address the basic question: will the role be strategic and/or tactical? This will naturally have an impact on the degree of influence conventional air power would have in the regional contexts in the future. It has been my very firm conviction that the primary role and function which conventional air power

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essentially performs is strategic. And as long as its predominant function is strategic, its influence can only grow in future. The reverse linkage of course, is also true. Two points merit attention here.

The first concerns the political context. Use and utility of military power itself rests within the political framework as indeed was embedded in the classical Clausewitzian concept of war as an extension of politics by other means. Without going into detailed reasons, it can be stated with some degree of assurance that regional landscapes of political context into the 21st century would indicate that the potential for conflict would remain high for a long time (and hence the need for military power), and the scope and progress on arms control measures is likely to remain limited in spite of our best efforts. And acquisition of higher military technology, if anything, is likely to gain momentum. On the other hand, we in India are firmly convinced that our highest strategic priority is the socio-economic development in the country. This requires an extended assurance of peace. India's primary politico-military strategy into the 21st century, thus, would continue to be based upon the prime objective of war *prevention.*

Conventional air power has a crucial role in a war prevention strategy. This capability and role perhaps has not received in the past the attention it deserves. Many factors would enhance the war prevention role of conventional air power in the 21st century:

> *Conventional air power provides the primary instrument of deterrence in* support of war prevention strategies. With increasing reach, effectiveness, and responsiveness, air power has the means to provide credible deterrence posture, both through deterrence by denial as well as punishment; whereas the other two components of military power (on land and at sea) are limited to deterrence through denial only.

Developing countries like India are highly vulnerable to the effects of war because of the limited number of high value installations and infrastructure. Air power has the inherent capability to attack even those beyond the combat zone and inflict serious damage to them, pushing national economic and developmental processes back by decades. The case of Iraq in the recent Gulf War is a vivid example of the strategic impact of air power on a developing country. Considerations of mutual vulnerabilities have led to confidence and security building measures like the Indo-Pakistan agreement not to attack each other's nuclear installations. Taken to its logical conclusion such a process is likely to become an important factor supporting war prevention objectives and strategies.

Military power may be employed in support of political objectives through resort to war or the use of force in a way that does not result in a continuum of armed conflict. Out of all forms of military power, air power has the greatest attributes contributing to control over engagement and disengagement, escalation and de-escalation. Air power thus offers policy options and choices below the level of war where application of force may still become necessary.

Threats in future are likely be characterised by uncertainties and unpredictability. One of the greatest problems which is likely to keep confronting defence planners and commanders is how to meet the threat of a surprise attack. Assessing hostile intentions will continue to be a difficult process. Air power, by virtue of the advances in sensor technologies, data handling and responsiveness is the primary instrument of military power to cater to the variables in potential threat scenarios. At the same time, as and when we move towards arms control and confidence/security building measures, air power assets will become the major source of strength of national technical means for verification.

The second aspect is that historically, war fighting was mostly confined to the tactical plane. During this century, the operational level has progressively assumed greater significance, and the use of air power has extended war fighting substantively to the strategic plane also. Advent of nuclear weapons in fact generated a range of missions providing a distinct strategic role to air power. Technological changes are progressively shifting more of the war fighting from the tactical to the operational and strategic planes. Air power which has been playing an increasingly dominant role in war fighting must consequently be seen to impact at the strategic level to a much higher degree than it ever did before.

Regional Dimension

Before we look into the future in any detail, it would be useful to briefly survey the experience in the regional dimension. The Indian Air Force (IAF) came into being on October 8, 1932 and, for various reasons, was conceived and structured for a tactical role only. The strategic role in the region during World War II was performed by the (British) Royal Air Force and the US Army Air Force. After the war and India's independence, although the Air Force assumed a greater role and responsibilities, there has been a strong tendency to treat it more in terms of tactical air power. This was inevitable in the context of the world-wide trend in relation to conventional air power. An overall defensive philosophy, heavy reliance on Soviet aircraft (with their limited range and payloads) and ground-based systems for terminal air defences tended to reinforce the tactical orientation. It was only towards the end of the 1970s that the role was seen more accurately in terms of the strategic dimension. This trend is likely to continue, especially reinforced by the experiences elsewhere and the technological developments affecting military power in general, and air power in particular.

Historically, the IAF played a crucial but, in the overall context, limited role during World War II essentially because of its very small size. During the 1947-48 operations in Jammu and Kashmir, the IAF provided crucial airlift which saved the valley and Ladakh. However, combat air power was employed only in a peripheral manner. During the Chinese invasion in 1962, once again airlift became vital, but this time combat air power was not deployed at all. It was only in 1965 that all components of available air power were employed; and in 1971 the Air Force role was critical to the success of what came to be known as the 'lightning campaign' in the East, and the successful conclusion of the war in the West. Our experience has been that air power has played an increasingly dominant role in the conflicts we have been involved in. The basic factors which have led to the increasingly dominant role are likely to remain valid in future.

There has been a progressive increase in the sophistication and mechanisation of the land forces, and naval forces in the region have been expanding (the Pakistan Navy for example doubled in surface fleet strength in one year during 1989-90). Even if the present level of forces continues into the 21st century (as seems most likely), the mobility and firepower of these forces are likely to keep increasing. At the same time, night fighting capabilities are likely to increase in future. The lessons of the war in West Asia will no doubt be imbibed by the defence planners of China, Pakistan, India and other countries. Increasing mobility and fire power of surface forces inevitably will enhance the role and influence of air power.

Technological advances and modernisation have been increasing the effectiveness of air power in the region. China's military modernisation has significantly enhanced its air power capabilities, transforming it from a purely day fair weather force into one capable of increasing day/night and adverse weather operations. A typical example is the modernisation of avionics on its fighters like the A-5, F-7 and F-8II. Although the F-8II upgrade with US systems has been given up by the Chinese, it may well be due to the prospect of acquiring equivalent capability on better platforms (MiG-29 and Su-27) from the Soviet Union, no doubt also on more favourable financial terms. With the Chinese economy picking up during the 1990s, and the military's role in national decision making having increased after the Tiananmen Square conflict in 1989, China's military modernisation (which suffered the least during the past five years) is likely to pick up its momentum. As China enters the 21st century, its military modernisation would increase the vulnerabilities of its land and naval forces to hostile air power; and thus the influence of air power (friendly and adversarial) is likely to increase in the future. For example, China has a large fleet of surface warships in its Navy. But its ability to operate outside the cover of land-based aircraft would be severely restricted against the threat of air launched anti-ship missiles which could be fired even from maritime patrol aircraft or helicopters besides combat aircraft. This window of vulnerability indeed would be true even for other navies which do not possess integral area air defence capabilities which can be provided only by aircraft carriers.

Pakistan has always sought greater fire power and mobility with superior technology as the means to offset the perceived imbalance of forces vis-a-vis India. This has been one of the factors responsible for the increasing influence of air power in the military balance. Almost every step in qualitative improvement in armaments in the subcontinent has been triggered by the acquisition of high-technology equipment by Pakistan, whether it was the F-104 Starfighter in late 1950s or the F-16 in early 1980s, the induction of the first submarine or the first sea-skimming anti-ship missile (Harpoon), the acquisition of the Patton tanks or 155mm SP guns and artillery locating Firefinder radars. In many ways this has created the action-reaction which many have referred to as the sub-continental 'arms race'. It is difficult to say whether this pattern will continue into the 21st century since the source of supply of high technology weapons systems to Pakistan is external and may be greatly influenced by the political architecture, both global and regional. If there is any slowing down of the transfer of

high technology systems to Pakistan, there would be a corresponding tapering off of the firepower and mobility of its military power. The pressure on India may thus appear to reduce somewhat. However, China's strides in military modernisation may well offset this.

It is inconceivable that any of the three major regional powers (China, India and Pakistan) would reduce the focus on air power. In fact, any slowing down in other areas would tend to increase the pressure for greater capabilities in air power. This would pose some serious challenges to defence planners; but greater emphasis on technological imperatives may be expected. Greater focus on combat support elements (including electronic warfare) would help to increase air power effectiveness and extend its width of missions without necessarily increasing the size. It is significant to note in this context that the IAF continues at the 1961 level of sanctioned force of 35 combat squadrons, but its effectiveness and capabilities have multiplied substantially during the last three decades.

Technological Imperatives

The complexity of modern warfare has made military power increasingly vulnerable to internal disruption. The increasing effectiveness of air power has provided more means of achieving this, at the adversary's operational and strategic depth. There is a wide spectrum of means and methods which would enhance air power roles in the future. In essence, as in other components of military power, they revolve around three fundamental and critical factors: firepower, mobility, and the freedom of action to exploit them.

Technological advances have already transformed the firepower factor of air power. Conventional air power till recently was essentially limited to air-to-ground operations in daylight/fair weather only. This has already changed in the case of great power and developed countries. Significant advances in technologies related to reconnaissance, surveillance, target acquisition (RSTA) and weapon effectiveness have not only narrowed the CEPs but also have expanded the time dimension for application of firepower to include night and even adverse weather. Similarly, mobility has been significantly enhanced by greater range, speed, manoeuvrability and transportability. Mention here must be made of ballistic (and cruise) missiles which add another dimension to conventional air power. But it is really in the domain of freedom of action to exploit firepower and mobility that the technological strength has made significant impact by expanding the width of missions. Stealth technology, electronic warfare and V/STOL capabilities (especially with rotary wing aircraft ranging from the helicopter-fighter to large cargo/utility craft), night fighting, C3I and RSTA capabilities have all been brought together to provide the means to exploit the freedom of action. In fact the crucial difference between the apparent high-technology air forces of regional powers and those of developed advanced countries lies really in this field.

Many of the technologies enhancing the three critical elements are already spreading to the developing countries. However, it would be many years into the 21st century before even the more advanced developing countries reach the levels of current capabilities of, say, the West European states leave alone those of the US. The problem here is not so much of the differential between the great power capabilities and those of developing states, for that differential, if anything will increase over time. But the problem is two-fold. Most of the technologies that enhance combat capabilities and effectiveness produce what may be termed as 'low visibility' systems. Air power itself operates at a technological level much higher than that obtaining in the rest of the country. Adequate understanding, absorption, and exploitation is a constant problem, especially in developing countries with a limited science and technology base. The low visibility systems pose additional problems both because of inadequate appreciation and an absence of adequate doctrinal framework in which to use them. The second problem is that combat power ultimately has to operate in a relational

framework in a given environment. In a regional context, grave uncertainties always remain in terms of when and what type of technologies would get transferred to one of the regional powers. In the case of low visibility systems which would act as force multipliers, the problem is even more acute. Generation of adequate responses, thus, is a serious challenge. And the framework is unlikely to change in the coming decades. Thus at one level, regional powers may work to cater for worst case scenarios; and at another still not be certain of the outcome in case of actual war. The problem posed by ballistic missiles is typical in this regard. Over 20 developing countries are expected to possess a ballistic missile capability by the turn of the century. However none of them will have a viable defence against them for many decades. This imperative would tend to drive in favour of greater influence of air power.

The technological imperatives would also keep playing on the traditional offensive/defensive equations. For a long time, perhaps traceable to landmarks like the Duncan Sandys' Defence White Paper of 1957 in the UK, and certainly visible in the Soviet system, greater reliance has been placed on ground-based air defence systems. After the 1973 Arab-Israeli war, defence in fact was assumed by many to dominate to the extent of severely curtailing the freedom of action provided by offensive action. However, most of the effectiveness of modern defence lies in the exploitation of the electromagnetic spectrum. The electromagnetic spectrum also stands seriously threatened by electronic warfare, stealth technologies, and application of air power. This would shift the balance in the years ahead in favour of offensive action. The utility of ground-based air defence systems especially of the terminal defence type is likely to be seriously eroded. How the new equation would evolve may not be very clear at this stage; and it would vary greatly with the environment. But technological superiority coupled with emphasis and reliance on the offensive is likely to remain the key element in the exercise of superior military power. Air power once again would play the dominant role.

Future of Air Power

As the regional powers meander into the 21st century towards the capabilities currently possessed by, say, the US, what would be the shape of air power at the upper end of global capabilities? At one level, of course, the US Army's identification of 13 key emerging technologies 'whose development is considered most essential to ensure the long-term qualitative superiority of Army Weapon systems' is a pointer. Eleven out of the 13 have application for aviation and air defence components of the US Army. At another, new and emerging technologies are being exploited in ways which would alter most of the existing paradigms of warfare. In the exploitation of air power, the altitude band of 25-125 odd kilometres has not yet been used for pursuit of war fighting capabilities and activities. However the development of trans-atmospheric vehicles in the shape of space planes and hyper-velocity delivery systems would alter this. The US space plane project was brought under X-30 configuration into a military related program. Other single stage to orbit vehicles which can take-off and land from normal airfields, carry payloads of 10,000 kg or more, and manoeuvre at speeds varying from Mach 5-30 at altitudes above 25 km would be a reality in the early decades of the 21st century. By that time a variety of new kinetic and directed energy weapons may be available at least in the US inventory. Defence against such capabilities would pose serious problems even to the industrially advanced developed countries. The developing countries would obviously be almost totally vulnerable to air power in this class. Such developments would push air power into new dimensions of influence and control.

Conclusion

In the ultimate analysis, while technology would certainly enhance the role and impact of conventional air power, the human factor is likely to increase in importance. This would manifest the most in two critical areas: doctrine and leadership. The war in West Asia has already reinforced the importance of these factors. Effectiveness in the employment of air power is heavily dependent on them. Smaller, more capable air power with little time to make corrections once the conflict starts raise their premium further. The limits of influence of air power in the 21st century are likely to be determined by the human factor.

DISCUSSION

Wing Commander K. Clarke (RAAF): The two previous speakers this morning and yourself referred to the role of combat experience in command leadership; you also talked about personal experiences. We in Australia have not been in combat for some 20 years. How do you perceive that will affect our ability to wage the war which we all hope we won't have?

Air Commodore Singh: I don't think that to be able to fight well, you need to have a lot of experience in fighting. You can think through most of the problems beforehand. If you have any difficulty getting experience, come and join us in exercises!

Corporal M. Andrew (RAAF): Do you believe that the increased air power of the Indian Navy, giving it a major regional projection capability with its Sea Harriers and the Sea Kings with their anti-shipping missile system, has changed the way many South East Asian countries view their strategic circumstances?

Air Commodore Singh: Simple answer: an emphatic no. Firstly, just because our Navy has certain air defence and anti-submarine warfare capabilities on board its ships, I don't see how that adds up to a problem or threat for anyone else's defences. You must understand, we are far more concerned about our defence, our own security. We haven't got over that concern, and I don't see ourselves getting over that almost near-paranoia for a long time. It's not so easy for countries which have repeatedly faced military aggression resulting in very substantive chunks of their territory being occupied by other states to be able to get away from that concern so soon, so fast. You know very well that something like 38,000 square kilometres of Indian territory is under Chinese occupation at the moment, and another 90,000 square kilometres claimed; and one third of Kashmir is occupied by Pakistan.

Regarding the Indian Navy's capabilities, I don't wish to stand in front of the British Aerospace insignia and talk about the limited utility of the Sea Harrier. Personally I would like to see the MiG-29 on board the carriers. But I think we must see that role very clearly for what it is. An aircraft carrier is seen as a source of power projection in the classical sense. However, the only carriers (of the 80,000 ton range) that can project that sort of power belong to the United States, and that's the reason why the Soviet Union has been building such carriers. The point here is that a surface fleet cannot operate in any role unless it either has an integral air capability or stays within the air cover of land based aircraft. Given our geography, when you calculate the number of airfields and aircraft we would need to provide a surface fleet with that sort of cover every time it wanted to sail out in any defensive posture, it simply would not be cost effective. It's simpler to get a platform and put half a dozen aircraft on it.

What role could our carrier perform in the South East Asian region? Firstly, I don't think the Indian Navy has the capability to pose a threat even to a small sized air force anywhere. Secondly, in any case, that's not what we're planning for. There is no political scenario we can visualise that requires a role for our aircraft carriers in an

offensive posture. It is difficult to perceive the political objective that India would see today, or in the next 20, 30, 40 or 50 years, where such a situation would arise. We historically have never operated outside our own limited areas except as part of the United Nations peace-keeping forces or in a direct bilateral request from another friendly government. The Maldives was one example, Sri Lanka was another. So I think that most of these fears are unfounded, most of these scenarios are based on wrong premises. I don't think I will sound too much like a gung-ho fighter pilot if I said that if you were to send an aircraft carrier with eight Harriers within 500 miles of an airfield of mine I don't think I would let it come anywhere near it. With or without an anti-ship missile.

Commander B. Dowsing (RAN): During your speech you touched on the issue of foreign sales of aircraft to your country and the vulnerabilities that accompany such a policy. I wonder if you would share with us your views on the regional trend of indigenous military aviation development and production, and where it's going.

Air Commodore Singh: Let me start by quoting two people we tend to refer to in India very often; one is Gandhi and the other is Nehru. They clearly articulated a policy which remains valid today for us and, I think, most countries. No country can be truly independent unless it is self-sufficient in the matter of its armament. We set out in the 1950s to achieve indigenous, self-reliant military capabilities, fully understanding our own limitations. Incidentally, we were at that stage developing our doctrine, our concepts and our aims for the future of air power in India when the Duncan Sandys' White Paper was presented in Britain, a country we have always looked to for inspiration and guidance.[1] I think the British aircraft industry took 30 years to recover from the paper. In our case, it delayed some developments. One of the things that was hurt very badly was our ability to proceed with indigenous development. After 1971 we assessed that we were unlikely to become engaged in any serious war, especially if we were well prepared. So, it was time to start paying attention once again to the long term development of our own systems, rather than having to purchase, acquire and even build under license.

We now have a sound defence industry, especially in the manufacturing sector: we have manufactured a couple of thousand aircraft, mostly under license. We've also manufactured thousands of tanks in the country under license, and so it goes on. But the indigenous input has still been unsatisfactory, especially in design and development, largely because of the overall narrow base of science and technology. Most of our good scientists, designers and engineers migrate to greener pastures, most of the time for obvious reasons. That has been a problem, and what we are trying to do now - for example, with the light combat aircraft [LCA] project - is to develop our own aircraft to meet our own requirements. We understand fully that delays are inevitable, and that we will have to collaborate on critical technologies with people outside India. But in the long run we feel that is part of the whole process of building up our own capabilities. What was perceived in the early years as self-sufficiency simply cannot be achieved. I think even the United States recognises that fact. We understand that there is a world-wide interdependence in the defence industries. For example, we are building a strong linkage with the United States, where the F404 engine is already committed to go into the LCA aircraft, besides other technological collaboration.

Our Navy has been more successful in many ways in trying to move step by step into more indigenous war ship designs and production, and I think that some of their ships are excellent because they have been produced to meet our specific requirements.

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1 In April 1957, British Defence Minister Duncan Sandys tabled a White Paper which suggested Britain's air power would in the future be based primarily on missiles, and that the days of manned military aircraft were limited. Sandys' paper naturally had a profound effect on air power doctrine and force structures.

with capabilities that perhaps are not needed in the European environment or by the superpowers, but perhaps are necessary in a regional environment. I strongly recommend that you have a close look at that example.

Squadron Leader R. Rance (RAAF): You have a tradition of operating Soviet fighter aircraft and it seems that your next generation may again be a Soviet machine. However, on your borders you have F-16s and various others. There would have been a temptation to move towards a similar type of aircraft to match, if you like, the opposition's force and technology level. The MiG-29 appeared to be a natural transition; however, on the other hand, I believe certain pricing aspects were important as were certain capability aspects. So, in the way that you generate your requirements, why do you buy a MiG-29 and not an F-16 or something like that?

Air Commodore Singh: I think that is an extremely important question if you want to understand India and our way of working. Firstly, the diversity of equipment arises substantially because of our adversities. The F-16 (with the F100 engine) was never available to us. In fact we had to get the MiG-21 because the US refused to give us the F- 104 in the early 1960s. The MiG-29, though, is also partly the result of our long experience with Soviet equipment. At the macro level I don't think we could have developed the capabilities we now have for about 3.75% of GNP if we had not relied on 70-75% of Soviet designed equipment, of which about 90% has been produced in India.

Let me also state that the cost of that equipment is not low because we get any special friendship prices from the Soviet Union. Let me give you some idea of the cost of MiG-21 production in India. When I was commanding a squadron 15 years ago, the Indian-produced MiG-21 was costing us about half a million dollars. Today that cost is two million dollars because of inflation. So we are getting a first rate aeroplane, made 99% in India, for two million dollars. It's got a tremendous capability and the reliability factor is very high. If I were to go back and command a squadron I would choose perhaps for the bulk of my work aeroplanes of this type. I think General Boyd mentioned sustainability; well, these blessed things just need armaments, fuel and air, nothing else.

The MiG-29 is a very interesting case. We knew that the 29, or the Fulcrum as we knew it at that time, was on the design board and being test flown; but the Soviets were not in a great mood to part with it a hurry. We also knew that Pakistan was going to get the F-16. What the Soviets were willing to offer us was a MiG-23MF, the air defence version of the 23 which we had evaluated and rejected. And that's the reason we went for the Mirage 2000. That was supposed to be our answer to the F-16 in the time frame and at the type of level we were going to be faced with, knowing full well it was going to be an extremely expensive proposition. That explains our concern in India about the F-16 transfers to Pakistan. They forced us to step up the level of technology and expenditure, when I think both sides could have managed at lower levels provided there was better trust and confidence. But the unfortunate reality is there wasn't, and there is a lesson in that somewhere. When we went for the Mirage 2000, the Soviets noted that our deal with the French was for the outright purchase of 40 and an option to manufacture 110. Now if you were to go in for a large scale manufacture of the Mirage 2000 in India with an LCA already on board, the Soviets would have lost out substantially on the relationship. I am one of those people who believe that while in these last 30 years we've needed the Soviet Union, they've needed India a little more. It wasn't our intention to apply pressure, it was only our intention to find ways and means of meeting our security requirements at affordable costs. The end result was that the Soviets came up with the MiG-29. I think we were the first air force outside the Soviet Union to start getting it, while it was still in the process of development.

There is a second factor which I have mentioned in passing. The MiG-21 initially was totally inadequate for the roles we wanted it to perform. I have no hesitation in saying that it was our experience which helped the Soviets to upgrade the MiG-21. Most of the developments of the aircraft came from the way the Indian Air Force used the aeroplane in peace and war, not in the way it was intended, but for what our needs were. I think the Soviets were looking for a similar experience by giving the 29 to India.

There's a school of thought in India that we should have the Rafale or the EFA. Now somebody might even turn up and say let's have the F-117. That's why I mentioned the budget and cost factor.

Commodore S. Bateman (RAN): I would like to address your statement on the aircraft carrier. I would probably concede your point that an unsupported carrier with eight Harriers would have difficulties operating within 500 miles of your air bases. But in the real world nothing is like that. Consideration has to be given to the importance of the mission, the weather and visibility, relative intelligence, surveillance capabilities, and the other capabilities which may or may not be supporting that carrier. In those situations I think the picture may not be quite as bleak as the one you painted for us. If I were the carrier task group commander, the one thing that would really worry me would be whether the other side had a nuclear attack submarine. I think that looking at the Indian carrier situation, the temporary acquisition of the nuclear submarine looks really interesting in terms of the situation vis-a-vis China.

Air Commodore Singh: I think you know that submarine has gone back. That seems to have upset people as much as when it came, at least as I read it in *The Canberra Times* the other day.

I agree with you that there are tremendous operating limitations in a third world military system. When we talk about the weather or other limitations, I think we just take them as a given. I can't do anything about that. We don't think we will have the types of capabilities that the United States has today for perhaps another 40 or 50 years, by which time a lot of other things will have changed. But we are talking about the environment in which we are likely to operate, in a certain political context. And that is essentially the defence of India, and what might be regarded as vital national interests. Our vital interests revolve around the EEZ, the off-shore installation 300-400 kilometres away, our critical dependence on the sea, and oil resources. For example, just look at what a one dollar rise in the price of oil has done to the Indian economy - it's made us go running to the IMF once and now for a second time. We are that critical on that sort of issue, and nobody wants that in a country with 840 million people who have the right to vote and a free press. We understand our limitations. That's why there is a need for the most up-to-date anti-submarine capabilities, sub-surface, surface and air. I think that's where the aircraft carrier and the nuclear powered submarine fit in. The question is, can we get it? If we can, I am the strongest advocate that we must have it at the earliest time.

But our main requirements are influenced and controlled by technological development in warfare. We must also try to structure our forces for the environment in which we will have to protect our basic interests, even with a highly defensive posture. While we may not have the necessary assets for a very long time, that does not take away my vision.

INDEPENDENCE OR ALLIANCE - A VIEW OF REGIONALISM AND ITS INFLUENCE ON AIR POWER

Brigadier General Soedibyo

Due to the unique geographical nature of Indonesia, air power provides the most effective defence against any aggressor from outside the region. Air power can engage the aggressor at his most vulnerable point en route to Indonesia, but air power is also the most demanding in terms of resources. Indonesia's economic well-being determines to a considerable extent what it can afford to spend on national defence and therefore what risks it must take. A significantly smaller GNP would probably mean less funding for defence, no matter that the actual defence needs themselves are determined in large part by the force posture, spending level and political policies embraced by other nations, and not by the level of Indonesia's GNP.

This paper examines the role of air power in Indonesia's national security and concludes that in a condition of very limited resources, strategic cooperation, especially in the development of air power, among regional countries is the best solution for maintaining national and regional security. Whatever the form and structure of the cooperation in the development of air power it should be based on the development of national and regional resilience.

National and Regional Resilience

National Resilience

Traditionally, security has been very much equated with the security of the state, its sovereignty, its territorial integrity, and the inviolability of its borders. Protecting the state was very much a military issue, and security policy was defined as the combination of foreign and defence policy. Of course the military aspect of security has not disappeared; but its relative significance appears to have declined. In recent years more and more emphasis has been given to non-military aspects of security. A contemporary concept of security leads to a more comprehensive view; that security consists of political, economic, socio-cultural and military components. These components are themselves related in many ways, and everything influences everything else.

'National Resilience' is a term signifying self-preservation, that defines the Indonesian national doctrine for pursing 'the common objective of states'. These objectives are:

> Self-preservation: self-preservation is a universal goal. A state's desire for existence, a fundamental requisite, is believed to be the highest value.
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> Security: in an interdependent world, security is defined as mutual acceptance of common values. Security experienced by one state is not at the expense of that of other states.
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> Ideology: ideology provides the state with an identity. Ideology is the most fundamental within the concept of self-preservation of the state. It gives the nation-state a strong base for domestic legitimacy. The state ideology must be strong enough to withstand revolutionary upheavals and be a symbol of the existence of the state.

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Well-being: after the higher priority objectives of self-preservation and security have been satisfied, the state should try to improve the actual conditions of existence of its people. Well-being is pursued through economic activities, and because of its own dynamics it forces states to interact with each other. Interaction provides a major behavioural force to harmonise with the regional political system. Disparity in well-being becomes a source of instability domestically and regionally.

Strength: strength as a state neither depends on, nor correlates with power. Weak and strong powers habitually refer to the traditional distinction among states in respect of their militaries and their economic relative capabilities. The principal distinguishing feature of state strength is the low level of concern strong nations have with domestically-generated vulnerabilities to their own security. Strong states are able to create a domestic political and social consensus of sufficient strength. The ideology of these states, their social structures and territories will all be clearly defined and stable in their own right. Approved mechanisms for adjustments and change exist, and will command sufficient support so that they are not seriously threatened from within the state. The behaviour of states will be guided by legitimate mechanisms, which are more predictable and stable, rather than by personalities.

Regional Resilience

The South East Asian region is, at the beginning of the 1990s, more peaceful than at any other time since 1945. No country is threatened with direct aggression by any other country and even the Cambodian problem seems close to settlement. Indonesian concern is with the coherence and unity of the Association of South East Asian Nations' (ASEAN) policies and finding an accommodation with the apparent increasing nationalist sentiment into an emerging regional 'self-reliance' which includes all states within the region. The rapid rate of political and economic development in South East Asia makes it even more essential that countries in the region act to secure their own strategic interests. The states in the region should not allow extra-regional actors, whatever their interests in the region, to manage regional strategic affairs to their own advantage. Responsibility for the protection of current interests and the promotion of future interests rests squarely on those who have most to benefit from a secure and stable strategic environment, namely, the regional countries themselves.

As to regional security versus global security, one crucial question is whether it is possible to approach global security by regional measures. Another is the extent to which global developments affect sub-regional or regional trends and efforts. There is still another perspective to consider, namely, the potential effect of regional measures on larger development.

From the South East Asian perspective, there emerges a more complicated strategic picture. Looking beyond purely political and strategic dimensions, South East Asian countries' security environment continues to be affected directly or indirectly by a range of social and economic factors. The emphasis on regional political security is based on a number of considerations:

> The regional efforts are more likely to succeed than global efforts, because the problems are more clearly definable. The need for joint action is more readily apparent, and potential partners - being tangible entities - are easier to deal with.
>
> The endless interstate conflicts are primarily between neighbouring states.
>
> The various regions of the world, being composed of different groupings of countries, differ sharply in their historical friendships and animosities, their aggregation of political systems, their ethnic compositions, and their level of development. Since these and other national variables help to determine the nature of regional security issues, the necessity for regionally distinct approaches becomes truly evident.
>
> Enhanced regional security serves to strengthen global security. Regional initiatives strengthen global security directly and indirectly: directly by the virtue of the region being a part of the whole; and indirectly by virtue of the region setting an example.
>
> If involvement of external powers cannot be excluded, a regional security approach to solving regional conflicts should be based on harmonising the interests of the region and the interests of individual states.

Indonesia recognises that regional events have a direct bearing on its national development, so that it has come to see a very close relationship between its own future and that of South East Asia. This regional focus can be enhanced without neglecting the relations with communities of other regions. Indonesia's attention in centred on the common interest of South East Asian countries associated with ASEAN.

Following the same pattern of thought of national resilience, 'regional resilience' can be described in the same terms. It is understood that for Indonesia regional resilience basically means developing the resilience of South East Asia as a region, by strengthening its political cooperation and solidarity in various fields of common endeavour. Regional resilience is an on-going process, which is already expanding among ASEAN member countries through the strengthening of bilateral and regional cooperation, alongside efforts to enhance individual national resilience. One striking characteristic of ASEAN is that the member states have initially cooperated primarily not for regional development, but basically for national development. ASEAN was set up for politico-strategic factors and its achievements on behalf of regional solidarity have been largely in politico-strategic fields. ASEAN achievements are more pronounced specially in evolving an ASEAN stand, and generating an ASEAN identity and attaining regional stability as a prerequisite for national development.

The multilateral effectiveness of ASEAN is greatly reinforced by the many bilateral links of its members. There are links in the economic, social, educational, medical, agricultural and cultural fields, and they serve to strengthen relations and as a whole have strategic effects. But it is perhaps the bilateral military and security links where the strategic effects of these ties are most pronounced. Bilateral security cooperation has the effect of both building regional confidence about national strategic intentions and creating cooperative procedures to handle potential military security problems.

ASEAN solidarity is unlikely, however, to lead to expression in a multilateral military arrangement between its members. Not only is such an arrangement unnecessary at present, but it is provocative. In the first place, there are the obvious difficulties relating to differences in doctrine, force structure, weapon types and systems and different styles of military engagement. More significant, perhaps, are the strategic disincentives facing the formation of an ASEAN military bloc. In the absence of any identifiable threat to ASEAN member states or ASEAN interests in general, the establishment of a formal multilateral military structure would be regarded as provocative and unnecessary.

Indonesian Armed Forces Capability

In time of peace the Armed Forces as a nucleus of the total defence system should be small but effective and efficient, and should be capable of exercising its functions to deter and take initial actions against any threat (Decree of the People's Consultative Assembly on the Guide-lines of State Policy, 1988-1993). In Indonesia the development of strategic policies has to be considered in terms of its geographically unique nature as an archipelagic state.

Indonesia's sovereignty extends over an enormous sea and land area which complicates capability development to exert national authority. After 20 years of national development with emphasis on the economy, Indonesia has come to a stage where the idea of sacrificing space to gain time for developing the defence capability must be reconsidered because of the consequences to the economic and social infrastructure such a strategy will cause.

The Indonesian Armed Forces (ABRI) are organised to engage in limited conventional conflicts in defence of Indonesia and its national interests and to conduct domestic low intensity operations. The capabilities being developed are to undertake a range of tasks within the strategic framework and to become the nucleus for expansion if confronted with an emergency beyond the expected level. Threat perception, operational environment and technological availability are to be considered in defining essential capabilities and force structure. The development of these capabilities is in turn dependent on the availability of resources.

The Iraqi invasion and annexation of Kuwait, the Vietnamese intrusion into Cambodia, the Soviet involvement in Afghanistan and the British recapture of the Falklands Islands, have all demonstrated how short defence preparation time can be, and the existing forces must have the capabilities to meet the need of the moment while at the same time providing capabilities to expand quickly and effectively.

Our approach to force development is to have more comprehensive, logical means of providing both short and longer term direction for the identification and subsequent development of the necessary capabilities. This approach consists of a series of successive comparisons of existing force structures and to identify new capabilities needed, and to manage the existing force structure as the best alternatives to meet the threat perception of the time. It is important here to stress the development of a total defence force rather than the separate uncoordinated development of separate services, with each service trying to win its own war.

As regards external threat, the focus is on the force characteristic a potential enemy would need to posses to become a threat to Indonesia. Indonesia would be confronted by a potential aggressor with a strong naval force that could be met at its most vulnerable position and defeated at sea by the application of air power. For low intensity operations the capabilities needed are related to the force structure for national defence, with a certain modification.

Considerations of the operational environment are concentrated on Indonesia's region of interests and the identification of defence and security importance. This region of interests is determined through an analysis of such features as demography, natural resources, industrial capacity and potential, political importance and infrastructure. These areas if lost or destabilised could result in serious consequences for Indonesia's security and national development efforts. Considerations of technological availability are concentrated on such areas as the level of technology available in Indonesia, the effects of technology on operations, the costs of research and development and possible trends in technology.

Availability of resources is a major constraint on capability development. Those constraints could affect the risks involved and alternatives have to be found to minimise risks to an acceptable level. Annual budget allocation is around 2.5% of GNP and 12% of the State budget and that includes the police force. Around 50% of the routine budget is spent on personnel related expenditure.

At present the capabilities of ABRI can be grouped under these headings:

> Strategic intelligence, which includes defence intelligence, domestic intelligence, counter intelligence and psychological warfare.
>
> Security capability components, which are area surveillance, maintenance of public order, law enforcement, low intensity warfare and disaster relief.
>
> Territorial management, which is the capability to mobilise the region for defence and security purposes.
>
> General support capabilities, which are the force multiplier in the conduct of any operation. In a geographical environment like Indonesia logistics and communication will be a dominant factor for the success of any operation.

Defence management science transformed into the Indonesian environment and strategic analysis are the basic ingredients for the efficient use of resources in designing a defence and security posture. Indonesia is a large country, and the development of a defence and security posture needed to satisfy a very minimum

requirement can be misinterpreted by its neighbours. That problem must be handled with tact, and an exchange of views and information can prevent any misunderstanding that could destabilise the region.

Regional collaboration for the development of forces, supporting industry, research and development, test and evaluation, retrofit of existing material, technology and trade in defence related products is more likely to be successful in the efficient utilisation of scarce resources that 'going it alone'. It may also function as a confidence building measure scheme within the region, and reduce the risk of the forces ever having to confront each other.

Air Power

Air power has a major role in supporting the capability of deterrence and to take initial actions if deterrence fails. The aggressor, assumed to employ naval forces for force projection, must be engaged during his advance and movement to Indonesia, at the point of comparative advantage on the side of the Indonesian forces. The employment of air power in an independent strike operation in a maritime environment is the 'best' alternative to execute such a mission.

The warlike situation which might confront Indonesia will be from an external regional power using maritime forces with 'advanced' equipment and domestic confrontation with or without external support. In both categories of confrontation air power will play a part, at one time it might be decisive, but at other times it will be a complementary role or its influence might be less important.

Low Intensity Warfare

Low Intensity Warfare (LIW) begins with counter-insurgency operations, and extends to a wide variety of other politico-military operations, both overt and covert. In the case of Indonesia LIW is definitely not a concept for intervention in the domestic affairs of other nations, it is not a commitment to employ force in a regional or global crusade against revolutionary movements and governments.

In the course of nation building, LIW is a concept of winning the hearts and mind of the insurgents. The best hope of defeating the rebels lies in separating and isolating them from the people and then forcing them to surrender. Except for strategic airlift, air power is basically to be employed as combat air support operations in the land environment, which will be employed in the following roles: surveillance, interdiction, tactical mobility and close air support. Close air support is not intended as an indiscriminate application of firepower but to convince the rebels of their hopeless condition, and force them to surrender.

Defensive Warfare

Defensive warfare is the employment of military forces to achieved military goals to support political objectives, in the defence of the state. Recent wars have demonstrated that air power can be very decisive for three reasons: first, the wars on the whole have confirmed the very effectiveness of air power when properly applied; second, they have shown that the proper application of air power is against targets that are beyond the reach and capacity of other weapons; and third, the high lethality of anti- aircraft defences can be reduced by the maximum exploitation of the geographical conditions and the utilisation of new technology in precision guided munitions (PGM) in the employment of air power.

Future Challenges

From the Indonesian perspective the role of air power in the future depends on various factors. Important among them are the changing geopolitical climate in South East Asia in which air power must operate; the extent to which the resources of air power might be made available when other priorities are competing; and the technical and operational problems of actually bringing air power to bear in a crisis situation.

Indonesia and other ASEAN countries are in the process of developing their naval and air power to meet the 'minimum' requirement of national defence. The economic factors of these countries play a major role in determining the expenditure for defence. The development of a 'minimum' defence requirement should not disrupt the economical development by diverting funds from other areas also requiring financial resources. The efficient way to ensure the strength of the long-term national defence and national well-being is by providing those resources needed to generate growth in the economy. As mentioned in the opening paragraph, a nation with a small GNP has to accept higher national security risks because its actual defence needs are determined in large part by the spending levels and political policies of other nations, and not by the level of our GNP. Strategic cooperation among ASEAN countries can enhance regional strategic capability and overall national security.

National air power because of its high demand in resources and size will not be economical to operate and maintain. To achieve economies of scale and effort cooperation is the best solution. Air power can offer the potential for speedy reactions and for flexibility. In a joint effort air power can redress or forestall a threatened or actual regional imbalance of power. Air power has the advantage that it can deploy over very long ranges with great rapidity and yet be at high readiness to consolidate and redeploy. Jointly it can provide a presence that will indicate to a potential aggressor an intention to regionalise the crisis, or it can provide the countervailing force that is likely to be called for when the need arises.

In a bipolar or multipolar power system, the ASEAN countries' strategic cooperation can offer a measure of deterrence from their own resources but can expect the validation of their efforts on the mutual balancing of foreign powers. The same power that has an interest in South East Asia by the fact of its strategic location will protect the region from the domination of an external big power. The potential aggressor has to consider the existence of what is called 'environmental deterrence', a related deterrence that can be of benefit to small powers because of the existence of the deterrence policy of other powers.

A practical example of 'environmental deterrence' is Australia's 'defence in depth' strategy. With or without any prearranged commitments, if the aggressor to South East Asia represents a threat to Australia's security interests it will provide means and support, direct or indirect, to enhance ASEAN defence capabilities. If Australia is vital to United States' security interests, the United States will be indirectly or directly involved in maintaining the strategic balance in South East Asia. Environmental deterrence can provide 'protection' to countries not formally affiliated with super or big powers.

With all the advantages that air power can provide, it is not just a matter of air strength and raw numbers. It is also about the ability and willingness of a nation to meet the budgetary and opportunity costs of air power. The force structure requires very sophisticated management and, despite the available financial resources, the basic skills and infrastructure to support air power need thorough planning and intensive training and practice to get impressive results. The skills of maintenance and repair as well as training for the multiplicity of ground and air skills are essential to an operational front line. To achieve the most benefit from practice requires that exercises be carried out with a large element of realism, but concern for the safety of

the aircraft and high costs associated with it, often leads to very conservative exercises. Exercises without realism will restrict the exploitation of skills acquired during training and the system will lose its effectiveness.

The factor of scale determines the efficiency of the acquisition and operation of air power. No country can support 'modern' air power unless it has a well-established infrastructure. Cooperation in the maintenance of air power capabilities will not only reduce the defence budget but will also provide the experience and training to manage advanced systems with an incomplete inventory. The economic value of such cooperation is the possibility of technological transfer and its spillover effects to the civilian economy. Cooperation must be pursued through dialogue which is largely a question of political will to give to the idea of national and regional resilience a practical value.

DISCUSSION

Air Commodore N. Ashworth (RAAF, Retired): General, you made mention of the use of air power in Indonesia in two particular roles. The first was what you might call maritime strike in defence of the Indonesian mainland, and the second was the use of air power in domestic problems. Would you like to elaborate a little bit on how useful you see air power in the role of internal security, in dealing with domestic problems?

Brigadier General Soedibyo: We are basically a small army, only 220,000 for such a large country. The force structure of the army contains about 10-20% of a regional management unit. There is no fire power in that regional management unit. I think the nucleus of the army and strategic mobility is dependent solely on air power. That is one function of air power. It can reach any contingency, especially on the periphery, very quickly.

Regarding surveillance, we have a very vast maritime area and it has not been covered, especially the eastern part. Even our air space is not totally covered with observation radar and so on, although we are developing it for the purpose of civil aviation. We try to cooperate for the purpose of civil aviation and national air defence; and also technical surveillance. Because of the geographical conditions, the terrain, it may take, for instance, 2-3 weeks to cover an area if you have to patrol it by ground forces, but if it is done by RPV it can be covered within 15 minutes. With ground forces, by the time you have got the intelligence and you react to that intelligence, the whole situation may have changed. Technically there is no problem in developing such capabilities, but the problem is with finance. Once materials have been procured, there can be extensive demands in maintaining and sustaining the weapon system, and that means we must be very careful before we decide to do something, before providing expenses.

Mr G. Austin (Sydney Morning Herald): I wonder if there is any contradiction between a couple of statements in your paper. The first, with which I agree, is that there are very significant differences between the national strategies of countries, depending on their ethnic composition, political systems and the level of their development. The second statement, with which I agree to a point, is that Indonesia can to some degree rely on a commonality of security interests with Australia because of our policy of defence in depth. At what point does Australia's interpretation of security interests differ sufficiently from those of Indonesia's, where Australia wouldn't see a response to a threat in the same way as Indonesia; or conversely would see events in Indonesia affecting Australian security adversely.

Brigadier General Soedibyo: I will rephrase your question. Because of different perceptions, it will not be possible to find commonality in defence cooperation. Is that your question?

Mr Austin: It's more a matter of when serious issues arise. The question of direct contact between the armed forces of Indonesia and the armed forces of Australia in normal peace-time matters is not particularly difficult. It's when Indonesia perceives its national interest to be different - for example, protection of its maritime resources in areas where that might conflict with Australia's view.

Brigadier General Soedibyo: There are many other things. Assume for instance, in deciding our cooperation, there is a test and evaluation here in Australia of tracked or wheeled fighting vehicles and Indonesia actually developed, wanted to develop, the same test and evaluation. I think we could exchange information on that basis. And then also avionics. I think the airframe is about 30% of the whole aircraft and 60% to 40% is avionics. I am not familiar with that but take for instance 40% in avionics - we can exchange that kind of information.

The problem is in my opinion that Indonesia's orientation is much more to Europe or the United States in developing defence capabilities, not the capabilities that are available in Australia. Take for instance if we decide on refurbishment of the AMX-13. We look to industry in Europe for such kind of refurbishment, even for trucks, which is a simple thing actually. I think that's one problem. And the other is also, as far as my experience of being in the office for policy planning and projects, we have never received any request or representation to have a presentation regarding Australian capabilities, while aerospace and many other European companies have done that. I have mentioned these things actually for quite a long time because you can read in military technology the capability of the Australian defence industry, even for designing frigates. There are so many things actually but I do not know where to start first, I know the difficulties but there must be somebody who wants to take the risk. It is a business man's calculation. If you want to achieve something you have to sacrifice first and you have to take risks. But I do not know how to handle this thing because the defence capability in Australia is much more in the hands of civilian industry than the defence force, in ours it is the industry of the forces and I think that is also a handicap. While we are familiar with industries from Europe and the United States and even from Argentina, Brazil, Spain . . . I think it is much more psychological, if you can bridge that psychological barrier - I don't know who can bridge that - then I think it will not instantly be relieved but progress will be very significant.

Air Vice-Marshal I.B. Gration (RAAF): We've given the gun runners two challenges now: that is, to sell us things cheaper and to resolve those rather difficult problems Greg [Austin] referred to.

Group Captain D.P. Hurst (RAAF): You've mentioned in your paper that you would see air power as the primary means of repelling any sort of sea-borne invasion against Indonesia. Would you use it purely as air power, or in conjunction with your surface units like your missile firing corvettes, submarines and the like? Would it be a joint effort or purely an air power effort?

Brigadier General Soedibyo: This is my personal view. It is the level of engagement, the value of what we have to protect and the forces that we want to engage. And that must be considered in conjunction with the whole value system because if we lose our navy in the first battle then we will lose everything, quote, unquote. The navy's function is not only to engage an invading force, but also to maintain communications among the various islands and for logistic support. I think that if there is no financial constraint then it is air power, mainly air power, because if we involve the navy then the navy can enter the jurisdiction of other states and it can create problems. It will take a longer time to be in the jurisdiction of another state than air power, air power can make an engagement and go back, consolidate and take the next engagement. If at certain stages in the development of the invasion it will come to a condition where the naval

forces are most capable of engaging the aggressor, then the naval forces will be involved. I think they are the stages I have in mind in mentioning that it is air power that has a major role in engaging naval power.

Air Commodore W. Belton (RAAF): In your paper you referred to a wider definition of air power that includes the infrastructure. In Indonesia there has been significant investment in aircraft production and maintenance facilities. Would you like to elaborate on the linkage of that investment to the air power matters that you raised.

Brigadier General Soedibyo: In the acquisition of air power, the one problem we have to face is that the percentage of expenses externally is very large. Then we have to compromise - maybe less capable but it is domestically available. The investment will be made for the domestic development of our industry, and in this case IPTN has to function as an intermediary. Take for instance the negotiation of the procurement of the F-16. After we agreed on the F-16, Minister Habibi was involved, because he has to make certain demands to General Dynamics regarding offsets. Actually the one who can provide the best offset and who also can absorb Indonesia's commodity exports is most acceptable, preferable, in this case. That is why, when there were many choices in this case, it came to the Mirage 2000 or the F-16.

After we acquired the F-16 then we wanted to have a lesser aircraft, and there were so many possibilities, but it is not only what is the best in performance but what is the best in exchange in what we have and what they can provide. I think that is quite a difficult negotiation, not only with the producer but also among ourselves. Take for instance, for maritime surveillance, we have the CASA 235. It is domestic; but the avionics, the radar and so on for the electronic warfare purposes we have to import, and deciding what's the military requirement is also dependent on what sort of offset they will provide. That is the major issue. It is also that we have to compromise and we have to take larger risks in designing force capability, and that's why I mention that the air force has forced us to cooperate because it is the most expensive. For instance in training, if we want to have a flight exercise, maybe two or three aircraft from Indonesia, three aircraft from Singapore and we use the same fighting range and so on, it might be that Indonesian pilots have the experience to command and conduct an operation with six aircraft while the expense is three aircraft. This economy of scale is very important in deciding how we will develop, and in my opinion air power is the major force that we have to cooperate.

Mr I. Meibusch (Association of Australian Aerospace Industries): Coming back to the topic of cooperation and collaboration in the region, Air Marshal Funnell yesterday referred to a seminar that was conducted in association with Asian Aerospace last year. At that seminar a number of people from Australia introduced the idea of regional collaboration. Major General John Grey talked from the military viewpoint, Mr Peter Smith, Commercial Director of Hawker de Havilland, talked from the civil viewpoint. We had representatives attending that afternoon session from around the region, and quite frankly the feedback has been disappointing, it was like the grains that got cast on the rocky ground. Have you any ideas, any suggestions for follow-up for those activities?

Brigadier General Soedibyo: I'm a member of the advisory board for Rolls Royce in South East Asia, and sometimes, sponsored by Rolls Royce, we conduct a discussion. Lately it has been done not directly sponsored by Rolls Royce but with the initiative of the board members. Then it has been discussed in Manilla the possibility of such kinds of cooperation and I think there are still problems where to start. But with the F-16 I have information here from Indonesian Air Force colleagues who mentioned we have cooperated with Singapore, with Thailand, in using their facilities which are not on the inventory of Indonesia. Then when it comes to industry it is very difficult, because even in Indonesia to decide on what weapon system to acquire is also a problem, and in my experience decision making in acquisition takes a very long time.

You have the experience in Malaysia. At one time there is an option for Tornado but later on it is nothing. I asked my colleague in the Centre of Strategic Studies what has been changed, it is an old lesson. I think there are so many problems actually, but we start with simple things. Air power is I think the most difficult thing because there is so much involved in deciding what to do and I think it is much more by coincidence than by planning. Who wants to start this, for Indonesia it is sometimes difficult. It seems it is easy but for us it is a problem. There is a Japanese saying that you have to follow through, you just wait until somebody takes the initiative and you do not take over but you give support to that kind of initiative. Sometimes it also depends on personalities, that is the problem in South East Asia. I think it is a major problem in countries where personalities have a very strong influence in whatever to decide.

Colonel R. Estrellado (Philippines Air Force): There is one statement here that I fully agree with, when you say that in the ASEAN context we won't have any multilateral or military agreement. However, there is one statement that I don't seem to reconcile myself with and that is you said that any formal multilateral military structure would be provocative and unnecessary. I wonder, following the statement by the gentleman here on logistics, about the present thrust of Indonesia with regard to air power. Apparently you have embarked on quite an extensive expenditure in the development of aircraft such as what IPTN is doing now on the 235 and also the decision on F-16s. In our region it seems to be the thrust that is embarking into the higher multi-role type of aircraft, except for the Philippines. Now going back to your original decision that the multilateral military structure would be provocative, don't you think embarking on your program, considering the type of economy we have in the region, is also provocative? Could you please enlighten me on this aspect.

Brigadier General Soedibyo: I rephrase you question. The acquisition of the aircraft which happened in Thailand, Singapore and Indonesia: is that not also provocative? I say that to you.

Colonel Estrellado: Going by the statement of being provocative, I said I can't seem to reconcile the idea of multilateral agreement on military defence against building up military capability.

Brigadier General Soedibyo: A multilateral agreement, what I assume is, will be based on an instant reaction of the one who is involved in the treaty, in the agreement; while a loose kind of cooperation is quite a different thing. It might be that a situation arises where a threat for Indonesia is not a threat against Singapore, against the Philippines, and then the option of not being involved is open. That is also the basic consideration in developing regional resilience, because basically we realise we have established ASEAN for the purpose of having a stable environment so that we can conduct economical development; but later on we see the merit of cooperating together in trade and in any other endeavours. Take for instance with industry, and it comes up also in defence industry. But the problem is being so late to start with discussion then each country has already established their defence capability, no, their quote, unquote, defence industry.

Take for instance, Indonesia with CASA of Spain have developed with IPTN the CN 212 and 235; and then Malaysia has already developed that. And also with small weapons Indonesia have already a license from the FNC with quite a different type of ammunition as far as I know from the Philippines with the M16 and Thailand. And then Singapore have developed their own indigenous design, and that is very difficult to reconcile. With ammunition, I don't know about cooperation on that kind of small scale. We know Singapore has the capability to refurbish the AMX-13 because there is a lot available in Singapore and Indonesia also. Maybe we can cooperate together to develop the guns that we need, because also the defence industry of Singapore is very expensive. But I say once again the problem may be with personalities. But now we have reached a certain level, a certain stage in trade and also in investment.

Singapore, Malaysia and Indonesia have a certain triangle and there is also the probability of a triangle of Singapore, Malaysia and Thailand, and then there might be a triangle of Malaysia, Indonesia and the Philippines. But certain problems have to be solved and I think if nothing happens on the surface it doesn't mean that there is nothing actually happening. It is the problem with us in South East Asia. We try not to hurt other people's feelings and we try to avoid solving difficult problems but it is intentionally so, it is not because we are negligent but it is intentionally so. I hope I have answered your question.

TRENDS IN AIR POWER: NEW SYSTEMS, OLD PLATFORMS?

Dr Benjamin S. Lambeth[1]

Introduction

On January 7, 1991, in the largest single contract termination in the history of the United States Defence Department, Defence Secretary Richard Cheney cancelled the US Navy's A-12 Avenger II stealth attack aircraft program. That aircraft, which had been under joint development by General Dynamics and McDonnell Douglas, was conceived as a follow-on to the Navy's A-6 Intruder. The A-6 first flew in 1961 and is now long overdue for replacement.

At stake in that cancellation was a $52 billion program to produce 620 A-12s for the Navy, as well as another 400 land-based derivatives for the US Air Force to replace that service's F-111s and F-15Es. In the three years since the initial contract of $4.8 billion had been let, the Navy had invested *$3 billion in a development effort that was* well behind schedule and over budget at the time of Cheney's decision to terminate the program. That decision did not reflect any technical problems with the aircraft itself. Rather, it was prompted by the inability of the major developers to meet the terms of their contract. As Secretary Cheney noted in his announcement of the decision: 'This program cannot be sustained unless I ask Congress for more money to bail the contractors out, but I have made the decision that I will not do that. No one can tell me exactly how much more money it will cost to keep this program going. If we cannot spend the tax-payers' money wisely, we will not spend it'.[2]

One could hardly imagine a more timely event to dramatise the policy issue posed in the assigned subtitle of this paper. More than any other on-going aircraft development effort, including the Air Force's Advanced Tactical Fighter (ATF), B-2 bomber and C-17 airlifter programs, the A-12 was sorely needed to modernise a Navy medium attack aircraft inventory that had long since become obsolete despite recurrent efforts to modernise and upgrade it. The A-6 is more than a decade and a half older than the aircraft which the other three programs noted above are intended to replace.

Even in the best of circumstances, the A-12 would not have fully supplanted the A-6 inventory until the A-6 was almost 40 years old. Now, having been presented with the A-12 cancellation, the Navy is faced with no ready alternative for replacing the A-6 and no stopgap solutions other than band-aid fixes like re-winging the A-6 with composites and adding new defensive avionics. About the best mid-range solution available at this point will involve a missionised F-18 or, less likely, an upgraded F-14 converted into an all-weather strike bomber analogous to the US Air Force's F-15E.[3]

The first solution will only temporarily extend the useful service life of the A-6. Neither option will offer the Navy a high-confidence attack capability for the high-threat environment of the early 21st century. Also, none of these interim solutions will offer

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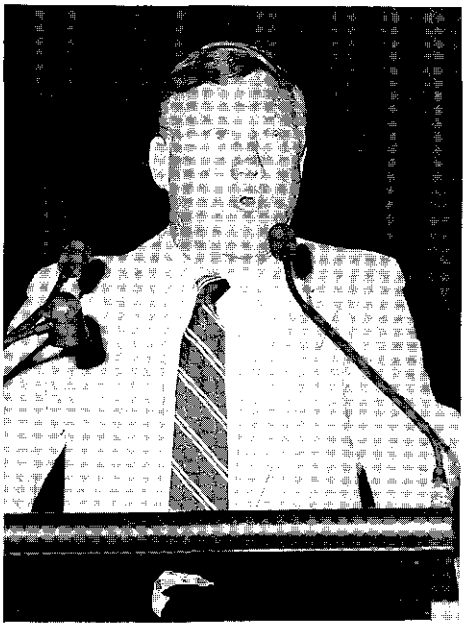
1 The views expressed are those of the author and do not necessarily represent the official views of RAND or any of its governmental or private research sponsors.

2 John D. Morrocco, 'Navy Weighs Alternatives After Cheney Kills Avenger 2', *Aviation Week and Space Technology*, January 14, 1991, pp 18-19.

3 See 'Amid the A-12 Ruins, Several Planes Rise Up As Possible Alternatives', *Defense Week*, January 14, 1991, p 6.



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the Navy what it originally sought in the A-12, namely, low observability and a range/payload capability in excess of that provided by the A-6. As matters stand, the Navy will have to start from scratch to fill the gap left by the A-12 cancellation, marshalling whatever usable technology advancements the A-12 program had achieved and applying them in a less ambitious effort to provide a stealth platform at a more agreeable cost. This challenge, unprecedented in severity for US tactical aviation, could have been avoided by a different approach toward modernising the Navy's medium-attack aircraft inventory.[4]

The purpose of this paper is to explore the issue that has been so starkly highlighted by the A-12 cancellation, namely, how best to approach the fundamental choice between investment in new air vehicles from one generation to the next and incremental improvement of existing platforms over time, coupled by greater concentration on upgrading the mission-support systems carried by these aircraft, such as avionics and munitions. At bottom, the issue has to do with the rising costs and extended development lead times for major new military aircraft like the ATF and the A-12. At its core, the question concerns whether the United States and its allies can continue their past practices of routinely developing and fielding new generations of air vehicles as their predecessors wear out, or whether they will have to begin

4 An informed overview of the major program benchmarks and management shortcomings that led to this situation is presented in David Montgomery, 'How the A-12 Went Down', *Air Force Magazine*, April 1991, pp 44-8.

thinking more and more about such things as preplanned product improvement, extending the service life of existing airframes, and relying increasingly on systems add-ons as technology and operational requirements evolve over time.[5]

This issue is heavily tied up with the question of requirements determination, and it has taken on special urgency as a result of the A-12 cancellation. That event sent a powerful message that the weapons acquisition process is in serious trouble. Its immediate effect has been to leave the Navy dead in the water with an A-6 in dire need of replacement and with nothing even on the drawing boards to fill the breach left by the A-12 cancellation. It is anything but clear at this writing how the Navy will extricate itself from this conundrum. But the issue itself could not have been more clearly posed than by Cheney's decision to pull the plug on the A-12.

It will be instructive to see what lessons are applied by all concerned in the wake of that decision. For if one thing is clear, current fiscal trends and the steadily rising cost of modern weapons are inexorably driving nations toward smaller air forces in terms of overall numbers, even as technological advance is making air power ever more looming in terms of overall capability and centrality to national strategy. That means that force development decisions are becoming progressively more difficult and the opportunity costs of mistaken choices progressively more unforgiving at the same time those decisions are assuming unprecedented importance.

Why New Platforms?

Before considering some current development programs, it would help first to review the rationales that typically inform a decision to proceed with a new aircraft. The first is simply the need to modernise and replace forces as existing assets become tired from prolonged use.[6] A follow-on to the A-6 is urgently needed on this ground alone. Whether the recently cancelled A-12 was the most astutely conceived aircraft to fill that bill is a debatable question. But no serious analyst on either side of the tactical air debate would deny that the A-6 is long overdue for replacement.

The same argument applies with less urgency to the ATF replacement for the F-15. By the time ATF enters squadron service, the F-15 will have been operational for nearly 30 years. Furthermore, the Soviet aircraft industry will have produced evolutionary variants of the MiG-29 and Su-27 that may significantly exceed the F-15 in aerodynamic and perhaps even weapons performance. Likewise, European and other developers will by then have begun producing advanced fighters that will be available to the third world air forces against which the Western allies might have to contend, as they did (with remarkable success due to poor enemy operational prowess) in the war over Kuwait and Iraq. For those reasons, there will definitely be a need to have supplanted the F-15 with something better by that time. As in the case of the A-12, whether the YF-22 prototype now awaiting a full-scale development decision meets or exceeds that requirement is also a debatable question. But as the Navy has experienced to its deep consternation with the A-6, simply upgrading an existing

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5 Just to be clear on terminology, by platform I mean manned combat aircraft. By systems I mean everything else of a hardware nature that goes into making those platforms survivable and mission-effective. This embraces a whole gamut of equipment types, including standoff munitions; onboard and offboard aids to pilot situation awareness, such as radar and AWACS enhancements; target acquisition systems like LANTIRN and ATHS; IFF systems to permit the beyond-visual-range use of air-to-air weapons; and drones like TACIT RAINBOW for defence suppression and Pioneer for battlefield surveillance and targeting.

6 As my RAND colleague Fred Frostic, a former USAF colonel and career fighter pilot, has summed up this point from his own experience: 'Just like our aging bodies, all sorts of funny and unpredictable things happen to jets like fuel cell leaks, electrical system failures, hydraulic problems, and so on. These things go before the usable airframe life is expended, and it takes a Herculean effort to keep them in the air'.

platform is hardly an acceptable solution when that platform would be a half-century old by the time it was retired.[7] Tactical air forces simply need to be rejuvenated from time to time.

A second and related case for the development of follow-on platforms at seemly intervals stems from the expanded performance afforded by technological advance. Ideally, new technology application should be disciplined by an honest determination of changing threats and operational needs, so as to prevent the indiscriminate incorporation of features that may not provide much operational value for the cost incurred. It is in this area where most of the pitfalls in force development tend to occur. This is also the area within which conflicting opinions clash most heatedly, and accordingly within which most of the fighter modernisation debate takes place.

Yet a third case for follow-on platforms entails taking advantage of technological progress by increasing the simplicity it permits in such sub-systems as hydraulics, avionics, and engines to heighten maintainability, reduce failure rates and drive down life-cycle costs. This was a definite trend established in the generation of fighters represented by the F-15 and F-16. The aborted F-20 promised even better performance in this regard. And there is every reason to expect that the F-22 will do better yet.

A fourth argument for acquiring new platforms at appropriate intervals is psychological and entails what fighter pilots call being the biggest gorilla in the sky.[8] This was one of the most compelling reasons behind the Israeli Air Force's initial interest in the late 1970s in acquiring the F-15 as the cutting edge of its fighter force. It is a powerful argument as well for the ATF, insofar as the latter will represent the US Air Force (and eventually the Navy as well) in the air power arena of the 21st century. There is no question that for the past decade and a half, the F-15 and F-16 have been the standards against which other world-wide fighter developments have been measured and paced. There is especially no doubt that they were the inspirations behind the Soviet Union's development of the MiG-29 and Su-27, which emerged some five to seven years later. And they represent the baseline from which such current fighter developments as the European Fighter Aircraft (EFA) and the improved MiG-29 are seeking a performance improvement.

From the vantage point of the fighter pilot, knowing that one is about to commit to battle in the world's finest tactical air vehicle is tremendously confidence-inspiring. It is also conducive to disciplined aggressiveness. Conversely for the less well-equipped side, knowing that the opponent has a platform advantage generates a powerful effect on the ensuing chemistry of air combat, whatever the asymmetries in aircrew skill and weapons capability may be. This asset is non-quantifiable, but there is no denying its existence and importance.

A final case for platform improvement concerns maintaining a strong technology and defence industrial base. As was predicted by many, the Israeli aircraft industry suffered notably after the Lavi cancellation by an atrophying of its once-strong cadre of design engineers, whose talents had been fully engaged during the Lavi's development phase but later became dissipated in other activities. It is now said for much the same reason that if EFA does not proceed to development and deployment, the British aircraft industry will probably never develop another fighter.

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7 This was the strongest argument against the YA-7F, a Vought proposal to upgrade the Air National Guard's A-7Ds by stretching the fuselage and adding an F100 engine with afterburner.

8 As one fighter pilot summed up this viewpoint: 'Personally, I consider air superiority fighters in exactly the same context as my pistols. When the gunfight starts, I want the very best, because when it's over there will be no second place silver medal - only me and the dead bastard who picked the fight'. Quoted in Benjamin F. Schemmer, 'Will Stealth Backfire?' *Armed Forces Journal International*, January 1991, p 48.

It is an intensely debated question today whether staying comfortably at the leading edge of fighter development requires proceeding in each case to full deployment once a platform incorporating a new generation of technology has been produced and successfully flown. One school holds that in light of growing unit costs and extended acquisition intervals, it makes the greatest sense to develop platforms first as technology demonstrators and to enter production only when it is clear that a real operational need exists. Among other things, this may help assure that the platform is acquired at a cost low enough to permit its deployment in operationally usable numbers. An opposing argument holds that technology exploration through extended prototype testing such as that recently conducted in the ATF program is insufficient, by itself, to preserve an industry team capable of efficient production in the absence of reasonable assurances that full scale development and deployment will eventually follow. There is a general consensus, however, that there is no way to sustain a robust defence industrial base without keeping that community at work by constantly exploring new platform concepts through development and testing.[9]

On the other hand, new platform development, and especially production and deployment in large numbers, involves momentous policy choices that cannot be made lightly. It is a fact of life that aircraft have steadily grown in unit cost throughout the post-war era.[10] Along with their increasing technical sophistication, this has resulted in fewer numbers of platforms and longer periods between the start of successive weapons development programs. This has more and more made it essential that the requirement for a new platform be set right the first time, lest a development effort get so far along that it becomes too costly to change major specifications or to terminate the program outright in case of downstream technical problems.

The basic question of whether or not to develop and procure a new platform cannot be discussed in the abstract. It depends heavily on the operational task the platform is expected to perform and on the R&D and force structure needs that are imposed by the task. The five 'new platform' rationales outlined above cannot simply be applied without qualification. In all cases, the issue must be framed in terms of 'new platform for what?'

Ultimately, the answer will turn heavily on a professional (and, in the case of big-ticket items like the ATF and B-2, a political) judgment call by those both in and out of uniform who will have to live with the consequences. Analysis can help inform such a choice, but it will generally take a back seat when it comes to determining the actual decision. Clearly, however, there are divergent answers one can anticipate depending on the particulars of a given case. In the following discussion, I will try to illustrate this by examining two contrasting examples in point - one concerning the ATF, where I believe the case for a new platform is difficult to dispute, and the other concerning close air support, where, in my judgment, the case for a new platform is on far more tenuous ground.

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9 As the recently retired head of Lockheed's Skunk Works, Ben Rich, has noted in this regard, 'I worry about the industrial base . . . I'm losing my engineers to Imagineering [Walt Disney's creative unit near the Skunk Works' Burbank facilities]. They're more challenged there. The defence industry is too cyclical for them. We're going to lose the ability to build airplanes'. Quoted in Rick Wartzman, 'Designer of Stealth Fighter says US Runs Risk of Losing Technological Edge', *Wall Street Journal*, February 4, 1991.

10 See Kevin N. Lewis, *The US Air Force Budget and Posture Over Time*, The RAND Corporation, R-3807-AF, February 1990.

When New Platforms Matter: The Advanced Tactical Fighter

Insofar as the cost of a new aircraft bears at least a loose relationship to the amount of new technology concentrated in it, an essential question concerns where to draw the line on performance in the interest of affordability. This is obviously a judgment call, but it can be informed by a dispassionate look at the environment in which the aircraft will be expected to perform. All too often this critical question is not properly addressed in the requirements application process and available technology, rather than user need, dominates the design and development effort.

At the same time, it is not always clear what 'user need' actually entails. A good example concerns the application of low observable technologies in the two contending ATF prototypes that were developed to replace the F-15. Both the YF-22 and YF-23 were designed to meet the expanded capabilities that one would expect of an F-15 follow-on in terms of agility, maintainability and reliability, cruise performance, and fuel efficiency. Yet unlike the previous generation of fighters, the ATF has also been expressly configured to have 'stealthy' characteristics in the visual, infrared, and electromagnetic spectrums.

The purpose of stealth in an air combat fighter is clear. It is to allow the side possessing it to enter the fight unobserved and get the first kill with impunity, thus making the other side predictable and permitting the ATF to dominate the engagement from the initial set-up through the end-game. For a strategic bomber like the B-2, or for a single-mission tactical aircraft like the F-117, there is little denying the tactical value of low observability, since the primary purpose of such aircraft is to get to a high value, heavily defended target unobserved and deliver weapons on it. For an aircraft like the ATF which will be operating in a much more dynamic air-to-air environment, however, one encounters a somewhat greater diversity of opinion.

For one thing, there is the question of how much real tactical advantage resistance to radar detection will provide the ATF when existing IFF systems cannot permit a clearance to fire without a positive visual identification of the target. Beyond this, there is the alleged susceptibility of the ATF to timely detection by infrared sensors. The YF-23, in particular, embodies design features aimed at masking the aircraft's infrared (IR) signature from at least some aspect angles. Yet according to some schools of thought, this will not be enough to cloak the aircraft from future infrared search and track (IRST) systems. Even if the exhaust gas temperature is substantially suppressed, according to this argument, there will remain the problem of heat generated by aircraft skin friction at supercruise airspeeds. Aerodynamic heating is directly related to speed, especially at higher Mach numbers.

Current IRST systems are not sensitive enough to allow precise ranging. However, they are said to be capable of providing at least rough range estimates. With improvements over time, such systems are envisaged by some to have the promise of detecting targets as far out as 150 nautical miles. Whatever the case, people of this persuasion insist, improved sensitivity IRST systems will eventually negate the tactical value of radar stealth. Whatever a fighter may be constructed of, its external components will have dissimilar heat absorption and reflection features, and those components will heat and cool in a manner unlike that of the ambient air, especially at higher airspeeds. One specialist has said that 'if an aircraft deviates from its surroundings by only one degree centigrade, you will be able to detect it at militarily useful ranges'.[11] It is also claimed that by coupling multiple sensors, such as an IRST and a laser range-finder or a narrow-beam, high-power radar, fighters like the ATF with classic radar stealth will still be vulnerable to enemy detection.

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11 Quoted in Francis Tusa, 'Europeans Suffer Stealth Sticker Shock Syndrome', *Armed Forces Journal International*, February 1991, p 24.

To a considerable extent, such arguments against heavy concentration on radar stealth in the ATF may simply entail efforts to make a virtue out of necessity. This certainly seems to be the case with respect to the Soviets. It may also explain the arguments voiced by those Europeans who maintain that although radar stealth may offer tactical advantages today, this quality will eventually be overcome by improved capabilities for exploiting the infrared spectrum. Among other things, this line of reasoning may bespeak an underlying inability to sustain the financial burden required to support radar stealth technology development. As a Dassault spokesman observed, 'it must be wonderful to be able to afford stealth aircraft - we, alas, cannot'.[12] Such a concern may also account for the assertion that reducing a fighter's side-aspect radar cross-section is not worth the added cost required for special coatings and other design features when the probability of beam attacks will most likely be very low. The same can be said for the argument voiced by some that the ATF's beyond visual range (BVR) advantage afforded by stealth may come at a price of reduced supersonic manoeuvrability (even though the YF-22 and YF-23 both appear to have vindicated themselves quite nicely in this portion of the operating envelope).[13]

The point of the foregoing is not to defend stealth as a design virtue in the ATF, but rather to show how people can differ over where to draw the line with respect to performance and cost trade-offs in such an aircraft. Arguments critical of radar stealth tend to come from countries that are too strapped financially to pioneer this technology. Yet at a time in the history of fighter development in which most nations fall into that category, a strong case can be made for the United States to continue its current aggressive pursuit of stealth application. Other powers, both friendly and hostile, will respond to the performance versus cost dilemma in their own institutional and budgetary ways.

Undoubtedly the results of Desert Storm will cast useful light on the wisdom of the United States' determination to pursue low observability in the ATF and the AX (the A-12 follow-on). From the combat outcomes disclosed thus far, the F-117 and the F-15E seemed to have performed equally well in that war. Yet the F-117 operated autonomously, relying solely on its stealth features for survivability. The F-15E, by contrast, required the support of precursor defence-suppression attacks, fighter cover, and airborne radar warning through AWACS, all of which substantially increased the cost per pound of ordnance delivered on critical targets. The difference is revealing for what the future may hold.

Already, the Soviet aircraft industry is developing evolutionary variants of the MiG-29 and Su-27 that may significantly exceed the F-15 in both aerodynamic and perhaps even weapons performance. Moreover, European and other developers are now working on advanced fighters that, within a decade, when the F-15 has neared the end of its useful service life, will be available to third world air forces against which the Western allies may have to contend, as they did in the case of the Gulf War.

People can and do quarrel over how often, and at what level of technology and performance increase, changes in platforms should be paced in order to stay comfortably ahead of such trends in potential adversary fighter developments. Indeed, one can find sharp disagreement over the question of whether the YF-22 and YF-23 were designed faithfully to satisfy emerging mission needs or, in fact, were over-designed to any reasonable operational requirements for the next generation of air

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12 Quoted in Tusa, *op. cit.*

13 Smaller size, also cited as a tactical virtue by those critical of excessive reliance on radar stealth, is yet another instance of making a virtue of necessity in the contemporary era. Both EFA and the Rafale are substantially smaller than either ATF prototype, giving them a reduced RCS and visual signature on the cheap. However, that same small size limits the power and capability of their onboard radars, as well as the type and number of air-to-air weapons they can carry. This means that EFA and Rafale will be most effective only in a within visual range environment.

superiority fighters - and at a commensurately excessive projected price. But it is hard to find a responsible view anywhere in the US defence community that we need to get on with a replacement for the F-15, leaving aside the question of desired performance or overall numbers, for all of the five 'new platform' rationales outlined in the preceding section.

As for stealth, one can quarrel about just how much we needed to provide for an ATF designed ultimately to prevail in the close-in air combat arena, just as one can argue over whether the outlook for stealth countermeasures may be sufficiently promising to make low observability, at least to radar, a transitory tactical advantage at best. But we live in the here and now. And as attested by the F-117's unscathed performance in Operation Desert Storm, we can draw great confidence in the leverage that stealth offers to force planners and operators for the near term. Low observability is here to stay as a technology based force multiplier. And until effective countermeasures are developed and made widely available, it will occasion the entire book of air combat rules to be rewritten around it.

When Platforms aren't the Answer: the Case of Close Air Support

Sometimes the effort to upgrade forces, whether by means of new platforms or supporting systems, gives insufficient attention to the prior question of mission definition and mission needs. Close air support offers a telling case in point. If the argument for proceeding with the F-22 makes sense for the five platform rationales outlined earlier, the case for an F-16 variant optimised for close support is on tenuous ground because it shows little relationship to those criteria.

In recent years the USAF has sought to grapple with the problem of its aging A-10 inventory by seeking a faster and more survivable platform in the form of a missionised F-16 called the A-16. Configuring for the close air support mission, however, touches the heart of a highly complex inter-service political issue which features the involvement not just of the USAF, but also the Army and Marine Corps, the Office of the Secretary of Defence, and both houses of Congress.[14] I would like here only to develop a simple point that bears on the platforms versus systems issue.

Language naturally has its compulsions. What we choose to call something has a powerful - and often determining - effect on the way we think about it. As soon as we invoke the term 'close air support' we in effect offer a solution to a problem that begs definition. A different perspective emerges when one considers the problem from the viewpoint of the consumer of that service, namely the platoon commander (or, more likely, his section commander) whose forces are engaged by enemy fire in close proximity and are in dire need of immediate relief. What that lieutenant requires is accurate, all-weather, and on-call direct fire support. In the situation, he is not likely to be interested in whether that support comes from a fixed-wing jet aircraft, an attack helicopter, organic artillery, or off-shore naval gunfire. It is solely the effect that will concern him.

The Israeli Air Force, which has a great deal of often costly experience in the use of air power in direct support of ground forces, does not even use the term 'close air support' in its operational lexicon. Instead, it talks of the intelligent application of air power in land warfare. In this construction, air power's contribution to the land battle, at least in the early phase of a war, may neither be 'close' nor even entail direct

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14 Indeed, the US Congress has insisted that the Defence Department not only consider the USAF's A-16 proposal, but carry out a competitive flyoff involving the F-16, A-7, A-10, F-18 and AV-8B to determine the most appropriate aircraft to replace the A-10 in the CAIRS role. It has also mandated, for reasons closely connected to some of the arguments to be etched out immediately below, that any such assessment give full and due consideration to all other means of fire support, including attack helicopters and surface-deployed weapons. See Robert R. Ropelewski, 'Congress Stirs Pot, Air Force Simmers as Close Air Support Decision Nears', *Armed Forces Journal International*, February 1990, pp 22-4.

'support'. Rather, it may involve things like securing control of the air and engaging enemy forces on the march by striking early and deeply in such a way as to minimise, if not obviate entirely, the need for conducting direct fire support of engaged troops and having to run the gauntlet of overlapping enemy surface-to-air defences which any such mission would necessarily entail.

This is not to say that 'close air support' in its literal sense will be denied as a matter of doctrinal principle in situations in which it is urgently needed. But it is considered an emergency mission of last resort, the least effective way of using expensive fighter assets, and ultimately a testament to the *failure* of air power to have performed its job deeper on the battlefield, as attested by the fact that an emergency request for CAIRS had to be made by a beleaguered ground commander in the first place.[15]

It hardly follows from this, of course, that a uniquely Israeli solution should be accepted by the USAF or any other air force. But the Israeli approach to conceptualising the fire support issue can help us better appreciate that insofar as CAIRS *is a legitimate tactical air mission, it is one whose successful performance* turns less on better platforms than on a variety of mutually supporting platforms and systems, coupled with skilful joint service command integration and employment of those assets.

Put more directly, there is ground on which to argue that the USAF and the US Army *already have much of the essential wherewithal for jointly meeting the needs of that* embattled lieutenant referred to above. The problem lies in the intelligent fusion of those assets into a force employment repertoire that will provide reliable fire support from fixed-wing aviation in those cases in which available aircraft, properly loaded, and the larger exigencies of the battlefield together conspire to make it practicable for those aircraft to provide on-call CAIRS.

One of the reasons why the US Marine Corps has seemed to do so well with CAIRS is that it speaks a common language and is organised to fight a common war. This also applies in the case of the Israeli Defence Forces. By developing and better internalising such a commonality of language and thinking at the operational level, the USAF and US Army could arguably make major advances on the CAIRS front without *spending another nickel, let alone investing in a major platform like the A-16. The key* would lie in making more responsive and mutually supporting use of the diverse assets at their disposal - including joint doctrine, communications, RPVs, and the diverse means of fire support maintained by the two services.

There may be an entirely rational separate case to be made for an expanded F-16 *force to bring better air power to bear in land warfare. No doubt the still-undigested* experiences of the Gulf War will help shed more practical light on this question. But if so, and leaving aside the current fact that the USAF fighter force is being drawn down rather than expanded, such a case would be better made on precisely those terms. Simply painting an F-16 green, adding a CAIRS related capability like the automatic target hand-off system (ATHS), and promising that it will be a dedicated CAIRS asset *does not make for a strong procurement rationale.*

Clearly the USAF has ample room to expand its capacity to apply air power, on suitable occasions, to provide effective fire support to engaged friendly troops. But unlike the challenge of dealing with the emerging air-to-air arena and the associated need for replacing the F-15 inventory with an appropriate number of ATFs, this is not a *case in which the most sensible solution is likely to be provided, at least in the first*

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15 A thoughtful perspective on this whole range of nested issues is provided in Colonel Colin J. Brewer and Wing Commander Jack Lynch, 'Air Support in the Land Battle', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, Sydney, 1988, pp 501-21.

instance, by the development of a new platform. Nobody denies the need for an airborne fixed-wing CAIRS capability in principle. But the core question concerns finding the proper balance not just among platforms, but also among various munitions, communications systems and procedures, and joint service tactics and doctrine to underwrite the Army's fire-support needs.

The Promise of an Improved Acquisition Strategy

Much of the dramatic cost growth in modern weapons that has occasioned the 'platform versus systems' dilemma in the first place has been less a result of the technology incorporated in the platforms than of the often Byzantine way in which they are developed and paid for. The sort of procurement system that routinely permits the $600 hammers and $4000 coffee makers that have lately gained such popular notoriety is also likely to yield major platforms at costs in considerable excess of either the inherent operational value of the systems or what they might cost in a less encumbered acquisition environment.

A major part of this problem stems from the 'requirements' process by which military customers levy desired performance specifications for major weapons on potential developers in the defence industry. This process often leads to over-designing for most mission needs by routinely fixating on what is technically feasible rather than on what the actual needs of a theatre commander would call for. It also forces industry to accept those stipulations (some of which may work at cross purposes) without challenge and then to represent them in an air vehicle that somehow accommodates them in a seemly fashion. The result is likely to be an aircraft defined in fairly specific terms by the customer, rather than a platform that leverages industry's comparative advantage in creativity and design skill in producing a platform best suited for broadly stated mission needs in the interest of both effectiveness and cost. In both cases, the result is often a system whose eventual cost (including the non-recurring cost of R&D) is higher than it needed to be for the overall performance offered.

The 'technology push' all too inherent in the requirements process is frequently depicted by defence critics as intentional gold plating. In fact, it more often leads to nothing more insidious than simply routine over-engineering. Take, as a bit of a caricature, the hypothetical case of a major in the Systems Program Office of a next-generation fighter for the mid-21st century. This major is responsible for the development of the altimeter for that aircraft, and his career (at least in his perception) depends on his ability to assure that the instrument incorporates the latest that modern technology can produce. That incentive leads him to recommend an altimeter that not only does what an altimeter is supposed to do, but also that works 200 ft underwater and in space - definitely feasible, but also beyond what is required for mission needs and at a commensurate price. When this practice is extended to every other sub-assembly in the emerging aircraft's design, one can easily see how the acquisition process, without the slightest malice afore-thought, can produce a fighter at a price fit for kings.

Under the current military specifications (or 'milspec') system, the industry contender that would seek to produce an aircraft or one of its major sub-systems would have to accept the customer's performance stipulations without quarrel, even though he knew

they might be excessive, with a definite downside cost consequence.[16] By contrast, to offer just one countervailing example, automobiles are now routinely manufactured with diagnostic chips hard-mounted to their engine blocks that are built to milspec standards, yet are a tenth the cost of, more reliable than, and several years ahead of comparable systems procured by the military. The Defence Department is free to purchase this same technology off the shelf at market prices, but procurement regulations and the milspec system prevent it. This is just one instance of how far the defence community has yet to go before it can take advantage of the flexibility and efficiencies offered in the commercial world.

For its part, industry's obligation to honour client desires often does it out of a fair chance to apply its corporate experience in generating solutions that are most efficient and cost-effective. One aerospace executive has suggested that the military could do itself a favour by relinquishing control over the more detailed specifics of weapons performance. He maintains that it should be enough for the military to 'specify the overall performance desired and then let industry come up with the most innovative solution, considering cost, performance, reliability, and maintainability'.[17]

Yet another source of increasing cost in new platforms has to do with the complex procedures by which the defence acquisition system operates. Performance shortfalls, program slippage, and resultant cost growth have become endemic features of the acquisition process. These failings have little to do, in and of themselves, with the sought-after technical sophistication of these systems.

A mechanism that tends to drive up the cost of platforms and systems alike is the imposing collection of rules and regulations, standard procedures, and other bureaucratic practices that dominate the way the Defence Department engages industry to underwrite its force-structure needs. Until recently, one such rule obliged industry to finance itself in competitions for source selection and to accept fixed-price contracts for initial systems development involving new technologies. Industry is also encouraged by the services to bid for procurement levels that tend to be higher than Congress traditionally has been disposed to fund. The usual result is scaled-back expectation, lower production rates, and higher unit costs that are inevitably passed on to the customer once a program attains production status.

Another undesirable feature of the acquisition process is the false competition that often prevails among bidders, in which bottom-line price rather than system quality or requirements compliance constitutes the ultimate basis for contract awards. This typically results in unrealistic planning, false promises to the customer, and a situation in which the low bidder, having won the production contract, soon discovers (all too often disingenuously) how much he under-played his hand. Inevitably the next step is a request for supplemental funding by the producer to assure delivery as originally promised. Before the A-12 cancellation, it was not uncommon for the Defence Department to honour such industry demands. Perhaps the A-12's demise and the

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16 This raises a related question about what the responsibility of industry is when confronted with what it knows to be overdrawn performance demands from its customers. Often industry has been criticised for reacting over enthusiastically with 'how many do you want and in what colour?' rather than engaging in a dialogue aimed at negotiating more reasonable performance specifications. The problem here is that the price of such civic responsibility is all too often to lose a contract to the lower or more compliant bidder. As the chairman and chief executive officer of McDonnell Douglas recently noted, 'you have to have a relationship with the customer where you have real dialogue, but at the same time you have to know when to stop talking and just plain listen and quit trying to tell the customer what he wants'. Interview by Robert R. Ropelewski and John G. Roos with John F. McDonnell, *Armed Forces Journal International*, March 1990, p 50. At a seminar at RAND in November 1989, the general designer of the Mikoyan Design Bureau, Rostislav Belyakov, observed in response to a query about how the Soviet aircraft industry deals with this same dilemma: 'We give the Soviet Air Force not what it wants but what it needs'. It would be an interesting research topic to see how this posture works out in practice in the Soviet military-industrial relationship.

17 Interview by Glenn W. Goodman, Jr., with Richard A. Linder, President of the Electronic Systems Group, Westinghouse Electric Corporation, *Armed Forces Journal International*, February 1991, p 36.

Congressionally mandated trend away from fixed-price development contracts may help lead toward greater costing realism in industry's bidding for major platforms in the future.

A related problem in platform procurement is the widespread practice of concurrent development and production, in which production tooling is laid down before the aircraft flies and operational testing and initial production and deliveries are conducted simultaneously. Such front loading of development programs typically locks in resources prematurely, resulting in massive costs and commitments that make it difficult to modify or terminate a program in the event that it should encounter snags in the production and development phase.

As a result of these procedural constraints on American weapons development and production, industry has often been forced to cut corners to make ends meet, occasionally lapsing along the way into the now well-known sins of 'waste, fraud, and abuse'. Although such excesses have been the exception to the rule, they have nevertheless prompted a further overlaying of government rules, along with highly intrusive and burdensome reporting requirements on industry. These have contributed, in turn, to fairly endemic government micromanagement of defence procurement. Such 'legislative and regulatory harassment factors' have had the pernicious result of encouraging exactly what they have been intended to head off, namely, further cost growth in major weapons, by introducing friction into the R&D and production system.[18]

In sum, the relentless cost growth of major platforms is, in considerable measure, a result of the acquisition strategy we have chosen to pursue rather than from high technology and its application *per se*. True enough, as one industry executive has noted, one must recognise that 'in every development program, there are going to be some problems along the way' as a result of 'pushing the frontiers of technology'. Yet the problem has been less one of technology itself than of applying proper discipline to its development and use.

Much of this difficulty is a result of procedures that drive up the cost of weapons in irrational and unnecessary ways. The problem is compounded for defence planners since what is at stake is never simply one system, but an array of competing force modernisation programs, each of equally assumed 'high-priority' importance to the national defence effort. When one contemplates that in contention for funding are not just the A-12 and ATF, but these aircraft along with the B-2, the C-17, and such other systems as the SSN-21 submarine and a new ICBM, one begins to appreciate the pressures that have led to the platforms versus systems conundrum.

Numerous reform proposals have been put forward in recent years to help infuse the acquisition process with efficiencies aimed at seeking greater productivity from reduced investments. These initiatives include, among others, the Packard Commission report, the Goldwater/Nichols Act, and Secretary Cheney's Defence Management Review of July 1990. Each undertaking has been concerned with some common themes. Among them have been striving to buy the 'right' kinds of weapons, with a proper focus on operational effectiveness, affordability, and production efficiency; improving the mechanisms and processes of acquisition so as to reduce overall program cost, increase the performance of industry, and facilitate more rapid development; and finding ways of making the defence industrial base more innovative and responsive to customer needs.[19]

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18 For further discussion, see Senator John McCain, 'The Self-Destruction of America's Defence Industrial Base', *Armed Forces Journal International*, June 1990, pp 40-6.

19 See Jacques S. Gansler, 'Defence Acquisition Reform: Can We Get More with Less?' *Armed Forces Journal International*, January 1990, pp 48-52. See also the check-list of still-unimplemented reform ideas itemised in Michael D. Rich, 'Cancelling A-12 Was Bold but Insufficient', *Los Angeles Times*, January 15, 1991.

One approach uniformly urged by critics of recent acquisition policy (and now mandated by the US Congress) has been to 'fly-before-buy'. This strategy was followed with great success in the lightweight fighter competition that resulted in the USAF's acquisition of the F-16. It also, after a fashion, was followed in the USAF ATF competition. It was *not* a strategy elected by the Navy in the case of the A-12, and that choice played a signal role in the trouble that led to the A-12's cancellation.

An important adjunct of the fly-before-buy approach should be a strategy of competitive prototyping. A conservative approach to such a strategy would feature austere startups, in which basic airframe/engine combinations were first tested before more complex commitments to avionics development and integration were undertaken, to say nothing of laying down production tooling and committing to full-scale development before the basic concept has been proof tested. Such an approach offers built-in safeguards against high risk technology being delivered to users before it has first been debugged and validated. For it to work, however, the philosophy of testing needs to revert to first principles by seeking to explore and verify (and, where necessary, identify ways of improving a prototype) rather than attempting from a standing start to 'certify' it for production. The latter approach is a guaranteed recipe for counter-productive pressures in the early phases of a test program. It can also lead to compulsions toward subjectivity and wilful distortion in performance reporting.

Other reforms proposed to ease the cost of major platform development have been aimed at the organisation and management of the acquisition process itself. Among such proposals are reducing the legislative and regulatory intrusions that sap industry creativity and responsiveness; seeking greater stability in acquisition programs once production commitments have been made so that real economies of scale can be achieved; and eliminating the constraining fixed-price contracts that helped do in the A-12 in lieu of more flexible pricing to accommodate the inherent unknowns of new technology exploration.

Hand in hand with such changes should be a provision for government to end full industry self-financing during the startup phase and to share both risk and cost with industry, inasmuch as it is the customer who sets the requirements and controls the financial fate of programs. As matters stand today, the industry consortium of Northrop and McDonnell Douglas that lost the ATF competition will have to write off its sunk cost in that program, which has been considerable. Losses at that level of magnitude could be severe enough to put whole aerospace companies out of business, or at least force them to transform themselves radically and begin looking beyond the defence sector for continued financial livelihood.[20] Such a set-back is bound to have a stultifying effect on even the winner's incentives to compete the next time a new program initiative is announced.

A related improvement, as noted earlier, would be to ramp down the burdensome 'requirements' that are now levied upon industry by the military in favour of broader statements of mission need that would allow industry to meet that need according to its best judgment as to how to provide the desired capability at an affordable cost. This would help bring defence planning and procurement practice more into harmony with those of the commercial sector and thus ease the tension in the military-industrial relationship at the same time it served the interest of reduced platform cost. Existing rules tend to drive industry away from opportunities in the defence sector.

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20 As Northrop's chief executive officer, Kent Kresa, has sombrely pointed out: 'This is not just a competition to build the Air Force's next fighter. Given the budget climate, this could well be a competition for survival for several aerospace companies'. Quoted in Jeffrey P. Rhodes, 'The YF-23 Rolls Out', *Air Force Magazine*, September 1990, p 119.

An important corollary would be for both users and industry to temper their tendency to fixate on platforms as all-purpose solutions to operational need with an appreciation that it is the synergistic blend of effective platforms *and* capable sub-systems that makes for an effective weapon. This implies a need for greater emphasis on systems along with a paced development of new platforms, especially those systems that would make existing platforms more combat effective and survivable. Among other things, this calls for greater attention to mission-specific weapons that can be designed, developed, and fielded in a reasonably short time.

Finally, as the 'sticker shock' of the B-2's price tag and the cancellation of the A-12 have so dramatically shown, there is a strong case for greater parsimony in the resort to 'black' programs as a technique for protecting new technology. Such compartmentation works superbly for small and disciplined enterprises like the Lockheed Skunk Works, where specific, single mission aircraft like the U-2 and SR-71 are concerned. Both aircraft were produced in short order, but also in small numbers. Even the F-117, with nearly 60 produced overall, was an overwhelming success in terms of cost management and program efficiency.[21] But large, long lead-time, multibillion dollar undertakings like the B-2 and A-12 are a different matter. Their very magnitude deprives them of any realistic opportunity for efficiencies of the sort that have routinely been registered by the Skunk Works.

In the case of large programs, it is easy for compartmentation to become part of the problem rather than part of the solution. Because of the multiple administrative and management inefficiencies it necessarily imposes, compartmentation contributes to overall program cost increments that have nothing to do with the platform itself. Furthermore, it is conducive to programs being conducted beneath legislative and public scrutiny, which no enterprise involving large amounts of national treasure can endure for long. The fate of the A-12 is a telling example of what can happen to a vital national program when the lack of public accountability facilitated by compartmentation is allowed to get out of hand.

The main thrust of the foregoing has been to argue that much of the platforms versus systems conundrum has been of our own making rather than inherent in the complexity of new platforms. At issue is not whether or not we really 'need' the ATF or the A-12. Clearly the F-15 and A-6 must be replaced with more modern and capable aircraft. To that extent, the follow-on platforms that have been conceived and funded to take their place are not choices that we can take or leave, at least not if we intend to remain serious players in the tactical air arena of the 21st century. The point, however, as Secretary Cheney's cancellation of the A-12 so forcefully underscored, is that the Air Force and Navy will have to provide reasonable assurances up front that their program costs are going to be kept within sensible bounds if the American defence procurement process - including, most notably, the legislative part of it - is to provide them with these needed platforms without serious reservation. No nation can afford a $100 million fighter or attack aircraft, let alone a half-billion dollar strategic bomber, regardless of its technical soundness or combat capability.

For one thing, at those prices we cannot buy them in numbers large enough to make an operational difference. For another, the unit cost is so high that we can scarcely risk flying them in routine peace-time training because we cannot bear the cost of attrition if we lose them in accidents. It is a fair subject for debate what level of technology and what degree of performance should have been designed into the ATF prototypes, the A-12, and the B-2 to meet expected mission needs. But in the end, much of the seeming luxuriousness of modern platforms stems simply from the way we buy them, not from what they contain.

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21 For some interesting details bearing on this, see Jeffrey P. Rhodes, 'The Black Jet', *Air Force Magazine*, July 1990, pp 72-6.

An acquisition system that, in its worst manifestations, leads to $600 toilet seats is bound to have a comparable, if not necessarily commensurate, effect on the cost of capital weapons systems. This being so, it is far from clear that even substantially downgraded platforms in terms of technology and performance would be that much cheaper. This should tell us where much of our attention needs to be directed to keep us from eventually being shut out of the platforms business altogether. As matters stand, there is much merit to Norman Augustine's only partly tongue-in-cheek projection that, given current trends, by the year 2054 the entire US defence budget will allow us to buy only one tactical aircraft.[22]

Looking to the Future

If the question posed by the subtitle of this paper is taken to concern whether current trends portend a decline in the frequency of new platform deployment and a collateral increase in the emphasis given to incremental platform improvement through new systems that offer expanded capability, the short answer must clearly be 'yes'. Recent history unmistakably points toward such an answer as the only possible conclusion. Consider the contrast between the mid-1950s, when the USAF was able to field no fewer than six new fighter types (the F-100 through F-106) in just three years, and the more recent period in which cost and development lead times for new fighters have appeared to grow almost exponentially. To appreciate the extent of change that has taken place, one need only note the example of the 36th Tactical Fighter Wing, a typical USAF fighter unit stationed at Bitburg, Germany. From the mid-1950s until the mid-1970s, that wing successively cycled through the F-100, the F-105, and three variants of the F-4 before acquiring the F-15 in 1978, which it still flies today, more than a decade later. Given the marked slow-down in the rate at which major new platforms are now being developed, that unit will not received the ATF until the late 1990s at the earliest - which means that it will have flown the F-15 for over two decades by the time it converts.

The explanations for this trend are not mysterious. They have to do with the escalating cost of new acquisition programs and the growing complexity of those programs as increasingly more sophisticated technologies are integrated into successor-generation platforms. The inevitable effects have been longer acquisition intervals, higher unit costs (with resultant lower overall numbers of platforms purchased), and aircraft designed for greater maintainability and longer service life.

Furthermore, after a lengthy evolutionary period of having steadily expanded their speed and altitude envelopes, today's fighters have approached the limits of their performance in the traditional sense. High altitude no longer provides a sanctuary against enemy missiles. As for maximum load factor, the F-15 and F-16 are stressed for routine manoeuvring at 9g at combat weight, which comes close to the limits of human tolerance today. As reflected in the considerably lower maximum speed of both ATF prototypes (Mach 2 or less) compared to that of the F-15 (Mach 2.5), Western fighter designers have accepted that, at least for the time being, an end speed in excess of Mach 2 exacts unacceptable penalties in terms of aircraft weight, complexity, fuel efficiency, and cost, while offering little gain in combat capability for that investment.[23]

What this means in practical terms is that current fighter development trends are now more and more driven not by a determination to 'push the envelope' in the traditional sense, but rather by an effort to expand the performance of the aircraft within the

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22 See the chapter 'The High Cost of Buying', in Norman R. Augustine, *Augustine's Laws*, New York, 1982, pp 47-53.

23 For more on the implications of this trend for future fighter development and tactical employment, see my 'Future Air Power Developments', in Desmond Ball (Ed), *Air Power: Global Developments and Australian Perspectives*, Sydney, 1988, pp 65-91.

existing envelope in terms of such measures as instantaneous and sustained turn rate, nose-positioning ability, fuel efficiency, supercruise capability, and low observability. This offers yet another reason why, for the foreseeable future, the development and deployment of new platforms like the ATF will be fewer and farther between, and that incremental improvement of existing platforms with new systems will become more and more the rule.

That said, 'platforms versus systems' is no more the issue today than it was in years past, notwithstanding the fact that new platforms have become harder and harder to justify and deploy for the reasons cited above. The real issue concerns what kind of platforms, at what rate of acquisition, and with what capability and in what mix with what supporting sub-systems all make for the most sensible force modernisation strategy. Here, the question really concerns the nature and extent of discipline which should be applied to the acquisition process in the interest of getting the most capability in operationally useful numbers at an affordable price.

Sub-optimal solutions to force development are generally not the result, first and foremost, of excessive or insufficient application of technology. To take the case of ATF, few operators would quarrel with the argument that any fighter program intended to replace the F-15 should include, broadly speaking, the various performance attributes reflected in the YF-22 and YF-23 prototypes that were recently flown in the ATF demonstration-validation.[24] The question is not the level of technological sophistication incorporated into new platform designs. It is the way we go about determining that degree and then applying it in the force development process. In both cases, the resultant problems are wholly of our own making.

I noted earlier how excessive attention to minor detail in user statements of required operational capability can lead to an unintended but nevertheless reflexive over-engineering in an aircraft's design and development phases. This inevitably has a down-stream cost consequence for those in industry who must then translate those abstract requirements into produceable and flyable aircraft. Three points are worth mentioning in this regard.

First, there is a strong case for users to stick to broad statements of mission need and to leave the specifics regarding performance trade-offs and technical feasibility, at least in the first go-around, to those who will develop and produce the aircraft. All too often it is in the attempt by users to assure the last 10% of performance that the biggest problems crop up. Unfortunately, the opportunity costs of wrong decisions or misplaced priorities do not typically show up until much later in a program, when too much momentum has been generated to allow for major mid-course corrections. It is typically the last 10% of performance that generates half of the program cost and three-quarters of the development headaches.[25]

Second, a technique is needed for separating the necessary from the merely desirable, especially when so many concurrent force modernisation programs are contending for a limited amount of defence funding. Today, the United States has in train a military aircraft development program that, all told, could cost over $200 billion.[26] When one considers that this spectrum of programs is competing for funding

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24 See, in this regard, the arguments put forward by a former US Marine F-18 group commander, Colonel Randolph H. Brinkley, 'Future Fighters Are at a Cost/Technology Crossroad', *Armed Forces Journal International*, January 1991, pp 49-50.

25 As a suggested counter to this recurrent problem, the recently retired commander of the USAF's Tactical Air Command, General Robert D. Russ, has proposed what he calls 'the 80% solution', by which the services would strive to 'avoid the use of risky, exotic technologies associated with the "100% solution", which often produces only marginal improvement at exorbitant cost'. Quoted in *Armed Forces Journal International*, March 1991, p 56.

26 See Benjamin F. Schemmer, 'The Pentagon's Jihad', *Armed Forces Journal International*, January 1990, p 8.

at a time when the defence community is also pursuing a simultaneous modernisation of naval, ground force, and strategic missile platforms, it is all but self-evident that something will eventually have to give. In the absence of a money tree, which the R&D community has yet to develop, we simply cannot have everything.

If a more rational defence program is to emerge from these conflicting demands, the bulk of discipline for separating the necessary from the merely desirable will have to come from the uniformed services themselves. After all, it is they who will be called upon to commit those forces to combat in time of national need. I have written elsewhere, and will emphasise again here, that if military professionals do not, out of enlightened professional self-interest, impose upon themselves the bitter choices regarding where to draw the line between the necessary and the merely nice to have, others - whether they be civilian bureaucrats, legislators, or administration politicians - will surely make those choices in their stead.[27] Furthermore, because these latter players will have their own agendas and little real appreciation of professional military needs, there is every chance that those choices will not be consistent with the best interests of a balanced defence posture.

Finally, given the mounting complexity and scale of today's weapons programs, it is more important than ever that requirements be set right the first time. As an example of the sort of midstream intervention that should never occur in a well-structured program, the major aircraft review conducted by the US Defence Department only months before the first flight of both ATF prototypes recommended that a major redesign of those prototypes be undertaken, including reducing the supercruise requirement from Mach 1.6 to Mach 1.1 out of concern for keeping the aircraft stealthy against IR detection.[28]

Similarly, it was reported earlier that because of weight and cost growth trends in the ATF, Tactical Air Command was considering suggesting that the aircraft be redesigned around a single engine rather than the current twin-engine configuration. It is not clear how serious the Air Force ever was in fact with regard to this suggestion. Nevertheless, it precisely typifies the kind of radical mid-course changes in a program that can only be carried out at a great cost penalty in the end.[29]

To conclude, 'platforms versus systems' is a false issue. The tactical air forces seriously need the ATF and an A-6 replacement. There is perhaps more room for reasoned argument about the B-2 because of the changing Soviet relationship with the Western world and the broader question of operational need, to say nothing of the fact that the USAF just completed a very expensive B-1 procurement. But the F-15 will be 30 years old by the time the ATF reaches operational service. The aging A-6 presents an even more urgent problem. The A-12 cancellation, although a correct policy decision, created an unmitigated disaster that has left the US Navy in deep trouble. Cancellation of the ATF would have a similar effect on the USAF. A follow-on multi-role aircraft to replace the F-16 is not such a pressing concern, and the F-111/F-15E force can easily endure while the Navy sorts out its A-12 successor problem. But we are approaching the point rapidly when the F-15 force will be in serious need of replacement.

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27 Benjamin S. Lambeth, 'Pitfalls in Force Planning: Structuring America's Tactical Air Arm', *International Security*, Fall 1985, pp 84-120.

28 See Benjamin F. Schemmer, 'Buy Only 30 B-2s, Delay/Redesign ATF, C-17 OK, Boost Navy ATA, Cheney Told' *Armed Forces Journal International*, April 1990, pp 21-2.

29 To its credit, the USAF has shown a willingness to bite the bullet when needed. The Vice Chief of Staff and former head of ASD, General Mike Loh, has said: 'We're flexible enough that when we see the technology not going to be able to match what the operational user thinks he needs, we can change those requirements'. As an example, he added: 'We're going to continue to scrub out of ATF those high cost, low payoff features of the aircraft' such as 'a lot of avionics goodies that are kind of nice to have but not essential'. Quoted in Schemmer, *op. cit.*, p 22. Avionics can end up costing between 40% and 60% of the ATF's flyaway costs.

This is not to say that there is no room for improvement both in the way we procure platforms and in the sort of balance we seek between platforms and systems in our tactical force posture modernisation. Indeed, capable platforms without supporting systems not only reflect a skewed investment pattern; they needlessly put platforms at risk in the event of war. Despite the successes of Desert Storm, the USAF is still badly under-supplied with effective air-to-ground standoff munitions. Such weapons offer great opportunities for increased platform survivability that are being insufficiently exploited and funded.

Furthermore, although the trend of the day is for fewer platforms at longer intervals and for greater stress on sub-systems, it does not follow that the development and deployment of these sub-systems is necessarily going to be any less painful. The advanced medium range air-to-air missile (AMRAAM), for example, has been an item of discussion and development for over a dozen years. Yet no operational USAF or Navy fighter unit to this day has a fully operational launch-and-leave air-to-air weapons capability, aside from the F-14 with its long range Phoenix missile.[30] Likewise, the AGM-130 (a rocket-powered version of the GBU-15 laser-guided 2000 lb bomb) has been on and off again for years and has only recently entered the operational inventory.

What is needed is an acquisition system that views platforms and systems complementarily, with the latter expressly pursued so as to help expand the capability of the former as operational tasks become ever more demanding. New avionics and munitions, and even offboard combat support assets like COMPASS CALL and Joint-STARS, should be pursued not as programs in themselves, but rather as inputs into improved mission performance of the overall tactical air force. This means that they must be conceived and managed with an *operational* focus rather than merely from a systems program perspective. In a nutshell, it is not a question of either-or. It is a question of proper balance.

Finally, it bears stressing that insofar as *both* platforms and systems have encountered cost growth problems that have severely jeopardised their future prospects, these problems have been of a sort that can be corrected by more rational management techniques. Just as no screwdriver produced at $600 can possibly contain a commensurate amount of technical elegance or practical utility, a single B-2 cannot possibly offer a half-billion dollars worth of combat or even deterrent capability, *whatever* its operational impressiveness may be when viewed in the abstract. Such perversions of rational costing simply reflect the way the procurement system allows such commodities to be priced.

Fortunately, in the United States at least, there have been some hopeful recent signs. The Senate Armed Services Committee reported in its July 1990 authorisation that the Soviet threat had declined sufficiently to take at least some of the edge off the urgency that once nurtured a drive to develop weapons 'to meet an arbitrary fielding deadline'. In light of this, the committee suggested we 'can now afford to get it right the first time before becoming deeply committed to troubled weapons systems'.[31] The A-12 cancellation constituted powerful handwriting on the wall which underscored further the merits of greater deliberation in future platform development planning. Finally, the spectacular results of Desert Storm in terms of leadership and planning, command

30 The USAF's 58th Tactical Fighter Squadron, an F-15 unit that by happenstance downed almost half of the US total of enemy aircraft in the Gulf War (16 Iraqi fighters), has recently become the first US squadron to attain initial operational capability with the AIM-120 AMRAAM. See *Aviation Week and Space Technology*, May 1991, p 17.

31 Quoted in Benjamin F. Schemmer, 'Fly Before Buy - Even for Submarines; 26 Weapons Terminated; 10 Slowed', *Armed Forces Journal International*, August 1990, p 16.

integration, and combined-force operations may help, by the force of good example, to eliminate some of the parochialism that has bedevilled competing defence programs in the past.

If there is to be a rational solution, there will need to be a more balanced distribution of pain across all services and programs in the interest of providing an effective fighting force at a time when everybody has to face a real decline in spending authority. Reforming the acquisition and force development process cannot offer a panacea for producing a sensible mix of platforms and systems in the conventional air power arena. But it holds out the promise of eliminating much of the friction that drives up the costs of both, and thus easing the systems versus platforms conundrum at least at the margins.

DISCUSSION

Air Marshal John Thomson (RAF): Could we widen the scope just a little bit beyond the very good presentation you gave us on low observables, air defence aircraft and attack aircraft, to give us your thoughts on tactical reconnaissance in the decade ahead. We seem, at least in the NATO context, to have paused before moving forward from the RF-4C generation of tactical reconnaissance aircraft. We brought in, of course, the reconnaissance version of the Tornado very recently, with a very specialised capability in tactical operations, but that in itself lies at the heart of my question. How do you see manned tactical reconnaissance developing in the context, first of all, of a complex of sensors: overhead, standoff and unmanned tactical sensors; and secondly, getting away from the higher technology arena which NATO has represented for the past 20 or 30 years. It seems to me that if we are to proceed with useful tactical reconnaissance, we do need at last to make this leap to near-real time information at the point of request.

Dr Lambeth: You're right, the RF-4C is a rapidly ageing presence in the US tactical air force structure. We're about to shut down, if we have not already done so, the one remaining operational unit in Europe. Most of the other reconnaissance assets are in the Air National Guard. There has been talk about an F-16R, but I sense not a great deal of enthusiasm for that.

I can see both a very high technology and a very low technology fix at the same time. To take the high technology fix first, the F-117, which right now has a single mission purpose of ingressing unobserved to a highly defended, extremely high valued target, uses a capability to accomplish that mission which would be supremely well suited to reconnaissance. Reconnaissance is a tough mission as you know: alone, unarmed and unafraid. (Of course you don't have to do it that way. You can go in armed.) I can imagine how, at some point in the foreseeable future, the kind of technology which is reflected in the F-117, and which will be embodied in the Advanced Tactical Fighter, would make reconnaissance not 'mission impossible', but a job that one could go out in a highly defended environment and perform with reasonable chances of success. It will not be real time because you have to bring the jet back, land, bring out the film, process it, disseminate it and that takes time. You can reduce that length of time by cutting out some of the friction in the processing procedures. But it's going to take time.

Then, at the low end, there is, as I mentioned in my opening remarks, a platform called Pioneer, which is remarkably inexpensive. I think the idea of simple, cheap, unmanned air vehicles with the kind of electro-optical capability mounted on Pioneer offer great potential. It can provide very effective, real-time battle-field surveillance and target designation. I suppose you could put a laser on it. I am not a war planner by profession, but I can imagine that a large number of those things, which are virtually invisible to radar, in the right places at the right time could have been helpful in the

mobile Scud hunt. This is only at the New York Times level of classification, but I think the two kinds of technology, both the very exotic and the cheap, can provide a very usable asset in a matter of less than a decade.

Corporal M. Andrew (RAAF): I have two questions. Do you believe air forces without access to low observable technologies should try to acquire an electronic warfare capability by employing a small number of dedicated platforms, or by using pods - at the expense of weapons load - on a fleet of multi-role platforms? Secondly, do you see advanced electronic warfare, low observable and defence oppression equipment being denied to non-Western nations by the US, as has occurred with regard to weapon system software to a country in this region operating advanced US systems?

Dr Lambeth: The short answer to the first question is that there are no general rules. It will depend entirely on the operational setting, on operational need. Secondly, simply slapping an ECM pod on an airplane may or may not provide the survivability needed to get into and through the threat arena. It would have to be tailored to operational needs, and it is hard to generalise about that. My inclination is to say that it all depends, and that you do the best you can. To take the Israeli case, they have, as I understand it, a fairly elaborate electronic warfare suite. But they don't have stealth, and they won't have it for a long time to come. They operate on the premise that you never know for sure whether it was ECM or luck that saved you. So you carry the ECM, but you fly the mission as though you didn't have it.

As for the second question regarding whether stealth technology will become available, I suspect that the answer is 'no' in the near term. The recently retired president of Lockheed Skunk Works, Ben Rich, was asked that very question a couple of months ago regarding whether the ATF would be available on the international market. His off the top of the head answer was 'not only no but hell no'. Then he thought about it for a day and said, well, if you took some of the coating off and you put on traditional leading edges and eliminated the treated canopy, then yes, the aircraft would become available. Whether you would want to buy it on those terms is a different story.

Mr R. Howe (Industry): Air Vice-Marshal Gration introduced your speech by predicting that the RAAF might have 50 year old F-111s in 20 years time. As I interpret your thesis, you would perhaps disagree with that in the sense that perhaps platforms wear out just as fast as humans do. Can you give us any indication of the rationale behind the US Air Force's recent decision to retire quite a few of its F-111s, and would you agree that perhaps the Australian Air Force might have 50 year old F-111s in 20 years' time.

Dr Lambeth: I do not speak for the United States Air Force and I would defer on that specific question to General Boyd. I will try and take your general question regarding the possibility of the F-111 being in the inventory for 50 years. I'm just a political scientist from North Carolina. I am not an aero engineer, I am not a force planner, I am not a resource manager. But I think it's pertinent that F-111 type aircraft and F-15 type aircraft are very different categories of tactical vehicles. They perform different functions and have different fatigue problems. The F-15, the F-16, the F-18 operate routinely in a high 'g' environment. If a lot of stress is put on a jet it gets old and tired a lot quicker. I would say that were it a matter of operational necessity to have a long range maritime strike aircraft in the inventory into the future, and were the F-111 the only platform available, if any tactical platform could be kept serviceable for an extended period of time, I suspect the F-111 would be it.

Let me make a quick comment on the US Air Force decision. To my understanding, insofar as the Air Force is talking about removing F-111s and some F-15Es from the active inventory, it has been due to an expectation that at some point the A-12 would come on line as a replacement. Perhaps General Boyd can cast some more light on that question.

Lieutenant General C. Boyd (USAF): It's been a while since people in the Pentagon stopped talking to me, but when I was still sitting on the council and we were trying to figure out how you deal with the force structure, the kind of visceral reaction you have is, will I save the new stuff and get rid of the old stuff? In that regard, if you want to talk 111s, well, you talk As and FBs, and it just becomes a very expensive proposition. They're a very expensive aeroplane to maintain, they're old and we never liked them much in the first place, but they got issued to us, and so it's our last revenge on Robert McNamara. But I don't mean to be flippant, and when you start thinking about how you are going to take apart a pretty well balanced force structure of 36 1/2 tactical fighter wings, you start making some decisions like those I've just alluded to. The newer stuff stays and the older stuff goes.

Let me hit back on another issue, because I think you mentioned, Ben [Lambeth], something about the mud fighter question. An A-16's not the answer. But with the kind of fiscal climate we have known since 1985, when you think new starts on aircraft, and then you think about how best you can provide some close air support to the army with a weapon system that is survivable on a tricky battle-field, you come to the conclusion that it's better to put an 'A' in front of it and paint it green and give it some neat little capabilities like ATHS. The alternative, which is what we are probably going to be faced with now, is to provide that same kind of close air support but without all the enhancements. So you are going to do F-16s rather than A-16s because I don't think we are going to get a new start on a close support aeroplane any time soon. The larger question of whether you ought to be doing close air support or not in the first place is a cultural question and it's a political question. It's a very complex issue that surrounds our defence reform caucus in Congress. The United States Army has come to expect an awful lot of close air support. It's psychological as much as anything.

Dr Lambeth: Please understand, lest my point be missed, that I'm not quarrelling about close air support *per se*. If the mission is going to be performed, for my money I would rather perform it in a sharp-ended jet, a jet painted green with ATHS if need be, than in the A-10. My point was more conceptual than intended to pick on a particular program, and it had to do with what the close air support mission is all about. My point was that close air support is a form of force employment in which a lot of things have to come together. Having the world's finest platform with all the super add-ons that the A-16 envisages, without all those other things coming together, is still a good way to die. I would rather have a good, integrated joint service repertoire for performing that mission, with assets appropriately fine tuned and tailored to perform the job, than a new platform and nothing else.

Group Captain A.G.B. Vallance (RAF): What you are saying reinforces an impression I've had for a little while, and that is, capabilities are becoming more and more a function of the systems that you put into aircraft rather than the platform itself. It does seem to me that these systems will not be available to all air forces and that you'll very soon get a two tier structure in the world's air forces. It reminds me of a quotation from Kipling which was: we will prevail because we have got the maxim gun and they have not. I wonder whether we are in that sort of situation, but insert 'stealth technology' for maxim gun.

Dr Lambeth: I guess I would counter your question with a question: prevail against whom?

Group Captain Vallance: Those who do not have access to new technology - either they are denied access or can't afford it.

Dr Lambeth: I would suggest as a principle that, for the near term, the fact that the technology is denied does not in any way sound the death-knell of future force planning, to the extent that one can do very, very well against most conceivable threat regimes without it. Stealth, low observability, was designed in the first place to deal with the very dense and capable integrated air defence structure that was part and parcel of organic air defence for Soviet ground forces and of the Soviet air defence posture in the homeland. Until quite recently, that was the most dense and capable system in the world. That is a threat environment that few air forces are going to have to come to terms with. I would emphasise that technological magic is an instrument for making things happen, but it is not a panacea for those who have it but don't know how to use it. The MiG-29 is a wonderful aeroplane when it's properly flown. Yet I have a lot of friends flying F-15s in the Gulf who are biting their knuckles because they didn't get a chance to show what they'd learned from 15 years of Red Flag training.

One can compensate very nicely for the lack of leading edge technology with superior training, tactics and leadership. I'm prepared to argue that in the case of the Bekaa Valley air operation in 1982, you could have taken the two forces and reversed them and probably had much the same outcome. So the answer I would give you depends very heavily on what the threat is and whether one is likely to incur prohibitively high attrition without the ability to get through unobserved. Then, all of a sudden, that kind of technology becomes very important.

But I would say that this applies only at the very high end of the threat spectrum. The Coalition forces could have done beautifully in the Gulf without the F-117, I would think. That aircraft was icing on the cake. It put some very bold words on the wall about what that technology portends for the operational arena of the coming decade and beyond. But I would submit that the outcome would have been the same without the F-117, perhaps with somewhat higher losses to Coalition aircraft. It was not magic that produced the victory. It was clarity of objective, national leadership that was prepared to let our officers do what they've been trained to do, and unity of command. Just the idea of a daily Air Tasking Order 600 pages long, for four flying services of the United States armed forces plus all the other Coalition air forces, to me was marvellous. And there was no technology in that. It was just human ingenuity.

USE OF AIR POWER: NEEDS AND EXPECTATIONS

PANEL TWO

Air Vice-Marshal I.B. Gration, Rear Admiral K.A. Doolan, Major General M.P. Blake

Air Vice-Marshal I.B. Gration

Before coming to the heart of my comments I will remind you of some of the rationale of Australia's strategic defence posture. Because of our relatively small population, but relatively wealthy and technologically developed economy, Australian military strategy aims to avoid manpower intensive and resource debilitating land wars of attrition. Instead, reliance is placed on a technological military edge and an operational concept which rests on control of the air/sea gap, that is, the maritime approaches to northern Australia. Land forces serve to 'raise the ante' for any would-be aggressor, in turn increasing the vulnerability of that aggressor in crossing the air/sea gap. Land forces also provide the capability to deal with small scale incursions which may penetrate the maritime screen. These concepts were formalised in the 1987 Defence White Paper (DOA 87).

Subsequently, particularly in the face of instability in the South West Pacific (New Caledonia, Fiji, Solomon Islands, Vanuatu and PNG), further thought has been given to the desirability of Australia's having available the military capability to support the small island nations of the region if they sought such assistance and the circumstances so warranted; or to protect Australian citizens, assets and interests in those locations if they were threatened. Such considerations give emphasis to what might be described as a readily deployable constabulary-type land capability, involving rapidly deployable air transportable forces, able to secure an airhead and protect assets or the withdrawal of personnel. This would be very much a defensive capability, operating with the agreement and protection of the host government. Deployability, mobility, self-sufficiency and appropriate command and control capabilities would characterise such a concept.

Reference to these two strategic functions - one related to the defence of Australia, the other to Australia's ability to contribute to regional stability - is made to underline two points. Firstly, the defence of Australia must remain the fundamental purpose of the ADF; with resource allocation reflecting that priority. Development of secondary capabilities must not be at the expense of, but rather supplementary to, that primary function. Secondly, the credibility of the DOA 87 concept rests on our ability to control the maritime approaches and, hence, our ability to maintain a technological edge.

That second point then leads to my theme, which is that the technological route to the defence of Australia is not cheap and can be undermined by inadequate support, either directly in terms of appropriate weapons and operational support systems (including the ordnance itself, EW, command support, and the ADGE), or indirectly in terms of trained manpower, sustainability, and security.

Air Vice-Marshal I.B. Gration, AO, AFC
Air Commander Australia

Turning now to the purpose of this conference - to address the relevance of air power to the defence of regional powers in the next 25 years, and to our topic this session - the needs and expectations of the operational commanders, I would like to dwell on the less obvious - but nevertheless essential - aspects of air power which must be fulfilled if our strategic concept is to be viable.

Looking forward 25 years, I think Australia's air power needs will be much as they are now. Control of our sovereign airspace, and the northern air approaches particularly, will still require air surveillance, early warning and control, air intercept and the appropriate command and control facilities. Naval surface forces will be particularly vulnerable to stand-off air attack and will certainly wish to operate under at least local air superiority.

Surface surveillance by maritime patrol aircraft will still be an essential feature of maritime operations, with the continuing need to identify contacts gained by other surveillance means and especially to target high value vessels for air or surface strike. The potential submarine threat will not go away either. Protection of focal points and selected coastal traffic against the submarine threat will continue to be an essential feature of the defence of this island continent, being as dependent as it is on international trade.

The ability to take the offensive strike initiative will also remain as part of our deterrent posture if our strategic concept is not to be reduced to a simply reactive defensive one, incapable of positively resolving a conflict on our own terms.

And the universal military requirement for effective air transport support - especially where long distances and difficult terrain is involved, as in Australia - will remain, continuing to be fulfilled by fixed and rotary wing aircraft.

So, in aircraft terms at least, 2015 probably won't look much different from 1991. Of course, the F/A-18s and F-111s may have been replaced by a single platform intended to meet both tactical fighter and tactical strike functions, and yet another P3 update may be in vogue, but I can almost guarantee that the C130R - or some such - will still be the tactical transport of choice. Perhaps the only obvious change will be in rotary wing aircraft. Will the Osprey-type tilt-wing vehicle give the desired long range tactical lift?

No, the aircraft won't have changed much. But I sincerely hope that we will have corrected some of the technical and resource deficiencies currently limiting our *effectiveness*.

The Gulf War has clearly demonstrated the efficacy of PGMs - an absolutely essential feature for a small force to have any strike credibility. And the weapons must be available - in advance - in sufficient numbers to allow development and retention of both maintenance and delivery skills, and to provide sustainability until the pipeline is flowing (a nice balance of warning and lead times, and of risk against cost!).

I suspect the post-war analysis of the Gulf conflict will also reinforce the essentiality of mastering the EW spectrum, especially for a small force where minimisation of attrition is critical; and where the force multiplying effect of capitalising on electronic *intelligence, and electronically blinding or deceiving the enemy, may tip the scales.* We must give higher priority to the mastery of EW through education, the introduction of appropriate equipment, and the practical exercising of the capabilities - both offensive and defensive. We in the RAAF have started down the road with EWOSU and some elementary aircraft equipment. But, if we are to retain a technological edge regionally, then we are going to need a significant commitment of resources - and soon!

Another area where we are lagging but which is an important force multiplier for a small force is command support: the ability to collect and use intelligence, to assess and interpret relevant data, and to communicate rapidly, reliably and securely. We are *advancing - but oh so slowly! The technology is available but are we commanders* giving the requirement sufficient priority?

And I would be remiss if I did not take this opportunity to remind everybody of the vulnerability of a nation without effective air defence. Yes, we have a superb aircraft in the F-18. But no, we do not yet have comprehensive air surveillance or adequate fighter control; or secure data and voice communications; or appropriate command support. Jindalee is in the pipeline but AEW is not. The rest is, for the time being at least, belt strap and bootlaces stuff. Thank goodness there is no current air threat - only the largely unknown abuse of our airspace by criminals and other non-military law-breakers.

While PGMs, EW, command support and the ADGE are, I suggest, critical technological areas we must develop in the coming years if only for military strategy to be credible, there are other mundane - but equally critical - non-technological areas of deficiency. Three I would highlight are: insufficient trained personnel to sustain higher rates of effort associated with a defence emergency; insufficient personnel and supporting equipment to secure adequately our home bases - as distinct from forward airfields in the north - against terrorism, sabotage or even the more sinister international demonstrations; and insufficient stocks of ordnance and spares to sustain minimum training levels and credible rates of effort, especially in respect of precision munitions.

Without discussing in any detail these well recognised current deficiencies, I simply wish to make the point that our concept of operations places emphasis in force structure terms on maintaining a force-in-being capable of dealing with the so-called low level contingencies. Implicit in this concept is possession not only of the more obvious squadron structures and aircraft, but also of the less glamorous but expensive supporting elements - the flesh on the skeleton so to speak - without which the hardware is useless. We have given insufficient attention to this critical aspect in the past, and now we risk perpetuating that failure in the future because of financial stringency. We must face the problem honestly and ensure that our government understands the real limitations of the defence force it is willing to fund.

That rather sombre note is an appropriate one on which to close. The thesis I am proposing is that the strategy for Australia's defence into the next century appears sound; that the types of capability represented by current aircraft and weapons systems will remain valid (although the actual types may change); but that these two aspects alone do not provide viable or credible air power. We will need to address the adoption and development of technological advances to improve our combat power and maintain a technological compensation for small numbers; and we must address the essentials of sustainability to achieve an actual capability to deal with low level contingencies. Resource limitations will then define the degree to which that capability matches the strategic expectations of the government.

Rear Admiral K.A. Doolan

Air power in the maritime environment continues to be a crucial part of the equation and in my view will remain so for the foreseeable future. Confrontation or conflict in the maritime environment will be a mix of operations which are conducted under, on and over the sea and the maritime command will continue to need elements of air power to cope with these three facets.

But while this fundamental need for air power at sea will remain, the means of fulfilling the need are bound to change. Indeed we have already seen some of this change as technology has introduced variations into the way in which we do our business. The advent of the shipborne helicopter with an onboard data processing unit, its own fire control system and data link and underslung smart guided weapons as a maritime strike asset is a good example of how the dimension of air power at sea has changed in recent years.

But returning to the first of the two key elements I have been asked to address, let me now spell out what I see as the real needs as we look forward into the 21st century.

The first of these is the need for airborne maritime surveillance - and along with this I include all the elements such as a facility for real time, secure, machine readable data transmission without which the end product will be deficient. Recent events have served only to further convince me that accurate and timely knowledge about the widest possible range of information in an area of operations is one of the crucial ingredients for success. Of course airborne maritime surveillance will be but one part of the means by which surveillance of a maritime area of operations is achieved, and the assets employed will be both land based and shipborne - the ship/helicopter package being increasingly important and effective in this respect.

The second of the needs is for the availability of sufficient air power to provide that additional element of protection which will allow maritime surface units to go in harm's way. This need may take the form of defensive combat air patrol stationed so as to deter or, if need be, defeat an aerial aggressor. Or it may be in the form of having friendly air power establish air superiority over an area of operations by significantly

Rear Admiral K.A. Doolan, AO, RAN
Maritime Commander Australia

reducing or destroying an opponent's ability to mount an air strike against our own maritime surface forces or shipping we are protecting. In specifying this need I make the point that CAP is but one, albeit very important, part of the requirement. Other parts are of course such items as onboard surface-to-air area or point defence weapon systems.

The third need I must specify is that of airborne ASW, both land based and sea-borne. In the demanding, difficult and increasingly technologically enhanced game of combating submarines, each piece of the ASW mosaic is important, and the lack of one segment reduces the effectiveness not only of the whole but also of the other individual complementary parts. Land based LRMP complement sea based ASW helicopters and I do not see this changing. Technological advances in submarines have stayed well ahead of advances in the ASW sphere and if we are to defend Australia in the air/sea gap, quality airborne ASW forces will remain an essential requirement of our force. Insofar as sea-borne ASW air assets are concerned, there is in my judgment an ongoing need for dipping sonar. Our experience is that the randomness and unpredictability of dipping sonar operations from the submarine's point of view are real headaches and hence I lay emphasis on this need.

A further need in the maritime area is airborne early warning and though some would see this being met in large part by the advances in the technology inherent in the *Jindalee over-the-horizon* radar, I do not believe such a system, by itself, will provide the degree of early warning which might be necessary in the air/sea gap around Australia in which we must mount our defence. Along with AEW, and closely aligned to it, is the need to control airspace over the maritime area to the extent needed to mount a successful and, if need be, sustainable defence.

Though not exhaustive, I will add but one more need to my list before turning to expectations - and that is the need for utility sea-borne helicopters for the multitude of tasks that recent events in the Gulf have shown us are essential. Let me dwell upon two of the utility roles, boarding operations and mine warfare. In situations of heightened tension but short of outright and unrestrained war, boarding operations are best effected by helicopter. Frankly I do not see this changing. The other utility role was in searching for floating mines. Given that an adversary can lay these easily in almost any maritime area, the availability of a helicopter to search for these very considerable dangers may well be critical to the safety of surface ships and escorted shipping.

Enough then of needs - let me now turn to expectations. Perhaps I should phrase this as hopes and expectations given the uncertainties which lie ahead. My primary expectation is that because of our relatively small population and hence limited resource base, there will always be a considerable gap between the optimum level of air assets needed to defend the country in our vast maritime surrounds and what we have available. We must therefore 'think smart' and 'act smart' in our choice and use of aerial platform weapons and sensors.

In the realms of surveillance this leads me to expect that we will seek to make up for a paucity of aerospace surveillance assets during the next decade and beyond by being smart in the way in which we deal with information received from our likely relatively few airborne surveillance assets. The secure transmission and subsequent processing and re-transmission of relevant surveillance data in real time machine readable format is one of the ways I expect that we will do this.

For air power in the air/sea gap we will need to ensure that we bring in smart weapon and sensor packages. It seems to me that one clear lesson from the Gulf War is that mounting a well planned, well executed airborne strike mission, whether by a smart weapon equipped manned aircraft or cruise missile, is vastly more effective than trying to strike the opposition with large numbers of conventionally armed aircraft. The sea-borne helicopter against relatively small but nonetheless lethal fast moving surface-to-surface missile equipped Iraqi patrol boats attests to this. I also expect that we will continue to move down the technologically advanced path for systems like the Nulka offboard decoy system to offset the likely lack of CAP. Let's face it, the threat is not the enemy aircraft but rather his ability to successfully deliver weapons on our surface units or vessels they are protecting. I expect us to push hard to hold our regional qualitative and technological edge so as to achieve this.

Turning now to my expectation for ASW, I believe we will continue to face an enormous challenge in coping with this aspect of maritime warfare. Whilst we are already moving ahead with some technologically advanced parts of the ASW mosaic and here I cite the new Collins Class submarines and our work on towed arrays, we have a long way to go if we are to maintain a qualitative and technological edge in the airborne ASW field. I expect that we will have to continue to argue the case for the maintenance of all the parts of the airborne ASW package and I further expect that we will see the development of a lightweight dipping sonar and that once its potential is fully appreciated, it will be seen to swing the balance of ASW back against the submarine.

In summary let me simply say again that I foresee an ongoing and comprehensive role for aerial assets in the maritime arena, that we will not have the optimum and that because of this we can only ensure the ongoing ability to defend the country in the air/sea gap by making best use of emerging technologies in platforms, weapons and sensors and by being smart in the way we handle information.

Major General M.P. Blake

My address will cover three major issues: the characteristics of the land battle in Australia; the nature of land operations in low level conflict; and air support requirements. I shall also have a brief look at the future. Some of the points I raise will be discussed in more detail in tomorrow's presentation by Brigadier McGuinness.

The land battle in Australia will be characterised by dispersed, manpower-intensive operations. Mobility will be essential to cope with the vast areas and isolated population. An inadequate infrastructure and long supply lines will cause sustainability problems; while further difficulties will arise with the hostile environment and harsh climate, especially during the wet season.

Because of these factors, civil/military cooperation will be very important. The Land Commander will have to apply himself to the interface with civilian authorities to a far greater extent than the Air and Maritime Commanders.

Turning to the nature of land operations, there will be three broad types of activity. The first is reconnaissance and surveillance operations. We will have to establish a systematic watch over the Land Area of Operations (AO), by day and night, in all weather, using ground and air resources. The AO will extend about 3000 kilometres, a distance equivalent of that from London to Moscow.

The second type of land operation is protective operations. We will have to protect Vital National Assets (VNA) and their approaches, as well as forces moving from the south east to the AO. If there are too many assets or our forces become too widely dispersed, protective operations may be compromised.

Finally, there will be manoeuvre operations. Manoeuvre brigades must be moved to the AO, and dominate the area. They will be required to contain and remove the threat. Mobility is the key to success.

I should now like to examine the air support requirements for each of the operations.

Reconnaissance and surveillance requirements will in the first instance be met by strategic assets. That capability will be complemented by Army fixed and rotary wing aircraft providing wide area surveillance (out to 300 kilometres). In addition, special reconnaissance missions can be flown as required. It is possible that aerial fire support would be the quickest response to the detection of a small enemy force. Some limited troop lift would be necessary for the reconnaissance and surveillance operation: the Caribou is ideal for this task. Some logistic support also would be needed.

Strategic mobility would be the first requirement for protective operations, as troops, equipment and supplies are deployed to the widespread pockets of VNA which have to be protected. Subsequently, tactical mobility - most probably C130s - would be needed to move forces between VNAs. Reaction forces would be inserted by Blackhawk or Caribou, while a day/night casualty evacuation capability and some continuing logistic support would be essential. Close air support may be needed to engage targets beyond the range of land systems: here, the use of PGMs would assist troop safety and limit collateral damage, especially in built-up areas. During protective operations, reconnaissance and surveillance would continue.

Major General M.P. Blake, AO, MC
Land Commander Australia

Manoeuvre operations would start with a concentrated strategic lift to deploy manoeuvre forces. The demand for logistic support would increase, and the need for battlefield air interdiction remains. While I acknowledge the likelihood that tasking for the latter role will be limited in low level and extended low level contingencies, it continues to be a valid requirement in the wider context of the air/land battle.

Two final points must be made. First, there will be a need for a fast command and control aircraft to enable commanders to get around. Second, the wet season will place heavy reliance on all forms of air support.

I should now like to address future needs.

We must continue to improve our national strategic reconnaissance and surveillance capability (eg, OTHR, RF-111, P3C). Remotely Piloted Vehicles (RPV) might prove useful.

In relation to mobility, I consider the present C130 fleet too small for the multitude of tasks. While the Caribou has limitations, it is still essential due to the limited number of C130 capable airstrips in the north. The upgrading of airfields in the north is a slow process. Accordingly, I would prefer to retain the Caribou in service for as long as possible. Pending airstrip development, we may need to replace this aircraft with a similar type. We will never have enough tactical mobility, and a third Blackhawk squadron remains on my agenda.

Close air support and battlefield air interdiction continue to be legitimate tasks. Resources must be allocated for training in that role.

Within Army Aviation we must address shortfalls in tactical reconnaissance, where a new helicopter is needed with improved range, endurance, avionics and target locating equipment. A variant of this reconnaissance helicopter could be developed for aerial rotary wing fire support and as an offensive weapon system. Similarly, a new fixed wing aircraft is needed for wide area and tactical reconnaissance, emphasising range, endurance, enhanced sensors, and with STOL and all-weather capabilities.

Finally, there is a need to develop target designation systems in order to improve the effectiveness of aerial fire support and lessen the risk of engaging our own forces.

DISCUSSION

[A question was asked whether the ADF should concentrate its efforts on developing doctrine for combat power and its application, rather than trying to integrate the separate doctrines of air, sea and land power.]

Air Vice-Marshal Gration: From the Air Command point of view - and bear in mind we are environmental commanders, joint environmental commanders - the development of doctrine at the operational level is essential to make full use of air power in all its roles. And that's not just air force, that's air power for land, sea and air operations. As the doctrinal speakers yesterday indicated [see Panel One], it is perhaps more difficult to develop doctrine at that level than at the conceptual, strategic level. But certainly as far as I'm concerned, it is going ahead at the pace we can manage.

Rear Admiral Doolan: I think what we are on about in the final analysis, as we have just seen in the recent conflict, is rounds on targets. We need to ensure that we retain a sharp point on the end of the spear. The formation of doctrine and all that it portends musn't be allowed to obscure the fact that we need to keep alive the many specialisations and areas of expertise which we've honed over the years in our separate forces. There is a fine balance between going down what I might call the involved, integrated route, and still keeping alive all those areas of expertise. Certainly from the Maritime Command's point of view that is where we are trying to head at the moment. We don't want to lose sight of my original point, and that is to get rounds on targets.

Major General Blake: I think the Maritime Commander talking about sharpening spears says it all.

Air Marshal Funnell: On that point, Air Commodore Les Fisher from the ADF Warfare Centre is here in the audience. Les, I wonder if you might address this issue. It seems to be very much in your bailiwick, and we were speaking yesterday about taking a better approach to the development of joint doctrine.

Air Commodore L. Fisher (RAAF): For all of you who may not know, I am the Commandant of the ADF Warfare Centre which was recently formed in Williamtown, NSW. Previously we have not had the resources to undertake the development of joint doctrine that we have needed to do. Fortunately that has been resolved and the manpower and expertise now resides within my organisation. Over the next year or so we will be pursuing - at a very fast rate if I have anything to do with it - the production of those joint warfare matters that we have been unable to address in the past. To give you an idea of the types of topics that will be pursued, surveillance and reconnaissance is one of the most important we have to get on top of. Also, maritime operations: you may know that at the moment we rely on NATO doctrine for our joint maritime operations.

I'd like to comment on the suggestion made yesterday by our specialist doctrine people that the single services at the moment believe that in all cases doctrine is produced primarily by the single services, and later on we come along and produce joint doctrine. Now, I believe we can't be absolutely emphatic about that; for example, joint command and control doctrine is normally produced first. So, I wouldn't say that in all cases single service doctrine precedes joint doctrine.

Finally I'd like to say that there's a lot to be done. The ADF has given the Warfare Centre the resources to do the job, and we will be proceeding as quickly as possible to fill in all the gaps in joint doctrine that you know are there. I might add that none of it will be produced without the full co-operation of and clearance through the joint commanders you see in front of you.

Air Marshal Funnell: Thanks very much Les. I think you've raised one of the difficulties - in fact it's almost a dilemma - we have with the production of our doctrine. I note your point about the overarching nature of joint service doctrine, particularly with a small force such as the Australian Defence Force, and the immense task we have and the immense area we have to cover. But unless things change from what I've seen in the last 20 or so years, all the really good ideas, all the doctrinal ideas, seem to bubble up through the single services. So I think you have a real challenge in front of you to continue to keep those ideas coming through at the same time as you are trying to develop some overarching doctrine. I wish you well.

Air Vice-Marshal G.W. Neil (RAAF): My question is directed towards the Land Commander. Regardless of whether we have overarching doctrine or particular joint doctrine, and not withstanding that close air support aircraft may not be available, is he satisfied that we have in place the necessary procedures, and are they practised; or are you in fact going to rely on alternative procedures which are not practised?

Major General Blake: I presume you are talking about aerial fire support. No, I am not satisfied we have enough practice. The procedures, the doctrine, I think are in place, but we haven't practised enough recently and I would like to see more done. I do acknowledge the difficulties from the Air Commander's point of view about allocating resources. One of my primary concerns is that the two services don't spend enough time working together on target identification; and particularly, how we will get the aircraft, having located the target, to make an effective delivery.

Air Marshal Funnell: I just wonder, seeing we are on this issue of providing fire support to the land forces, about its responsiveness. It has always seemed to me that we airmen have probably promised too much in the way of providing fire support to the land forces. I don't know enough about ground force operations I suppose, but my belief, Murray [Blake], is normally when you guys get into trouble you need something within the next 10 or 15 minutes, not something within the next 10 or 12 hours. I believe that level of responsiveness, particularly in the sorts of operations you were describing to us here, will not be available with the small forces we have, because we won't be able to operate a Typhoon-type cab rank as the Allies did in 1944 in the Normandy breakout.

Major General Blake: I think there are two issues here. In low level contingencies we would probably see the ground forces very widely dispersed. Now in some cases we may well have a small force well out of range of any land support systems that we have, and yet they may have detected a legitimate enemy target. There may be no other way of hitting that target unless a fast aircraft can deliver ordnance, and in those circumstances I consider it a legitimate use of air power. However, I am not advocating anything like a combat air patrol.

As a second issue, we all need to understand that, when we get into an escalated level of conflict, what is available and what can be made available, will be a matter of priority. It is very difficult for us to get our Army heavy fire power into place in time, and air power provides great flexibility. I do not believe that we have unrealistic expectations.

Squadron Leader D. Harrison (RAAF): I'd like to ask the Maritime Commander and the Land Commander - all inter-service rivalry aside - whether you have any fundamental disagreements with the philosophies presented in the AAP 1000, *The Air Power Manual,* and whether you see your own organic air as conforming to the principles that are laid down in that doctrinal publication.

Rear Admiral Doolan: The first thing that I've got to admit is that I've not read AAP 1000, and the reason I say that is I'm very conscious of the fact that it has just been produced. I also know that there is going to be a naval speaker who will address that subject tomorrow and I don't want to steal his thunder. I have read his paper and he will deal with that question.

Turning to organic air, I come back to a point I was trying to make during my presentation. I think again we are talking of the difference between doctrine and practice, if I may say so; and the first point I would make is that looking to the future, we are never going to have, it seems to me, the resources to be able to do all that any command would like to do. That's a fundamental given. Therefore, to make the smartest and best use of what we've got - whether you call it organic or whether it comes from some other area - is, I think, going to be maximised by bringing in what I'd call smart information properly processed. We've now got that in the maritime sphere. Knowing what's going on and having some degree of confidence that you are actually getting the picture right makes it much easier to allocate resources. It's particularly difficult in the areas to our north. I was involved in an exercise in the north western part of our maritime surrounds in 1984, and the identification problem for the very many surface and air contacts was very difficult. Now, that challenge of finding out who's there and what they're doing and who they are is always going to exist. The trick of the trade, it seems to me, is to get that information and make use of it as best you can and very quickly, in a machinery that will format and process it and get it out again. We have made some significant progress, which means the commander does know far better than he probably would otherwise what the heck is going on and where his resources are going to come from and whether he has to go and seek extra assistance from elsewhere. So again I come back to part of the answer I gave to a previous question; and that is, there is a trade- off here between what might be seen as the doctrinaire approach and what I would call the practitioner's approach. As far as I'm concerned, I go for the practitioner's approach every time.

Major General Blake: Likewise, I have not read the publication you referred to. From what I have read in recent times, the only slight concern I have is whether the Air Force is giving enough recognition to the total concept of the air/land battle; and in particular, the RAAF hitting the enemy as far out as possible and helping the Army manoeuvre as we close in. In relation to the use of our organic air, I presume you are referring particularly to helicopters. We have not had Blackhawk long enough to demonstrate any significant change. What I anticipate will occur is more realistic tasking on the part of Army commanders because they will have the aircraft with them, consider them Army assets, and employ them with confidence in an effective manner. I also expect that it will enhance our overall capability by giving us greater range and flexibility as a result of innovative tasking.

Air Vice-Marshal P. Adamson (CAS, RNZAF): I would like to follow up this question of organic air because I think it is a very interesting one. We are looking at the use of air power, and the title of the symposium is of course the use of air power in the 21st century. I think that begs the question: who is it that is going to be using the air power?

I have always thought that we in the air force are at something of a disadvantage because air power is a commodity that is exercised by armies and navies as well as air forces, but I don't know of any air force that is presumptuous enough to get into the business of exercising sea or land power. Ben Lambeth made a valid point a while ago when he mentioned the increased efficiency and effectiveness the US Marines get from organic Marine Corps aircraft, over that which presumably could be supplied by the air force - or the navy, if it comes to that. I don't think there's any doubt that there are going to be more pressures for organic air, and both the Maritime Commander and the Land Commander came up with an impressive list of their expectations of air power into the next century. I would like to know the panel's views on who it is that is going to be exercising that air power in the next century, what are the developments going to be. Are we going to stay the way we are, or can we see something a little bit different in the future?

Air Vice-Marshal Gration: I don't see that it's going to change much in our region in our time, and the main reason for that is resources. I don't think it actually matters who operates the aeroplanes, although that's usually a very emotional discussion. What does matter, I believe, is that we do it most economically. Most pale blue people in this room would consider that the battlefield helicopter decision was not taken on those grounds. The other argument which I think relates to the operation of organic air is: where resides the fundamental understanding of air power? Now, airmen have no special claim to that, except that professionally that's what they're about. Because most brown and white folk tend to look after land and sea power, it remains to the air force to drive the fundamental doctrinal process for air power. But absolutely - in my view anyway - all three services operate air power. In our resource-constrained environment, the real question seems to me what is the most economical way of doing that.

Rear Admiral Doolan: I see any change that's coming as being incremental, and it will come as a result of some of the things that I brought forward in my short paper. That having been said, I'd just like to emphasise that, for example, the business of defending a task group from air attack at sea has changed. Technologies have allowed us to bring in bits and pieces which make it that much more difficult for an aggressor to actually get a round from an aeroplane or an air platform onto a ship. Now there's always the matter of countermeasures one way or the other; in other words, as soon as you've got one plus then you get a minus on the other side. The fundamental question you're really asking is who's going to call the shots in terms of where air resources go. That, I think, is going to be very much scenario-driven; and will depend on who has the whip hand at that time, by direction, as to allocated resources. If the battle is joined in the maritime arena, it may be either the Air or the Maritime Commander, or it may be a Commander Joint Forces Australia. Same sort of thing if the battle happens to be joined on the land side of the equation. However, I pick up what my colleague said a few moments ago. I do not see the resources as ever being sufficient to give any of us a nice warm feeling. We are all going to have to plan on what the heck we do if, when we need that resource, it is not there. That's a very chilling thought, and we have to bear it very much in mind.

Air Marshal Funnell: I have a couple of thoughts to offer on this topic. I think we airmen throughout the world have found it very difficult over the years to get some of the things that we are brought up on, and we believe we understand, across fully to our colleagues in the army and in the navy. Army and naval air power is viewed - and quite rightly so given their operational imperatives - as support for the land and maritime battle. With a small defence force like Australia's, that becomes a very concentrated way of thinking about air power. What we have been trying to do in our doctrinal development in the RAAF is to conceive of air power as an entity and try to envisage its application across the whole of the ADF. And perhaps Peter [Adamson], picking up on your point and looking at ways we might conduct our business better and see air power more holistically, we may have to consider the integration of the

three services. Now I know that there's a knee jerk reaction from most people in blue, white and khaki uniforms when we say that, and people always raise the Canadian example as being a failure. There's no doubt that it was generally believed to have been so in the first instance, but the Canadian model is not the only way of achieving integration, so I wouldn't cast aside the notion totally. I'm not advocating it but I'm saying it must come within our consideration. I believe unless we do that or something like that, it's going to be very difficult to get everyone in the Australian Defence Force to think in a holistic way about air power and the other forms of combat power. And with that small homily I will close today's session and thank you all for your participation.

POWER IN THE AIR

Professor Geoffrey Blainey[1]

Even before the outbreak of the First World War there were glimpses of how aircraft would be used in warfare, but nobody could foresee the sheer magnitude of their power. The Italians were the first to use aircraft in war. Fighting the Turks in North Africa in 1911 and 1912 their aeroplanes mapped the movements of the enemy and even attacked them: most aerial attacks depended on the firing of rifles and even of revolvers fired from the aircraft.

In 1914, in the opening months of the First World War, aircraft were used to spy on the enemy army far below. As the Germans swept through Belgium and north-east France in that remarkable sweeping movement, British aircraft observed the danger to General French's army. Their pilots, however, did not photograph what they saw. The planes could not easily carry the heavy cameras of that era.

In some military aircraft the propeller was at the rear, thus enabling an airman to shoot at the target he could see in front of him - without damaging the propeller. In May 1915, the Germans took the enemy by surprise when their Fokker aircraft were able to fire at the enemy through the propeller.

At first the Germans thought that their massive airships flying at 25 to 40 miles an hour and dropping their bombs from on high would destroy the morale of British civilians. Their raids were infrequent but frightening. In the course of the war German air raids on English cities were to kill 1413 people. The French, after Paris was bombed, retaliated with raids on German cities - Cologne and Stuttgart were targets. On Christmas Eve 1917 a British squadron dropped a ton of bombs on the German city of Mannheim. What a devastating show of force, said some observers.

Both the big airships and frail aeroplanes became important in the search for submarines in near-coastal waters or in detecting enemy warships. Aircraft were vital in informing the artillery on the success or failure of their bombardments. Occasionally aircraft attacked troops with success. In Palestine in 1918 the Turkish 7th Army was trapped in a ravine and bombed, with heavy casualties.

The aircraft carrier appeared: at first an orthodox ship lowering onto the calm water a little seaplane which then climbed into the sky. The fixed position of the mast and funnel on warships made it slightly difficult to build an airfield on a ship's deck, but it was accomplished. Planes found it easier to take off than to land. In order to facilitate their return the British built in the large warship *Furious* a special landing deck at the opposite end to the take-off deck. The eddies of wind around the funnel and the effect of the smoke belching out still made a landing difficult. By 1925 the modern big aircraft carrier had arrived, and the United States had built two giants and Japan had built one giant, each of about 33,000 tons with a supposed speed of 33 knots.

By the end of the First World War the aircraft had become pervasive. In the Second World War they would be decisive.

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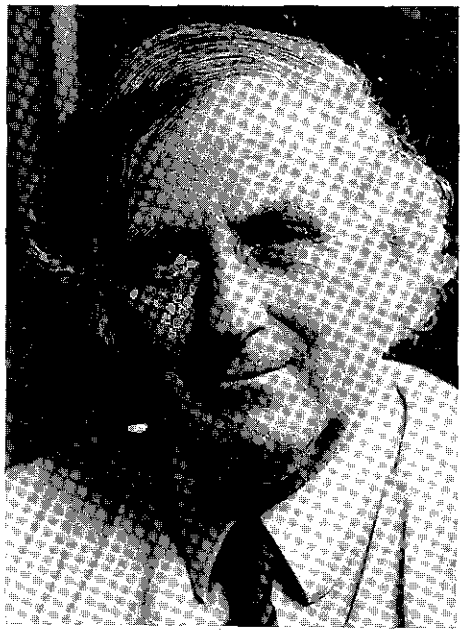
1 This paper was the conference dinner address.



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The civilian aircraft were especially welcome in the Australian continent with its abundant landing strips, and its relative freedom from fog and cloud, and the lack of competing forms of transport in so many regions. QANTAS, the world's second oldest airline, began in the dry interior of Australia, its tiny passenger planes hopping from small town to small town. The initials of QANTAS stand for Queensland and Northern Territory Aerial services, a sign of its outback origins.

Australians, out of all proportion to their numbers, were enthusiasts for the new art of flying. Many learned to fly during the First World War. In 1919 two such airmen, Ross and Keith Smith, were the first to fly from Europe to Australia. Their adventure occupied 24 days. They had no radio and usually no weather forecasts of the route ahead; they usually flew in daylight, at 80 miles an hour.

Australians pioneered many of the world's long air routes. In the 1920s, Charles Kingsford-Smith and C.T.P. Ulm were the first to fly across the Pacific and likewise the Tasman Sea. Wilkins made the first transpolar flight, flying from Alaska to Spitzbergen in 1928. Hinkler, from the sugar town of Bundaberg, was the first to fly across the Atlantic from South America to Africa, a west-east flight. Several of these aviators died while attempting new records. Hinkler is buried just outside Florence in Italy. Kingsford-Smith has no grave.

In Australia the aircraft gave rise to a new, exciting form of sport. The air race occasionally rivalled the big horse race in glamour. Indeed the air races often ended on the race courses near the heart of the main cities. Australia's first air race was in 1912, from Sydney to the outer suburb of Parramatta. W.E. Hart, flying a Bristol Box-kite, won in 23 minutes. His opponent, known as The Wizard, flew into a rain cloud and lost his way. In 1934 the most glamorous event when Victoria and

Melbourne celebrated their centenary was an air race from London to Melbourne. Even airliners could compete in their own special section, and the Dutch KLM crossed the world in a Douglas C2 in the remarkable time of 3 days and 18 hours.

Australia's imagination was captured by aircraft. Our 20 dollar note reflects this absorption. On one side is the portrait of Hargrave who about 100 years ago was conducting aeronautical experiments just south of Sydney: a man far ahead of his time, he was not in the mainstream of the development of aviation. On the other side of the 20 dollar note is Kingsford-Smith, a hero in what you might call the Stanley and Livingstone era of exploration by air.

The Australian people and traditions, enthusiastic about aircraft in times of peace, have been ambivalent towards aircraft in time of war. When Australians think of their nation's past wars they think firstly of the army and secondly of the navy. Nearly all the overseas wars to which Australia sent forces were primarily land wars - the war against New Zealand's Maoris in the 1860s, the Sudan war in the 1880s (the Australians, too far away, arrived too late), the Boer War fought between 1899 and 1902, the First World War, the Malayan insurgency, and the Korean and Vietnam Wars. In those wars most or all Australians were soldiers. In most of those wars Australian naval vessels were vital or useful.

What about attitudes to air power? In the Second World War, especially in the Pacific War (1941-45), air power was crucial for Australia's success but outside military and strategic circles its importance in that war has largely been forgotten. Of course many individuals - indeed everyone present here tonight - understands the influence of air power but Australians as a people do not remember the role of air power in the early 1940s when their own nation was endangered. Today their education system - if the word 'system' can be used to describe benign chaos - largely ignores air power if and when it teaches students about the danger facing Australia during that war.

Today the most frequent recollection of the Pacific War centres on the Australian prisoners of war, and the cruelty and hardship which they experienced while working for the Japanese on the Burma railway and other projects. Australians understandably remember the cruelty. They fail to remember why some 20,000 Australians were captured after the fall of Singapore and the collapse of the Dutch East Indies. They were captured because the loss of sea power prevented them from retreating and from organising a 'tropical Dunkirk'. Control of the seas was lost because power in the air was lost.

In Australia's history the dominant military legend is the landing of Australian soldiers at Gallipoli on 25 April 1915 and the bravery shown by the soldiers during their months on a narrow beach-head. There are strong reasons why the day of their invasion, Anzac Day, remains in Australia a day of remembrance. But it would be better for Australia's future security if the Fall of Singapore, 27 years later, were remembered with the same vividness.

It is unwise for Australian public opinion to attribute military success, and we do that when we remember Gallipoli, solely to such human virtues as self-sacrifice and perseverance and to forget the power of technology. The biggest difference between fighting the Turks at Gallipoli and the Japanese at Singapore was that Australians held the superior technology at Gallipoli and the inferior technology at Singapore. In 1942, air power was the key element in military technology. It is salutary to observe that if, at Gallipoli, the Turks and their German allies gained the same kind of air superiority or the same control of the lines of communications as the Japanese gained at Singapore, then Gallipoli probably would have been abandoned quickly by the Australians as well as the British, French, Indian and New Zealand forces there.

Woe betide the nation which misunderstands its own wartime history. If you were to ask well-informed Australians why Singapore was conquered in 1942, most would give a definite naval answer, not an air answer. They would say with some scorn or puzzlement that in Fortress Singapore the artillery pointed out to sea when it should have pointed inland, towards Malaysia. In other words they maintain that the big mistake, before the outbreak of war, was that the British fortified Singapore in expectation of a naval attack from the enemy. There is some validity in such an explanation but it misses the main point. It would not have mattered where Singapore's big guns pointed. Japanese air power, more than its army, defeated the British and Australian forces, if I read my history correctly.

In Australian eyes, the other vital military episode of the Pacific War was fought three months after the Fall of Singapore. The Japanese, having captured Rabaul from the Australians, resolved to push south and capture Port Moresby from the sea. Part of the Japanese naval force was intercepted in the Coral Sea - in effect a vast gulf fronted by Queensland and New Guinea. In that tropical sea, on 7 and 8 May 1942, the opposing American and Japanese fleets, completely out of sight of each other, fought a crucial battle that proved to be the first major repulse to the Japanese in the war.

Partly because it is called the Battle of the Coral Sea, it is seen by most educated Australians as a naval battle. Indeed many books on Australian history interpret it simply as a battle between ships. And yet it was primarily fought by aircraft. The rival navies did not even fire on one another.

That vital battle was fought close to Australia. The American aircraft carrier *Lexington* was sunk a mere 600 miles from the Queensland coast. If the Japanese had won - rather than drawn - that battle, they would have probably driven the Australians and Americans from New Guinea, thus exposing Australia to great danger. The Australian people, as distinct from high officials, have never celebrated the anniversary of the Battle of the Coral Sea. It is seen as too American a victory. No nation, in retrospect, likes to be rescued by its ally, though that is the very purpose of having an ally!

Air power, essential in those two dramatic events, the Fall of Singapore and the Battle of the Coral Sea, is given surprisingly little weight in Australian memory. Of course there are books which tell a more realistic story, and there are strategists and historians and returned servicemen who know what happened; but on the whole neither educated opinion nor public opinion knows about the role of air power in saving Australia from isolation and even possible invasion. In a democracy, public opinion is crucial in the long term. It helps to determine the nation's high priorities and the priority - if any - given to defence.

The importance of air power, in these episodes crucial to our nation's survival, has been largely forgotten by Australians. A nation's defence is too important to be afflicted by Alzheimer's.

I conclude with a word about the future. In my opinion there are, amongst independent nations, few cultures as vulnerable as Australia's to a major surprise in warfare. Sometime in the future we are likely to be surprised, either by the sudden outbreak of a war affecting us, or by a lightning strike that begins the war. We have become a complacent nation, a laid-back people. Complacency, unbelievable complacency, is a major cause of our economic decline. We are also, more than most other nations, likely to be surprised because we have a powerful sporting tradition of which the idea of fair play is part. We forget that in war the sporting rules do not necessarily apply.

Furthermore, we have a long tradition of relying on powerful allies, firstly Britain and now the United States. With our alliances we traditionally have been amongst the top dogs, and the top dog is less likely to use surprise as a weapon at the start of a war: the top dog has less need of that weapon. Surprise is the special instrument of the

underdog. We have had little experience of being the underdog, and indeed have only once - in Vietnam - been on the losing side. We have never been the underdog for the duration of a war.

In the realm of surprises, we did not digest the lesson of Pearl Harbour. We are still inclined to think that the Japanese were especially treacherous, indeed abnormal, in attacking Hawaii and Malaysia and the Philippines without issuing a warning or declaration in December 1941. But wars again and again have commenced without a warning. A prior declaration of war, the issuing of a warning of attack, is unusual. When two opponents are separated by sea rather than a common land border, the sea provides a special opportunity for a surprise attack. The underdog will always be tempted to use that opportunity.

As Australians we tend to view military events more through the West European experiences. In Europe the typical war begins with an invasion by land, and such an attack can rarely be accompanied by a high level of surprise. In contrast Australia is surrounded by sea, and so an attacker or retaliator is likely to use surprise, partly because it is easier to employ surprise in crossing an air/sea gap and partly because it is necessary for the attacker to use surprise to compensate for the disadvantage which the sea barrier imposes.

I am not pointing a finger at any particular foreign power. The strained relationship, the issues of dispute, which precede a war may be as much the fault - or more so - of Australia than another nation. I am not being pessimistic. I am rather optimistic in the sense that I think that with effort Australia can overcome its vulnerability. Our vulnerability stems partly from a state of mind and therefore is changeable. Surprise succeeds only when one power is complacent. Surprise, to be successful, depends as much on the incompetence of the victim as the competence of the assailant.

Surprise is really a two-barrel rifle, and the victim, without knowing it, actually fires the second barrel. Our history, our culture, suggest that unless we wake up we could one day be a victim.

Public opinion is vital for the health of the armed services and for national security, but in such matters public opinion and political opinion in Australia are often complacent and cavalier. Nonetheless, many Australians take pride in the 70th birthday of the Royal Australian Air Force. And they would gladly join me in congratulating you, Air Marshal Funnell, on your leadership and your sense that national security and regional security are intertwined.

AIR POWER IN THE MARITIME ENVIRONMENT: A SURFACE PERSPECTIVE

Commodore W.S.G. Bateman.[1]

Introduction

I will start this paper with a disclaimer. The title of the paper offered to the conference was 'Air Power in the Maritime Environment' although the qualification 'A Surface Perspective' appears in the conference program. No doubt this limitation was added with the best of intentions but I would like to think that my paper was more that just 'a surface perspective'. It is a view of air power at sea from someone who makes no distinction between the ownership or origins of military capabilities in the maritime environment. They all comprise maritime power of which aircraft are but one element.

In the main the discussion in this paper is at the strategic level. It reviews the concept of maritime power and then discusses the nature of the maritime environment in so far as it is different to the air and land environments. The paper also considers some historical aspects of air power at sea and discusses issues which should be considered in the development of Australian doctrine for air operations in the maritime environment.

The main theme of the paper is that in the maritime environment 'sea power and air power are indivisible'.[2] Like surface ships, aircraft are essential for many operational tasks at sea but there is nothing intrinsically special about aircraft which elevates them to their own category of strategic consideration as far as maritime operations are concerned. In a maritime strategic sense, there is no merit in talking about 'air power' to cover aircraft, 'sea power' for surface ships or, in the most extreme case, 'submarine power' for submarines!

Maritime Power

On an initial point of terminology, I should mention that I prefer the term 'maritime power' rather than the more traditional 'sea power'. The latter has come to have rather narrow naval connotations although of course the early maritime strategists, such as Mahan and Corbett, used it in the broadest sense of covering all facets of a nation's maritime power.

Maritime power is a more contemporary concept than sea power. It reflects all the changes, primarily technological and economic, which have occurred since Mahan and his fellow authors were writing just on a century ago. It recognises that military power at sea now includes more than just ships. To remove any misunderstanding that sea power is exercised by navies and air power by air forces, maritime power is exercised militarily not just by surface ships but also by submarines and the aircraft which operate over the sea, as well as potentially by the mobile land forces which undertake operations from or over the sea. As Sir Herbert Richmond put it, 'Command of the sea is the indispensable basis of security, and whether the instrument which exercises that command swims, floats, or flies is a mere matter of detail'.[3]

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1 The views expressed in this paper are the author's and do not necessarily reflect those of the Chief of Naval Staff, the Department of Defence or the Minster for Defence.

2 E. Grove, *The Future of Sea Power*, Annapolis, 1990, p 138.

3 Sir Herbert Richmond, *Statesman and Sea Power*, London, 1946, p 136.

Commodore Sam Bateman, RAN
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With regard to air power at sea, I can only say that no modern writer of the Maritime School has ever thought of aircraft operating in the maritime environment as being anything other than an integral part of maritime power (or sea power, as they may have called it). This of course is most apparent in the highly successful US Maritime Strategy of the 1980s which emphasised the importance of offensive sea control and horizontal escalation through the use of carrier battle groups and nuclear attack submarines to destroy the Soviet Navy either at sea or in its bases. This has been thought of as a clear demonstration of the application of maritime power although of course aircraft are an essential ingredient of its success.

The idea of 'maritime power' also recognises that a country's commercial maritime interests now include more than just merchant shipping and sea-borne trade but also, for example, fishing and off-shore mining activities. Because of resource scarcities on land, these latter interests will grow in importance in the years ahead and this trend is reflected by the greater concern of nations about their claims to maritime space and off-shore resources.

This concern is particularly apparent in Australia's region - both in the South Pacific and in South East Asia. Partly as a consequence of these trends, South East Asian nations, in particular, have sought to become stronger maritime powers in recent years, especially with regard to their capabilities for maritime warfare (ships, submarines and maritime aircraft), but also in terms of larger merchant shipping fleets, a growing concern over the security of sea lines of communication and a wider range of off shore interests both fishing and mining. In short, our region seems to be entering a new maritime era.

The Nature of the Maritime Environment

The maritime environment is more complex for military operations than either the land environment or the air environment. It is often claimed that air power is the most misunderstood form of combat power but I would offer the counter-claim that the maritime environment is the most misunderstood environment for military operations, particularly by non-practitioners of the art of maritime warfare.

The maritime environment is multidimensional with the possibility of operations under, on or over the sea. Environmental factors potentially have relatively greater impact on maritime operations than on land or air operations. In saying this, I am thinking more of the often unpredictable and localised short term factors of sea state and visibility, and their significant impact on weapon and sensor system performance, rather than of the more predictable, broad seasonal conditions of weather, temperature and humidity (eg, the 'wet' and 'dry' seasons in Northern Australia). Oceanographic conditions are another complicating factor of the maritime environment, particularly in the context of submarine operations and anti-submarine warfare.

International law figures more prominently in maritime operations than in air or land operations. This is borne out by the fact that rules of engagement for maritime operations are invariably more complex and more extensive than they are for other types of operation.

Aircraft provide a difficult problem for the military staffs who have to draft rules of engagement for maritime operations. These staffs have to be able to assure their political masters that their proposed rules are adequate for all situations (including different environmental conditions, such as weather and visibility, in so far as they limit identification and manoeuvre) and for all considerations of international law. The lack of an ability to provide this assurance may limit the employment of aircraft in maritime operations, particularly in a constrained rules of engagement situation. This of course is more likely to be the case in the lower levels of conflict than in the higher levels.

All the considerations of self defence and the laws of war apply equally to the maritime environment which is further complicated by the addition of international law of the sea. Maritime issues, such as the freedom of the high seas, maritime exclusion zones, transit rights, and the rights of other nations in the exclusive economic zones, archipelagic waters and territorial seas of coastal States have no direct parallel in land or air operations. Where they are a consideration in air operations, it is usually because such operations are an adjunct of maritime operations (for example, with the freedom or otherwise for a naval ship to operate its organic aircraft during a passage through the archipelagic waters or the territorial sea of another country).

The ambiguity of naval forces also complicates the legal situation with maritime operations. Ships can mark other vessels and demonstrate national presence in a way that aircraft cannot. O'Connell in his excellent exposition on *The Influence of Law on Sea Power* has written that 'An aircraft is an unsuitable vehicle for a credible display of self-defensive force, since it has only a high strike capability and nothing short of it, save buzzing. It allows for no flexibility in the level of response'.[4]

Graphic illustrations of these considerations in practice were provided during the Iran-Iraq war of the 1980s when Iranian frigates could steam alongside units of the USN with impunity while Iranian aircraft would not have dared to close within missile range of the American vessels. It is not too difficult to envisage situations when aircraft

4 D.P. O'Connell, *The Influence of Law on Sea Power*, Annapolis, 1975, p 181.

may have to be regarded as expendable if they are seeking, for example, to identify potentially unfriendly forces which could exercise the right of self defence. These considerations could be particularly acute for a small air force with limited aircraft numbers.

Lastly, it should be noted that maritime capabilities are the most catholic of all a country's military capabilities - land, air or maritime - in the sense that maritime capabilities operate largely in a free environment (ie, the high seas) and are a mutual interest shared by all coastal and island States. This means that maritime operations potentially provide a much better basis for cooperation between nations than do air or land operations. Also, maritime forces tend to be more familiar with operating together in combined operations than do air forces or armies.

The greater complexity of the maritime environment suggests the importance of unity of command for maritime operations. Successful maritime operations require a thorough appreciation of the maritime environment, including the operational, political and legal issues which are peculiar to that environment. I doubt very much whether the required knowledge is likely to be possessed by a land based air commander unless his staff largely duplicates that of the maritime commander.

Maritime Air Operations

AAP 1000, *The Air Power Manual* for the Royal Australian Air Force, discusses maritime air operations under the following headings:

> strategic maritime strike - the application of air power against enemy naval targets not in contact with Australian or allied forces but posing an indirect or longer term threat;
>
> interdiction against enemy lines of communication primarily in the air/sea gap;
>
> co-operation in the maritime environment (including maritime surveillance, reconnaissance, aerial mine-laying, intelligence collection, and search and rescue);
>
> anti-submarine warfare; and
>
> anti-shipping warfare involving airborne attacks against enemy ships that are directly threatening or in contact with one's own forces.

To be frank, I do not believe that AAP 1000's handling of air power in the maritime environment is sufficient given the importance of that environment to the security of Australia. There does not seem to be full coverage of the role of aircraft in the maritime operations which could be required in the defence of Australia. Let me illustrate this criticism.

Firstly, there is the issue of the general nature of maritime operations. We should assume that aggressive patrolling of the air/sea gap or other maritime areas of interest by Australia's maritime forces would be required at any level of conflict. This is recognised in the ministerial statement on *Australia's Regional Security* issued in December 1989 which identifies the essentiality of maritime patrol and response forces 'to intercepting hostile forces forward of Australia, to protect off-shore territories

and interests, and to allow Australia to influence the type, level and location of hostilities'.[5] In other words, we must be able to establish control of the sea where and when necessary.

Air superiority is an essential element of sea control but the qualification in AAP 1000 that 'air superiority implies a restriction to air supremacy in either time or space, or both'.[6] is important. Sea control is always exercised on a selective basis and we should anticipate that air superiority in the maritime environment will also be exercised selectively.

Air superiority can also be a more complicated task at sea than over the land. Air power theorists have tended to ignore the difficulties of maintaining air superiority in the maritime environment, particularly with land based aircraft. John Warden, for example, in his definitive work *The Air Campaign* talks of air superiority as 'a necessity to ensure victory or avoid defeat' but then in quoting examples when this was so, uses land battles only.[7] He makes no reference at all to maritime campaigns.

Problems of time and distance are especially critical in maritime air operations. Land based aircraft are invariably required to operate at greater distance from their home bases in the maritime environment than is the case in the land environment and air crew are more sensitive to 'get home' considerations. Range, endurance and weapon load are always critical factors with maritime operations and safety margins tend to be higher than they are with land operations. Due to the long distances involved in maintaining air superiority at sea in possible Australian areas of operations, air superiority may have to be maintained by ship-borne weapons alone without the assistance of land based aircraft.

It is of course these considerations which underlie the concern of the commander afloat that he may not receive air support from land based aircraft when he needs it most. This concern is accentuated when national air doctrine includes emphasis on the principles of mass and the concentration of force, as well as acceptance of 'the fact that it is not possible to defend everywhere and everything'.[8] The important point for air power doctrine here is the one made by Air Commodore Jasjit Singh when he said that 'What needs to be borne in mind is that air superiority is the means to an end, and not an end in itself'.[9] It is all too easy to envisage a situation where the Air Commander is concentrating his forces to win the air battle although the land or maritime battles may be more important 'ends' and these are lost before the air battle is won.

Secondly, there is the concept of the centre of gravity of operations. This is particularly relevant in maritime operations but, I believe, in a rather more dynamic sense than is postulated at present in AAP 1000. Admiral Wylie has written that 'the primary aim of the strategist in the conduct of war is some selected degree of control of the enemy for the strategist's own purposes', and this is achieved primarily 'by manipulation of the centre of gravity of war to the advantage of the strategist and the disadvantage of the opponent'.[10]

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5 *Australia's Regional Security*, Ministerial Statement by Senator the Hon. Gareth Evans, December 1989, p 16.

6 RAAF, AAP 1000, *The Air Power Manual*, Canberra, 1990, p 32.

7 John A. Warden, *The Air Campaign*, Washington, 1988, pp 14-19.

8 *ibid*, p 70.

9 Air Commodore Jasjit Singh, *Air Power in Modern Warfare*, New Delhi, 1989, p 33.

10 J.C. Wylie, *Military Strategy: A General Theory of Power Control*, New Brunswick, 1967, p 91.

The key word in this statement is 'manipulation' because it implies that action can be taken to control and influence the centre of gravity. This would be done primarily through the mobility and flexibility of one's own forces by, for example, choosing which forces are deployed, where they are deployed, and what operational posture they adopt. Unfortunately, I do not think these considerations emerge in the discussion of the centre of gravity in AAP 1000 which talks only of 'determining' the centre of gravity both of the adversary and of Australia but, I fear, only in the sense of reactively identifying where the centres of gravity are rather than proactively setting or establishing the centres of gravity.

By virtue of the nature of the maritime environment, the ability to influence the centre of gravity is potentially more significant in that environment than in the land environment. Operations in the maritime environment can influence not only the centre of gravity of an opponent at sea but also on land. British maritime operations during the Falklands Campaign provide some excellent examples of these principles in use in practice. Needless to say, they could be especially important to Australia given the extent of the maritime areas around Australia and the importance of the maritime areas to the defence of Australia. In our case, it is primarily the maritime strike capabilities possessed by the RAAF and the RAN which would enable us to control the escalation of conflict and the centre of gravity of operations. However, it will be highly important that these operations are coordinated and I suggest that the Maritime Commander is best placed to exercise that coordination.

Protection of shipping is the third issue I would like to talk about in the context of current Australian air doctrine. There is very little in AAP 1000 about the protection of shipping despite the strategic importance to Australia of sea-borne trade both economically and militarily.

The priority to be accorded to capabilities for the protection of shipping has been a vexed issue in the Australian defence debate over the years. Naval people have tended to assert the importance of these capabilities in fairly general terms while their opponents have pointed out, for example, that the vast majority of Australian trade is carried in foreign flag ships or that Australia is largely self-sufficient in most key commodities and foodstuffs.[11]

This paper is not the place to develop these arguments about the priority which should be accorded to the protection of shipping task. Suffice to say that few could deny that, in all the levels of conflict involving Australia, there will always be some shipping which will require close protection. These could be the ships carrying high value military cargoes, such as tanks, heavy vehicles and other equipment, which cannot conveniently be carried by air, or those with cargoes of strategic importance, particularly fuel.

In any defence contingency in northern Australia or its maritime approaches, the resupply of fuel to northern ADF bases would be a major problem which inevitably would require tankers to be escorted from southern refineries to ports in the north.[12] Furthermore, indications are that Australia is becoming less self-sufficient in liquid fuel

11 For example, the Dibb Review noted 'a tendency to overestimate the importance of trade' to our national economy, on the grounds that, inter alia, 'Australia is one of the few countries in the world to be so fortunate as to have an exportable surplus of energy, minerals and foodstuffs'. *Review of Australia's Defence Capabilities*, Canberra, 1986, p 39.

12 Coastal shipping is regarded by the transportation industry as being the only practical mode of transport for moving almost 17 million tonnes of crude oil and petroleum products around Australia each year. Virtually all the fuel used in northern Australia in peace-time is supplied by sea. Directorate of Naval Force Development, *The Role and Importance of Coastal Shipping in Australia: A Defence Perspective*, Canberra, 1986.

and that we will be increasingly dependent on the North-West Shelf for what indigenous fuel we do have. Again there are significant longer term implications here for the protection of shipping task and for maritime operations generally.

What doctrine there is in AAP 1000 about protection of shipping appears to be based solely on the concept of concentrating forces in focal areas.[13] While not setting aside the importance of securing focal areas, particularly prior to the passage of important shipping, the key point is that shipping is best protected by a moving 'zone of sea control' which can change on a day by day, or even hour by hour, basis. In World War II, there was considerable wastage of resources, and particularly air resources, through attempts to protect areas of ocean rather than the ships themselves.

Lastly, I should observe that the relatively scant discussion of maritime surveillance in AAP 1000 is of concern given the importance attached to this activity in Government statements such as the 1987 Defence White Paper and the December 1989 statement on Australia's Regional Security. Contrary to the approach of AAP 1000, Air Commodore Singh in his excellent book Air Power in Modern Warfare allocates an entire chapter to 'Aerial Surveillance for Maritime Security'.[14] There he makes a number of good points relevant to Australia, particularly on maritime missions and control and coordination, which I would have liked to have seen reflected in Australian air doctrine.

I can say with complete confidence that maritime surveillance aircraft will have some role in all defence contingencies involving Australia. In many situations, they will be the 'first cab off the rank' with a high rate of effort required when the rest of the Australian Defence Force (ADF) may still be largely on standby. Current numbers of aircraft, and more importantly current aircrew numbers, will be insufficient given the extent of the maritime areas to be covered and the possibility of aircraft also being required for other roles. This is a significant force structure deficiency in the ADF but there seems to be little action in hand to redress it. The P3C is a very expensive aircraft, both in money and manpower terms, so perhaps the solution lies with a 'high-low' mix in maritime surveillance capabilities as suggested by Air Commodore Singh.[15]

So far I have only discussed maritime air operations in periods of tension or conflict but, in line with the view that maritime strategy is a strategy for both peace and conflict, there is also a peace-time dimension to the use of aircraft at sea. The ministerial statement on *Australia's Regional Security* issued in December 1989, which I have already mentioned, declares a regional security policy which involves Australia playing an active role in cooperation with regional nations to ensure regional security and to prevent threats arising. It speaks of Australia having a 'comprehensive engagement' with South East Asia and a 'constructive commitment' to the South Pacific.[16]

Because of the dominant maritime nature of the region, the maritime capabilities of the ADF will provide most of the defence contribution to implementing these policies for regional security. This will be a task for both the RAAF and the RAN. Examples of relevant operations are:

> RAAF P3C surveillance flights over the South China Sea and the Bay of Bengal;

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13 AAP 1000, p 167.

14 Singh, *op. cit.*, Chapter 9.

15 *ibid*, p 234.

16 *Australia's Regional Security*, pp 44-6.

rotational deployments of RAN units to South East Asian waters; and

ADF assistance with maritime surveillance arrangements in the South Pacific (eg, the Pacific Patrol Boat Program, surveillance flights and naval ship visits and patrols).

Maritime air operations would figure prominently in any credible contingency involving a threat to Australia or national interests. Yet as I have just suggested, Australian air power doctrine, while acknowledging the significance of the air/sea gap between Australia and neighbouring countries, has so far paid relatively little attention to doctrine for maritime air operations.

While recent air power theorists in Australia have called on historical experience to confirm the importance of the unity of air power,[17] I believe that the experiences they have in mind are all related to land campaigns. Indeed I am unable to identify a single maritime operation where the unity of air power has been a winning factor. In fact the opposite may be more the case when persistence with the unity of air power and the splitting of command over naval and air forces has in fact lost engagements at sea.

Historical Perspective

A review of the history of air power at sea yields many examples of a sharp contrast between the successes of naval aircraft and the failure, at least initially, of aircraft operated over the sea by air forces. The state of Coastal Command of the Royal Air Force at the beginning of World War II provides an extreme example of the failure of an air force to accord proper priority to maritime operations. This was despite the proven effectiveness of aircraft in the anti-submarine role during the First World War.[18]

As its name suggests, Coastal Command had been developed as 'part of Trenchard's grand design for defending the home base against all forms of attack',[19] but without any real appreciation of the nature of the maritime operations which may be required. The evidence in the literature is damning. As John Winton has described it:

> There were very few aircrews with any training in either attacking or defending shipping. There were no properly equipped long-range ocean search aircraft, nor any aircraft suitable for either task of defence or offence against shipping.[20]

David Divine is even more forthright in his book, *The Broken Wing,* which is a critical analysis of the performance of air power - for some reason largely ignored by air power writers. Divine observes that at the beginning of the war, Coastal Command's aircraft were 'totally inadequate for the responsibilities assigned to them' and that, despite the experience of the First World War, 'in the anti-submarine role, the capacity of the Command was disastrous'.[21]

Slowly and painfully, the realities of air power at sea made themselves felt but it was only after Coastal Command was placed under the operational control of the Admiralty in April 1941 that a degree of cooperation and mutual understanding was reached

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17 As, for example, in B.L. Kavanagh, 'One-a-Penny, Two-a-Penny', *Defence Force Journal*, No 76, May/June 1989; and P.J. Criss and D.J. Schubert, *The Leading Edge: Air Power in Australia's Unique Environment*, Canberra, 1990, p 81.

18 For a discussion on the role of aircraft at sea during the Great War, see Vice Admiral Sir Arthur Hezlet, *Aircraft and Sea Power*, London, 1970, Chapters 2,3 and 4.

19 David Divine, *The Broken Wing*, London, 1966, p 202.

20 John Winton, *Air Power at Sea 1939-45*, London, 1976, p 106.

21 Divine, *op. cit.*, p 203.

between the RAF and the RN.[22] This was 'in the face of ignorance, prejudice, failure to reach correct decisions in the face of the clearest evidence, and difficulties of divided command'.[23]

Even so, problems of divided command for maritime operations remained and these were most clearly manifested in the escape of the *Scharnhorst, Gneisenau* and Eugen from Brest through the English Channel to German ports in February 1942. AAP 1000 seems to regard this as a success for anti-shipping warfare,[24] but the reality of course is that from the British point of view the operation was a fiasco with the root cause being that 'the Royal Navy, having predicted the enemy's intentions accurately, virtually left the whole operation to the RAF'.[25] If the experience of British operations during World War II is any guide, one is left with the nagging suspicion that leaving any responsibility for maritime operations to land based air commanders is to risk that insufficient priority will be accorded to such operations.

The Relevance of Air Power Theory

There is relatively little in the customary air power texts about the application of air power at sea. The explanation seems simple - the primary concern throughout the historical evolution of air power theory has been with the independent application of air power and that seems to make more sense as an adjunct to continental theories of strategy rather than maritime theories. Generally air power theorists have eschewed the support role of air power in land/sea operations and have directed their attention more towards the strategic role of independent air power and the importance of air superiority although even the latter has been primarily in the context of the land battle or for the air defence of land targets.

Air power theory appears to be postulated on the idea that there are three elements of combat power - sea power, land power and air power. It then goes on with the well-known definition of air power as 'the ability to project military force by or from a platform in the third dimension'.[26] Even with the qualifications that the platform from which power is projected is itself in the third dimension or that the third dimension is used by the platform as a medium for 'manoeuvre, deployment, concealment and surprise',[27] definitions of air power along these lines seem to be self-serving statements of doubtful utility, particularly in the maritime environment.

The inference is that land and sea power are limited to the surface of the earth and only project power in the first and second dimensions - land power on land and sea power at sea. But what of the notorious cruise missile turning left at the Baghdad traffic lights? Most probably it was fired from a ship, so was it a demonstration of sea power or air power? I would say the former noting that the projection of power ashore is a familiar role of sea power.

And what of a surface-to-air missile system which clearly projects power into the third dimension? And what of the ship-borne helicopter in an FFG? These are nothing more and nothing less than extensions of the ship's weapon and sensor capabilities. These questions alone seem to introduce sufficient doubt regarding the veracity of a separate

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22 Winton, *op. cit.*, p 109.

23 *loc. cit.*

24 AAP 1000, p 169.

25 Hezlet, *op. cit.*, p 225.

26 Air Marshal M.J. Armitage and Air Commodore R.A. Mason, *Air Power in the Nuclear Age*, London, 1983, p 2.

27 *ibid*, p 3.

concept of air power in the maritime environment without drawing on the ultimate example of the aircraft carrier as the surface platform capable of comprehensively projecting power into the third dimension.

Lines of demarcation based on a split between sea, land and air are simplistic and ultimately lead to bureaucratic problems and antagonism between a nation's armed forces. This is the very situation identified by Eric Grove when he observed that:

> Lines of demarcation have never been easy to draw and these disputes have sometimes had serious operational effects. The full potential of land-based air power over the sea has often not been fully exploited. Navies have been limited in their ability to operate aircraft. The situation is usually happiest when the sea/land boundary is used as the basic operational divide, that is, aircraft designed to operate over or from the sea being operated by the navy, and those over land by the air force.[28]

The solution to this problem is, as suggested by Air Marshal Funnell, to 'view combat power as an entity and to have less stress placed on air power and sea power and land power with its inevitable spillover into emphasis on the Air Force, the Navy and the Army'.[29] However, we still have to consider geography. An island nation, or a country with a long coastline and extensive maritime interests, will lean towards a maritime defence strategy embracing relevant components of combat power in its military strategy, but a land-locked country, or one with a small coastline and relatively few maritime interests, will incline towards a continental defence strategy including both air and land power. Israel is an example of a country which can rely primarily on continental power and a continental defence strategy.

By virtue of our geostrategic circumstances, probably no country in the world has a greater need than Australia to adopt a maritime strategy for national defence in preference to a continental strategy. Any strategic concept for the defence of Australia must be maritime in nature. This is apparent from the 1987 White Paper, *The Defence of Australia*, which states unambiguously that 'by its very nature, the defence of Australia and its territories emphasises maritime warfare capabilities'.[30] Air Marshal Funnell also recognised this when he observed that 'our strategy is and must be maritime based'.[31]

De facto, Australia now has a maritime strategy. This is reflected in the heavy maritime bias in our defence capital equipment program with the Anzac Class ships, the new submarines, the over-the-horizon radar (OTHR) system for surveillance of the air/sea gap and maritime capabilities for RAAF aircraft (P3Cs, F-111s and Hornets). What we have to ensure now is that our military doctrine is in line with the maritime strategy.

Australia has a unique opportunity to come up with something different for the integration of the separate concepts of sea and air power into a comprehensive maritime strategy for the security of Australia. The onus is on naval and air staffs to work together to meet this challenge. Overseas solutions are unlikely to be relevant to

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28 Grove, *op. cit.*, p 139.

29 Air Marshal R.G. Funnell, 'The Blamey Oration - Air Power in the Defence of Australia', *Journal of the Royal United Services Institute of Australia*, Vol 10, No 1, August 1989, p 8.

30 *The Defence of Australia*, White Paper presented to Parliament by the Minister for Defence, the Hon. Kim C. Beazley, March 1987, p 43.

31 Funnell, *op. cit.*, p 6.

our circumstances. Our geographic situation is very different to that of the UK, the US and certainly that of Israel (despite the tendency for Australian air power theorists to look to Israel as an archetype).[32]

Conclusion

In Australia's situation we should talk about the importance of maritime power to the security of Australia rather than the significance of air, sea or land power. All are important but none by itself provides the 'key' to the defence of Australia. The idea of maritime power reflects the indivisibility of sea and air power in the maritime environment. It recognises the importance to the defence of Australia of naval and air capabilities, as well as potentially of the land capabilities to seize or hold ground from or over the sea. It fully comprehends the importance of the maritime environment to Australia's security and the common ground between maritime defence and Australia's maritime interests and marine interests all of which are likely to grow in importance in the years ahead.

The importance of maritime operations to Australia is likely to increase in the future as we gain a better appreciation of the geostrategic environment around us, our maritime interests become more important, and we move towards a more cooperative approach to regional security. Maritime operations will also become more complex reflecting the proliferation of high technology maritime capabilities in our region - ships, submarines and aircraft.

In conclusion, I will leave you with the thought that Australia has still to come to grips with the full strategic significance of the maritime environment - or to properly recognise that environment in the development of our joint military doctrine. I suggest in this regard that the Australian air doctrine published so far has taken insufficient account of the maritime environment and is essentially a continental view of the application of air power rather than a maritime view.

I do not want to see a separate concept of Australian air power in the maritime environment or, for that matter, a separate concept of Australian naval power. Principles of air power and naval power are inputs to the concept of maritime power and we should not bog ourselves down with the issues of demarcation which have bedevilled the past history of land based air power at sea. Indeed I would go so far as to suggest that the addition of that qualification 'A Surface Perspective' to the proposed title of my paper is symptomatic of the very problems I am alluding to.

DISCUSSION

Colonel J. Murray (ARA): You allude to the adversarial nature of the doctrine and development process in the Australian Defence Force and I think you have made some very constructive suggestions. But might I suggest that the AAP 1000 is a most positive step forward in attempting to solve the problem of the doctrine gap in Australia, and if we had a maritime doctrine base - in other words a formal statement of the RAN's reason for being - then it would be very easy to overlay the AAP 1000.

Commodore Bateman: I was not intentionally presenting the idea of an adversarial approach to ADF doctrine and development, though I accept that I could have implied that. There have been several references to a rewrite of AAP 1000, and I would like to think that the criticisms I made will be reflected in the rewrite. I do admit also that I was intentionally hyper-critical, I think for a good reason. I was invited by the Chief of the Air Staff to be challenging.

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32 For example, see Criss and Schubert, *op. cit.*, p 154.

I applaud and support wholly, entirely and absolutely the process of developing joint doctrine. I think the maritime environment is almost by definition a joint environment and has to be regarded as such, and I think that's the reason why, coming back to Air Commodore Fisher's comment yesterday, priority has been given to the development of joint doctrine for maritime operations.

Air Commodore J. Coward (RAF, Retired): You mentioned that the Royal Air Force had very few and no suitable maritime aircraft at the beginning of the war. May I point out also that they had no suitable light bombers, no suitable heavy bombers, very few fighters and no transport aircraft. This was very largely because in between the wars a major part of the defence budget was spent on building battleships. It was not until Mr Churchill pointed out to the House of Commons how the German Air Force was building up that any money was spend on the Royal Air Force, and the expansion only started in 1937.

Commodore Bateman: Now there's many ways of answering that. I don't really want to get into a debate on history, but I do commend the book, *The Broken Wing* which discusses the issue of the priorities in the 1930s and the development of the UK defence forces. I thought the issue of the strategic bombing campaigns of World War II might come up. I think the revisionist approach of World War II historians is to generally support the line that is, when we look at the question of whether the resources used by Allied air forces during World War II in their strategic bombing campaigns could have been more usefully employed in direct support of land and sea campaigns, the answer seems to be along the lines that insufficient priority was given by air forces to support of the land and sea campaigns. I am quoting from a couple of recent studies I think came out in The Journal of Strategic Studies. One looked at the strategic bombing campaign and the other at the Atlantic War. The conclusions from these two separate papers are, firstly, that the priority for the strategic air offensive may actually have prolonged the defensive stance that the Allies had to adopt in the sea war and thus in effect delayed the American build-up in Europe for D-Day; and second, that for many historians of the Atlantic War, the myopia of the airmen who drove the strategic bombing offensive seems incredible. For example, one argument is that the failure of the Allies to close the Iceland gap in 1942 actually delayed the end of the war, because the number of aircraft required to close that gap was in fact no more than the numbers lost on many nights during the bombing of Europe. I think that is quite a fascinating example of priorities gone astray.

Group Captain A.G.B. Vallance (RAF): I refer to the report by Speer, the German Minister, who said that if the RAF's Bomber Command could have carried out five raids in succession at the rate of the Hamburg raid, Germany would have collapsed in 1942 and the war would have been over. The only reason the RAF didn't achieve that was they were never given the force required to meet their aim.

Commodore Bateman: I leave the judgment on that to a wide range of historians.

Lieutenant Colonel C. Westenhoff (USAF): Going back to 1942, let's look at the approaches to Australia and the defence of Australia after the Battle of the Coral Sea. As I recall, the Allied navies refused to operate in the area of the northern approaches to Australia, and those approaches were finally secured in the most decisive naval battle, the most one-sided 'naval' battle in history, which was the battle of the Bismarck Sea, in which no Allied naval forces fought. The Japanese invasion fleet steaming for New Guinea was destroyed by the Allied air forces alone, in an action later described by General MacArthur as the decisive aerial engagement of the war in the South West Pacific Region. Now, is it possible it's time to discriminate between blue water open ocean areas and maritime theatres in which the approaches can be denied because of the archipelagos?

Commodore Bateman: I regard those as maritime operations. We can dispute the nature of the battle of the Bismarck Sea, but certainly Coral Sea and Midway were clear examples of naval battles.

Coming back to the relevance of those engagements to Australia, it's interesting to speculate whether we'd have been better off if, in the 1930s, we had properly embarked on a maritime defence strategy rather than just tippy toeing around and not knowing where we were going. I don't regard the Singapore strategy necessarily as a maritime based defence strategy for Australia, although people could say it was a sea power based strategy. If we'd recognised a maritime defence strategy in the 1930s we may have had ships and aircraft more relevant to the defence of Australia than in fact we did, but that is another question.

Your comment also raises the considerations of sea denial and sea assertion. Sea denial is a very important role. If you really have got a tight budget, sea denial is what you're into in terms of denying an adversary from approaching your shores. It's interesting, I think, to look at South East Asian navies in that context. They have traditionally been sea denial navies, and I'm thinking here about Indonesia, Malaysia, Thailand as the classic examples.

There was disagreement earlier during this conference about the developments going on in those countries in terms of their military capabilities. To my mind the answer is simple. They are developing their maritime capabilities: the strike aircraft they are buying and focusing on are for use in the maritime environment, for their sea denial capabilities. Having talked closely with naval planners both in Kuala Lumpur and Bangkok in the past six months or so, I detect that they clearly see a role in sea assertion as well. That of course comes back to something I mentioned in my paper: that those countries are concentrating more on maritime issues. Five or 10 years ago they had no merchant navies of their own; now they all have significant mercantile fleets. Their economic prosperity has created a greater dependence on trade, so they are thinking off-shore in terms of threat perception, they are starting to think sea assertion. When you look at the map of the region, I would argue very strongly that Australia also has a requirement for sea assertion capabilities. I think that the justification for that ultimately and publicly appears in documents such as Senator Evans' statement on regional security of November 1989.

Squadron Leader M. Swinbourne (RAAF): Earlier on you spoke about the complications caused by the law of war and the law of the sea in the maritime environment. You suggested those factors are not necessarily an issue in the air environment. I would disagree with that. The law of war also applies to aircraft operating over the sea: in fact, the laws of war are much more restrictive to aircraft operating in the maritime environment than they are to ships. Because the laws of war are not clearly delineated for aircraft in the land environment, the Air Commander's role is in fact complicated, not simplified as you suggested.

Commodore Bateman: Yes, you're right and I agree whole-heartedly. I didn't say that the laws don't apply. My point really is the relative one that the issues involved are more complex in the maritime environment than in the land or even the air environment; although, of course, many of the considerations for the maritime environment apply also to the air environment. For a treatise on these issues, I commend to you Dan O'Connell's book, *The Influence of Law on Sea Power*, which reviews the subject and makes the same sorts of points I have. One real problem is that since O'Connell's book was published in the mid-1970s, the law of the sea has come a long way, as also to some extent have the laws of war. I'd invite a military lawyer to update the work as I think there's a desperate need for it.

Mr I. Westmore (ADI): Sam, a very provocative paper. You talk about maritime and continental operations both being essentially joint. I wonder how much better the Maritime and Land Commanders would be if air power was exercised by only two commanders - I wonder what kind of cooperation they could expect.

I understood you to say that whilst you appreciated the initiative represented by the AAP 1000, you were also, in a sense, highly critical of it. I gained the impression that Navy has no intention of producing a seminal document along the lines of the 1000 on sea power, and I would imagine that you would say there's no need for that, because we are talking about maritime power. Whose role is it to produce that manual - the folks at the Australian Defence Force Warfare Centre?

Commodore Bateman: The short answer is 'yes'. You said 'highly critical', and I suppose that's how it came across. The word I would use would be 'hyper-critical' because I was intentionally trying to draw things out and be provocative. I would have to say that I admire the AAP 1000 enormously. Its real benefit in my opinion is that it's out in the public purview. Part of my job is to give seminars in Australian universities that teach strategic studies, international relations and so on. A lot of them have the AAP 1000, and it's serving a valuable role as an unclassified reference the academics can use. I'd like to do a similar volume for the maritime side of things. I think, though, from a maritime power or sea power point of view, there is already a much greater volume of literature available in the public arena than there is about air power. Air power doesn't seem to have quite the same amount of literature to support it.

The sorts of things I'd be writing in a maritime doctrine manual would be very bland commentary about what's in those existing sea power volumes. Admittedly those volumes are from overseas. I would like to see a book written on Australian maritime strategy, and there will be some collections of papers coming out - in fact there's already one volume out - in the next 12 months or so which will promote these issues. But basically I think ADFWC is the place for maritime doctrine. I see myself working more at a strategic rather than doctrinal level.

Squadron Leader P. Robinson (RAAF): You seem to be putting the case for an aircraft carrier. With costs of around a billion dollars for both the platform and its aircraft, and upwards of 5000 people needed to support it, I wonder whether you think it would represent a good use of resources. Secondly, do you have the resources to protect such an investment in manpower and equipment? An RAN carrier would be seen as a high value target and would be vulnerable to air attack. Given that one well placed shot could sink your whole fleet defence, do you think a carrier is the best place to put your money?

Commodore Bateman: You've got two questions there. The answer to the first is that in our current resource environment, a carrier obviously is not a priority for the RAN. Regarding the more general question of the vulnerability of the vessel, I come back to my comment to Air Commodore Singh yesterday. If you put an aircraft carrier within 300 miles of an air base in clear skies, clear visibility and with no support at all, then of course it's vulnerable, but that's not the real world. I think there are ample examples over the whole history of maritime operations and maritime campaigns which provide the answer to your question, and I commend some of that literature to you. The best examples are the Falklands campaign with the UK ships. All right, they'll go in harm's way if necessary, but they've got the freedom to manoeuvre on the high seas.

I think that your question also raises a fundamental difference between maritime strategy and air strategy. Maritime strategy is about more than the big battle. Your question implies that what we're all about is the ultimate sort of conflict of arms and he who has got the best technology is going to win. But strategy is much more than that. It's about avoiding the big battle as much as anything, and I think there's a whole strategic justification for the type of capability you're denigrating.

Group Captain A.G.B. Vallance (RAF): Thank you for a very thought provoking paper. I appreciate that what we are all trying to do is to get a better understanding of the interface between the three environments, but there were a number of assertions you made in your paper which I felt were very dangerous. Perhaps I can just deal with one in particular which has three sub-parts to it.

Your first assertion was that air superiority is not an end in itself but a means to an end. It can be a means to an end, but it can also be an end in itself. If you are faced with a very strong opposing air force, unless you achieve air superiority then you will be beaten. I don't want to dwell on the Gulf War, there are many other examples.

You also said that air superiority may have to be achieved by ship-borne weapons alone without land based air power. Now, I find that a very surprising thing to say as we approach the 50th anniversary of Pearl Harbour, and are nine years on from the Falklands War. We well-know that ship-borne weapons systems are quite incapable of defeating an air threat. It is getting more and more the case that ships are very vulnerable to air attack, not less the case.

Your third assertion, if I understood you correctly, dealt with the question of how air superiority should be achieved: should it be with carrier based aircraft or with land based aircraft; and as I understand it, you were arguing that ship-borne aircraft are always there at the disposal of a naval commander and therefore can be relied on, and therefore are a better way of doing it. Well, big carriers can't be afforded and small ones get sunk. Land based air power in World War II - and it's developed an awful lot since then, relatively as well as absolutely - accounted for 60% of the enemy ships sunk. If we think of air power purely in terms of ship-borne systems and land based systems, we miss the point that 30% of the world is covered with land, 70% is covered by sea, and 100% is covered by air. The same aircraft are going to be used over the land and the sea, and unless you centralise them rather than divide them up between the army and navy, then you are not going to get the best use out of your air power.

Commodore Bateman: What worries me about air doctrine - and I think there's some of this in the AAP 1000 - is that when it uses words like 'concentration of force' and 'concentrating effort' to win the air battle, there is a suggestion that perhaps in the larger strategic sense air power is being concentrated to win an air campaign at the expense of the whole battle. The battle of the Atlantic may be one example which I have already mentioned. I accept in general terms the importance of air superiority, but I stand by my paper. I can conceive of situations, particularly in Australia's case, when air superiority may not be the objective of the ADF. In fact I can readily conceive of Australian defence contingencies where air power in terms of air superiority, aerial bombing, etc, has almost no role at all; where the entire role of air power would be in support of sea and land forces because there is no air threat as such. You can argue semantics, that by implication the scenario I have used implies Australia has total air superiority and the other side is not prepared to contest it. My point in raising that sort of considerations is to reinforce my more general points about the maritime environment and the nature of maritime operations.

Coming to your second point about whether air superiority can be achieved by ship-borne weapons alone, I think I asked you that specific question at a seminar at ADFA last year, and I think you answered 'yes'. I can envisage Australian maritime operations being required beyond the reach of land based air, conceivably within the range of enemy air. In those situations, I'm going to have to maintain air superiority with my own systems.

With your third point, I think I've almost covered it in my answer to the second question. I think Australia's strategic view is very different from that of the UK. We have to think about the maritime environment more, we have to think about operations when,

as I just mentioned, air superiority may have to be maintained by ship-borne weapons. We are also going to have to think more about the possibility of operations beyond the reach of land based air; or where land based air is going to be very limited by virtue of simple laws of physics, rates of effort, range and endurance, and all of those sorts of considerations. They are realistic factors that have to be considered, and I think relatively much more in Australia's situation than in the UK's.

Lieutenant General C. Boyd (USAF): As far as I can see, what we are really all about here at this conference is to try to figure out how we can better allocate our resources in a period of declining defence spending. I would like to go over a couple of numbers because at least they relate to how we divide up our resources and what kind of a payoff they would seem to give us.

The US Navy seems to consume about 34% to 35% of our defence budget. That will vary a percentage point or two over time, but it runs in that range. Now if you look at the contribution of our navy to the Gulf War, we had six carrier battle groups there, about 85,000 personnel committed. We waged an air campaign of about 110,000 sorties and our six carrier battle groups contributed about 16% of that total effort. Of the 16%, about two-thirds were flown in support of itself - fleet air defence and fleet support - leaving about 6000 sorties or so for projection of power ashore; that is, about 5% of the total. That doesn't seem like a wise investment. It doesn't seem like we're getting a high payoff in terms of actually putting things that go bang on people's heads, which is what we are really all about in the first place. Could it be that we're just mismanaging our resources, and if we were to take that 35% of the defence budget and invest it in something other than carrier battle groups that we might be able to figure out ways to project a lot more power?

Commodore Bateman: I wonder about the use of statistics, sir. You're trading off 16% of the sorties in the Gulf War against 35% of the US budget. But in my humble view the Gulf situation was quite atypical. I heard some discussion last night about the number of Coalition aircraft that were in the air at one time, and I wondered whether overkill etc. would underlie some of those statistics. The April edition of Australian Aviation magazine listed aircraft numbers involved in the Gulf, and when you compared the numbers of aircraft in the six carrier battle groups against land capabilities, there seemed to be a lot of naval aircraft. I accept the general point about the relative usage and rates of effort from the land based air power versus the sea based air power. But surely we can't accept the Gulf as being typical of the types of operations that US forces may be involved in again some time in the future. Actually, in my paper there is a paragraph about the US maritime strategy, which was a vexed issue in defence circles in the US. I think we would have to agree that the US maritime strategy, which was postulated basically on a forward deployment of carrier battle groups and attack submarines, played some part in the collapse of the confrontationist policies of the Soviet Union. I think that is an example of the greater flexibility of a sea based air power capability. I also note some of the statements that were coming out of the USN before the Gulf War broke out that the US maritime strategy was going to be maintained. I would hate to think that because of the statistics that General Boyd mentioned, the 35% of the budget that goes to the USN would be under threat solely because of the experience of the Gulf conflict.

Air Marshal Funnell: I have to wrap it up there Sam [Bateman]. I won't comment on most of the issues, I'll allow your words to stand and leave people to make their own judgments. But I couldn't conclude without one passing remark. Behind us here you've projected a quite different view of Australia. I think that what you've attempted to do by projecting this map as a backdrop to your whole presentation is to correct a view which you believe has distorted our thinking about strategy and defence policies. I'd offer a counter view: that the view you've presented is itself is a distortion. I believe that if you were to cut that hemisphere off not far south of the Tropic of Capricorn and

appreciate that threats which might come from the north east are small to totally insubstantial, then you would have a different view again of Australia's geostrategic circumstances. I thank you for your paper and the way you've challenged our thinking.

AIR POWER IN THE AIR/LAND ENVIRONMENT

Brigadier P.L. McGuinness

As a user of air power, I welcome the opportunity to address this topic to a gathering of air power practitioners. I am pleased, too, that the title of the address you have asked me to give illustrates that Army and Air Force are planning to fight in concert in the defence of Australia, and it is in the context of joint operations that I will address my remarks this morning.

For this presentation I will use the term air power in its broadest sense, that is, as the sum total of a nation's aviation and related capabilities. In doing this I acknowledge that the air assets and capabilities to meet the tasks that I will cover might be provided by any of the three services of the ADF or by civil aviation.

The Australian Army has appreciated the important role played by air power in the land battle ever since the campaigns of the First World War, and thus has some comprehension of the costs, benefits, advantages and limitations associated with its employment. If commanders in the ADF are to be properly prepared to engage in operations in the defence of Australia, further study of the utility of air power in the unique joint force operations that will pertain is vital. Such study will lead to a better understanding of all the issues involved, and consequently allow more effective planning for, and prosecution of future campaigns.

Endorsed strategic guidance indicates that the focus for the development and planned employment of the ADF is to be on credible ways in which a potential enemy's existing and prospective military capabilities could be used against Australia in the shorter term, and how the ADF should respond in such circumstances. Hostile acts against Australia short of military action could include: diplomatic and political pressure; military threats; administrative interference with Australian shipping, aircraft transit, landing rights, trade and commence; challenges to Australian authority such as that exercised in the Australian fishing zone; and the collection of intelligence.

If such measures prove ineffective, or any enemy decides to escalate his interference, enemy action could develop into low level armed conflict against Australia's interests in the northern island chain, the sea and air approaches, and the north of the Australian continent and the off-shore territories. Hostile acts could include the insertion of small forces onto the Australian mainland to reconnoitre, harass and raid.

An adversary could place significant demands on the ADF by:

harassing, raiding or even seizing temporarily off- shore territories such as the Cocos and Christmas Islands;

concurrent terrorist activity anywhere in Australia:

the insertion of raiding parties against isolated targets and settlements along the northern coastline; and

the simultaneous application of low level military pressure on friendly neighbouring countries.

Brigadier P.L. McGuinness
Director General Operational Planning - Army

Incursions could be up to section or platoon size, that is groups of between 10 to 30 men. In these small groups an enemy could sustain low level operations for a very long time by manipulating carefully the use of his forces.

An enemy could further escalate the conflict and stretch the resources of the ADF by:

increasing the frequency, scale and geographic spread of attacks;

attacking more significant targets with the intention of inflicting greater damage; and

mounting limited air attacks on selected targets.

This escalated form of low level conflict represents the assessed upper limits of how credible threats could be applied realistically against Australia. An enemy would be less able to conduct such operations for a protracted period, and the time at which escalation occurs may not be predictable. However, he may choose to initiate operations at the escalated level.

In escalating the conflict, an enemy may be prepared to supplement unconventional forces and tactics with elements prepared to directly confront the ADF. Incursions of up to company size, about 100 men, are credible, although the number of such incursions is likely to be limited because of the difficulty of sustaining them from within or over the air/sea gap.

Eisenhower observed after World War II that 'separate ground, sea and air warfare is gone forever. If ever again we should be involved in war, we will fight it in all elements, with all services, as one single concentrated effort'. The truth of these words has been evident in wars since 1945 including the most recent operations in the Gulf.

Joint operations will certainly be the case for the ADF in land operations in the defence of Australia and its interests. The land force commander will operate within a defined area of operation (AO) across the north of Australia with assets assigned to him by CDF or Commander Joint Forces Australia. The degree of operational authority and duration of assignment will of course depend on many factors, including competing demands for scarce ADF assets to meet other tasks. The AO would be divided into tactical areas of responsibility (TAOR) of about brigade size with assets tailored to the assessed needs of each area.

In credible contingencies Australia is most unlikely to be faced by a large scale invasion, but rather by the insertion over time of small enemy parties to disrupt the pattern of our infrastructure operations and hence to challenge our claims to overall sovereignty. Forces could be infiltrated by means such as fishing vessels, light aircraft or trading vessels. In the first instance even scheduled commercial flights could provide a suitable means of entry. In these circumstances, and given the vast areas involved and technical limitations associated with locating and tracking such targets, the prevention of incursions on this scale into northern Australia over the air/sea gap will be a difficult, if not impossible task for the ADF.

Australia cannot afford to maintain standing forces large enough and with the range of capabilities necessary to identify and defeat all of these incursions as they are being attempted. Consequently what is needed is a balance of forces available in the ADF which allows us to minimise the number of incursions, to identify the location of those that are successful, and then to deploy forces to neutralise and excise the enemy group as quickly as possible.

An enemy will use the vastness of the Australian north to his advantage and to the ADF's detriment. However, in choosing this course of action he is left with many disadvantages. He will have only limited organic transport and heavy weapons. If he is to operate for an extended period he must try to live off the land as best he can with augmentation from an unreliable resupply system. When separated from population centres he will be largely impotent, and if he is located he is likely to be destroyed.

In low level and escalated low level conflict in northern Australia, an enemy's most likely use of air power will be for lodgement, resupply and withdrawal. The tonnages involved are likely to be quite small and for security reasons as much as possible of his lodgement and resupply is likely to be by air drop. An enemy is also unlikely to be able to operate helicopters in northern Australia in support of his campaign.

Despite these disadvantages, the continued presence of an enemy force can be portrayed as mocking Australia's capacity to defend itself against incursion. Consequently the political implications of his presence may far outweigh the military significance of his actions.

With that as a background, I wish to present to you today an Australian Army perception of the tasks an operational commander will have for air power in an air/land battle in the defence of northern Australia in credible contingencies. That is, how air power would be employed by a land commander in what some may refer to as low intensity conflict. Most of the tasks I will cover would also be applicable to land operations in the Australian area of direct military interest.

In identifying these tasks I am fully cognisant that the use of air power assets to satisfy any or all of them will be conditioned always by such factors as: availability, competing priorities, and risk of use. The latter factor is an important one which has a political as well as a military dimension and I will return later to this subject.

The successful conduct of a land campaign in Australia to counter credible contingencies would place great reliance on air power. The distances from the Australian support area to the north, and across the possible area of operations are vast, and the potential targets numerous and spread throughout an area which is poor in infrastructure. Lateral road links are limited in number and of poor quality, and ground movement in the wet season is extremely difficult and slow. A defensive land strategy in these circumstances, and with limited ground forces available for deployment, will depend heavily on the ability to move men and stores by air.

One of the early demands on air power in the air/land battle will be for reconnaissance by the commander and key staff officers. This will continue concurrently with initial deployments by air of forces by civil and military means to reinforce surveillance units already stationed in the AO, and to deploy further operational and logistic forces.

If a precautionary deployment into the AO is ordered, there will be a requirement for initial logistic stocking of the support bases. Depending on the size of the AO there may be as many as six of these bases, and the urgency of the requirement plus the relative isolation of the bases may force this initial stocking to be carried out principally by air. It is likely in these circumstances that maximum use would be made of civil air to move stocks into the major airheads, accepting that there will be limitations imposed by a lack of specialist ground support equipment and restrictions on airfield use. Again, because of the distances involved and the paucity of road and rail links into the AO, stocking of these bases may be done direct from the Australian support area into TAORS.

Subsequent resupply to these bases and on to forward areas will also involve significant use of air assets. In the case of bases in more remote areas, air resupply may need to be solely by ADF aircraft. The principal usage items would be food, POL and water. The reliance on air for resupply will increase significantly during the wet season.

The majority of troop deployments to the AO in the initial stages are likely to be by air. In these circumstances troops will be on light scales with heavy equipment being deployed subsequently by surface means including shipping. If deployment to off-shore islands or installations is required, this would be accomplished by a combination of maritime and air transport means. Clearly, transport aircraft will have a key role to play in this phase. However, competition for air transport will be intense as ADF assets are moved north to meet other operational needs.

During the initial deployment stage, the risk to aircraft from enemy ground fire is likely to be low despite the effectiveness of modern anti-aircraft weapons. This is because of the exceedingly small areas that enemy groups will be able to influence relative to the overall size of the AO.

Training in the control and use of air power will be important both in the Australian support area and in the AO. Adequate air effort must be set aside for this to ensure that air power is not wasted during the actual campaign. In general, training will be more intensive than is possible in peace-time with greater realism to accord with the likely operating tasks. Considerable emphasis will need to be placed on the co-operation and coordination necessary between the ground and air elements.

Once the land force is established in the AO operations will be of three broad types:

surveillance/reconnaissance,

protective, and

offensive.

During the period of diplomatic deterioration Australia will maintain a 'business as usual' approach with normal air and sea traffic continuing to operate in and around Australia. During this period, aircraft will be deployed on surveillance tasks in the air/sea gap and in the declared land AO.

In low level conflict of this nature an enemy will attempt to elicit a disproportionate response from Australia. The vast expanse of the continent and its northern sea and air approaches greatly simplifies his task. Of the countless potential targets scattered throughout this sparsely populated land, many have limited strategic significance, and their relative importance can be quantified, but in the context of his goal of disrupting or challenging Australian sovereignty each target has its own importance. This means that the surveillance plan must provide enormous coverage both in area and in frequency. Whilst sea and land surveillance units will be employed extensively, air surveillance will provide the bulk of the coverage, particularly for wide area surveillance of regions distant from key vital assets.

In conjunction with surveillance tasks, air power will need to play a key role in close reconnaissance of suspected enemy sightings. The requirement will be to confirm sightings and provide to tactical commanders hard information on strength, location and direction of movement of enemy parties. The reactive deployment of ground forces will largely be responsive to such reconnaissance. Whilst much of the ground force will be engaged in reconnaissance as a necessary part of their defensive tasks, air reconnaissance by Army aviation units will be a major contributor because of the flexibility and ability of aircraft to cover the large distances quickly.

Having located an enemy party, it will usually be necessary for aircraft to remain in contact with the enemy until a reaction force arrives. The ability to stay on station for an extended period and out of range of enemy weapons will be important, as will the ability to guide reaction forces to the target and to advise on approaches to the area, current enemy actions and possible landing sites.

Protective operations by ground forces will not guarantee that vital assets are inviolate to harassment or raids. The force commander's objective will be to reduce risk to a level commensurate with the importance of the asset being protected. The large area covered by many northern assets, the concealment provided by terrain, vegetation and darkness, and the relatively small deployable forces available to the land commander mean that infiltration through security forces will always be possible. Providing a 'picket fence' around vital assets will not be an option for him. Air power in the form of fixed and rotary wing reconnaissance aircraft, battlefield helicopters, aerial fire support aircraft and close air support (CAIRS) will play a key role in protective operations. Some of the most important vital assets to be protected will be the air bases from which many of the ADF's aircraft will operate. Some of these aircraft, the tactical fighters in particular, will have a role to play in protecting these bases.

In some circumstances when enemy forces are engaged, control of the engagement may best be done from the air, and the control of indirect fire will also be greatly facilitated from the vantage point of an aircraft. Aerial observation will help to fill in the gaps between dispersed ground forces but will need to have the ability to pass information direct to the ground forces.

Commanders will use aircraft to familiarise themselves with their TAOR and will assess likely enemy approaches to vital assets, forming up places, escape routes and hides. Protective forces will often be deployed in very small groups remote from one another with air power the only means of insertion, extraction, resupply and reinforcement. Deployment and resupply in these circumstances will be by both fixed and rotary wing aircraft.

It will be important to maintain protective forces on alert in their deployment locations over an extended period. This will require frequent rotation of forces through rest areas, and air movement will often be the most appropriate means.

Aeromedical evacuation will be important in protective operations, and will be used in conjunction with ground means. Casualties will be collected from as far forward as is feasible and flown direct to an appropriate medical facility. Rotary and fixed wing aircraft will be used in this role and some serious casualties will be evacuated by air from the AO to hospitals in the Australian support area.

In offensive operations the effective counter to the enemy's strategy will be to perfect our ability to quickly locate enemy groups and then to concentrate rapidly sufficient force at that point to destroy them. The faster this can be done the more successful the ADF will be in providing evidence that Australia has the capacity to protect its sovereignty and deny the enemy any worthwhile propaganda value.

The troops available to the Land Commander for offensive operations should ideally outnumber the enemy at the decisive point and have superior equipment, firepower and mobility. The latter characteristics will be provided by a combination of wheeled and tracked vehicles and aircraft. The intention is that the enemy will have little capacity to inflict significant battle casualties on the ADF in a direct confrontation. Consequently he will attempt to manoeuvre to avoid combat with the ADF under most circumstances and the ground commander's counter to this will involve the use of all his mobility assets including air power.

Night operations will be important as both sides will seek to exploit the security afforded by darkness and gain relief from the heat of the day. The capability to employ elements of air power throughout the night will therefore be important to the land commander in conducting his operations.

In the case of escalated low level conflict, forces of up to battalion size will be earmarked for offensive operations. These forces will be highly mobile and will be supported as necessary by aviation, light armour, mortars and artillery. They may have to respond over distances of up to 300 kilometres or more. Although the response by forces mounted in light armoured vehicles or trucks will be acceptable for many incidents, a timely response to incursions in more remote locations and in the wet season will increase the demand for employment of air mobile forces. However, air assets will always be in short supply and will usually be controlled at the highest level as is the case for other scarce resources.

Air mobility allows a commander to concentrate rapidly a reaction force of up to company group size at locations up to 150 kilometres from his base of operations. Air mobility also means that a ground commander can make his appreciation of troops required for tasks with the confidence that reinforcements can be held back until the decisive moment of the battle. Forces can then be delivered at a time and place of the commander's choosing to deal with the threat. However, the relative security of this type of long range deployment is dependent on the assured availability of adequate air assets.

Airmobile elements deployed at RAAF Darwin, RAAF Scherger, RAAF Curtin and Port Hedland respectively could reach about 70% of all potential targets in northern Australia within two hours flying time. A similar response using ground mobility would require up to six times as many deployable elements. Air power therefore acts as a significant force multiplier for the ground commander.

Rotary wing aircraft are important for this type of operation as they allow the ground commander maximum flexibility in choosing options for approaching the enemy and for moving forces to gain the best tactical advantage. If the ground force is able to operate away from fixed airfields, greater security and quicker response times will be possible than would otherwise be the case. This will be an important factor in achieving the initiative and keeping the enemy guessing as to exact locations of security forces. However, the logistic bill is high, particularly for POL, and medium lift helicopters, as well as LAPES capable transport aircraft would have an important role to play in providing this support.

Combat exchanges between opposing land force elements will generally be on a smaller scale than in more substantial conflict, but the intensity of fire, especially that from direct fire weapons including small arms and light support weapons may be high. This applies particularly to escalated low level conflict when hostile forces may be prepared to confront the ADF directly. Although the heavy weight of fire support characteristic of more substantial conflict will not be needed in all circumstances, an adequate level of direct and indirect fire must be available to the ground commander to deal with the enemy. Rotary wing aircraft will be used to deploy indirect fire weapons such as mortars and artillery and their ammunition.

In some cases the most efficient and effective application of force will be to employ CAIRS. Given the problems of detecting targets in the air/sea gap a priority will need to be established which recognises the importance of directing tactical fighter effort in support of land operations.

In examining the appropriateness of CAIRS to support land operations in credible contingencies, consideration must be given to the vulnerability of the aircraft. It is likely that the level of sophistication of our present CAIRS capable aircraft and their high cost would deter us from exposing them to the dangers of surface-to-air shoulder fired missiles. However, if the mere presence of enemy forces on Australian soil is seen as a major challenge to Australian sovereignty, will government allow consideration of that option? If CAIRS is available in a timely manner when does the balance sheet between aircraft cost and soldiers' lives reach equilibrium, is it one life or 20? Essentially these are political as well as military questions. The Army view is that where a suitable target presents itself CAIRS should be one of the options available to the commander. If CAIRS is to be a part of the land battle this requires the continued ability to direct aircraft onto targets by either airborne or ground based controllers.

An essential adjunct to this air mobility strategy is the requirement for aerial fire support (AFS). ARMY sees AFS as an integral part of tactical air insertion. It is there to provide a measure of protection to the aircraft and the troops en route and during insertion, and to provide additional fire support once the enemy is engaged.

In credible contingencies in northern Australia the threat of opposed air insertion or enemy interdiction en route to the insertion site is likely to be relatively low, and consequently the need for en route armed escort is limited. Security will be provided for by careful selection of the route to be flown, flying at night and at low level, and the use of AFS aircraft as already discussed. The AFS role is therefore quite different to CAIRS and will be an integral part of the ground force operations I have described. Again it is important to emphasise that if a reaction force is deployed against a located

enemy force it will be with a view to the immediate destruction of that force. AFS aircraft would probably remain with the land force until the operation has been successfully completed.

Clearly the successful prosecution of the land campaign strategy I have described today is heavily dependent on the availability and sound utilisation of air power to generate the combat power necessary to win the land battle. Without ready and adequate access to key elements of air power which are fully integrated into the land battle, particularly for surveillance, reconnaissance, battlefield mobility and transportation, ground forces could not operate effectively in defence of northern Australia.

DISCUSSION

Air Commodore N. Ashworth (RAAF, Retired): Ever since the concept of low level conflict was discovered by Dr Dibb in 1986 the ADF has been running around in circles trying to decide how best to deal with it. I would, however, point out that I believe Dr Dibb found low level conflict not in any assessment of Australia's particular circumstances, but rather in the conflicts within the Defence Department. Ever since that time no one has sat down and asked themselves the questions: How credible is low level conflict? Who is going to launch this low level conflict against Australia? (and I point out here that 'Kamaria' is not a real world country).[1] We can decide who it might be, why are they going to do it and how they might go about it. And then you ask yourselves what are their chances of success, and what would they rate their chances of success, and I would suggest those chances would be about zero. Therefore, I suggest low level conflict is a completely false basis on which to base our defence planning.

Brigadier McGuinness: Well, all that I'd say is, governments decide what is our proper role; we are military experts and our role simply is to provide military advice.

Group Captain P.J. Criss, (RAAF): Both of the previous speakers [Bateman and McGuinness] set up scenarios where we seem to have deployed half of the ADF north to engage a small raiding party. I put it to you we have the technology to respond instantaneously at far less cost and far more accurately than what you have proposed. I agree whole heartedly with what you said about the importance of surveillance and reconnaissance but that's where I then say why not use air power to disperse that party. We have the technology. Why not use a single aircraft, a single PGM and about half an hour's flying time, and save the deployment costs of your 'non-escalated' deployment to try and remove them with ground forces?

Brigadier McGuinness: I suppose underlying that question is the belief on your behalf that your are able to confine these groups, to close with them and to deal with them, and that the appropriate assets will be available. Of course, I'm not privy to all the technical capabilities and shortfalls of our current inventory. Nevertheless, I will say that it's my firm belief that even in this technologically advanced age, we are not capable of doing what you suggest to all targets, particularly the sorts of targets I have described. I think in some respects, the higher the level of enemy activity projected against us, the easier it is to deal with. I think the challenge for Army in coming to terms with what the government is directing us to look at, is to see just how much damage and threat can be caused by the sum of individually quite insignificant attacks on Australia. We really would be very stretched to detect a raiding party coming across the air/sea gap in a wooden hulled boat. Even if we were to close with it, if it were mixed with innocent vessels, how would we identify the target and how would we

1 'Kamaria' is a mythical country used as the 'enemy' in recent major ADF exercises.

deal with it? I think those are real practical problems and limitations on what we would like to do at the lower end of the threat spectrum. Again, I would stress that I don't think I said anything in my speech that would detract from an appropriate role for sea and air power in the air/sea gap. However, in contingencies that threaten Australia, there are limitations and the enemy will get through.

Air Marshal Funnell: Group Captain Criss, I think you owe the brigadier a response. He asks could you find, hold and deal with that raiding party.

Group Captain Criss: I acknowledge there's a need for surveillance and reconnaissance before I can act in the way I am proposing and I also appreciate that in this forum it's a little bit difficult to get into detail. What I am saying - and I'll accept the fact that your sampan can broach the air/sea gap undetected - is that once detection has occurred, we have the technology now to deal with it using a single weapon, outside harm's way of any enemy defence system they may have brought with them.

Brigadier General Soedibyo (CSIS): Being a military man myself, and then I have to advise government so many times and sometimes subvert in certain instances so that our argument will be accepted. But that comes all because of responsibility . . . We have a certain responsibility as a military officer in conducting our function while also related to politics, and I regard this as an intellectual exercise.

What is the motive to send a raiding party with wooden boats or disguised fishermen to Australia? Do we regard the surrounding leadership of Australia as people like Saddam Hussein? If so, that might be a possibility. But if we regard the leadership in Australia and also surrounding Australia, because in my opinion such kind of transgression into Australian sovereignty will be conducted by countries in direct surrounding Australia. I don't think that China will do that or India will do that. And by implication I do not want you to impose that is that, but by implication I can draw a conclusion that there must be somebody that is in the neighbourhood. And I do not want to draw a conclusion that somebody is that stupid, because there are other means if somebody wants to intrigue Australia. For instance, closing one threat and providing another threat. But it is a turn-around that is quite simple. But I understand being an infantryman that my battalion, my squad, my platoon, my company has to exercise, and out of that understanding I understand also the whole issue. Thank you.

Air Marshal Funnell: Before I have one infantry man respond to another, I think that what you done for us, sir, is highlight the real difficulties faced in defence planning and force structuring in a no-threat environment. It raises serious conceptual difficulties, and more and more countries will find this to be the case in the years ahead. It becomes exceedingly difficult to plan when you cannot construct a realistic environment; when, as I've said before, almost anything is possible and nothing is probable. How do you construct a force to react to that? This is where I think the necessity for balance in a defence force is a prime consideration so that, no matter what occurs, the defence force can offer feasible options to the government. It's conceptually difficult, and I have no doubt that we'll get some discussion going from that. Peter [McGuinness], you might wish to respond.

Brigadier McGuinness: Indeed sir, and in fact one plank of government policy is of course that the capabilities one assembles for dealing with credible contingencies must provide a range of options for doing other things, and we've always got one eye on what those other tasks might be.

Air Vice-Marshal G.W. Neil (RAAF): Peter, yesterday the Land Commander gave what I thought was a very disappointing answer to a question I asked regarding the progress being made in air/land operations. I think your paper offers more hope in that you have identified a lot of the problems we will have in the north. If in fact the enemy

gets through the air/sea gap, is Army deluding itself by accepting a 3000 kilometre AO, operating its own organic air support and perhaps expecting close air support? And is Air Force also deluding itself - although it has a little bit written in the AAP 1000 - about its ability to provide forward air control? I suggest the Air Force is deluding itself to a degree, because we have never had an operational FAC capability. We still don't have the aircraft and we are unlikely to. We don't have the spare fighter pilots to train as FACs and send out with Army units if need be, or to put in the field with FAC aircraft. I think the time has come when Army really has to assess the situation and decide whether or not it should grasp the nettle and endeavour to provide its own forward air controllers.

If a forward air controller can operate in the environment we are talking about, that's all very well. If he can't, your aerial fire support from the helicopter gunships probably can't either. So, I think we need to identify alternative systems. We've got some technology in terms of radar beacons, offset beacons, laser target designation, but I think we cannot hide behind that and just accept some very loose, throw-away lines in the AAP 1000. We really have to get down to developing techniques that work with what we've got now and what we might have in the harder times to come. Would you care to comment?

Brigadier McGuinness: Yes sir. Of course it probably was as you indicated a more appropriate question for the Land Commander; nevertheless, I'll provide a view.

I believe you're right in that we are now in the business of trying to deal with the realities of what we have got in the inventory or what we're likely to get. I am aware that Army Aviation pilots, for example, do receive some AIROP training, although I don't think it extends into all of the skills of the FAC. It may be that Army Aviation has made a bid for that skill but it has been resisted; I don't know. Certainly - and this applies to many of the capabilities that I mentioned in my talk - there will be from the Land Commander's point of view certain capabilities that are vital to the prosecution of the land battle. He is going to have to decide whether he is willing to pay the price, and I think we have now entered a period in defence planning when those pretty tough decisions are being made. Perhaps they're indicated by the Army flagging that it might, subject to a whole range of imponderables, be prepared to reintroduce the Chinook capability. At the time it was lost, perhaps all the ramifications were not understood by Army. Perhaps a new aircraft with the necessary range and capabilities might be worth paying the price in terms of hacking off some part of the Army that we've become accustomed to having. I think it is coming to that point where we need to make those fairly tough decisions and if we do want the Chinook capability perhaps we are going to have to provide it essentially out of our own hide.

Senator David MacGibbon (Liberal, Queensland): Brigadier McGuinness, I'm pleased that you started off by saying that the regular Army were prepared to fight with the Air Force for the defence of Australia, in contrast with Commodore Bateman, who advised us that the Navy were prepared to fight the Air Force for the defence of Australia.

Dealing with your speech, I thought the final part was the most important. I think the way the ADF Headquarters is going to integrate air assets with ground forces is really the crucial question. As has been said by other speakers, the whole matter of low level contingencies is simply a very cynical political deception on the Australian community. It is absolutely untenable, as General Soedibyo has said, in the international diplomatic context, that you could have groups of section strength or even up to company strength, harassing the Australian mainland. If I might inject a note of levity, we've got more than enough police force members in the capital cities of Australia to deal with that sort of threat. It's not really tenable at all and it's come about because it's what the government feels it can afford; so that we generate a scenario that the government can fund. We have things like strategic basis papers and defence of Australia papers which are all very well, but they are also irrelevant in the real

world: they've got about as much validity for the defence of Australia as the Queensland railway time table. They're a guide and an educated guess as to what might happen. But to have staff officers lecture me that the only basis on which they can contemplate action is what is said in the Defence of Australia paper is absolute nonsense.

But I come to the real point of my question which is: What are we doing to integrate air assets with ground forces? We have to prepare for the ultimate threat where Australia might be attacked in force, as Professor Ball brought up on the first day of this conference.

The other thing that we have got to consider is that we will probably be involved increasingly in the future in United Nations actions as we saw in the Gulf. I would hope in future actions we would have something more significant than the Navy contribution. This is not to belittle the Navy contribution, but having just come back from three weeks in the Gulf, I was very disappointed we didn't have both an air and land component there with other forces.

I also wonder what we are going to do about intelligence collection, the dissemination of information, and getting some compatibility and standardisation in communications, which is a great deficiency within the ADF.

The final point that was raised by Air Vice-Marshal Neil on identifying the forward edge of battle and friendly troops from unfriendly is also critical. Some of the highest casualties suffered in the Gulf were as a consequence of friendly fire. To pick up on one of the final points on close air support, I should like to quote what General Glosson, who ran the air war, said to me some weeks ago. His instructions to all the pilots was that there was no reason at all for anyone to risk their lives flying below 5000 feet, and yet when the land battle started he told them that there were several hundred thousand reasons why they should lose their lives; and of course they lost eight aircraft in the 100 hours of that ground war. I've got no reason to believe that the Air Commander of Australia would take a different view.

Brigadier McGuinness: All I would like to say in response to that sir, is that I think that there has been a very slow, painful but inevitable move towards joint command and control of ADF operations. In my view our three so- called joint commanders are not really joint commanders, they are environmental commanders. I think that the inevitable trend will be, must be, towards greater unity and greater jointness in our approach to defence of Australia problems at all levels.

Air Marshal Funnell: Ladies and gentlemen, before I wrap up this session and ask you to thank Brigadier McGuinness, one issue I would like to raise coming out of both presentations this morning is that of doctrinal development in the Royal Australian Air Force; and in particular the revisions of our air power manual.

As those who were here on Monday will recall, I pointed out that in establishing the Air Power Studies Centre and setting up a process of doctrinal development, I insisted that in our manual we lay down for everyone to see what the doctrine review process will be. In the manual's final chapter it sets that out. A doctrine board has been established, and included in the representation on that board is the Assistant Chief of the Defence Force for Operations, the Deputy Chief of the General Staff, the Deputy Chief of Naval Staff, the Director General of Military Concepts in Headquarters ADF, and the Commandant of the ADF Warfare Centre. And there is a doctrine working party working to the doctrine board, with similar representation at half-colonel level. That's the way in which we are going to refine and improve the doctrine which governs the operations and activities of the Royal Australian Air Force. Moreover, if there is

anyone in the audience who would like in any way to contribute to our doctrine development, by all means communicate that to the Director of the Air Power Studies Centre at RAAF Base Fairbairn.

THE USE OF THE MILITARY IN TIMES OF DEEP PEACE

PANEL THREE

Dr Ross Babbage, Air Marshal S.D. Evans, Air Vice-Marshal R.A. Mason

Dr Ross Babbage

The title of this session raises some intriguing questions. Let me attempt to address just two. First, are we facing a period of 'deep peace' in the mid and late 1990s and beyond? Or are we really facing something quite different? Second, what are the main factors that are changing the usability of military force as we look to the future?

Deep Peace or Something Else?

Are we facing a period of deep peace or not? I believe that in hindsight the late 1980s will be seen as a unique period in the post-war era. This is primarily because the dramatic changes in the Soviet Union and Eastern Europe brought about a happy congruence of interests between the superpowers.

We saw President Gorbachev introduce and press ahead with his radical policies of glasnost and perestroika. Open debate became the norm in the Soviet parliament and even on the streets of Moscow. Simultaneously we saw a methodical dismantling of the Cold War with a dramatic improvement in the East-West Dialogue, Soviet force withdrawals from Afghanistan and Eastern Europe, heavy cuts in Soviet conventional forces, a dissolution of the Warsaw Pact and COMECON and rapid progress in most arms control forums. In Eastern Europe most communist regimes fell in rapid succession and Germany was reunited.

The rapidity of change brought many commentators to make euphoric predictions that a radically changed new world order was at hand, that military forces were now obsolete and that a substantial peace dividend could be earned by re-allocating resources hitherto devoted to defence. All this gave rise to the notion of 'deep peace'.

Let me suggest that such thinking is wide of the mark. I believe that while we do face a world order that will differ significantly from that of the past, there remain a least four major categories of tension and conflict in which military force may be applied in the future.

Superpower Tensions

First, I suggest that the era of superpower tension and possibly hostility is not yet over. The main reason is that as the Soviets wrestle with their deep-seated economic problems, the challenge of regional nationalism and the loss of many of the trappings of empire, many powerful, reactionary and mostly right-wing forces within the Soviet Union will see benefit in blaming the West for their troubles. In particular, they may use the spectre of Western interference and subversion as a justification for a forceful restoration of order, national unity and the unchallenged power of the Communist Party.

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How successful such strategies will be remains to be seen, but the internal problems of the Soviet Union are unlikely to be resolved quickly and great unpredictability and uncertainty characterise the future. On balance, it seems premature to assume that superpower tensions are a relic of the past.

Growth of Major Regional Powers

A second and growing source of global tension and conflict is the rise of a large number of major regional powers, some of whom have close neighbours as rivals. Examples include China, Japan, Taiwan, North and South Korea, Indonesia, India, Pakistan, Iran, Iraq, Saudi Arabia, Israel, Egypt, South Africa, Brazil and Argentina.

Many of these regional powers have experienced moderate to rapid economic growth through the 1970s and 1980s. Most have significant industrial infrastructures and carry substantial political clout in their local regions. During the last 30 years many of these countries have shifted their primary security concerns from the maintenance of internal security and national unity to the protection and, in some cases, the extension of external interests. Formidable conventional military capabilities have been developed and some of these countries have already acquired medium range ballistic missiles, medium range combat aircraft and nuclear and/or chemical weapons. Others are striving to acquire these capabilities.

The rise of this wide range of comparatively strong and well armed major regional powers does change significantly the shape of the world order. Some of these countries can be expected periodically to flex their muscles in their local regions and possibly further afield. Occasionally we may have a 'rogue' state prepared to challenge the global order outright by seizing a neighbour's territory or otherwise

interfering with their security. This type of behaviour will pose serious dilemmas for the international system at a time when the capacity of the superpowers to act as world policemen is declining.

The United States and its allies will, for their part, certainly continue to have the military wherewithal to put one of these rising middle powers back in its place if necessary. But it would be erroneous to conclude from the Persian Gulf War that the Western allies are likely to undertake such operations with any frequency in the future. In most circumstances the costs and risks of doing so will normally be very high and the Western allies and most other powers will be disinclined to interfere.

This suggests that we may be facing a more dangerous and difficult period in international relations where some long-standing constraints on the use of force by medium powers may be somewhat relaxed.

Internal Conflict

A third category of future tension and conflict is that within states arising from serious social, religious, political and economic pressures. Struggles for local autonomy or independence, to maintain national unity, to gain major political concessions or simply to suppress widespread lawlessness will be a continuing feature of the international environment. In my view we are likely to see a fair share of these serious domestic disturbances in the South Pacific in the mid-late 1990s.

Terrorism

The fourth and final category of continuing violence I wish to highlight is international terrorism.

The incidence of serious terrorist incidents declined in the 1970s and remained fairly steady through the 1980s. There has, however, been some growth in the number of groups engaging in acts of international terrorism and also in the range of causes terrorist groups are espousing. Separatist movements in the Soviet Union, the Balkans and Kurdestan are comparative newcomers, as are environmental extremists and narcotics traffickers counter-attacking law enforcement agencies.[1]

It is not clear whether the mid-late 1990s will see large numbers of terrorist incidents but we are likely to see some changes of tactics by terrorist groups, their use of more advanced technologies and possibly some limited use of chemical and other area weapons.

In summary, I suggest that we are not facing an era of deep peace. If anything, the mid-late 1990s and the first decade of the 21st century is likely to be a more anarchic and unpredictable period in which military force will probably be used at least as frequently as any period during the past 40 years.

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1 These and related trends were discussed by Brian Jenkins and Paul Wilkinson at a seminar on International Terrorism at the Australian National University, Canberra, November 1990.

Usability of the Military

This brings me to my second major question. What factors are changing the usability of the military?

Many important factors needing to be taken into account when considering whether to employ military forces seem not to be changing greatly. The need for adequate military resources to undertake the task, the need for quality units, the desirability of technological superiority in critical areas, the need to have adequate means of sustaining operations, etc.

But what is *changing* the usability of the military?

I suggest that the single most powerful factor for change in the usability of the military is the increasing influence of civilian populations. Civilians increasingly demand and, at least in Western countries, normally receive much more detailed and current information on military operations. The electronic media have really brought the battlefield into the lounge room and the resulting views of the population mass carry great political weight in most societies. Even more than before, the use or non-use of military force and the manner of its employment is now an intensely political issue on which the public not only expects its views to be heard but to be implemented.

I should emphasise here that the impact of civilian views on the use of military force varies greatly between societies. Advanced democracies with comparatively open forms of government, high levels of education, very competitive and intrusive mass media organisations and well-entrenched legal rights to government information, maximise the influence of public opinion on military use. On the other hand, in societies ruled by dictatorships, with limited levels of public education, tightly controlled mass media and few entrenched legal rights, the influence of public opinion is obviously greatly reduced.

The bottom line for democracies is that public opinion is playing an increasingly strong influence, and normally a constraining influence, on the use of military force.

Can we then say something about the conditions that need to be met before military force should be applied? In my view, the former United States Defence Secretary, CasparWeinberger, was very close to the mark with the six criteria he proposed in November 1984.[2]

Weinberger suggested that:

> military action should not be used unless deemed 'vital to our national interest';
>
> if use of combat forces is considered necessary, the nation should do so 'whole heartedly and with a clear intention of winning';
>
> the decision to commit forces should have clearly defined political and military objectives;
>
> those objectives and the 'size, composition and disposition of combat forces must be continually re-assessed and adjusted, if necessary';

2 For details of Weinberger's speech, see *US News and World Report*, 10 December 1984, p 8, and 24 December 1984, p 21; and *Nation*, 15 December 1984, p 635.

before committing forces to combat, the government should have reasonable assurance of popular support and the support of their elected representatives; and

the commitment of forces to combat should be a 'last resort' used only 'when other means have failed'.

Composed with the lessons of Vietnam still at the forefront of people's minds, some of these criteria might be considered an over-reaction. In particular, it is not difficult to make cases for the use of military action in situations that are short of being vital to the national interest - such as small scale regional commitments to protect the evacuation of civilians from hostile environments. Nevertheless, the caution, clarity and rigour that these criteria impose generate a useful discipline for decision makers in crises.

A strong case can be made for adding to Weinberger's list a further three criteria:

Except when the survival of the nation is at stake, forces should not be committed to combat unless there is a reasonable expectation of a speedy outcome. This is designed to limit the exposure of open democracies that have generally proved incapable of sustaining military operations designed to achieve limited military objectives for extended periods.

Second, before forces are committed to combat there needs to be a reasonable expectation that numbers of casualties can be limited. The political trauma of heavy losses can be severe, especially if the operational objective is not absolutely critical to national survival.

Third, before committing forces to combat, well practiced procedures need to be in place to manage the activities of media organisations in the operational theatre.

This argument can be summarised briefly by saying that for advanced democracies the sustained support of the people for military action is probably of greater importance than before, but it is also probably becoming more difficult to win and maintain. As we face an international environment that may be more anarchic, unpredictable and difficult, the disincentives for direct involvement are likely to be strong. This is a serious complicating factor for military strategists and planners.

Implications for Air Power

Finally, let me now focus on what this might mean for air power. In the past there have been strong constraints on the use of offensive air power, even in medium and higher level conflicts, because it has been seen to require the commitment of major assets, the delivery of heavy but not always accurate ordnance and to signal a substantial escalation of hostilities. But the thrust of this discussion suggests that in the period ahead air power may have a substantial compensating advantage; its limited media and political visibility when used against remote and off- shore maritime targets.

Ground operations, especially on or close to home territory, involve vast numbers of people, potentially large loss of life and are highly visible to the media and hence the public at large. Naval operations also involve the commitment of large numbers of people into hazardous environments, although they can be arranged so as to have limited public exposure.

Air operations, by contrast, involve the commitment to combat of very small numbers of people on operations that will frequently be unobserved by the mass media and hence be unreported or under-reported to the domestic and international public. In

fact, Israeli and other experience suggests that the increasing political sensitivity of conflict and the increased accuracy of air delivered ordnance makes air power a more, rather than a less, usable instrument of military force.

If more substantial analysis validates this judgment, there may be scope for considering seriously the earlier use of a much wider range of air options in low and medium levels of conflict than would hitherto have been considered by many to be appropriate in the past.

Air Marshal S.D. Evans

The use of the military in times of deep peace! *Prima facie* the question seems to require only a simplistic dissertation on how to keep the Defence Force motivated in peace-time. But firstly it is essential to define what is meant by the term 'deep peace'. One might say for instance that Europe, having avoided international conflict for some 46 years, has been in a state of deep peace, yet one could hardly describe the situation that has existed during that time, with massive combatant forces on constant alert, as deep peace.

Is the explanation to be found in analytical forecasts by governments, defence departments or the military? Is a prediction of eight or 10 years warning time before substantial assault deep peace? Or, is the definition to be found in the level of threat perceived? Whilst peace may obtain in Israel and in Australia, the level of threat is vastly different. Does this determine the depth of the peace equation? Whatever the determinant, it cannot guarantee certainty. History shows, even modern history, that threat predictability is far from being an exact science. In other words the 'depth' of peace can only be gaged in hindsight. To attempt to do otherwise is to ignore the lessons of history.

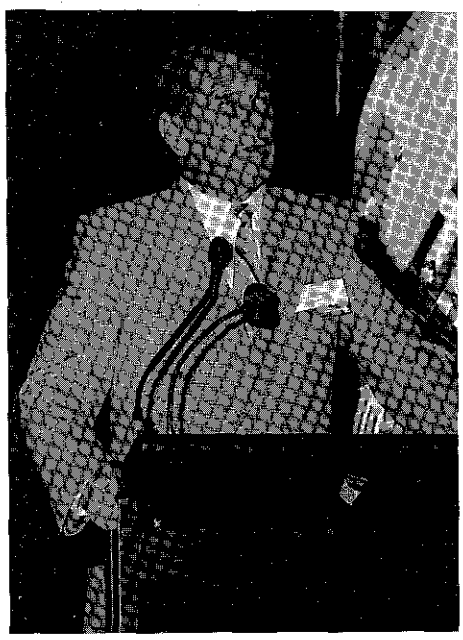
If this argument is accepted then it follows that there is an essential need to keep the military forces of a nation reasonably close to combat ready skills. This is important for national security and also because the professionalism and level of skill demanded will impact on the morale of the force and will be a factor in the standard of individual the Defence Force will attract and retain.

With this position established the problem to be addressed is that of managing the Defence Force in peace-time. It is pointless to attempt to define the depth of peace; the width of margin should be between immediately ready and near readiness.

Perhaps one of the major difficulties is that in peace- time the interests of the nation lie elsewhere; in trade, economic development, in education, health, the standard of living and in matters affecting the individual. Virtually ignored by the media, the Defence Force becomes almost an extraneous attachment to day to day activity of the nation. It is brought to attention only when the media senses sensation - the crash of an aircraft, the collision of ships, a court martial or some other event viewed as 'newsworthy'. The services become something of a backwater.

This has the effect of making members of the Defence Force feel - if not unwanted - somewhat as fringe dwellers of Australian society. It has an effect on morale which is countered by withdrawal into a discrete defence community - further separating the services from the community at large. Defence becomes something of a non-issue.

The flow-on effect is that politicians are quick to perceive the irrelevance of defence as a political issue. As a result the allocation of budget resources is likely to be cut to the extent that the Defence Force is, at best, marginally viable. As equipment becomes obsolescent it is not replaced; funds for maintenance of both equipment and facilities are reduced so that the forces take on an appearance of shabbiness and



Air Marshal S.D. Evans, AC, DSO, AFC
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deterioration; funds for overseas travel and realistic military exercising are cut and professional knowledge and military skills are degraded. All this causes further erosion of morale within the services and the wastage rate increases significantly thus exacerbating the problem. It is not an unfamiliar pattern and presently seems to be in full swing in Australia. However, the reason is probably to be found in the calamitous state of the nation's economy rather than a perception of deep peace in this unstable world.

The first step in meeting the problem is to increase public awareness of the Defence Force and to generate throughout the community a full appreciation of the skills to be found within the forces. This should of course include a full recognition of their essential role in defending the country and its people should a threat arise.

In the absence of an identifiable threat this can only be done by involving the Defence Force in activities that constitute the day to day management and development of the nation. Activities that, in themselves, draw the attention of the media and the public. Activities that contribute to the well being of the nation.

Obvious areas are coastal surveillance and search and rescue. These activities should be carried out on behalf of the agencies concerned - customs, health authorities, primary industries for fishing surveillance, the Civil Aviation Authority, federal law enforcement authorities and so on.

Opponents of the Defence Force carrying out such tasks will raise a host of objections. Military personnel have no law enforcement authority; service people would be taking jobs from others and create problems with the Trade Union movement; it would detract from military training and military skills and so on. However, these, like

all problems, are matters to be overcome - not to be ruled by. Indeed, many of the tasks that the Defence Force could undertake have a defence connotation. In considering gainful employment of the Defence Force in peace-time it is important to examine areas that use and would maintain skills relevant to the war role of the element concerned and also which could be seen to have a clear defence purpose. One may, for instance, note the severe lack of surface communications that inhibits development of the far north and indeed inhibits a proper defence of the area. There is no all weather road servicing Cape York Peninsula - the present road, if it can properly be described as such, is open for only six or at best seven months of the year; there is no port on the east coast above Cooktown. It seems unlikely that federal or state funds would be allocated to such projects within a decade or even two decades - perhaps more. Would not the construction of an all weather ADF: road be an appropriate defence project to be undertaken by the civil engineer element of the Army? It would seem to be a more useful pursuit than assembling and disassembling Bailey bridges; it would contribute to the development of the country and certainly provide a significant improvement in the defence infrastructure.

The suggestions set out above are no more than examples of the important and essential tasks that the Defence Force could undertake in peace-time. Tasks that would bring it to the attention of the public and which would generate an appreciation of its skills and its contribution to Australian society. Tasks that would provide satisfaction to service personnel and give them a sense of involvement with the community at large.

Notwithstanding such activities, there would not be enough appropriate tasks to provide employment for the whole of the Defence Force. Those not involved might feel even more irrelevant, particularly if there was a lack of resources for realistic training and exercising. As stated above, one of the effects of a low threat situation is the reluctance of governments to invest in the proper level of operational training. There would still be a large proportion of the Defence Force underemployed and slipping further and further from a professional standard.

The answer would seem to lie in a major restructuring of the Defence Force; a much reduced Regular Force and a greatly enhanced Reserve Force.

In regard to the residual Regular Force, the civil type activities described earlier, together with the high level of training activity that would be financially feasible for a smaller force, should maintain a standard of military skills near to, or at combat ready status. There should be a high level of job satisfaction and a relatively low wastage rate. Whilst there would be an element of the Regular Force concerned with the training of reservists, this activity should be largely the responsibility of the Reserve Force itself. It would be important that the reservists be given a full role in all aspects of the defence of Australia. Relegation to secondary tasks such as guarding vital points would spell disaster, as the connotation of second class soldier would become apparent.

In considering a major expansion of the Reserve Force and a drastically changed ratio of regular to reserve, it should not be assumed that the same factors would apply to each of the services. Clearly those areas requiring less time to develop the required level of combat skills lend themselves to reserve elements. On the other hand personnel trained to the highest skill levels who leave the Regular Force before their retirement age should be required, as a condition of enlistment, to serve a certain period in the Reserve Force.

The very significant restructuring proposed as being appropriate to a peace-time Defence Force would not be achievable in the short term. To reach maturity could take 10 to 15 years, perhaps longer. It would involve, as well as major changes in the structure of the Defence Force, significant changes in the attitude of the Australian

community; a recognition that the defence of Australia is a responsibility that all Australians should share. The fact that it would be a long term process is no reason for rejecting the concept if a major restructuring would be in the best interests of Australian defence.

Projects that are germane to such a restructuring should be implemented at the earliest possible time - re-introduction of the school cadet scheme, upgrading the training of reservists, recasting legislation to better facilitate the call-up of reserves, phased reductions of the Regular Force, and so on.

A combination of the measures outlined - involvement in appropriate civilian tasks, a major restructuring of the regular/reserve ratio - would seem an effective and economic way of providing a well trained, well motivated and well accepted Defence Force in peace-time, whether that peace be deep or shallow.

Air Vice-Marshal R.A. Mason

I appreciate this opportunity again to address the group, but I must admit that I had looked forward to putting questions to Dr Dibb rather than standing in for him. On the other hand, it occurs to me that I have been given the unique privilege of batting number three after two Australians openers. Let's hope I do a bit better than did the cricketers who batted after the English openers in the recent Test series between our countries although, as I said yesterday, the important contest is not cricket but rugby. But that's in the future.

If the concept of 'deep peace' means anything, it seems to be a perception held by some that the military threat to national security, or the need to resort to military force to protect or further essential national interests, is remote. Now I share without any collusion at all many of the opinions and points which have been made by the openers. You will see that my first set of comments refer very much to what Ross Babbage has said, and my second set about the use of the armed forces themselves resemble in many ways those of Air Marshal Evans.

First of all the concept. I think it is vulnerable, debilitating and short sighted. Apart from that it's got a lot going for it. As Dr Babbage has convincingly argued, the notion of deep peace is vulnerable to unforeseen external events. It is also vulnerable to revised interpretations of national interests by one's own government, a factor which sometimes we do not take in to account. I am aware of the old adage about interests remaining permanent and governments changing, but I suggest that, especially in a relatively young and expanding country, interests can change, and so I think the concept is vulnerable to the unpredictable.

Second, the concept is debilitating. As we have already heard, it inevitably removes or reduces the rationale and the motivation for investment and procurement in defence. Those of you who have completed any study of European military history will know that the Royal Air Force in particular was weakened by the so-called '10 year rule' of the early 1920s, which assumed that there would not be any war for 10 years and therefore preparation could be continuously postponed. That attitude was bad enough when it took less than a year to build an aircraft. Today, 10 years will not cover the identification, design, development, construction and procurement times associated with a modern combat weapon system. In that context it is obvious that a 10 year rule - or the idea of 'deep peace' - could be disastrous.

Further, the notion makes effective military training and evaluation much more difficult because, quite clearly, without a defined threat you do not have a defined yard stick: for example, as we have heard this morning, should we prepare to repel a number of rowing boats coming across the water or is there something more insidious at a longer distance?

It is also short sighted, because the rest of the world - or even the region - is unlikely to enjoy deep peace. Instability in one region can affect interests in another, setting in train complex events from which it is not possible to remain isolated, despite the loftiest of intentions. It is a fact of life that instability is contagious.

Finally, military pressure as a diplomatic instrument is no longer restricted to sabre rattling or gun boat diplomacy, a point which is especially relevant given the theme of this conference. Because of air power, the world is shrinking rapidly. As Professor Blainey argued in his superb presentation last night, the diplomatic role air power can play in the Southern Hemisphere, affected as it is by the 'tyranny of distance', could be especially important.

Turning to my second major theme, what are the activities which armed forces should be undertaking in this so-called period of deep peace? I would suggest there are three: they should be preparing for war; providing indirect support to national interests; and, as proposed by Air Marshal Evans, contributing to the civilian community.

One of the major problems in preparing for war during a time of so-called 'deep peace' is that of sustaining readiness. There are real difficulties here, not just economic, but also in terms of maintaining motivation. Over an extended period you just cannot sustain a high level of readiness. But that is no excuse for abandoning professionalism within the armed forces. There are ways of getting around the problem. For example, rotation of readiness categories can be used. I think to place units permanently into a readiness category such as A, B or C is debilitating for the morale of units B and C, but if units are rotated through categories over a period then the maintenance of readiness becomes a less formidable problem. A second method of sustaining readiness is to conduct imaginative and realistic exercises, complemented by rigorous operational evaluation. Even if you do not know which air force you are likely to be flying against, there is sufficient intelligence available now to indicate how an opposing air force of any kind is likely to operate. There are costs involved in this approach, but I would suggest that with substitution and imagination they need not be that great.

One of the most important points regarding the maintenance of force effectiveness to have emerged in the last couple of days is that Australia is not unique in having to deal with the problems of threat identification, economic pressure and political uncertainty. Those issues are now common among many, many countries which share the values and aspirations of Australia. Could we therefore not again look at the comparative costs of overseas exercises which, if done on a shared basis rather more than at present, may not in fact cost all that much, particularly if they are associated with a rotating level of readiness? I think those are the kinds of things we have got to look at.

We must also continue looking at ways to provide indirect support to national interests. With just a little bit of luck we may see a changed attitude in the United Nations, accompanied by wider collaboration in peace-keeping and perhaps peace enforcing. Now if that happens - and I do not wish to add fuel to the air force versus navy discussion which took place earlier this morning - we do have to distinguish between getting into the game or merely sitting in the stand. With the best will in the world, contributing three ships to picket duties in the Gulf is not the same as having, say, one squadron of F/A-18s actually fighting in the air war, or one battalion of troops in the land war. The fact is that unless you are in the game you are not going to have much

influence on the way the future rules are drawn up, or share fully in the benefits at the end of the match. By joining combat and risking life, individual nations are more likely to influence post-conflict settlements, accrue some international credit and, therefore, ultimately derive benefit for their national interests.

The third and final set of thoughts I wish to raise are associated with the contribution the military can make to the civilian community. Military forces can make a major contribution to, for example, disaster relief. We should not wait until there is a national disaster of some sort, we should clearly demonstrate that we are of value to Australia in peace-time. Nobody else is going to make a case for us, and nobody owes us a living, so we must take the initiative. The same approach should apply to activities like search and rescue, maritime surveillance, fisheries surveillance, and helping develop the national infrastructure. We need to send people back out into industry, administration, the broader civilian work place, to demonstrate that officers in the armed services can think, can integrate into the community, and can individually contribute very valuable skills.

There is the need for constant reminders that a national defence force is not a luxury, it is an insurance policy and, like all insurance policies, instalments can sometimes be difficult, particularly when there are conflicting and competing reasons for expenditure. But the defence commitment has to be met, and the longer the period of peace the greater will be the effort needed. There are opportunities in education and training for the careful cultivation of support associations which extend beyond the reserves. I think we should be sustaining a very low key program of national education about our value and capabilities.

Finally, I would stress that education and awareness programs cannot be left to the air power research centres and the senior commanders on their own. In a period of 'deep peace' it is up to every single wearer of white, khaki and light blue uniform to understand the issues and be ready at any time to explain them to a variety of audiences, including trade unions and pacifists. The question is a serious one, but I think there are ways of tackling it. With a little bit of imagination the importance of maintaining an effective, useful defence force can be demonstrated and realised.

DISCUSSION

Air Commodore N. Ashworth (RAAF, Retired): A brief comment for Dr Babbage. You made a point about the increasing importance for military operations of the political influence of public opinion, and the need for military planners to take account much more of the political realities of life, particularly in a liberal democracy. I would like to suggest that perhaps that's not a new phenomenon. Yesterday General Boyd commented on the early air power pioneers back in the 1920s, and the failure of their predictions of what air power could do. The observation was made that perhaps their problem was a failure to appreciate the technical limitations of air power. I suggest also that perhaps they misread the political implications of air power.

If you think back to those times, it was immediately after the First World War when nations had sent tens of thousands of men to the front lines without any obvious concern about casualties. I think that war changed people's thinking, with the result that they were far less willing to accept casualties. I further think that the inability of air power to do what its prophets claimed was perhaps related to an unwillingness to accept the ultimate consequence of using air power without any restraints. That leads me to the point that those who practise, preach and wish to understand air power also have to understand its political limitations.

Dr Babbage: Of course, it's true that political constraints are not new. What I was suggesting was that there have been some significant changes, first in the way media organisations operate; and second, in the political environment, especially in democracies. I would suggest that over the last 20 years media organisations have become much more capable in terms of real-time reporting. That was apparent in the Gulf, where we could actually see incoming Scud missiles being intercepted by Patriots, and you had people right across the United States and even in this country watching some of that take place in real-time. I would suggest that is a different sort of intrusiveness and a different sort of political effect to the sort of thing that we had in the Second World War, Korea and, even to some extent, Vietnam. The fact that you can set up your portable satellite dish - as we saw Mr Arnett do - and beam straight back from Baghdad to the United States is, I think, an extraordinary use of technology. The political effect of that is really quite dramatic. The other side of the equation is that the capacity and effectiveness of air power, especially with precision guided munitions, has also changed the nature of the game, as has the range and speed of aircraft. So to summarise the argument, I'd suggest that when we look at the utility of armed forces in the future, the game is changing, ground rules are changing. There are some types of military power which are much more vulnerable to political constraint than others, and that equation is changing.

Mr R. Howe (Industry): I've been a little disappointed over the last few days with the discussion on various trade- offs and how to assist smaller air forces. When you spoke on the first day, Air Marshal [Evans], you talked about a broader definition of air power which included all the aviation assets in the country. I don't know whether that was a trial balloon, but I would interpret that definition as including industry - especially Australian industry. Yet over the last few days Australian industry hasn't been mentioned.

I would suggest that the term 'military industrial complex' might have different perceptions overseas, and that Australia, with its very limited resources, has a desperate need for that sort of thing. I also suggest that industry can be involved in the development of doctrine. There are a lot of people in the industry who understand what the Defence Department and the defence business is all about; and there are a lot of people with systems engineering capabilities who could meet all the needs mentioned yesterday by Air Vice-Marshal Gration. I believe that, in that context, Australian industry should be given an opportunity to assist.

Air Marshal Evans: Australian industry really does get a great deal of work from the defence force as you know, and it's increasing all the time. CAS has said that he doesn't want to discuss force structure changes, but from what's been said by the Minister for Defence so far, it's quite clear that some of Wrigley's suggestions in regard to work for industry are being implemented.[1] I think that if you wait a month or so [following the release of the findings of a force structure review of the ADF],[2] you will have a full answer.

I would say that Australian industry hasn't really been aggressive in seeking business - it often has to be taken to them with a guarantee of no risk and no money put in. I'm referring generally to smaller companies rather than established companies. The larger companies have been more aggressive in seeking business overseas rather than relying on decreasing business from the Australian Defence Force. However, as I said, I expect the Force Structure Review to announce what work will be put out to industry. I hope industry is more responsive than it has been in the past.

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1 The reference is the report by A.K. Wrigley, *The Defence Force and the Community*, Canberra, 1990.

2 See Department of Defence, *Force Structure Review*, Report to the Minister for Defence, Canberra, May 1991.

Major General M. Jeffery (ARA): I would like to make a couple of comments on Air Marshal Evans' paper. Firstly, I agree whole-heartedly with your thoughts vis-a-vis the employment of the Defence Force on surveillance tasks. I think, for example, we could help the community a lot more in drug surveillance and that kind of activity. It would be great to build the roads in the country if we had some engineers, but we're running out of them one way or another. But you were talking way off net when you spoke about a 'rag tag' army as exists today. I think we have today probably the most professional army I have seen in my time. The fact that we're short of a little bit of money has not degraded the professionalism of the individuals in that army.

Taking your point on the reserves, it seems to me that you are proposing to cut out four regular battalions, which are not quite up to strength, to meet this proposed vast expansion to a reserve force of 40- to 50,000 people. Financially that simply won't work. I don't think the army would have any objection at all to a reserve force of 100- 200- 300,000, if we could pay for it. But that's the problem. It seems to me that what you're proposing will not be feasible unless we address the fundamental question of where the money comes from. I think that to a degree that is where Mr Wrigley gets off net in proposing the greater use of reserve forces. It costs virtually the same to reach a particular level of capability, whether it's the ODF Battalion or a reserve organisation. If you want a force at a particular level of readiness on 28 days notice, it costs about the same in time, effort, equipment, munitions and so on.

When you raise the use of reserves, you've also got to look at warning time. I think you said that we can't go through this 10 year syndrome. Current strategy says that the problems we are likely to face are going to occur at very short notice. To deal with short notice problems you've got to have regular forces, in the main. If you've got long warning times then you can have reserve forces. The question is to get the right balance between the two. I think also that you've got to look at the current situation in the Gulf where I believe the Americans considered using combat forces from the reserve but eventually didn't do so. They found that the reserves forces simply couldn't be made ready and were not combat capable; so they were used in the logistic support role. So, I think there are a number of reasons why we can't expand our capabilities through the reserves without a substantial increase in funding. You've also got to remember that the officers and NCOs who train this reserve force are going to come from the regulars, and if you reduce the regulars down to two - or even less - battalions, we will have very little capacity to train those reserves.

Air Marshal Funnell: I'd like to steer the discussion in a somewhat different direction now. You might recall Ross Babbage referred to six points set down by the then Secretary of Defence, Caspar Weinberger, in November 1984. Ross added three points. Secretary Weinberger listed the criteria which he believed should be met before the US committed its forces to conflict. I might be wrong, but as I recall it, Weinberger's six points were never picked up by the Reagan Administration across the board: I believe Secretary for State George Schultz was not in favour of them. Nevertheless, I think they provide a very sound basis for a liberal democracy to consider before sending any of its citizens into harm's way. As I recall, the very first point that Weinberger made was that US forces should only be committed to a conflict when the issue was vital to national interests. I wonder how we establish the criteria for 'vital'. The dictionary definition would suggest that unless the very survival of the nation was under threat then you wouldn't say that an issue was vital to national interests. I would like to ask Ross to comment on that point, and why the criteria weren't picked up by the Reagan Government.

Dr Babbage: I think there needs to be a distinction between commitment to combat and other military operations, including other foreign deployments of military forces. I can imagine circumstances, particularly in our own environment, where it may make a lot of sense for the ADF to conduct external operations: for instance, the evacuation of Australian nationals from a hostile environment, or peace-keeping. Clearly, it's unlikely

Australia's vital national interests would be at stake in either case. I think when Caspar Weinberger spelt out his criteria, he made it pretty clear that he was really talking about the sorts of operations and dilemmas that the US administration faced in the 1960s in Vietnam, and then in the 1980s in Grenada. I think he was particularly concerned about the dangers of committing forces to combat where there was no clear, short-term resolution in sight; where the objectives were not necessarily very well defined; where the overall operation was pretty open ended; and where there was not necessarily very clear support either from the public or their elected representatives.

I think that perhaps the key lesson for us in this might be that when we look at limited military operations for limited political objectives, we have to be extremely careful. The central point, which I alluded to in my presentation, is that it is very difficult for advanced democracies to sustain military operations for limited military objectives for extended periods. Taking Israel as an example, that is a country with a strong sense of national threat and a strong commitment to national security. In 1982 when they saw the threat from the Golan Heights and to the northern settlements, and they were being shelled and harassed across the northern border, they decided to move in force into Lebanon. Here was a limited military operation which at the time appeared to be very strongly motivated. But primarily because of political reasons they were not able to sustain the operation, and after 18 months or thereabouts they were forced to withdraw. Now, they did achieve many of their objectives, but the point I'm simply making is that we have to be very careful about the criteria we use for the application of military force. In fact I would go further and I would say that the criteria Weinberger spelled out for a superpower need to be viewed very carefully indeed by a middle power such as Australia, especially given the changing international environment we are going to face in the next decade or two.

Dr B. Lambeth (RAND Corporation): I would like to suggest as a precautionary note that Weinberger's six criteria can be a two-edged sword. I think one can fairly argue that they were all well observed as reflected in the way President Bush designed and applied US national policy in the Gulf crisis - by building consensus, by committing to use *force majeur,* by having very clearly defined objectives. But as Ross said, it's important to understand that the political context in which the Weinberger criteria were developed very much related to the Vietnam experience.

The second edge of the sword consists in the fact that by a strict instruction and interpretation of those rules, one could find a guaranteed recipe for non-involvement in some circumstances. In fact it has been argued that if the six criteria had been strictly applied in the early 1940s, the United States would never have entered World War II.

Dr S. Woodman (SDSC, ANU): I was in Strategic Policy [in the Department of Defence] for a while, so I was tied into the concept of credible contingencies and low level threats and the like. It struck me that there was a lot of mirth about those concepts. I think there is a lot of misunderstanding about them. What concerns me most of all though, is that I'm not quite sure from this conference what people are substituting for those concepts as a purpose for the air force and for the use of air power.

We've just talked about some of the constraints on using military force. Weinberger did it in relation to American force overseas; Senator Evans has come up with some conditions on the use of military force within our own region if we are required to go outside Australia.[3] The fact is that the Air Force, like any other service, is going to be required to operate under different sets of conditions. It's going to be required to

3 See *Australia's Regional Security*, Ministerial Statement by Senator Gareth Evans, Canberra, 1989.

operate under different political constraints, and in certain circumstances it's going to have to cope with different economical and social pressures. Now my concern is that if we laugh at the idea of credible contingencies, that's fine: you can put aside the idea of low level conflict, escalated conflict, that doesn't matter; the thing is, laughter is not a substitute. You've got to make sure that you don't substitute that for not thinking.

There are difficulties in always planning for the worst case. You may sometimes have to apply military force, air power, under certain constraints. And frankly, that's much more difficult than planning for the worst case because you can't always have a free go, you can't always do what you want to do. So even if you don't fully accept the idea of credible contingencies - and after all it was only a planning tool, it doesn't relate to a particular country - I think you must be able to plan flexibly enough to handle a range of different situations. And if for some reason - either lack of capability or government decision - you can't do a certain thing then you've got to have the flexibility. I think that's going to be one of the real challenges for the Air Force in the application of combat power, be it overseas or in Australia: that you've got to be able to do different things and be flexible enough to handle them depending on what your political masters think and what resources you've got. I think we've got to be careful we don't assume that worst case situations have got all the answers.

Air Marshal Evans: I think all military people know that there will always be political constraints on what we can do; and we do what the government tells us to do, that's never been in doubt. I think, however, that the low level, the 'more credible' scenarios or contingencies, have been developed to limit the type of equipment we should buy, the type of weapons we should have. It's the cheapest way to do it. If for instance we just armed the Australian Defence Force to meet low level contingencies we would have no hope in the world if we were wrong and a high level contingency came along. If we aimed for high level contingencies even though they are less credible or assessed as being so - although I think Brigadier General Soedibyo set us pretty straight on that this morning - then we have the flexibility to do whatever is required at the time. As it is, the flexibility of the defence force is being constrained by limiting our thinking and our equipment to low level contingencies. To give you an example, [Paul] Dibb says these are the things that are likely to happen, yes, keep your F-111s but don't buy PGMs for them because really it doesn't fit in with the more credible contingencies. That's the sort of thing I protest against.

Air Vice-Marshal Mason: Listening to the discussion, there seems to me to be a lack of political guidance in the country, which is a pretty sweeping statement for a visitor. I've listened to the problems of threat definition, but it seems to me that any military threat arises from political circumstances and I haven't heard a great deal of definition of political circumstances. It comes back to the question of the role Australia is looking to fulfil. Is it seeking to defend itself alone under all circumstances or is it seeking to work in cooperation with others? Is it seeking to contribute to a United Nations new world order or isn't it?

I think whichever way one goes, one comes back to two ideas. The first is the flexibility of air power, and I would endorse Air Marshal Evans' comment that if you can cope with a higher technology threat, certainly in the air you can cope with a lower one, but you can't go the other way around. Secondly, if you wish to work as part of a larger military grouping then the nature of your own force doesn't become the sole criterion of its structure - you look at the nature of that force in the context of a group of forces; and again, the Gulf was mentioned. The fact that the British contribution was relatively small, that the contribution of other countries was smaller, was insignificant because the whole was welded into a composite fighting force. So I think simply trying to identify whether a 'threat' is 'large' or 'small' or 'credible' begs two questions. One is a lack of political definition and guidance, and the other is the possibility of working in some kind of cooperative organisation.

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The easing of superpower tensions has not brought the degree of stability to world affairs initially expected by some commentators. With the balance of global power likely to shift from a bipolar to a multipolar basis, many nations are re-examining their security outlook. For most, strategic preferences will be constrained by economic realities.

Against that background, the decision by the Royal Australian Air Force to hold a major international conference on air power as the centre-piece of its 70th anniversary celebrations in March 1991 was particularly timely.

One major theme to emerge from this volume of the conference proceedings is that in the next two to three decades, security planners are likely to react to the circumstances outlined above by structuring defence forces that do more for less; that are 'Smaller but Larger'.

Air forces, with their unique versatility, mobility and ability to concentrate force rapidly and decisively - qualities which were graphically evident in the Gulf War, and which represent security 'cost-effectiveness' - will play the central role in that process.

The contributors to this volume properly focus on the place of conventional air power in national security into the 21st century. They do not, however, limit the scope of their thinking. Readers will find a range of considered, expert and sometimes provocative insights into a broad range of issues, including: strategic analysis, foreign relations, regional perceptions, community attitudes towards the military, joint operations, defence industry, force structure planning, doctrine and strategy, and historical analysis.

A feature of the book is the transcripts of the discussion periods which followed each paper.

Front Cover: An RAAF F-111C; and infra-red video from the F-111C Pave Tack precision-guidance weapons system, targeting a building.

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