



THE *art of air* POWER

PROCEEDINGS OF THE 2010 AIR POWER CONFERENCE

29–30 MARCH 2010

EDITED BY WING COMMANDER KEITH BRENT, CSC

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PO Box 7935
Department of Defence
CANBERRA BC ACT 2610
AUSTRALIA

Telephone: + 61 2 6266 1355

Facsimile: + 61 2 6266 1041

E-mail: airpower@defence.gov.au

Website: www.airpower.gov.au/airpower

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PREFACE AND ACKNOWLEDGMENTS

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

My thanks are due to my colleagues at the Air Power Development Centre, in particular Mr Graeme Smith and Ms Sandra Di Guglielmo, for their highly professional editorial assistance.

Keith Brent
Air Power Development Centre
Canberra

February 2011

NOTES ON CONTRIBUTORS

AIR MARSHAL MARK BINSKIN, AM

Air Marshal Mark Binskin was born in Sydney in 1960. He joined the Royal Australian Air Force (RAAF) in 1984 after an initial period of service with the Royal Australian Navy (RAN). Air Marshal Binskin's service commenced with the RAN in May 1978 and, on completion of flying training, he was posted to fly A-4G Skyhawk aircraft at Naval Air Station Nowra, NSW. He served in VC724 and VF805 Squadrons and in January 1982 was selected as the first RAN pilot to undergo an exchange with the RAAF flying Mirage III aircraft. On completion of this exchange and with the disbanding of the Navy's fixed-wing capability, he joined the RAAF.

Air Marshal Binskin's other flying tours include No 2 Operational Conversion Unit and No 77 Squadron at RAAF Base Williamtown, NSW, flying Mirage and F/A-18 Hornet aircraft; with the United States Navy at VFA-125 at Lemoore, California, training on F/A-18 aircraft; with the United States Air Force at 314 Tactical Fighter Training Squadron, USAF at Luke Air Force Base, Arizona, instructing on F-16C aircraft; and No 75 Squadron at RAAF Base Tindal, Northern Territory, flying F/A-18 aircraft.

He was the Commanding Officer of No 77 Squadron at Williamtown during the period 1998–99, Commander of Air Combat Group (F/A-18, F-111, Hawk and PC9-A(F)) in 2004–05 and later as Air Commander Australia (ACAUST) in 2007–08. Air Marshal Binskin's flying qualifications include Fighter Combat Instructor and Tactical Reconnaissance Pilot. Additionally, he has served as the RAAF F/A-18 Hornet Demonstration Pilot, and in this position represented the RAAF throughout Australia, Indonesia, Malaysia, Singapore and New Zealand. He has over 3500 hours in single-seat fighter aircraft. He was appointed as a Member of the Order of Australia (AM) in 1989 for his performance as a Fighter Combat Instructor and the RAAF F/A-18 Display Pilot.

Air Marshal Binskin has served in various joint and single Service staff positions including Headquarters Australian Defence Force as Deputy Director Airspace Control and as Staff Officer to the Chief of the Defence Force; in the Defence Materiel Organisation as Officer Commanding the Airborne Early Warning and Control System Program Office; and in Air Force Headquarters as Director General Performance Management Audit and Director General Capability Planning. During Australia's 2003 contribution to the war in Iraq, Air Marshal Binskin served as Chief of Staff at Headquarters Australian Theatre. Following this, he served as the first dedicated non-USAF Director of the US Central Air Force Combined Air and Space Operations Center where he was responsible for the conduct of all Coalition air operations in support of Operation *Iraqi Freedom* and Operation *Enduring Freedom* (ADF Operations *Catalyst* and *Slipper*). For this service he was awarded a Commendation for Distinguished Service.

Air Marshal Binskin is a graduate of the Harvard Business School Advanced Management Program, Australian Institute of Company Directors and RAAF Command and Staff Course

where he was awarded the Chief of Staff's Prize for Professional Excellence. Air Marshal Binskin was promoted to Air Marshal and appointed Chief of Air Force on 4 July 2008.

Air Marshal Binskin is married to Gitte and they have two sons, Scott, born in 1989, and Nicholas, born in 1993. Air Marshal Binskin's interests include camping, motor sports and motorcycle riding with his family.

AIR CHIEF MARSHAL ANGUS HOUSTON, AC, AFC

Allan Grant (Angus) Houston joined the Royal Australian Air Force (RAAF) as a cadet pilot in 1970. He spent the early part of his career flying Iroquois helicopters in various parts of Australia, Papua New Guinea and Indonesia.

He is a qualified Flight Instructor and completed several instructional tours on Macchi, BAC Strikemaster and Iroquois aircraft in the late 1970s. He also served on exchange with the Republic of Singapore Air Force (RSAF) and in late 1979 was posted to Hill Air Force Base, Utah, for exchange duties with a United States Air Force helicopter unit.

Air Chief Marshal Houston's principal command appointments include No 9 Squadron in 1987, during the introduction of the Blackhawk, the relocation of the unit from Amberley to Townsville and its transfer to Army; 5th Aviation Regiment in 1989; and No 86 Wing from 1994 to 1995. He was also Commander Integrated Air Defence System from 1999 to 2000.

Air Chief Marshal Houston has wide staff experience having served on the Joint Operations staff at Headquarters Australian Defence during the Gulf crisis of 1990–1991. He was the Director Air Force Policy during 1992–1993 where he negotiated the establishment of the RSAF Flying School at RAAF Base Pearce. He also served at Headquarters Australian Theatre from 1997 to 1999 as Chief of Staff, and Head Strategic Command from 2000 to 2001.

He was promoted to Air Chief Marshal and assumed his current appointment as Chief of the Defence Force on 4 July 2005 after four years as Chief of Air Force.

He is a graduate of the Flying Instructors Course (1975), RAAF Staff College (1985), Joint Services Staff College (1990) and the Royal College of Defence Studies in London (1996).

In 2008, Air Chief Marshal Houston was made a Companion of the Order of Australia (AC), having previously been appointed a Member in 1990 and advanced as an Officer in 2003. Previously, in 1980, he was awarded the Air Force Cross (AFC).

Angus Houston and his wife Liz, who is a teacher, have three sons.

SENATOR THE HON. JOHN FAULKNER

Born in Leeton in south-western New South Wales on 12 April 1954, Senator Faulkner has lived most of his life in Sydney. He was educated in the public school system and at Macquarie University, where he also served on the University Council from 1984 until

1992. He joined the Australian Labor Party (ALP) as a teenager and has held various positions including National President (2007–08) and Member of the National Executive (1989–2009).

Senator Faulkner was appointed Australia's Defence Minister on 9 June 2009.

Following the election of the Rudd Government in November 2007, Senator Faulkner served as Special Minister of State, Cabinet Secretary, and Vice President of the Executive Council.

Senator Faulkner entered the Australian Senate in April 1989, following the retirement of Senator Arthur Gietzelt. As a member of the Keating Government, Senator Faulkner served as Minister for Veterans' Affairs, Minister for Defence Science and Personnel, and Manager of Government Business in the Senate. In early 1994, he was appointed to Cabinet as Minister for Environment, Sport and Territories.

From 1996 to 2004 Senator Faulkner served as Leader of the Opposition in the Senate. He was Shadow Minister for Social Security (until 1997) and was then appointed Shadow Minister for Public Administration and Government Services.

After the 1998 Federal election, Senator Faulkner held the shadow portfolios of Shadow Minister for Public Administration and Government Services, and for Olympic Coordination and the Centenary of Federation. After the 2001 Federal Election he variously held the shadow portfolios of Special Minister of State, Public Administration and Accountability, and Home Affairs.

Prior to entering Federal Parliament, Senator Faulkner worked as a specialist teacher of children with severe disabilities, and from 1980 to 1989 served as Assistant General Secretary of the NSW ALP.

DUNCAN LEWIS, AO, DSC, CSC

Duncan Lewis graduated from the Royal Military College and the University of NSW in 1975, and served for more than 30 years as an officer in the Australian Army, including three tours with the Special Air Service Regiment. He joined the Department of the Prime Minister and Cabinet in 2005, on leaving the Regular Army as a Major General in command of the Australian Special Forces. For his services as a commanding officer he was awarded the Conspicuous Service Cross (CSC).

As a junior officer, Duncan Lewis served with the United Nations Truce Supervision Organization (UNTSO) as a military observer during the 1982 Lebanon War. From 1990 to 1992, he commanded the Special Air Service Regiment, which included command of the National Counter-Terrorist Tactical Assault Group. He has served on the Army Headquarters policy staff as Director of the Defence Reform Program in Army and as the Director of Strategy and International Engagement. During the International Force East Timor (INTERFET) deployment, he was the Australian Defence Force spokesman on East Timor. Duncan served as Army Attaché in Jakarta from 1994 to 1996 and returned to

Jakarta as acting Head of Defence Staff for a short period in 1998, following the evacuation of Australian nationals.

In January 2000, Duncan Lewis was promoted to the rank of Brigadier and appointed Commander Sector West in the United Nations peacekeeping force in East Timor, where he commanded the Australian and New Zealand forces on the border. He was awarded the Distinguished Service Cross (DSC) for his command in East Timor. He assumed the appointment as Commander Special Forces in January 2001 and, in late 2002, became the inaugural commander of the newly created Special Operations Command. During his period as Commander Special Forces, he was involved in the planning of a wide range of operations including deployments to Afghanistan, Iraq, East Timor and border protection operations including the seizure of the MV *Tampa* and the North Korean drug-carrying ship, MV *Pong Su*. For his service in command of the Australian Special Forces, Duncan was appointed an Officer of the Order of Australia (AO).

Duncan is a graduate of the British Army Staff College, Camberley, and the United States Army War College. He holds a Bachelor of Arts Degree from the University of NSW and a Graduate Diploma in Defence Studies and Management from Deakin University. He is a graduate of the Australian Defence Force School of Languages, where he studied Indonesian.

On leaving the Regular Army in 2005, Duncan Lewis was appointed to the position of First Assistant Secretary of National Security Division in the Department of the Prime Minister and Cabinet and in October 2005 was promoted to the position of Deputy Secretary. On 4 December 2008, Duncan was appointed to the position of National Security Adviser, at the Associate Secretary level, within the Department of the Prime Minister and Cabinet. As National Security Adviser, he provides direct advice to the Prime Minister on all policy matters relating to national security and the Government's international engagement, and is responsible for the strategic leadership of the national security community as well as the coordination of national security policy development and crisis response.

Duncan is the first chair of the Governing Board of the National Security College at the Australian National University, appointed to this position on 10 December 2009. He is an ex-officio member of the Council of the Order of Australia and of the National Australia Day Committee.

DR SANU KAINIKARA

Dr Sanu Kainikara is the Air Power Strategist at the RAAF Air Power Development Centre. He is also a Visiting Fellow at the University of New South Wales. He is the author of six books: *Papers on Air Power* (2006), *Pathways to Victory* (2007), *Red Air: Politics in Russian Air Power* (2007), *Australian Security in the Asian Century* (2008), *A Fresh Look at Air Power Doctrine* (2008) and *Seven Perennial Challenges to Air Forces* (2009). He is also the contributing editor of the book, *Friends in High Places* (2009). He has presented papers at a number of international conferences and published numerous papers on national security,

strategy and air power in various international professional journals. He is the recipient of a RAAF Chief of Air Force Commendation.

Dr Kainikara is a former fighter pilot of the Indian Air Force (IAF), who retired as a Wing Commander after 21 years of commissioned service. During his Service career, he has flown nearly 4000 hours on a number of modern fighter aircraft and held various command and staff appointments. He is a Qualified Flying Instructor and a Fighter Combat Leader. He is a graduate of the National Defence Academy, the Defence Services Staff College, and the College of Air Warfare. He is a recipient of an IAF Chief of the Air Staff Commendation and the Air Force Cross.

After retirement from active service, he worked for four years as the senior analyst, specialising in air power strategy for a US Training Team in the Middle East. Prior to his current appointment he was the Deputy Director Wargaming and Doctrine in the Strategy Group of the Department of Defence. He has also taught aerospace engineering at the Royal Melbourne Institute of Technology University, Melbourne.

He has two Bachelors Degrees, a Masters Degree in Defence and Strategic Studies from the University of Madras, and his PhD in International Politics was awarded by the University of Adelaide.

MR JOSEPH D. ROUGE

Mr Joseph D. Rouge is the Director, National Security Space Office (NSSO), the Pentagon, Washington, DC. He is responsible for leading a multi-agency unit tasked to create unity of effort across all of National Security Space. Specifically, the NSSO is responsible for promoting synergy and integrating interagency space policy, strategy, acquisition, launch, planning programming and technology development.

Mr Rouge is a graduate of the Reserve Officers' Training Corps (ROTC) program at the University of Southern California, where he earned Bachelors and Masters Degrees in aerospace engineering. He came on active duty in September 1974, serving in a variety of positions involving space surveillance systems, Strategic Defense Initiative Programs, and systems engineering and program integration. He has served on the faculty of the Industrial College of the Armed Forces, at the Air Force Inspection Agency and on the staff at Headquarters United States Air Force.

Mr Rouge was a Research Fellow at the Airpower Research Institute, located at the USAF Air University's Center for Aerospace Doctrine and Education, where he authored a book on national military space strategy. He was also a Research Fellow at the Industrial College of the Armed Forces, authoring a book on national security strategy. Mr Rouge is also a joint specialty officer. He retired in June 2004 as Chief of NSSO's Integration Division, and he has also served as Associate Director.

DR BENJAMIN S. LAMBETH

Dr Benjamin S. Lambeth is a Senior Research Associate at the RAND Corporation. In 1989 and 1990, he directed RAND's International Security and Defense Policy Program. He has written more than six dozen books and articles on air power and other defence-related matters.

Before joining RAND in 1974, he served in the Office of National Estimates at the Central Intelligence Agency. Prior to that, he worked for the Center for Strategic and International Studies and the Institute for Defense Analyses.

A civil-rated pilot, Dr Lambeth has flown or flown in more than 40 different fighter, bomber, attack, mobility, surveillance, and jet trainer aircraft types with the US Air Force, Navy, and Marine Corps, as well as with the Royal Air Force, Canadian Forces, Royal Australian Air Force, German Luftwaffe, Royal Netherlands Air Force, Royal Norwegian Air Force, Republic of Korea Air Force, and Israeli Air Force. He also has attended the USAF Tactical Fighter Weapons and Tactics Course, the Combined Force Air Component Commander Course, the Aerospace Defense Command's Senior Officers Course, and portions of Navy Fighter Weapons School (TOPGUN) and the Marine Aviation Weapons and Tactics Instructor's Course.

In December 1989, he became the first US citizen to fly the Soviet MiG-29 fighter and the first Westerner invited to fly a combat aircraft of any type inside Soviet airspace since the end of World War II.

Dr Lambeth earned his PhD in Political Science from Harvard University. He is a member of the Council on Foreign Relations, the Board of Visitors of the USAF Air University, and the Editorial Advisory Boards of *Air and Space Power Journal* and *Strategic Studies Quarterly*. He also is the author of *The Transformation of American Air Power* (Cornell University Press, 2000), which won the Air Force Association's Gill Robb Wilson Award for Arts and Letters in 2001. In 2002, he was elected an Honorary Member of the Order of Daedalians, the national fraternity of US military pilots.

DR ALAN STEPHENS, OAM

Dr Alan Stephens is a visiting fellow at the University of New South Wales, Australian Defence Force Academy; and a member of the Williams Foundation. Previously, he has been a senior lecturer at the University of New South Wales, the official historian for the RAAF, a principal research officer in the Australian Federal Parliament, and a pilot in the RAAF.

Dr Stephens has lectured and published internationally, and his work has been translated into 12 languages. In 2008, he was awarded the Medal of the Order of Australia (OAM) for his services as an historian of the RAAF and for his contribution to the development of air power strategy and doctrine.

DR CHRIS CLARK

Dr Chris Clark has been the RAAF Historian since 2004, and heads the Office of Air Force History within the Air Power Development Centre, Canberra. He received his PhD from the University of New South Wales at the Australian Defence Force Academy (ADFA) in 1991, for a thesis exploring the development of Australian air power between the world wars. He has been a Visiting Fellow (Associate Professor) in the School of Humanities and Social Sciences at ADFA since 2003. Over his career, he has served in the Australian Army, conducted policy analysis in the Departments of Defence, Foreign Affairs, and the Prime Minister and Cabinet, and worked at the Australian National University and Australian War Memorial. He has published more than 20 books on Australian (mainly defence) history, including a volume of official war history covering RAAF involvement in Vietnam 1962–75.

DR REBECCA GRANT

Dr Rebecca Grant is President of IRIS Independent Research, a public-policy research organisation headquartered in Washington, DC. Her research focuses on air power, joint operations, cyberspace and national security issues.

She earned her PhD in International Relations from the London School of Economics, then worked for RAND and the Offices of the Secretary of the Air Force and Chief of Staff of the Air Force.

Dr Grant is an active member of the Air Force Association and currently serves as the first Director of the Mitchell Institute for Airpower Studies, a new non-profit research arm. She writes regularly for *Air Force Magazine* and has appeared on television as a commentator on air power.

She lives in the Washington, DC, area with her husband, her five-year-old daughter, her motorcycle and a Tennessee Walking Horse named Red.

LIEUTENANT GENERAL DAVID A. DEPTULA

Lieutenant General David A. Deptula is Deputy Chief of Staff for Intelligence, Surveillance and Reconnaissance, Headquarters US Air Force, Washington, DC. He is responsible to the Secretary and Chief of Staff of the Air Force for policy formulation, planning, evaluation, oversight, and leadership of Air Force intelligence, surveillance and reconnaissance capabilities. As the Air Force's Senior Official of the Intelligence Community he is directly responsible to the Under Secretary of Defense for Intelligence.

General Deptula completed ROTC at the University of Virginia as a distinguished graduate in 1974, and remained to complete a Masters Degree in 1976. Earning his wings in 1977, he has flown more than 3000 hours (400 in combat) to include multiple operational fighter command assignments. He has taken part in operations, planning, and joint warfighting at unit, major command, Service headquarters and combatant command levels. He has served on two congressional commissions charged with outlining America's future defence posture—the Commission on Roles and Missions of the Armed Forces, and the National

Defense Panel. Prior to assuming his current position, he served as Commander of the General George C. Kenney Warfighting Headquarters, and Vice Commander, Pacific Air Forces.

General Deptula has significant experience in combat and leadership in several major joint contingency operations. He was the principal attack planner for the *Desert Storm* Coalition air campaign in 1991. He has twice been a Joint Task Force Commander—in 1998/1999 for Operation *Northern Watch* during a period of renewed Iraqi aggression where he flew 82 combat missions, and for Operation *Deep Freeze*, supporting forces in Antarctica. In 2001, the General served as Director of the Combined Air Operations Center for Operation *Enduring Freedom*, where he orchestrated air operations over Afghanistan during the period of decisive combat. In 2005, he was the Joint Force Air Component Commander for Operation *Unified Assistance*, the South Asia tsunami relief effort, and in 2006 he was the standing Joint Force Air Component Commander for Pacific Command.

DR ANDREW DAVIES

Dr Andrew Davies is a theoretical physicist by training, and published in the area of high-energy particle physics while at the University of Melbourne and the Australian National University. He joined the Analytic Studies Group in the Department of Defence in 1994. He worked on a range of scientific studies in support of Defence decision-making, including Army firepower options and RAAF stand-off weapons effectiveness. He was the manager of a major study into the ADF's anti-submarine warfare capability. He led the Capability Analysis Branch within Defence Headquarters for a time, before moving into the world of signals intelligence and information security with the Defence Signals Directorate.

Andrew joined the Australian Strategic Policy Institute as director of the Operations and Capability Program in 2006. He has written extensively on ADF capability, acquisition programs and the military capabilities and policies of regional nations.

PROFESSOR HUGH WHITE

Professor Hugh White is a Visiting Fellow at the Lowy Institute for International Policy and Professor of Strategic Studies at the Australian National University. He publishes widely on Australian strategic and defence policy, and the regional and global security issues that most directly affect Australia. He has worked on Australian strategic, defence and foreign-policy issues for 30 years in a number of capacities inside and outside Government, including as the first Director of the Australian Strategic Policy Institute (ASPI) from 2000 to 2004, the Deputy Secretary for Strategy in the Department of Defence from 1995 to 2000, Senior Adviser on International Affairs to Prime Minister Bob Hawke (1990–1991), and Senior Adviser to the Defence Minister Kim Beazley (1984–1990). He was the principal author of Australia's 2000 Defence White Paper. His recent publications include *A Focused Force: Australia's Defence Priorities in the Asian Century* (Lowy Institute, 2009) and 'Why War in Asia Remains Thinkable' (in *Survival*, December 2008–January 2009). In the 1970s he

studied philosophy at Melbourne and Oxford Universities, and was awarded Oxford's John Locke Prize in Mental Philosophy in 1978.

AIR VICE-MARSHAL GEOFF BROWN, AM

Air Vice-Marshal Geoff Brown joined the RAAF in February 1980 after completing an engineering degree. He graduated from No 111 Pilots Course in 1981 and was initially posted to No 12 Squadron at RAAF Base Amberley to fly Chinook helicopters. After three years at 12 Squadron he was posted to No 2 Flying Training School (2FTS) at Pearce and spent 18 months as a Flying Instructor before being posted to Central Flying School (CFS), East Sale in 1986. While at CFS, he was a member of the RAAF Roulettes aerobatic team from 1987 to 1989. He led the last Macchi team before they transitioned to the PC-9.

In 1990, Air Vice-Marshal Brown was posted to Williamtown for a Hornet conversion and then completed a short tour at No 77 Squadron. On promotion to Squadron Leader in 1991, he was posted to No 75 Squadron, Tindal as a Flight Commander. In 1993, Air Vice-Marshal Brown was then posted to No 77 Squadron as Executive Officer. He completed RAAF Staff College in 1995 and was subsequently posted to Headquarters Air Command as Staff Officer Operational Evaluation.

From 1997 to 2000, Air Vice-Marshal Brown commanded No 3 Squadron. He then completed an F-111 conversion and assumed the position of Officer Commanding No 82 Wing in December 2000. In 2003 he commanded all F/A-18 and C-130 operations in Operation *Iraqi Freedom* and was appointed as a Member of the Order of Australia (AM) and awarded a US Legion of Merit (Degree of Legionnaire) for his service in the operation. He was Officer Commanding Airborne Early Warning and Control Systems Program Office from June 2003 until December 2004 and spent 2005 at the Centre for Defence and Strategic Studies. He then commanded Air Combat Group throughout 2006. From January 2007 until June 2008, he was Director General Capability Planning in Air Force Headquarters. Air Vice-Marshal Brown was appointed as Deputy Chief of Air Force from 30 June 2008.

Air Vice-Marshal Brown has over 5000 hours in military aircraft.

He lives in Canberra with his wife Amanda and his two sons, Ryan and Jake. His sporting interests are gliding and golf.

ABBREVIATIONS AND ACRONYMS

AC	Companion of the Order of Australia
ADF	Australian Defence Force
ADFA	Australian Defence Force Academy
AEW&C	Airborne Early Warning and Control
AM	Member of the Order of Australia
ANU	Australian National University
AO	Officer of the Order of Australia
APDC	Air Power Development Centre
APS	Australian Public Service
ASAT	Anti-Satellite
ASW	Anti-Submarine Warfare
AWACS	Airborne Warning and Control System
C2	Command and Control
CAF	Chief of Air Force
CAOC	Combined Air Operations Centre
CBO	Combined Bomber Offensive
CSC	Conspicuous Service Cross
DCP	Defence Capability Plan
DWOS	Day Without Space [Study]
FY	Financial/Fiscal Year
GPS	Global Positioning System
IMINT	Imagery Intelligence
INS	Inertial Navigation System
ISAF	International Security Assistance Force
ISR	Intelligence, Surveillance and Reconnaissance
JSF	Joint Strike Fighter
JSTARS	Joint Surveillance Target Attack Radar System
KTO	Kuwaiti Theatre of Operations
MRLA	Malayan Races Liberation Army
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organisation
NSA	National Security Adviser

OAM	Medal of the Order of Australia
PhD	Doctor of Philosophy
PLA	People's Liberation Army
RAAF	Royal Australian Air Force
RAF	Royal Air Force
RPA	Remotely Piloted Aircraft
RPV	Remotely Piloted Vehicle
SAM	Surface-to-Air Missile
SATCOM	Satellite Communications
SIGINT	Signals Intelligence
STRATCOM	Strategic Command [US]
TTPs	Tactics, Techniques and Procedures
UAS	Uninhabited [or Unmanned] Aerial System
UAV	Uninhabited [or Unmanned] Aerial Vehicle
UK	United Kingdom
US	United States
USAAF	United States Army Air Forces
USAF	United States Air Force
USAFWC	United States Air Force Warfare Center

WELCOME ADDRESS

AIR MARSHAL MARK BINSKIN, AM

Good morning. I'd like to welcome here today:

- the Minister for Defence, Senator John Faulkner;
- the Chief of the Defence Force, Air Chief Marshal Angus Houston;
- the Chief of Navy, Vice Admiral Russ Crane;
- visiting Chiefs of Air Force and Air Force senior representatives from other nations;
- distinguished guests and speakers from Australia and around the world; and
- members of the Navy, Army, Air Force, and Department of Defence who join us here today, as well as members of the public.

Welcome to the 2010 Air Power Conference, on the theme *The Art of Air Power*. This is the first Air Power Conference since 2004. From now on, it is planned to be a biennial event, held every even-numbered year and follow a similar format to those very successful conferences that were run between 1991 and 2004. The RAAF achieved considerable acclaim from these conferences and they certainly placed the RAAF on the international stage as a key power with regard to the development of robust air power doctrine, concepts and strategy. My intent in re-starting these conferences is to inform and encourage a robust air power debate in Australia.

Before I proceed, I would like to state that this conference has been made possible by the assistance of Defence industry. Firstly, I would like to thank our principal sponsor, Boeing, and secondly, our two major sponsors, Rolls-Royce and L3. The RAAF has a close and valued relationship with Defence industry and we look forward to continuing this relationship into the future.

As we will see later on this morning, the theme is closely related to Sun Tzu's 'Art of War'. But it is necessary to state that the entirety of this conference is not only about the application of the ancient Chinese strategist's theories and their application to modern air warfare—that is certainly the subject of one presentation—but more importantly the presentations offer an opportunity to analyse, think, ponder, discuss and even argue, some of the key issues and challenges that face air power in the 21st century. Key areas we will address over the next two days include:

- The role of air power in Australia's national security—particularly as it applies to the 2008 National Security Statement¹ and the 2009 Defence White Paper.²
- Where does air power fit into irregular warfare, as we prefer to call it in the RAAF, as it incorporates counterinsurgency, counter-terrorism and, indeed, insurgency support.
- The role of space—something we take for granted, but also something that we rely on for intelligence, surveillance and reconnaissance, communications, global positioning systems (not just navigation but also targeting precision), and a range of other products and services that are part and parcel of 21st century life—not just warfare.
- The challenges to air power in meeting its full potential in a range of difficult cultural, political and geopolitical environments.
- Uninhabited aerial systems (UASs)—or remotely piloted aircraft to use the preferred USAF term—and their unique challenges. This is particularly important noting that Air Force acquired and employed its first UAS—the Heron—to Afghanistan last year in response to an urgent operational requirement from Australian ground forces.
- Intelligence, surveillance and reconnaissance (ISR) in which, I am sure you will agree, Air Force plays a critical role, perhaps even the key role, due to air power's unique characteristics of perspective, reach, pervasiveness, adaptability and our inherent joint theatre-focused command and control (C2) mechanisms.

While the conference is about the art of air power, it has a distinctive sub theme of the 'Professional Mastery of Air Power', which is a key requirement in understanding and applying air power.

When I first assumed command in July 2008, I released my *Commander's Intent*,³ stating that the RAAF will continue to develop its professional mastery of air power so that it will be able to best exploit the future force—Force 2030. My stated intent is that the RAAF will progress the way it trains, educates and prepares its people so that we will become more adept at employing the current force and are prepared and capable of fully utilising the enhanced future force.⁴

It is my view that 'appropriate, broad and ongoing education, including on-the-job development and mentoring by leaders and commanders, is fundamental to being able to

produce people who can consistently apply sound judgement in the complex and ambiguous situations we find ourselves in every day'.⁵ It is therefore of paramount importance that the RAAF, as a learning organisation, offers its members—officers, airmen and civilians alike—opportunities to develop and grow into professional masters of air power.

This Air Power Conference series presents a unique opportunity to immerse ourselves in air power matters for two days and is a key plank in us being able to achieve the required professional mastery that I ask. Additionally, towards this end, over the past 18 months we have undertaken significant work to realise this intent in other ways.

First, in 2009 we established the new CAF Fellow position at the Australian Defence Force Academy (ADFA) to teach air power subjects that have become part of the regular curriculum to undergraduates and postgraduates.

Second is Project *After*—the Air Force Training and Education Review. *After* has redeveloped the airmen to squadron leader training and is now working on the next step—wing commanders and group captains. Not only are the important issues of command, leadership and governance included in this continuum, but also military and air power doctrine, strategy and concepts.

Third, we are looking at how to make the CAF Fellowship Program more valued, attractive and relevant to the Air Force's 21st century requirements. We need to ensure that we produce military thinkers who can reason and think about air power, its role in warfare and its role in national security. We need to elevate the notion of *airmindedness* from a quality held by air power enthusiasts in this country to that held by air power strategists.

Fourth was the release of the inaugural *Chief of Air Force's Reading List* a few weeks ago.⁶ This is the first CAF Reading List in the history of the RAAF and will join the fine reading lists of the Chief of Navy and Chief of Army, as well as those of the Royal Air Force and the United States Air Force.

This year's list has a certain orientation towards the subject of irregular warfare and air power's role in it. We have been engaged in the Middle East since 2003 in an irregular conflict, after a short conventional campaign, and this is the conflict of our immediate future. There is also a selection of fine books on other contemporary air power topics and the history of the RAAF—both recently published titles and some that are more timeless. I commend the list to you to focus your reading.

I would also like to thank Dr Alan Stephens, a noted historian of the RAAF and air power, for writing the short essay contained within the publication on why it is important to read good history.

And lastly, I announce today the establishment of the 'CAF Essay Competition'. The Competition will comprise two essays:

⁵ *ibid.*, p. 11.

⁶ Air Power Development Centre, *Chief of Air Force's Reading List*, Air Power Development Centre, Canberra, March 2010.

¹ Kevin Rudd, 'The First National Security Statement to the Parliament: Address by the Prime Minister of Australia, the Hon. Kevin Rudd, MP', 4 December 2008, available at <http://www.pm.gov.au/node/5424>, accessed 30 April 2010.

² Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030: Defence White Paper 2009*, Department of Defence, Canberra, 2009.

³ Air Marshal Mark Binskin, AM, *Commander's Intent: Air Force: One Team*, Air Power Development Centre, Canberra, 4 July 2008.

⁴ *ibid.*, pp. 6–7.

- First, the 'Air Vice-Marshal H.N. Wrigley Essay' for air power analysis, which is open to all Australian citizens or recognised foreign military exchange officers serving with the Australian Defence Force (ADF). Wrigley was the first senior RAAF officer to seriously think and write about air power.
- And second, the 'Pilot Officer R.H. Middleton, VC Essay' for air power historical analysis, which is open to RAAF ADFA officer cadets. Middleton, at the age of 26, was posthumously awarded the Victoria Cross and commissioned with the rank of pilot officer from flight sergeant after being killed returning his stricken aircraft and fellow aircrew to the relative safety of the British coastline during World War II.

This competition will ensure that the memories of these two extraordinary airmen are perpetuated—one for his mature approach to air power strategy and the other for his youthful valour in battle. It will start this year and the first prizes will be presented at the RAAF Awards Night in 2011. Entry details will be published soon.

So, as you can see, this conference is one of several initiatives that are part of our collective endeavour to ensure that all of us achieve the level of *professional mastery* commensurate with our roles and responsibilities in the generation of air power for Australia's security.

With all that, welcome to the 2010 Air Power Conference, *The Art of Air Power*. I very much look forward to the next two days of analysis, debate and insight, and I am sure you do as well.

I will now ask the Chief of the Defence Force, Air Chief Marshal Angus Houston, to come to the podium to formally open the conference.

OPENING ADDRESS

AIR CHIEF MARSHAL ANGUS HOUSTON, AC, AFC

Minister for Defence, Senator the Hon. John Faulkner; Chief of Air Force, Air Marshal Mark Binskin; our international guests; other distinguished guests and speakers; ladies and gentlemen.

INTRODUCTION

It is a great pleasure to be here today to provide my first address to the RAAF Air Power Conference since I last hosted it as Chief of Air Force in 2004. I thank you, Air Marshal Binskin, for this opportunity to contribute today. I am a great believer in the importance of these broader engagement and educational activities.

As an organisation, we need to develop our own strategic thinkers and conferences such as this one are a great way of doing just that. It has the added benefit of moving Australia's national security debate along.

This morning I intend to present my outlook on our future operating environment. My rationale for this is that it has been nearly three years since I released *Joint Operations for the 21st Century*,¹ a document that encapsulates my vision for our future operations, and I want to encourage you all to start thinking about what should go into the next iteration.

STRATEGIC OUTLOOK

Since our strategic outlook is a significant determinant in our future operating environment, let me start there.

Fundamentally, our strategic circumstances are set by the relationships between major powers and looking forward I see a more uncertain future. What we have seen over the last 10 years is the rise of two major powers, a dynamic rise the like of which we have not seen for a long time in human history—I refer, of course, to China and India. Simultaneously, there is Japan, also a major power, and of course the United States, all working in our region.

So, the interrelationships between these major powers, and of course a re-emergent Russia, are going to influence our strategic circumstances into the future. So far, the emergence of these major powers has been beneficial for Australia, especially economically, and the regional environment has remained stable. But the reality is that we have to hedge against the fact that those relationships may not always work in our best interests.

¹ Department of Defence, Australian Defence Doctrine Publication—D.3—*Joint Operations for the 21st Century*, Department of Defence, Canberra, 2002.

Australia prefers to manage its national security risks with diplomacy, and Australia's military capability and posture are key contributors to our diplomatic influence. Because of this important role, our future force needs to have increasing strategic weight and combat power. This more potent force is further necessary, as the future environment could see increased tensions amongst those major powers, leading to uncertainty and instability in the region.

I do expect that the United States will remain an effective stabilising force for security for many years. However, it is conceivable that the ability of the US to project power in the Asia-Pacific could be constrained by other demands or by the capabilities of other powers.

The Prime Minister has made it very clear that he regards a secure Australia as a paramount government objective. At the same time, I would say that the security of our immediate neighbourhood is also something that is going to take up a lot of our time and a lot of our resources.

Of course, we need to be able to provide tailored contributions to promote strategic stability in the Asia-Pacific, and a stable rules-based global security order. We need to be able to defend Australia by having the ability to deter and defeat armed attacks. But at the same time, we need to have the adaptability to be able to move into the South Pacific to meet the requirements there, be they natural disasters, relief operations or, indeed, stabilisation and security operations. And, similarly, if there is a problem in the Asia-Pacific that affects Australia's security, we need the option to be able to provide a tailored contribution to a coalition if required.

WHITE PAPER

Last May, in a presentation to the Senior Leadership Group, I mentioned that I was 'absolutely delighted' with the outcome of the White Paper process. I still am. The key to this successful outcome, I think, was Defence's open and frank engagement with Government. The process was long and gruelling, made more difficult by the financial environment that we were working through, especially in its latter stages. Nonetheless, the 2009 Defence White Paper will deliver an Australian Defence Force (ADF) for the 21st century.² An ADF that will be better equipped, fully networked and better prepared to meet Australia's security requirements.

The force structure proposed in the White Paper is one that I am very happy with. Once the White Paper is fully implemented, I believe we will truly be a more muscular, more flexible, joint force, which can excel on joint operations, interagency operations and make meaningful contributions to coalition operations.

So what are the White Paper outcomes for Air Force?

Let me begin by stating that I am a firm believer in a potent and flexible air combat capability as a cornerstone of Australia's defence posture. Control of the air over our territory and maritime approaches is critical to all other operations in the defence of Australia. The White Paper reflects my belief and will ensure that the RAAF maintains its regional air superiority through the acquisition of approximately 100 Joint Strike Fighters. These aircraft will significantly enhance Australia's deterrence and provide a robust offensive capability should it be required.

The Air Force will continue to offer the Government air control, maritime strike, precision attack, offensive air support, close air support and air mobility capability options across the full spectrum of conflict, through the combination of:

- highly skilled people;
- multi-role air combat aircraft and assets, such as airborne early warning and control (AEW&C);
- multi-mission maritime aircraft;
- multi-role tanker transport aircraft;
- advanced weapons;
- command and control;
- intelligence, surveillance and reconnaissance (ISR) capabilities; and
- unprecedented situational awareness.

Australia's future Air Force will also include a balance of piloted and uninhabited aerial systems that will enhance the future anti-submarine warfare capability of Air Force and significantly enhance Australia's ISR coverage.

The White Paper also strengthens and rebalances the Air Force's strategic (inter-theatre) and operational (intra-theatre) airlift capability through the acquisition of new aircraft. Other capability priorities from the White Paper are:

- new and upgraded systems to collect and fuse air surveillance information from multiple sources, in order to create a recognised air picture of the ADF's primary operational environment;
- improved military air traffic control, navigation and communications systems to permit closer alignment of the national systems for both military and civilian air traffic management; and
- the use of modern technology to deliver improved training outcomes through the application of high-fidelity simulation and mission rehearsal systems.

The enhancement of Air Force's ISR capability through these acquisitions will be most impressive and, when combined with the less glamorous but nonetheless vitally important processing, exploitation and dissemination of ISR data, will result in Air Force taking a leading role in ADF data sensor fusion.

As you can appreciate, with all this new capability, the Air Force is entering a period of significant change. I know that CAF is preparing his work force to address the significant

² Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030: Defence White Paper 2009*, Department of Defence, Canberra, 2009.

demands that this capability transition will place on his force, through an active and engaged organisational restructure and modest growth in key capability areas. The end result will be a far more versatile and more capable Air Force, with a wider range of advanced ISR, air mobility and air combat options than ever before in our nation's history.

In other words, the White Paper is a good outcome for Air Force and a good outcome for the ADF, in probably the most difficult financial circumstances Australia has faced for 60 years. The fact that there were no major White Paper 'shocks' for Air Force, is testament to the years of intense capability planning it has undertaken within the ADF capability development process.

However, it will not be cheap.

STRATEGIC REFORM PROGRAM

To realise Defence's capability plans, the Government, in the recently released Defence Capability Plan (DCP), has allocated \$60 billion to develop the ADF to achieve the strategic requirements outlined in the White Paper. This represents a significant investment of taxpayers' money. But even this is not enough to fund all the capability projects in the DCP!

The intent behind the Strategic Reform Program is to comprehensively and fundamentally improve the supporting 'backbone' of Defence, making the organisation more efficient and effective, and creating significant savings to reinvest in building a stronger Defence Force. These savings and reinvestments are essential to ensure that the capability goals set out in the White Paper are delivered.

Let me provide you with a brief overview of the Strategic Reform Program and how important it is for the ADF.

The Strategic Reform Program has three key elements: improved accountability, improved planning and enhanced productivity. This reform will comprehensively and fundamentally improve the management of Defence, making our organisation more efficient and effective, and creating significant savings to reinvest in building a stronger Defence Force.

Over the years to 2019, the Strategic Reform Program will deliver gross savings of around \$20 billion without detriment to our ADF capability. Every last dollar of these savings will be reinvested:

- to deliver stronger military capabilities,
- to remediate areas of past underinvestment, and
- to modernise the Defence enterprise 'backbone'.

Reform on this scale is never easy, but the benefit is that these changes will give Australia a stronger, more agile and harder-hitting Defence Force.

The Strategic Reform Program comprises 15 separate reform streams across all the Groups that will take between three to five years to fully implement and deliver mature savings. This means that the Program will affect all members of Defence. After the successful conduct of

our military operations, the next highest priority for Defence is to deliver these reforms. The target of \$20 billion is fixed but the reforms must be flexible enough to capture opportunities for making the right changes when they arise.

Not to put too fine a point on it, the White Paper relies on us delivering the savings from this reform program. If we do not deliver the savings, we have to find offsets from somewhere else within the Defence budget, and that means we will have a sub-optimal approach to capability.

FUTURE OPERATING ENVIRONMENT

I would now like to move from our strategic environment to our operating environment.

The ADF of the present

The ADF stands in defence of Australia and our national interests. Our work is serious and difficult, and often, arduous and dangerous. We are called upon to perform diverse challenging tasks in fulfilling our mission—some very close to home and others further afield.

The world in which we operate is complex and unpredictable. Yet, our purpose is very clear: we are responsible to the Government for the protection of Australia, our people and our national interests, whenever and wherever those interests lie.

In undertaking this mission, the ADF, enabled by the Defence Organisation, might act independently, or it might contribute to a broader effort of other Australian or international civilian agencies or military forces.

The first few years of the 21st century have demonstrated that the dangers confronting us can take many forms. Some dangers are traditional and relate to state-on-state tensions over territory, resources or the balance and distribution of power. Some are old challenges in new guises, such as the emergence of new terrorist groups and potentially pandemic diseases. Some challenges are entirely new, such as climate change and the impacts of global demography. And some are natural dangers, such as cyclones, earthquakes and tsunamis, to name just a few.

The last 100 years have yielded many valuable lessons in the art of war. If the developments in air power in the 21st century are as dynamic as those of the preceding one, we will undoubtedly witness profound changes in the technology and capabilities of air power and the types of conflicts in which the Air Force will find itself engaged.

It is a testament to the complexity of our current security environment that our people are involved in an array of situations, using a wide variety of their skills from warfighting to peacekeeping. They are undertaking border surveillance, fisheries protection, support to United Nations-mandated operations, coalition operations, some national support tasks, and third country deployments.

Overall, I could not be more pleased with how all our operations continue to progress and how well we are able to achieve our many and varied tasks.

The ADF of the future

As many of you know, my vision for the ADF is one of a balanced, networked and deployable force, staffed by dedicated and professional people, who operate within a culture of adaptability and excel at joint, interagency and coalition operations.

To realise this vision I started the Australian Defence Organisation on a journey, three years ago this May, through the release of the departmental document, *Joint Operations for the 21st Century*. This document describes how we will best utilise the capabilities of our force to respond to the challenges, the opportunities and the uncertainties of the future in order to meet our commitments to the Australian Government. It provides guidance for how we should operate across a spectrum of activities—from humanitarian assistance and the provision of logistics support, to high-intensity combat.

In the future, we know that we must be able to fight well—but we know also that in an increasingly complex world, we will have to do more than fight.

Joint Operations for the 21st Century paints a picture of a joint force operating effectively as part of an integrated national response to events. This force will act to reach, know and exploit the future operating environment.

The purpose of this document is to guide our thinking about how we will operate in the future. In particular, this document orients every man and woman in Defence toward the future—it gives us all an understanding of where we will stand in the world in 2030 and the kinds of things we will be called upon to do. It also describes the attributes of the future force—not what we will have in terms of capability necessarily, but how we will behave.

My vision of a balanced, networked and deployable force is supplemented here with qualities that include being integrated and interoperable, survivable and robust, ready and responsive. In many ways, of course, these are already features of the Australian approach to warfighting, especially so for the Air Force, but for the future force, these are important qualities that we must foster if we are to continue to thrive.

Over the last 10 years or so, there has been a major change in how the ADF goes to war. No longer do the individual Services deploy separately under their own commanders as they did in the past. Nor do operations necessarily involve the deployment of existing formed squadrons or units.

In recent years, for example, the vast majority of Air Force operations have involved the deployment of sub-unit elements and detachments to ADF Task Forces under the command of a Joint Task Force Commander. This arrangement is working well, for it allows the ADF to deploy just the right type of combat capability to meet extant operational needs in the most flexible manner possible.

What we will be called on to do?

This brings us to the question of what we will be called on to do in the future.

While armed conflict will continue to involve the application of organised force in combat environments, the conduct of joint warfare will include both aggressive and non-aggressive applications of military power.

In 2030, the ADF will need to be able to do the following:

- Firstly, in keeping with longstanding government policy, we will need to be able to defend Australian territory against credible threats without relying on the combat forces of other countries.
- Secondly, we will need to be able to provide joint forces to lead or contribute to coalition operations in Australia's neighbourhood.
- Thirdly, the future force will be called upon to contribute to coalition operations further away.
- We will also continue to support United Nations activities and honour our other longstanding multinational commitments.
- We will contribute to crisis response as part of a coalition effort in humanitarian assistance and disaster relief.
- As well as routinely work with other government departments to provide options to Government to protect and promote Australian interests.
- Finally, we will provide regional situational awareness to a global commitment of military force.

Many of the things we will be called upon to do are responses to contingencies that could arise with little-to-no notice. The brevity of warning time almost ensures that we will join the fight with a 'come as you are' force. This means that our future force will need to be appropriately structured to manage the risks posed by our uncertain strategic environment.

In particular, this means the ADF's structure must be such that we can provide the Government with key strategic response options, as well as perform necessary pervasive and ongoing strategic actions. These options include:

- enhancing our ability to understand the geopolitical and operational context, and maintain appropriate situational awareness;
- to shape and deter any potential adversaries seeking to directly attack Australia or its interests;
- to defeat any adversary seeking to launch attacks on Australia;
- to deny operational freedom to any adversary or security threat within the immediate neighbourhood; and
- quickly and decisively, to help the civil authorities of Australia by providing military assistance when needed.

Understanding and shaping our environment; deterring, defeating and denying our adversaries; and assisting Australia's civil authorities—these are the core strategic response options that the future force will provide to Government.

A national effects-based approach

For the ADF, seeing ourselves as a single integrated tool in service of the Government has a number of implications.

Firstly, it means that in fact we need to be a fully integrated force, so that our actions work together to enhance the effects that we seek to produce.

The ADF has already embraced network centric warfare as a key enabler of our capability through generating tempo, precision and combat power. Network centric warfare, therefore, is one step on the road to a fully integrated force, one that goes beyond 'jointness' to 'seamlessness'. Another step was the creation of the integrated Headquarters Joint Operations Command at Bungendore, NSW.

Secondly, we need to be part of an integrated whole-of-government response.

Defence may not always be the lead agency for dealing with security challenges and we need to be prepared for, and highly capable of, working with other government departments. We need to go from using an *inter*-agency approach to 'get through' a crisis, to using a *multi*-agency approach, where we work together on an ongoing basis to meet the Government's goals through providing an integrated response.

Joint operations

As I reflect back upon the last two decades, I cannot recall any operation that was solely single Service in nature. From this experience, let me quickly describe what I think is a key component for their successful conduct.

Time and time again we have learnt that air power is a key ingredient to the successful conduct of joint operations. While control of the air is always required, it is air mobility and airborne ISR that are currently making a huge difference.

For example, in 2007, General Karl Eikenberry, formerly of United States Army and currently the US Ambassador in Kabul, estimated that, without air power, Coalition ground forces in Afghanistan would need to be 400 to 500 thousand strong, vice the 50 thousand that were then deployed.

In the future, when we are conducting joint operations, it is imperative that we do not 'penny packet' these important joint operations. We must ensure our command and control arrangements allow the optimal use of these assets and their supporting joint enablers—clearly, prioritisation will play an important role in this. This is why it is vital that we command and control these resources at the highest possible level to ensure optimal tasking. And this is the reason air operations are conducted under centralised control and decentralised execution.

Our command and control must be agile enough to ensure proper and prioritised use of these scarce and highly valuable assets. Not to put too fine a point on it, but I am sure you will agree with me that giving each commander two or three aircraft, quickly diminishes a valuable and scarce capability.

Personnel

The final component of our future force that I wish to talk about is its people. People are still my number one priority. As we all know, it is our people that are the key to an effective Air Force and an effective ADF.

By understanding, valuing and utilising the strength we derive from our people, we will forge a stronger and even more effectual organisation. By continuing to promote the ADF as a diverse and inclusive work force, we will broaden our appeal so we can recruit and retain the best and brightest from as broad a cross-section of Australian society as possible. By nurturing our image and reputation, I want the ADF to be perceived by the future labour force as the employer of first choice.

I have spoken at length to my senior leaders about the challenge of ADF recruitment and retention. While I am pleased with progress in many areas, I believe we can do better, especially with respect to indigenous Australians and women.

The ADF cannot afford to lose opportunities to recruit the best or retain the brightest because we have not done all we could to make the ADF the best employer in the country.

Another enduring aspect of the job of ADF leaders will be to take care of their people, and to make sure the people under their command are taking care of each other. We must look after the welfare of our people, we must act in their best interests and we must provide them with a safe, fair and inclusive work place where they know they will be empowered and allowed to innovate and excel.

I commend CAF, all commanders and leaders at all levels for your success in maintaining and further developing your values-based adaptive culture. Thank you for your efforts.

CONCLUSION

In conclusion, as I stated at the beginning of my presentation, I plan in the near future to review our current Joint Operating Concept in light of our operational experience and the revised White Paper and Defence Capability Plan. I think this is vitally important because failure to capture the operational lessons of today will deprive our Air Force and Australia of the experiences needed to develop our combat power into the new century.

Joint Operations for the 21st Century describes what we want from our future force. It guides our concept development and experimentation, our doctrinal development, and the testing of our future capabilities. The future force it describes is a recognisable development from our current force.

This future force is balanced, networked and deployable. As we have seen, this force is integrated and interoperable, survivable and robust, ready and responsive, and agile and versatile. However, to achieve the effects we think will be required into the future, this force also needs to be persistent and poised, sustainable, and capable of concurrency.

It is a future force designed to achieve our mission of defending Australia and our national interests well into this unpredictable century.

KEYNOTE ADDRESS:
AIR POWER AND NATIONAL SECURITY

SENATOR THE HON. JOHN FAULKNER

Ladies and gentlemen, let me begin by acknowledging the traditional owners of this land, and paying my respects to their elders past and present. Let me also acknowledge Air Chief Marshal Angus Houston, AC, AFC, Chief of the Defence Force; Air Marshal Mark Binskin, AM, Chief of Air Force; and other distinguished guests.

Australia was just two years past Federation when the Wright brothers made the first powered flight. We are an island nation, both surrounded by, and containing, great distances. The wide blue sky above our wide brown land has always been a part of our strategic and security plans. As early as 1911, the Fisher Government announced the intention to establish a military air service.

The fledgling Australian Flying Corps (AFC) had scarcely been formed before it was called upon to defend Australia's national interests in World War I. Following the war, Australia became the second nation in the world, after Britain, to formally create an independent air force.

Today, the global reach afforded by air power makes it an integral part of all defence operations both within Australia and as part of expeditionary deployments across the world. And air power continues to capture the public imagination as it did in both the World War I and II, through its combination of cutting-edge technology, powerful influence on air, land and sea operations, and the highly visible feats of individual pilots.

Today, the four key roles of the Air Force are:

- control of the air;
- strike;
- intelligence, surveillance and reconnaissance (ISR); and
- air mobility.

In Australia, it is easy to take control of the air for granted, as it has been 65 years since Australian soldiers or sailors were killed as a result of direct enemy air attack. Nonetheless, the requirement for control of the air remains the fundamental and enduring basis for all joint operations.

The 2008 Air Combat Capability Review and the 2009 Defence White Paper both concluded that control of the air over our territory and our maritime approaches is critical to all other operations in the defence of Australia.

In relation to strike, the RAAF's strike capability allows Australia more scope to determine the pace and location of hostilities, and would impose major defensive costs on an adversary

contemplating hostile action against us. Strike assets can, and have, supported Australian forces abroad, and offer a valuable option for contributing to regional coalitions.

Ladies and gentlemen, our control of the air and strike capability will be maintained and enhanced with two key acquisitions.

The arrival of the F/A-18F 'Rhino' Super Hornet will allow Australia to retire the F-111 in favour of a more capable platform, better able to meet future military challenges. In the nearly 50 years since the F-111 was designed, the air combat environment has changed to the extent where it is no longer able to provide all the capabilities that Australia requires.

The Super Hornet is a highly capable, battle proven, multi-role aircraft that has already proved its effectiveness in service with the US Navy. Its flexibility will enhance all four aspects of Australia's air combat capability, through maritime and land strike, suppression of enemy air defence, reconnaissance, air-to-air combat and close air support. In addition, 12 of the 24 Super Hornets will be wired on the production line to enable, should strategic circumstances dictate, conversion to the electronic attack 'Growler' variant—the EA-18G.

The Super Hornet is a first-class multi-role fighter, which will deliver a significant improvement in Australia's air combat capability and enable Air Force to smoothly transition to the future Joint Strike Fighter (JSF) force towards the end of this decade.

I am pleased to say that the Bridging Air Combat Capability (BACC) Super Hornet acquisition is ahead of schedule, as was demonstrated last Friday by the delivery of the first tranche of five aircraft to Australia.

But while the Super Hornet will greatly enhance Australia's air combat capability, it is the JSF which represents the next generation of air power for Australia. The JSF's combination of all-weather strike, stealth, advanced sensors, advanced networking and data fusion capabilities will provide unprecedented situation awareness, survivability and lethality—allowing Australia to maintain its capability edge and control its sea and air approaches.

In November 2009, the Government announced approval for the acquisition of Australia's first 14 JSFs, with the infrastructure, and support, required for initial training and testing. With such a large and complex project there are, and will continue to be, risks. These risks are being carefully measured, mitigated and managed.

That is why Australia welcomes the recent decisive action by the US Government to keep the JSF Program on track. The US President's Budget for Fiscal Year 2011, released on 1 February 2010, provides an additional investment of some US\$11 billion for 43 aircraft and ongoing development and testing. This reflects the US Government's strong ongoing commitment to the JSF Program as the backbone of the future tactical aircraft inventory for the US Air Force, Navy and Marine Corps, and for partner countries, including Australia.

While there have been cost and schedule issues over the last couple of years, in a recent major development for the JSF Program, the first Short Take-Off and Vertical Landing JSF—the most technically demanding of the three variants—completed the first short take-off, the first hover in flight and the first vertical landing. This is a major milestone not

only for the JSF Program but also in aviation generally—a supersonic stealth aircraft that can take off in short distances and land vertically.

I can report that ground structural testing has also been progressing very well with ground test aircraft completing testing at about three times the rate of earlier aircraft programs.

Testing of the stealth performance of the aircraft is also progressing well—meeting predictions based on new technologies that will significantly reduce the time and cost of maintaining the stealth capabilities.

All JSF sensors are performing well in the laboratories and on surrogate test aircraft, and will soon fly on the first JSF avionics test aircraft. And by the end of 2010, the 19 test aircraft already on contract should be delivered to the flight test sites. The first production aircraft should be delivered to Eglin Air Force Base to commence training at the first Integrated Training Centre.

The Australian Government's staged acquisition strategy for the JSF includes significant cost and schedule buffers to deal with project risks, which will make sure that initial operational capability in 2018 is met. Recent announcements in the United States in regard to the JSF timetable are still well within that buffer.

Ladies and gentlemen, intelligence, surveillance and reconnaissance (ISR), always crucial to operations, have never been more important than on the modern battlefield.

Air Force's ISR capabilities are a key element of all joint operations. The Air Force provides ISR systems with the flexibility to detect, locate, identify and track a wide range of targets in a variety of contexts. Australia's geography and the breadth of our national interests require the Air Force to own and operate ISR capabilities that can reach and operate over distant and wide areas, in the maritime, land and air domains.

The Government is introducing more persistent surveillance and reconnaissance platforms with high-fidelity sensors, which will provide greater breadth, quality, usefulness and timeliness of data across the network. Integrating that data will enable superior situational awareness. This means we will be more aware, earlier, of potential threats to ADF operations and will be able to respond more quickly and with more effect.

In mid-April 2009, the Government approved a proposal by the ADF to increase the ISR capabilities afforded to Australian and International Security Assistance Force (ISAF) ground forces in Afghanistan through the lease of a medium altitude, long endurance (MALE) unmanned aerial system, the 'Heron'. This is Air Force Project *Nankeen*.

The Heron is a one-tonne unmanned aerial vehicle (UAV) capable of missions in excess of 24 hours. Within 90 days of approval, Air Force and Army crews were trained in this new capability and were available for deployment. ISR missions for the Heron include improvised explosive device (IED) search, overwatch, and battle damage assessment.

Less than nine months after government approval, Air Force Project *Nankeen* now provides consistent, reliable ISR support for Australian, Afghan and ISAF combat and mentoring missions. The experience that Air Force gains in operating long endurance UAVs in

Afghanistan will also help shape the development of unmanned Defence capabilities for Australia through the next decade.

Ladies and gentlemen, the ADF's ability to move personnel and equipment rapidly to and around a theatre of operations is crucial to combat operations and to responses to natural disasters and humanitarian crises.

Air mobility, the rapid movement of personnel, materiel and forces to and from a theatre of operations, and within that theatre, includes air logistics support, airborne operations, air-to-air refuelling and aeromedical evacuation. Perhaps one of the most memorable examples of the use of air mobility was the Berlin Airlift, an operation in which the RAAF took part, flying 2062 of the more than 550 000 sorties and transporting 7030 tonnes of freight and 6964 passengers out of the 500 000 tonnes of food and 1.5 million tonnes of coal which supplied Berlin during the Soviet blockade.

Our contribution to the stability and security of the South Pacific and East Timor creates a requirement for not only land forces but air and sea lift capabilities. Humanitarian and disaster relief tasks within our borders and beyond also require integrated operations in which air capabilities play a crucial part.

To meet these challenges, Australia's Defence Force needs a wide range of capabilities which can be deployed with very little warning, including sea and air lift, aeromedical evacuation assets and medical support, logistics and air traffic control.

The Hercules aircraft is the workhorse of the Royal Australian Air Force, conducting combat airlifts in the Middle East Area of Operations since August 2004, where they have just exceeded 20 000 flying hours supporting Australian and Coalition troops. Three aircraft are currently stationed in the Middle East. They are also frequently called on for short-notice operations in the South-East Asian and Pacific regions, such as transporting humanitarian supplies to Fiji in the wake of Cyclone Tomas two weeks ago, as well as responding to domestic contingencies such as providing flood relief in North Queensland.

While the C-130 is the workhorse of the RAAF, the C-17 is the giant. The ability of the C-17 to provide up to four times the load carried by a C-130 over twice the distance and much more rapidly has given the ADF the ability to rapidly transport large outsized cargo and personnel over long distances.

Ladies and gentlemen, the Defence Capability Plan will deliver further improvements to the RAAF's airlift capability.

AIR 8000 is a project to provide the ADF with the latest in battlefield lift capability. AIR 8000 Phase 1 will provide two new C-130J Hercules aircraft, while AIR 8000 Phase 2 will replace the RAAF DHC-4 Caribou transport aircraft to provide a light tactical fixed-wing airlift capability. The planes will be able to operate from a wide range of rudimentary airstrips, with a useful payload, range and in-theatre survivability.

Underpinning these enhancements to air combat, strike, ISR and airlift, the development and implementation of an integrated and adaptive command and control system will deliver

decisions that enable precise engagement and permit real-time flexibility and adaptiveness when on operations.

Combining these developments with our Air Force's time-proven skills in generating air power for operations will ensure the RAAF remains operationally effective and relevant to the Government's needs and the community's expectations through time.

Ladies and gentlemen, the exciting possibilities of sophisticated air combat technologies often garner the most attention in discussion about Air Force, and indeed ADF, capabilities. But ask anyone in Defence what is the most important capability defence has, and they will tell you: it is our people.

Air Force recruitment is strong, with many young Australians attracted by the unique experiences available through the wide variety of jobs in the RAAF. The opportunity to work for a modern organisation and learn the skills needed to operate and maintain some of the world's most advanced technological equipment, while working to protect Australia and assist in vital humanitarian work, has seen many choose the RAAF as a career, and record numbers of Air Force personnel choose to stay in the Service.

Air Force recruitment has a year-to-date achievement of 92 per cent (411 from a target of 449), while total force separation rate (including personnel under training) at 1 January 2010 was 5.2 per cent, compared to 7.3 per cent at 1 January 2009. Recruitment of medical officers continues to be the sole area of concern.

Of course, recruitment and retention are only part of the challenge. As well as having the right people, we have to make sure they have the right training.

The ADF currently conducts fixed-wing flying training at three locations: Tamworth, RAAF Base East Sale and RAAF Base Pearce. Project AIR 5428 Phase 1 will provide joint fixed-wing pilot training for the ADF. The project aims to utilise basic and advanced training systems to increase the efficiency and effectiveness of the fixed-wing Pilot Training System (PTS). Specifically, the system will:

- enable an increase in graduation numbers;
- generate pilot skills consistent with advanced fourth/fifth-generation aircraft;
- enable the withdrawal of current training media; and
- provide solutions for the integration of synthetic training systems.

AIR 5428 Phase 1 achieved First Pass on 22 July 2009.

Future basing location has generated significant interest from industry, local interest groups and local, State and Federal members. Under AIR 5428 Phase 1, the Government agreed at First Pass on 22 July 2009 that RAAF Base East Sale would be publicly identified in the tender documentation as a basing solution for the future basic flying training school, involving relocation of flight screening and basic flight training from Tamworth to RAAF Base East Sale, noting prospective respondents would be required to tender for another location in addition to East Sale.

All basing proposals will be considered on a value for money basis with the final basing decision being made by Government when AIR 5428 seeks Second Pass approval by FY 2013–14.

Ladies and gentlemen, the Air Force of today and the air capability it provides is a key component of operations such as Operation *Slipper* in the Middle East and, closer to home, ADF operations to respond to the Victorian bushfires, Operation *Padang Assist* in the wake of the Indonesian earthquake, and Operation *Samoa Assist* after the earthquake and subsequent tsunami there.

The future Air Force will be carefully designed for balance against strategic need. It will need to meet the requirements of a joint military and whole-of-government, national approach to Australia's security. Air Force will need to operate seamlessly in the joint environment, be able to integrate with the United States, United Kingdom and other allied forces, and be interoperable with coalition and regional partners.

It has been 101 years since King O'Malley's prescient 1909 remarks on the importance of aircraft to the defence of Australia. O'Malley, of course, was true to his long history of taking a good idea to ridiculous extremes. He argued that aircraft would render an Australian Navy, perhaps even Army, unnecessary. The history of air power in Australian defence has, instead, been one of an essential component in an integrated force. There are things air power cannot achieve alone: but today, nothing can be achieved without it.

As we approach the centenary of the decision to form a military air service for the defence of Australia, I am confident that the RAAF will continue to meet the emerging challenges of air power in the 21st century, and am committed to ensuring they have the right capabilities to do so.

AUSTRALIA'S NATIONAL SECURITY POLICY AND AIR POWER

MR DUNCAN LEWIS

INTRODUCTION

Chief of Air Force, Air Marshal Mark Binskin, general and flag-ranked officers, distinguished guests, ladies and gentlemen, good morning. It is a great privilege to have been invited to speak to a gathering such as this and I would like to pay personal thanks to Mark Binskin for the kind invitation.

When I was a young officer, I was brought up like many of you in this room on a standard diet of Giulio Douhet, Trenchard, Mitchell and all those sort of characters, and I could never really understand it much as a young officer. But I must say, as my career progressed and I spent more time particularly looking at operational effects, it became apparent to me that we could not just rely on air power itself, but air power was an absolutely critical component of the total when trying to achieve some sort of military effect. We went through a sort of silly period back there in the late 1980s or 90s, I think it was, where everything was being sacrificed on the 'altar of air power'.

When I was working out what I might say to this group today, I pulled out a piece of paper. Unfortunately, you cannot see this but it is a piece of paper headed 'Sheraton Tacoma'—the Sheraton Hotel in Tacoma, Washington—and on it are handwritten notes that I took at the time. It was after Gulf War One and I was reminded at a meeting—it will not surprise you to know this was an Army meeting—that there were 6766 sorties flown in Kosovo, of which 3766 or 56 per cent were aborted. A further 990 were adversely affected and less than 50 per cent of the Air Tasking Order (ATO) was engaged. The speaker at the time then went on to remind us of an interview with an Iraqi tank battalion commander, who went into Kuwait, at the time of Gulf War One, with 39 tanks and suffered 20 days of constant air attack, and at the end of that 20 days he had 38 tanks. After 20 minutes close combat with the 7th Infantry Division he had none. Now those statistics actually are factual, but I do not want to bore you with the detail of it. The point I am trying to make here is that we are all dependent one on the other, and air power, I have come to discover in my military life, is a significant and essential component of delivering military effect. However, I have discovered in my more recent life since I have left the military that air power is indeed an absolutely critical component of achieving 'national' effect to provide for the national security of this country. You people and your interests are a critical component of that and so, as an officer who spent most of his time in the Special Forces environment, it will not surprise you to know that I am personally a great advocate of air power and what you can bring to the fight.

I want to talk about three things today:

- The framework of the national security structure.
- National security and air power.
- How does air power serve the needs of the Government?

So I will just break it up into those three tranches. I will speak largely about the first point as that is the primary area you probably want to hear about from me.

FRAMEWORK FOR NATIONAL SECURITY



Figure 1: Context

For our visitors here, the scenes depicted in Figure 1 might not be as identifiable as for the Australians in the audience. The left-hand side, 1975, was the year that I graduated as a young officer, and on the right-hand side, last year, is the range of issues that have more recently confronted the national security community. The point I want to make here is that on the left it is comparatively simple. I mean, there are a few issues there—Papua New Guinea independence, the East Timor evacuation, obviously the significant event of the Whitlam Government and its dismissal, and the Vietnam War which was just coming to an end at that point—but things were relatively simple. On the right-hand side, however, you are looking at the significantly different challenges that we face today and they are very complex; things like a natural pandemic, the boat people—a topic that is on the front page of the newspapers again today—and issues to do with natural catastrophes, the Victorian bushfires, the Padang earthquake and the tsunami and so on, and I will talk more about

those later. But the point is that we face a far more complex national security mix today than what we faced back in 1975.

KEY REFORM DOCUMENTS

I want to talk here about two seminal documents: the National Security Statement and the Homeland and Border Security Review:



Figure 2: Key Reform Documents

Homeland and Border Security Review. As shown in Figure 2, the Homeland and Border Security Review was conducted by Mr Ric Smith, a former Secretary of the Department of Defence. He finished it in the middle of the year before last and we spent the rest of that year, 2008, agreeing what should be done and then all of last year actually starting to put it into place. We are about 70 per cent through the implementation of Ric Smith's report. He had 44 recommendations in that report and we are on track to complete them all. There might be one or two right at the end that could be a bit 'sticky' but, basically, we are tracking very well at this stage to complete that report. The importance of Ric Smith's report was that, as you may recall, when this Government came to office there was a decision to be made as to whether we would have a Department of Homeland Security à la the US model, or whether we would have some variation on what we already had. Ric Smith came down very firmly to recommend that we should modify what we have got, make it better, and the Government accepted that and that is what we have been doing for the last 12 or 18 months.

National Security Statement. On 4 December 2008, the Prime Minister stood up in the Parliament and delivered the National Security Statement and that statement is seminal because it basically set a new direction for our national security community. Now Defence, and almost everybody in this room is of course in that space, has come from a very mature framework. We have been doing the 'Defence' bit for a very long time, but the other bits of national security are far more immature and they need some serious work to get them up to a level of maturity that would resemble anything like the deliberative way in which a Defence Force can go about its business, or indeed a Defence Department can go about its business. In the National Security Statement, the Prime Minister set out a number of strategic priorities and, of course, he announced the Government's response to the issue of whether we would or would not have a Department of Homeland Security.

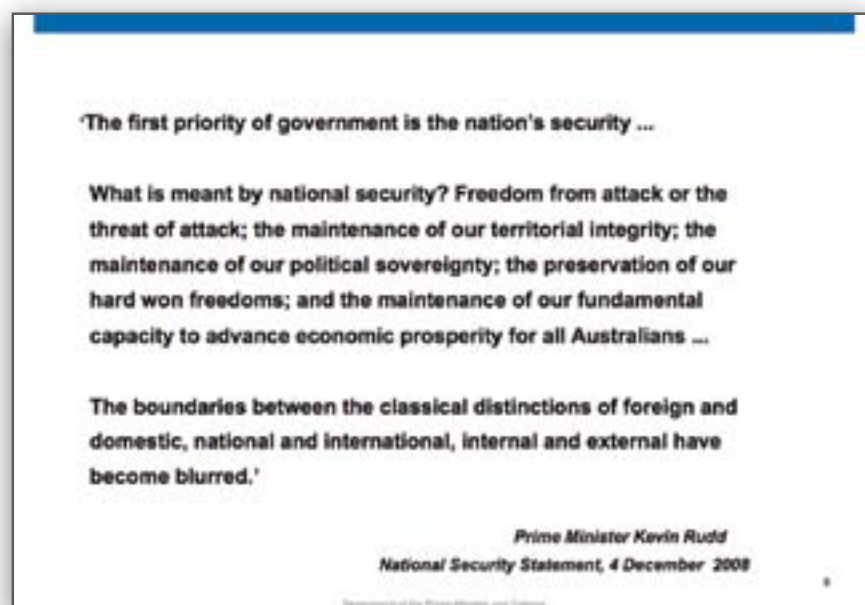


Figure 3: Extracts from Prime Minister's National Security Statement

Figure 3 shows some extracts from the National Security Statement. I would point out that these are the Prime Minister's words, not mine. You should pay particular attention to the last three lines. I think that issue about the blurring of the lines between domestic and national, and between international and internal/external is particularly important for us all to understand because that is where I work every day, at the blur. We are on the blur between those issues and, in my view, it is actually where the most complicated part of the work lies.

CURRENT STATE OF PLAY

Figure 4 gives you an indication of some of the major pieces of work that we have completed in the last 12 months under this new national security framework.



Figure 4: Achievements One Year On from the National Security Statement

Starting in the top left-hand corner of Figure 4 is the Strategic Policy Framework—I will talk about that in more detail in just a moment. The Defence White Paper you all know about. The National Security Science and Innovation Strategy was launched in about November last year. The Cyber Security Strategy was launched about the same time by the Attorney-General—that is the national one as opposed to the internal government cyber security arrangements—and you all know about the creation of the Cyber Security Operations Centre (CSOC) within Defence, opened by the Minister for Defence in January of this year. The Australian Civilian Corps is a group of what will become 500 selected and trained, volunteer civilians who will be available to deploy to various parts of the world where we have failing or failed states, and they can engage directly in capacity building in a more professional and a more directed and coordinated way than the pretty ad hoc sort of arrangements that we currently have in place. Next is the Federal Audit of Police Capabilities and the Senior Leadership Forum in the bottom left-hand corner—I will talk more about that also in a moment. Lastly, is the Organised Crime Strategic Framework and the Aviation White Paper—that is the aviation industry White Paper as opposed to anything military; it is all to do with civil aviation security.

National Security Strategic Policy Framework. I said I would come back to the National Security Strategic Policy Framework. As shown in Figure 5, there are three elements to this: assignment of priorities, the allocation of resources and then the evaluation. There is a lot of heavy lifting to be done around this work, which has not previously been completed for the national security community as a whole.



Figure 5: National Security Policy Framework

Coordinated National Security Budget. Figure 6 shows what the Coordinated National Security Budget is going to deliver. It will ensure the effective allocation of national security resources across the Government and, again, Ministers will have this full purview of where their money is going.

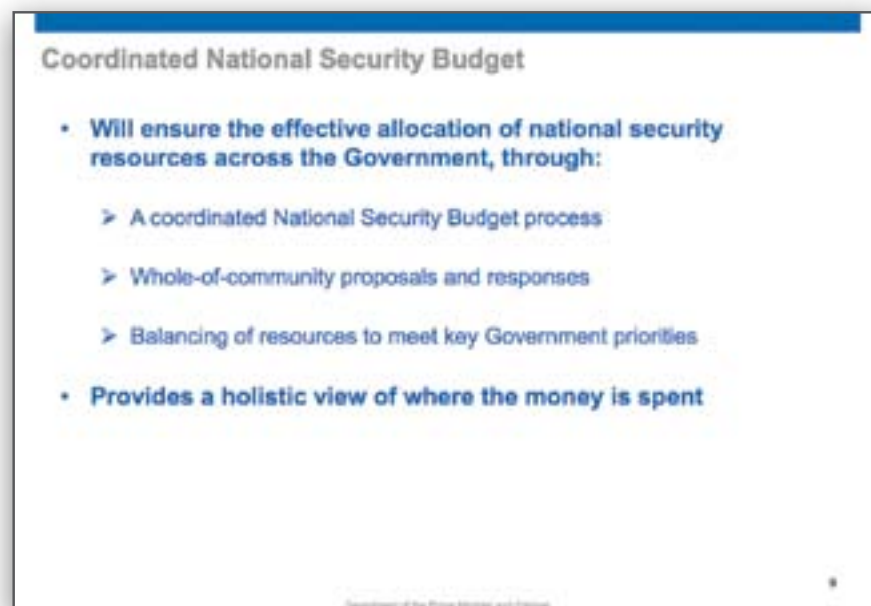


Figure 6: Coordinated National Security Budget

ROLE OF THE NATIONAL SECURITY ADVISER

My wife often accuses me of being good about talking about myself, so indulge with me for a moment while I talk about the role of the National Security Adviser (NSA). We have not had an NSA in this country in the past and, for our visitors who are here, some of you have NSAs and some of you do not. We, and certainly I, have been much inspired by the US journey. We have a very different system of government here of course, but nevertheless the journey of the National Security Council and a series of National Security Advisers in the United States is an edifying one for anybody in my position. If any of you have not read a book called *In the Shadow of the Oval Office*,¹ then I suggest you get hold of it. It is written by Ivo Daalder and I.M. Destler, two American authors, and is a very good and current account about the development of the NSA's position. I read with enormous interest that, if you look at NSAs, some have been more successful than others, and some more spectacularly less successful than others, but the one in particular who shines through as being a very successful National Security Adviser is Brent Scowcroft, an Air Force officer. For those of you who have not met him, he is a fairly small, diminutive figure, quietly spoken, but enormously effective because he managed to achieve trust; trust between the Secretary of Defense, the Secretary of State and all the big players in Washington. The biggest risk you run as an NSA is that you get crunched between the big players and I empathise with that because I am in that sort of position myself, in a way, sitting between Ministers of Foreign Affairs, Ministers of Defence, Attorney-Generals, Prime Ministers and all of their secretaries and agency heads. The only way you can actually make progress in this business is by engendering, developing and maturing trust. As soon as my organisation loses that trust we are done for.

The job has been everything that I thought it would be, plus some, and there are a few dimensions to the position that I had not really seen coming. If you had told me, for example, that a year and a bit ago I would have been wandering around behind the Prime Minister at the Victorian bushfires, I would have thought that was unlikely, but it is that kind of thing where the NSA position has also come to be engaged. In other words, I represent for the Prime Minister something of a one-stop shop. He needs to be able to turn around and say, 'Fix this, make it happen. Make it so that we have air support for the Victorian bushfires, or that we have the Army deployed for such and such'. He needs a one-stop shop and he needs someone who can find his way around the bureaucracy at a sufficiently high level to make stuff happen, and happen quickly. So that was a kind of unexpected, sort of direct (almost operational) part of the job, and I am not into operations, but you can see where I am going here. There is a certain urgency in the requirement of the Prime Minister to be able to give instructions and get stuff happening. The rest of the job is all as you would expect; it is policy, it is central coordinated policy. I really do three things: I provide advice to the Prime Minister, I coordinate across agencies and I provide leadership where the intersections of policy occur. So where there is a crossover, where there are crosscutting

¹ Ivo H. Daalder and I.M. Destler, *In the Shadow of the Oval Office: Profiles of the National Security Advisers and the Presidents They Served—From JFK to George W. Bush*, Simon & Schuster, New York, NY, 2009.

policy issues, that is where my organisation, and me personally, provide the leadership that is required in that situation.

I would now like to discuss a few issues about culture and, in particular, about engendering a culture of cooperation and collaboration within the national security community.



Figure 7: Engendering a Culture of Cooperation and Collaboration

We have expanded the membership of the National Security Committee of Cabinet (NSC), bringing in some formerly, more tangential players. We also have increased the membership of the Secretaries Committee on National Security (SCNS) by including people like the Department of Immigration, the Australian Customs and Border Protection Service, and the Australian Federal Police, who were hitherto not full-time members. So we have got additional people in there who represent this broader span of responsibility.

National Intelligence Coordination Committee. Prior to the establishment of the National Intelligence Coordination Committee (NICC) in 2009, we did not have a peak body that could bring together the strategic coordination of national intelligence. You all know that there are three bits of intelligence. There is foreign intelligence, there is security or domestic intelligence, and there is law enforcement intelligence, and all three of those intelligence bodies are separated in our country as a matter of law. There are separate legal divisions around each of those, whether it is foreign, domestic or law enforcement intelligence. Well, we have established the National Intelligence Coordination Committee, which I chair, and it has on it the heads of all of the intelligence agencies—the six inside Defence plus some of these other more, dare I call them, peripheral, but these less directly engaged organisations like the Australian Crime Commission, the Australian Federal Police, Customs and Border

Protection Service, and Immigration. The NICC enhances the ability of Australia's security agencies to share information, coordinate effort and identify opportunities to improve the whole-of-government response to terrorism and other national security challenges. The committee has been running for about 14 or 15 months and I think it is producing some pretty good results at this stage. We are not into operational sort of control. We have not got the 2000-mile screwdriver out there adjusting where our intelligence efforts are going on, but we do provide a framework within which each of our intelligence agencies operate.

National Security Chief Information Officer. We decided very early in the piece that we would need somebody, a senior officer, who was charged with the responsibility of bringing some sort of order into what I can only describe as the chaos of our covered information systems. All of our international guests here are probably smiling, not because they have got it sorted but because it is a common problem. We all have this difficulty. We now have one officer, Rachael Noble, who works for me as the National Security Chief Information Officer (NSCIO) and her role is to bring some sort of order into this business; to make sure that we can talk from one end of the system to the other, while still having the necessary filters in place to ensure that, if there is penetration or compromise in one place, that it does not permeate the whole show. Now, technically, that is not easy but we did find that most of the problem, and this will not surprise any of you, is cultural. It is not actually the widgets, it is cultural. It is trying to get people to understand that they need to come on board and be able to share information. That is where we get our advantage in a society such as ours, in the rapid handling and management of information. So there is a big job of work going on around that.

Senior Leadership Forum. The photograph on the right-hand side of Figure 7 shows the first of our national security executive forums, the National Security Community Senior Leadership Forum, held in September 2009. I intend to run these once a year. The Prime Minister and the Minister for Defence both addressed last year's forum. It was certainly a joy to my heart to see about 180 Senior Executive Service (SES) officers from across the national security community, from one end to the other, all sitting in one room receiving a common set of messages and able to exchange ideas one with the other.

National Security College. I just want to digress here as there is another point I want to address and that is the matter of the National Security College. Many of you will have read about the appointment late last year of Professor Michael L'Estrange as the founding Director of the National Security College. Michael has set himself up over at the Australian National University (ANU) and is developing a range of courses aimed at enhancing Australia's national security capability. We are in serious negotiation with the Australian National University right now about how these courses are going to be framed, run and, most importantly, paid for, but the bottom line is that we do need a greater degree of development for our Senior Executive Service, primarily across the Australian Public Service (APS). As somebody who has spent most of his working life in a uniform, I was appalled when I joined the Public Service to find what scant disregard was paid to training. I am a bit embarrassed to tell you this but I spent nearly *nine years* on the 'Queen's tick' being educated while I was in uniform. If you got *nine days* of professional development in the Public Service you would consider yourself lucky. We need to redress that issue and we

need to establish this National Security College and make sure that it runs, and that it runs properly, and I am determined to do that.

FUTURE CHALLENGES

I now want to say a few words about future challenges and where it all goes from here.

Global Financial Crisis. The global financial crisis obviously has had a number of impacts on us, the most obvious one, of course, being stringency in budget circumstances for the next few years at any rate. You will read in the paper every day about how well the economy is doing and how well it has bounced back and so on, but like every other country that put in place a stimulus package, we are in the business of paying that package off and that is a priority. So, money is going to be tight for the next four or five years and we just need to get used to that. For a lot of our young people that is a bit of a shock. I notice that the grey-haired sort of folks, myself included, in the audience would not be surprised with this because we have lived through times of stringency in the past. But for the national security space, maybe not the last two years but the 10 years or so before that were really years of plenty. Well, we have moved on.

Cyber Security. Cyber security is going to be a major issue. There are some very serious discussions going on with the United States at present. Quite clearly, the world or at least the 'like-minded' in the world are very dependent on the United States moving into some sort of leadership position around this issue and, certainly, all the recent engagements I have had with leaders in Washington indicate that the United States is well and truly prepared to do that and we need to get on board. But cyber security is a big deal and it is a whole-of-nation issue, and it affects everybody, from my mother right through to the highest classification of security IT systems we have.

Natural Disasters. Whether you are a global warming advocate or not, it does not matter. Whether you are into climate change or not, it is irrelevant. The fact of the matter is that the statistics show that we have had more disasters of greater impact in the last few years than we had in the previous years—maybe not more by number, but certainly more in terms of the impact. That is, every time one of these things hits, it is affecting more human beings and simple mathematics will tell you that there are more human beings around to be affected. So, we do have an issue around natural disasters. I am not entirely satisfied that we are internationally hooked up as well as we could be. I think regionally we could be doing a lot more. Certainly, we need to put in place a sufficient level of planning and the pre-planning that is required before these events, rather than running around after the wave hits and trying to put in place a system after the fact. So, there is a lot of work to be done around that.

The Asia-Pacific Century. You all know, you have seen the statistics. Based on any straight-line projection, the century we are in now is likely to be an Asia-Pacific century. The Asia-Pacific region contains 60 per cent of the world's population, 65 per cent of productivity and, most importantly, last year the Asia-Pacific represented 75 per cent of the increase in global productivity. Now that is the important statistic. So the trend is upwards and we need to make sure that, as a nation, we have got on board with that trend and we are leveraging it for all it

is worth. Of course, with opportunity comes threat and so there is a requirement to keep a weather eye on where this is all going and I am conscious that it is a sort of a two-headed coin.

National Security and Aid. National security and aid is another area of challenge. I have already mentioned the Australian Civilian Corps. I know we are increasing the amount of money that we are putting into Overseas Development Assistance (ODA). We are increasing that dramatically and the sums of money now that are available for Overseas Development Assistance are significant. What we need to ensure is that we have the maturity of the systems around that money to make sure that it is properly spent and properly directed, and there is a huge amount of work to be done in that space.

Where to from here? There are a few things, as shown in Figure 8, that my organisation needs to spend a lot of time thinking about over the next year or so. We need to strengthen this national security community. I would say 95 per cent of the community is on board but there are still a few doubters out there, people that have not quite picked up on the thread of this thing yet, but it is behoven on me to ensure that we continue to engender this spirit, this sense of 'national security'. All of you in the audience here, as young military officers, discovered 'jointery'. You went on the journey to 'joint' and then at some later stage in your careers, you went on the journey to 'combined' and then, for those of you in very senior appointments, you would have started the journey or gone on the journey of 'whole-of-government'. Basically, I am in the business now of whole-of-government. That is what I do every day and you are a component, a hugely important component of that, but you need to realise that you are a component and you need to bring everything that you can to the whole-of-government table.



Figure 8: Where to from here?

DEFENCE STRATEGIC GUIDANCE AND AIR POWER

I now want to move over onto your part of the deal and I am going to travel fairly quickly through this because you do not want to hear from me about the intricacies of air power, you are far more expert than I am on this.

Firstly, Defence strategic guidance and planning (Figure 9). Every five years, we are going to have a Defence White Paper and we will have an update of the Defence Capability Plan (DCP) on a six-monthly basis. The DCP will not be made public, but that constant upgrading is necessary as we go through our force planning. What is important in Figure 9, if you remember no other thing, is the word 'flexibility' in the second dot point. I have seen this time and time again around the Cabinet Table, what the Government is after is *flexibility*. They want to make sure that when they turn around and ask Defence to do something that you can in fact do it. I have been sitting in that room, both in and out of uniform, and listened to discussions about whether we could deploy this or we could deploy that and I have been astonished at the almost 'conservatism' sometimes expressed about, 'Well we don't really want to deploy this, that or the other thing'. Well it does not matter whether you want to do it or not, if the Government wants medical support to go here, or it wants air transport to go there, then you do actually have a burden to carry here and you need to make sure that you are up to it on the day. Now that is being a bit glib but, nevertheless, I just want you to understand that when you are in the room, and when the Chief of the Defence Force (CDF) is in the room, that is the sort of discussion that takes place. The Government does expect flexibility out of its Defence Force. Now I know, of course, from when I was sitting on the other side of the fence that you are being pulled every which way. I mean, 'Do you want me to do that? I can't believe you've asked me to do something like that'. So I do understand that it cuts both ways, but you are a *public service*. I do not mean that in an APS sense, but you are a *service* to the public and to the Government.

Figure 10 lists the major air power issues identified in the 2009 Defence White Paper: *Force 2030*. There was quite a bit of stuff about air power in the White Paper and I do not want to bore you witless about this. As far as the multi-role combat fighters are concerned, people are always asking me, 'Is the JSF right or not?' Well, I am a convert. I am absolutely convinced that it is the right aircraft and I hear and I read all the other sort of comments that are made, but I can tell you that I am on board with this and very supportive of the project and I do wish it well. We have had some teething problems, as you know, with some of those other projects listed, but nevertheless that is the suite of things that came up in the White Paper and I am not going to deviate from that.

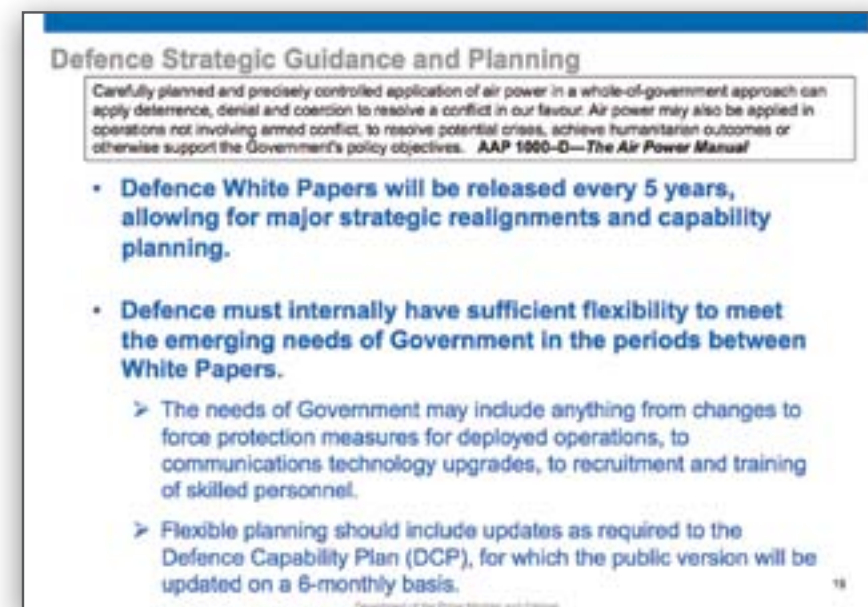


Figure 9: Defence Strategic Guidance and Planning

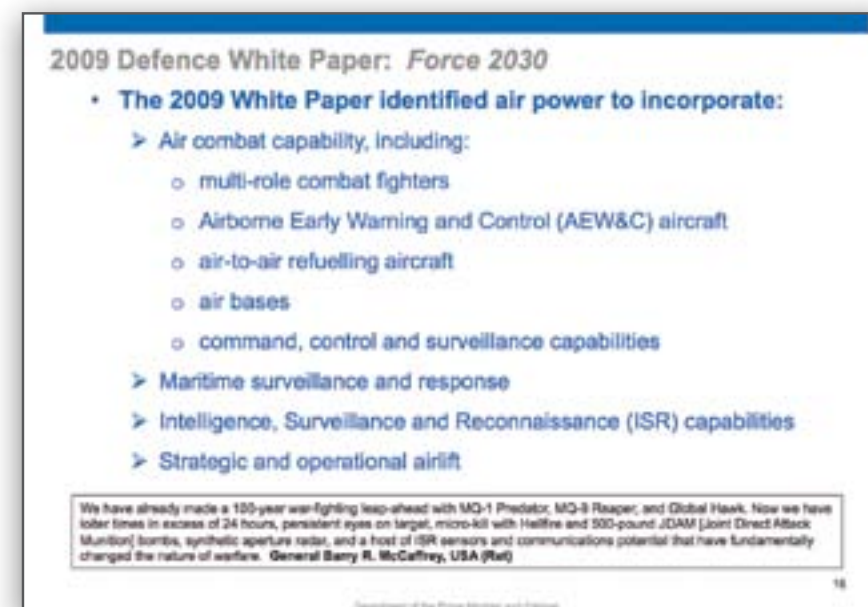


Figure 10: 2009 Defence White Paper: Force 2030

Use of Air Power on Operations. Figure 11 address the Government's use of air power on operations. Again, this is not profound but you all know that strategic lift, aerial surveillance, communications and rotary wing assets, in particular, are becoming very attractive to the Government for all sorts of reasons.

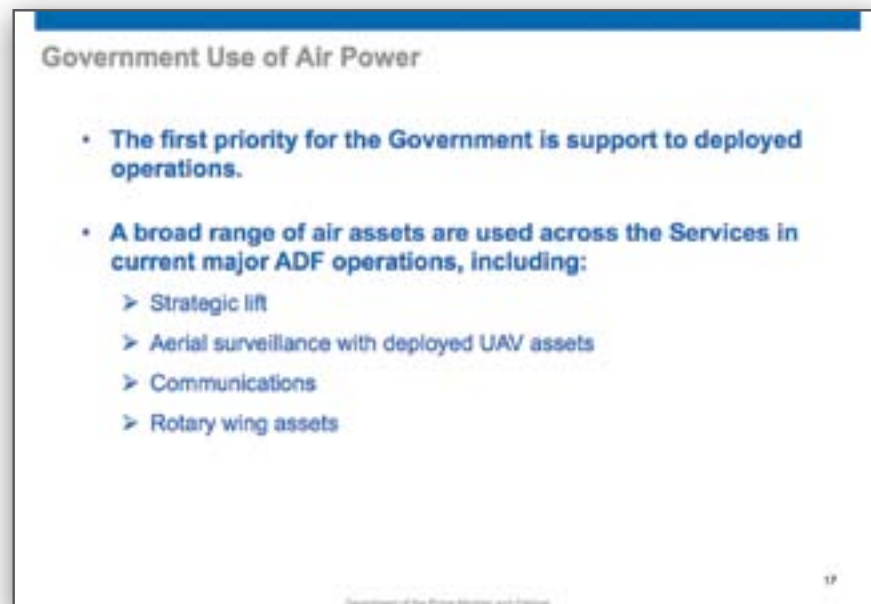


Figure 11: Government Use of Air Power

Deployed ADF Operations. Figure 12 lists the air assets that we have got deployed on Operation Slipper. The CH-47 Chinooks are interesting. It was one of those discussions that I had many years ago, where I sat in the room and somebody suggested, 'Why don't we put CH-47s into Afghanistan?' and there were aghast looks on the faces of the uniformed members present, an outrageous suggestion. How could we possibly do it? I see there is a couple of nodding heads in the room here who were with me at the time. Anyway, there it is. What else would you do but to send CH-47s to a conflict like that?

Other Activities. Of course, it is not just warfighting for which air power is used. As shown in Figure 13, air power encompasses a whole lot of other activities outside the traditional 'defence' operational context and these are the sort things that the Government is looking for on a pretty regular basis.

Humanitarian Assistance. I mention humanitarian assistance (Figure 14) as this is a growing concern for me and I think we are going to see a lot more of this. We currently have RAAF air traffic controllers over in Haiti providing valuable operational support in the wake of the devastating earthquake which occurred there in January this year. You all saw what we did with Air Force in Operation Padang Assist following the Padang earthquake in October last year. Air power is very well positioned to provide support at times of natural catastrophe and we need to make sure that it is ready to do that.



Figure 12: Air Assets Used on Deployed ADF Operations

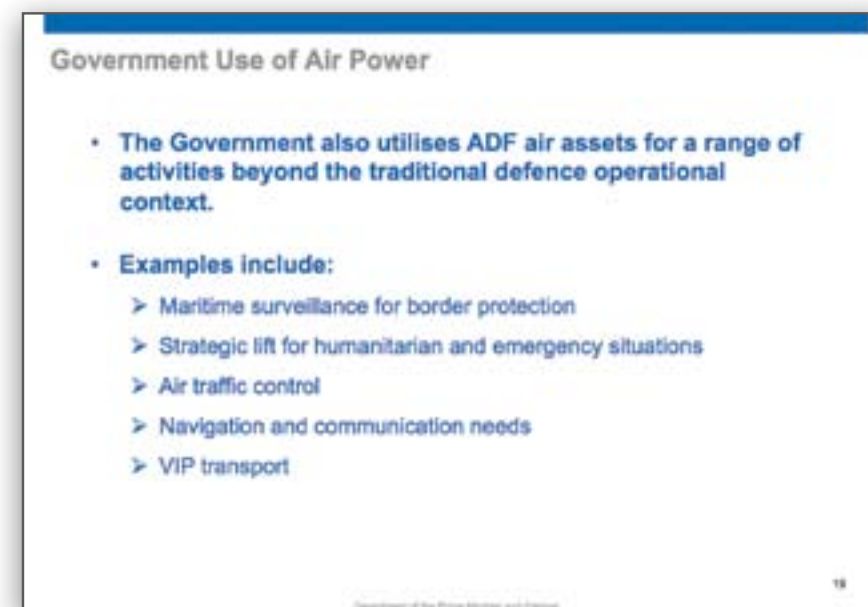


Figure 13: Government Use of Air Power for Other Activities

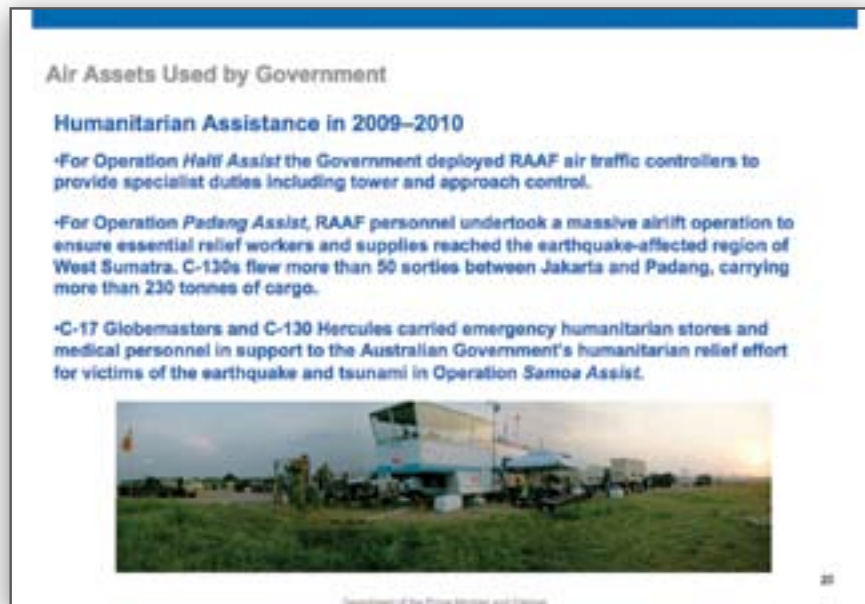


Figure 14: Air Assets Used by Government – Humanitarian Assistance

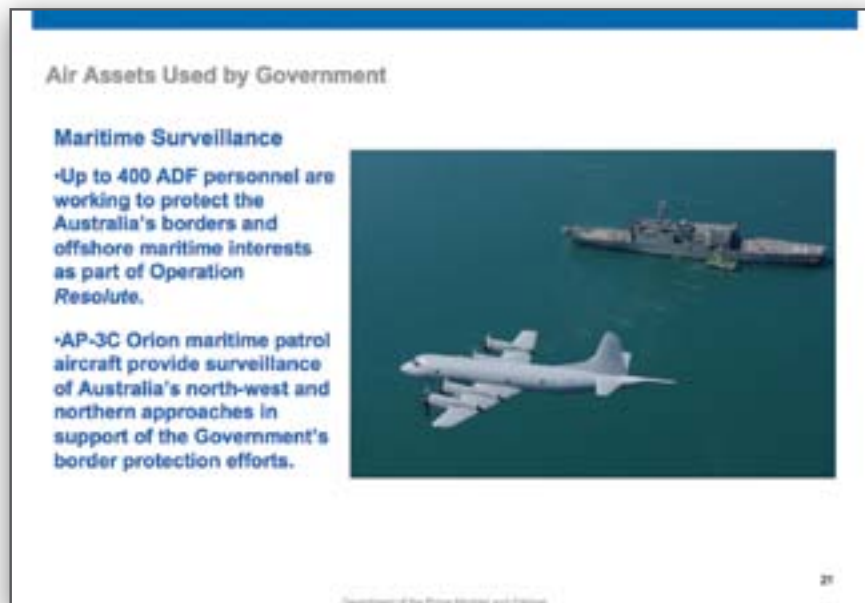


Figure 15: Air Assets Used by Government – Maritime Surveillance

Maritime Surveillance. Figure 15 addresses maritime surveillance. Quite obviously, the 'issue du jour' around the place in my space right now is the matter of border protection and illegal immigration. The work that is done by air power in support of that issue is indispensable.

Domestic Emergencies. ADF air assets are often called on to assist in domestic emergencies (Figure 16). Again, I go back to the Victorian bushfires. A fantastic job of work done by right across the ADF but, in particular, I would draw your attention to the extent to which air power contributes in these circumstances.



Figure 16: Air assets Used by Government – Domestic Emergencies

Government Priorities. Figure 17 provides an indication of Government priorities for air power. There is that word, 'flexible', again in the second dot point. Now a lot of that is what I might describe as 'motherhood stuff'. If there was anybody in the room that was unaware of any of that I would be surprised. But I just wanted you to hear it from my perspective because it is interesting coming at this from a slightly different angle than from within the organisation of Defence.

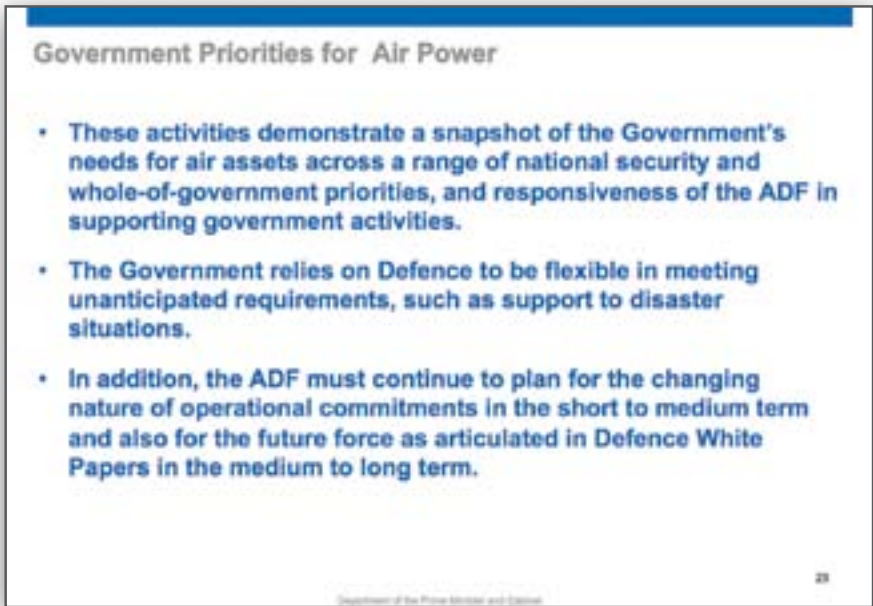


Figure 17: Government Priorities for Air Power

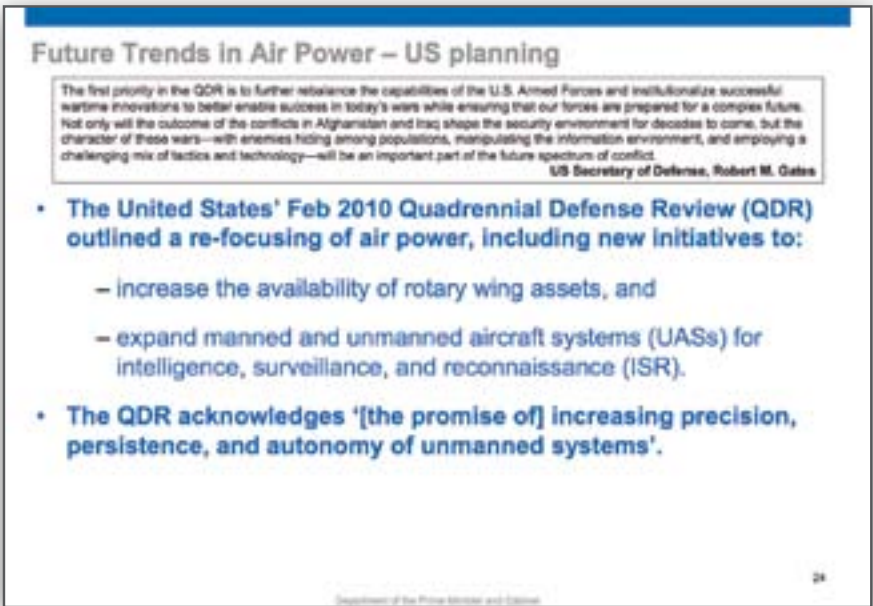


Figure 18: Future Trends in Air Power – US planning

Future Trends. Figure 18 lists some air power future trends in United States planning. I watch these just out of intellectual curiosity, if nothing else. A few years ago we were dining out on the issue of making sure that all of our weapon systems and so forth had great accuracy. We were into 'precision', essentially. There was a decade or more of discussion about precision. Now, interestingly, there has come along to join that party the issue of 'persistence'. Again, through my own personal experience with operations that were planned earlier for Iraq and later on in Afghanistan, I know that these issues of persistence and precision are absolutely critical for achieving an effect. I try to proselytise that particular message around Government to those who may not be as well versed as many of you in this room are on those issues.

Future Trends – Space. I was at a conference only a few days ago with the Deputy Chief of Air Force where we were talking about space policy and, quite obviously, there is a lot more to be done in this country around the issue of space. That is an area where we are kind of underdone.

That brings me essentially to the end and I just want to say a couple of things by way of winding up. Firstly, I would again like to thank Mark Binskin for the very kind invitation to be here and I want to congratulate Air Force on the initiative of, yet again, running this conference. I think this Air Power Conference is one of the major highlights in our calendar and I wish you well in your deliberations over the coming hours. So thank you very much.

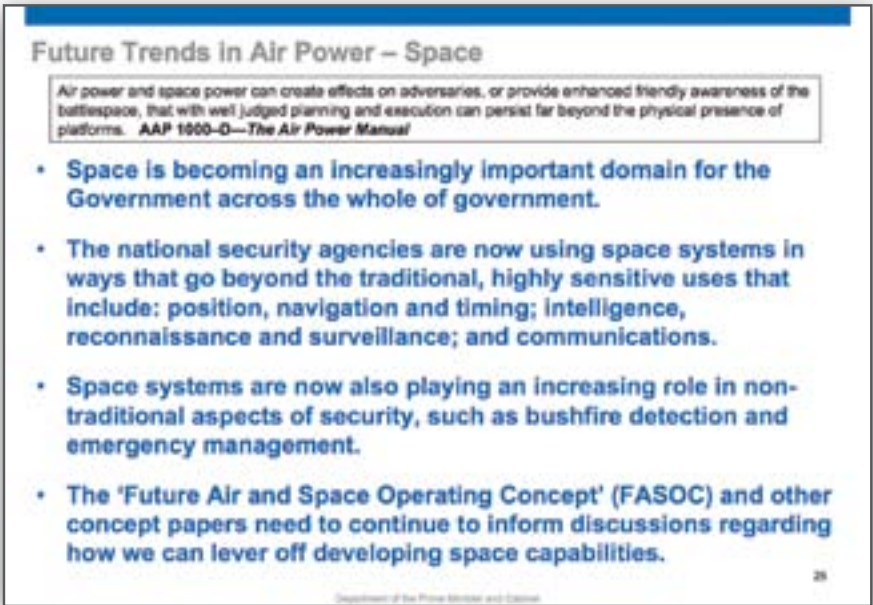


Figure 19: Future Trends in Air Power – Space

THE ART OF AIR POWER: SUN TZU REVISITED

DR SANU KAINIKARA

INTRODUCTION

War is the most complex activity that humankind undertakes and has been an indelible part of history. Therefore, it is not surprising that the study of war has always preoccupied the human race and its curiosity to arrive at a foolproof solution to attaining victory in conflict has never been satiated.

In recent times, the study of national security and allied strategies has become an avid pursuit not only of people directly involved in military activities, but also of an articulate and influential section of academia and public commentators. However, military strategic thought and the development of warfighting concepts have traditionally been an almost exclusive domain of the more erudite military personnel with a penchant for futuristic and abstract thinking. The classic texts on the strategy and conduct of wars, all written by warriors and commanders, clearly illustrate this point. One of the earliest books on war and strategy, *The Art of War*, written more than 2300 years ago by the warrior-statesman-strategist Sun Tzu, is perhaps the best example of such writing.

In the development of military strategy and doctrine, the lessons of history assume greater importance than in any other area of study. Military strategy at the highest level does not change through revolutionary processes, but reflects an enduring set of principles that is constantly refined over time and yet retains a common thread of relevance and continuity. This brings a certain sense of timelessness to the development of military strategy. It follows, therefore, that the classics in this field are considered the enduring foundations for the study and development of strategy. Accordingly, Sun Tzu's *The Art of War* is accepted universally as a discourse that must be studied by all serious military strategists.

Sun Tzu's ancient text is a profound treatise on human conflict, dealing with both the physical and the cognitive levels of war. The book is remarkably short, but is inspirational, unusual and enduring. It is inspirational because it offers a very comprehensive, and at times unique, set of principles for achieving triumph over adversaries. It is unusual because of the universal applicability of those same principles across the entire range of human endeavour. It is enduring because it contains universal truths that transcend time in terms of their applicability to human conflict. Sun Tzu's axioms are valid and applicable today and remain as relevant as they were when they were written 2300 years ago. This is an astounding achievement.

When Sun Tzu conceived his book, the concept of human flight was non-existent and air power as a military force not even the seed of an idea in a visionary's thought. However, the strategic and operational advice contained in the book broadly covers all the contingencies that a contemporary air commander conducting a sophisticated air campaign could possibly encounter.

AIM

The aim of this paper is to explain the ancient military wisdom and truisms that Sun Tzu propounded on politico-military strategy and situate them within the intricacies of the strategic application of contemporary air power employed within the broader perspective of a multi-agency or joint campaign.

BACKGROUND

In order to explain Sun Tzu's principles and their applicability to contemporary conflict, it is necessary to provide a brief background of the era in which the book was written and the sociopolitical circumstances that were then prevalent as well as provide an introduction to the author himself.

Modern scholarship suggests that *The Art of War* was written sometime between 480 and 220 BC—a period known as the 'Age of the Warring States' in Chinese history. The antiquity of the text can be better appreciated if this period is brought into a broader, global historical perspective. During this period, Gautama the Buddha was on his wandering pilgrimage through India in search of the meaning of truth; in Persia, current day Iran, Zoroaster was enunciating the philosophical-religious fundamentals from which Islamic thought would subsequently flourish; the Jewish state had embraced the Torah as its moral nucleus; in Greece, Socrates, Plato and Aristotle were expounding the theories and ideas that would become the foundations of modern Western philosophy; Lao Tzu and Confucius, two of the great 'sages' of China, were cultivating their own theories and postulations; and in Macedonia, Alexander the Great was gathering an army that would conquer most of the known world and reach the borders of India. It was indeed a momentous period in human history, rich in the development of far-reaching philosophical, religious, political and military ideas, and bursting with unparalleled energy and vigour.

THE AGE OF THE WARRING STATES

However, this was also one of the most chaotic periods in China's long history, with six of the eight major kingdoms engaged in wars that raged almost continuously for more than two centuries. Improved agricultural productivity had permitted the enlargement of military forces, thereby considerably increasing the scale of conflict. Campaigns became lengthy and of great magnitude with the strongest state reportedly maintaining a standing army in excess of a million soldiers. This in turn required a vast logistic supply chain and the mobilisation of troops on a scale not known till then. The management of such campaigns demanded great expertise in a number of interconnected disciplines.

The recognition that such a military force's core had to be composed of professional, disciplined officers and soldiers around whom the conscripts could be added as required led to the development and teaching of battlefield manoeuvres to ensure their efficient employment. Soon, an extensive body of military thought appeared, stimulated equally by battlefield requirements and evolving political and philosophical thoughts. The complexity in the conduct of long-drawn campaigns and the increasing sophistication of military

strategy saw the emergence of the profession of arms as a dedicated pursuit. This marked the arrival of the professional military commander as opposed to the civilian administrator who had so far doubled as military commander in times of war. This also marked the beginning of the gradual estrangement of the civilian realm from the harsh realities of war.

During the 250-year Warring States period, over 300 wars were fought between the different states of China. In contemporary terms, the resultant devastation and human suffering has been calculated as amounting to the participating states experiencing the equivalent of World War II continually for 150 years. It is from the depth of this experience that Sun Tzu composed his masterpiece.

THE AUTHOR

Unfortunately, very little is known about the Master who put together the book and there is no historical record regarding the actual dates of Sun Tzu's birth and death. However, it is generally agreed that Sun Tzu served in different capacities in the army of Wu, rose to the rank of general and participated in intense military campaigns during the Age of the Warring States. He was, therefore, a seasoned warrior and commander when he wrote his famous book.

THE VITALITY OF THE TEXT

The ongoing relevance of the thesis lies in the vitality of the text and in the approach Sun Tzu takes to put forward his theories or principles regarding the conduct of war. His observations of the wars of his time were shrewd and his analysis based on a deep philosophy that transcends time, context and circumstances. He based his thesis on a clear awareness and understanding that all wars cause devastation and that, in an interconnected world, survival and extinction in war cannot be clearly and directly assigned to the victor and the vanquished. In *The Art of War* he translated this philosophy into specific strategies to be victorious in conflict, while acknowledging the interdependency of the warring states. This is military strategy at its most sophisticated and has found resonance through the ages.

Some of Sun Tzu's verses are succinct to such an extent that they are open to a number of interpretations, which is evident from the large number of translations and varied versions of the book that are available. A certain degree of calculated risk is involved in any enterprise that attempts to combine age-old wisdom with contemporary modern concepts. I must admit, this paper is no exception. Therefore, it is incumbent on my part to state at the beginning that the interpretations in this paper of Sun Tzu's maxims are derived purely from my personal understanding of the text. While they have been deduced in a logical manner, I appreciate that they are not the only interpretations possible for any of the maxims. This is particularly true of the extrapolation that I have done in relating them to contemporary conflict and air power strategy.

In the text, Sun Tzu clearly sets down four primary premises that are generic in nature and must be highlighted. They deal with the importance of war to the wellbeing of a sovereign state, the relationship between national security and military strategy, the need to target the

cognitive domain of the adversary in war and the criticality of effective and ethical military leadership in achieving just victory. These premises are applicable to the conduct of all conflicts and formed the foundation from which he developed further detailed principles. I will relate the employment of air power to Sun Tzu's text when discussing the major principles that guide the military's role in implementing these premises.

The first premise is that war must be considered the greatest affair of the state and the basis for its survival or extinction. Sun Tzu, therefore, exhorted all leaders, political and military, to study war very carefully and thoroughly since it was the most important enterprise that a state could undertake.

*Warfare is the greatest affair of the State.
It is the basis of life and death,
It is the Tao of preservation and extinction.
Its study cannot be neglected.*

The opening verse of the book clearly proclaims this and provides a definitive indication of Sun Tzu's foundational philosophy of war. Sun Tzu recognised clearly that armed conflict was not transitory and could not be treated as an aberration. He considered war to be a conscious act and, therefore, susceptible to rational analysis. Since the fundamental cause for war has always been the struggle for ideological supremacy, its basic nature has also not altered appreciably over long periods of history. However, the characteristics and conduct of conflict are constantly evolving, making it imperative to study and understand these facets, if one is to be victorious. It is an irrefutable fact that the study and analysis of conflict are critical contributory elements in achieving victory.

As an outcome of the acceptance of the critical importance of war to the wellbeing of the nation, Sun Tzu listed two factors within this premise that have contemporary validity. First, he declared that wars must be avoided as far as possible and that strategic focus should be on defeating the enemy without having to enter into physical conflict.

*The skilled Strategist—
Defeats the enemy without battle;
Captures the city without siege;
...
Bends others' strategy without conflict.*

This is a philosophy ideally suited for the development of an effects-based, whole-of-government approach to ensuring national security that creates sufficient strategic depth within the nation to avoid destructive military campaigns. This emphasis on defeating the adversary through strategic manipulation rather than by the use of force is the most transformational concept in Sun Tzu's thesis.

Second, he emphasised the absolute necessity for a nation to achieve swift victory, at the least possible cost and with minimum casualties, whenever it went to war.

*In War,
Victory should be swift.*

*...
Protracted campaigns
Strain the public treasury,
And leads to loss of domestic support.*

Sun Tzu directly related domestic support for the conduct of war to the probability of its success, an issue that is clearly relevant even today. The criticality of these two factors in contemporary conflict underlines the deep and enduring philosophical foundation of the treatise.

Sun Tzu's second premise is that there is an unmistakably nuanced delineation as well as an extremely complex connection between what are, in contemporary terms, defined as 'national security strategy' and 'military strategy'. During his time, these two were normally considered the same and Sun Tzu's perceptiveness in clearly differentiating the two and explaining their interaction is a stroke of genius.

*Generally, in executing an Artful Strategy,
The General is mandated by the Ruler;
Then the army is assembled and the force concentrated.*

He very clearly enunciated the need to ensure the correct alignment of the strategic politico-military hierarchy before a nation commits to war, which is a lasting principle. This enduring concept, particularly valid for the democratic nations of today, underpins the need for a strong politico-military relationship—the general or military leaders formulate and implement military strategy, but within a clear mandate given by the ruler or the government. Sun Tzu propagated another principle that is clearly derived from military strategy and is also indicative of his analysis and thinking being far in advance of his times.

*In the execution of an Artful Strategy—
Capturing the enemy country intact is ideal;
Destroying it is inferior.*

He considered the annihilation of the adversary's forces, destruction of their cities and laying waste the countryside, as was the norm during his time, an inferior result to capturing the enemy's country intact. Essentially, he advocated peace without destruction as the desired end-state of a military campaign.

*Without a full understanding
Of the harm caused by war;
It is impossible to understand,
The most profitable way
Of conducting it.*

Another novel concept was Sun Tzu's advice to understand the consequences of the harm caused by war and to limit the destruction that accompanies any conflict as much as possible. There is a direct correlation between this basic surmise and the contemporary restrictions regarding intended destruction of adversary infrastructure and avoidance of collateral damage. This is also the foundational philosophy on which the contemporary principles of proportionality and discrimination in the application of lethal force are based.

Sun Tzu's third elemental premise is the path-breaking concept that victory and defeat in any conflict is predicated in the cognitive domain of the adversary. He advocated the use of deception and illusions to influence the opposing forces' behavioural pattern and belief system.

*The Way of war is—
The philosophy of deception.
...
Those who strategise,
Use the Tao of Paradox.*

He believed that the primary target of all military action should be the opposing commander's mind and the soldier's behaviour pattern, and that victory is achieved through manipulation of the adversary's thought process, which is directly stimulated by perceptions. Sun Tzu articulated this concept over 2000 years ago, and it remains a key aspect in dealing with the complexity of today's conflicts. In contemporary terms, this is the essence of an effects-based approach to strategy.

The fourth premise, one that is as valid today as on the day that Sun Tzu first advanced it, is that the moral strength and intellectual faculty of the military commanders are decisive factors in achieving victory in war.

*Leadership
Is intelligence, credibility,
Humanity, courage
And discipline.*

Sun Tzu lists the prerequisite characteristics that commanders at all levels must possess in order to be successful. He also provides detailed instructions regarding how intelligent analysis of observations can provide indications of the actual status of the adversary force. He further highlights the need for personal introspection and analysis, as well as the study of strategy, for a commander to be victorious. Sun Tzu's book is as much a text on the

essence of military leadership as it is on strategy. The underlying theme of *The Art of War* is that an enemy must be overcome through wisdom.

These four premises deal with grand strategy, victory through influencing the cognitive domain and the importance of military leadership in a very broad manner. While grand strategy remains a whole-of-government enterprise, in contemporary circumstances air power's resident capabilities offer the means to create powerful cognitive effects, provided it is commanded by leaders with the necessary skills.

CONTEMPORARY AIR POWER INTERPRETATION

Sun Tzu's classic easily transcends time and context, becoming ageless when it is read and understood with a sufficiently broad interpretational perspective. The book contains universal imperatives that govern strategic planning, the actual conduct of campaigns and command of military forces in war that can be readily interpreted to contemporary conflict situations. This enduring relevance is unique to Sun Tzu's *The Art of War* and sets it apart from other books on the art and science of war and military command.

While Sun Tzu advocated avoiding war as a strategy by itself, he was pragmatic enough to accept that situations would arise wherein the use of military forces would become unavoidable. He therefore articulated a number of fundamental principles that must be adhered to in order to triumph in war. Although he explained the operational and tactical measures to exploit these principles in combat purely from an ancient land warfare perspective, they can also be extrapolated to contemporary conflict and the employment of air power.

I have chosen 10 principles from Sun Tzu's original thesis as illustrative examples to demonstrate the pervasive nature of the concepts that the book outlines when they are superimposed on a contemporary conflict scenario. I will describe them and then relate them to the employment of air power by expanding on particular aspects that either enhance or constrain the application of these principles to contemporary conflict. The 10 principles have been selected at random and are not listed in any order of priority. They also do not reflect a uniform or equal emphasis on all the premises and principles in the original book. Each of the 13 chapters in Sun Tzu's book contains some principles that deal with military strategy, the conduct of war and military leadership. At times, one could even get the impression that the flow of thought has been deliberately broken to make the reader sit up and take note of some particularly obtuse concept that was being advocated. However, in order to maintain a discernible flow through the paper, I have tried to arrange the 10 principles to fit under the broad areas of national security at the grand strategic level, the conduct of conflict and military leadership requirements.

The First Principle. There are five strategic fundamentals that govern the art of war and form the basis for the formulation of national policy at the highest level. These must be analysed and applied individually and collectively to ensure national security.

*Calculate a plan with Five Working Fundamentals
And examine the condition of each.
The first is Tao.
The second is Nature,
The third is Situation,
The fourth is Leadership,
The fifth is Art.
Those who understand them will triumph.*

These fundamentals are directly linked to Sun Tzu's first premise that war is the most important undertaking of a state. Every nation needs a well-formulated, grand national policy from which the national security strategy can be easily derived. The national security strategy is the capstone principle from which all other security strategies draw life. The absence of either policy or strategy will, without doubt, spell disaster for the nation's overall security and lead to loss of sovereignty. The five fundamentals together provide the guidelines for the development and formulation of the national security strategy. Such a strategy, derived through the assimilation of the five fundamentals, will be a primary factor in initiating activities that contribute to and ensure the security of the nation. It will be fundamental to the decision-making process that commits a nation to war. It is also noteworthy that Sun Tzu's five fundamentals are equally applicable to the employment of all elements of national power, not the military alone, as they are to the formulation of national strategy.

Air power is an essential element within the military capabilities that directly contribute to national security. In a cyclical manner, the national strategy dictates the overall structure of the air force, which then plays an important role in shaping the evolution of the national strategy. Air campaigns planned within the broad guidelines provided by these five fundamentals will almost automatically be in alignment with the national security strategy.

The Second Principle. The culmination of a conflict in victory occurs only when the desired end-state, which must be correctly aligned with the nation's grand strategy, has been achieved.

*Skilled Warriors triumph in conflict by making no errors;
...
Vanquishing an already defeated enemy.*

*Skilled Warriors
Establish a Situation that cannot be defeated,
Win a war by assuring victory,
And miss no opportunity to defeat their opponents.*

Here, the terms triumph and victory are used to indicate the achievement of the grand strategic objectives, which has direct implications for the military leadership. If victory is defined as the achievement of the desired political end-state through the employment

of military forces, then the military leadership should be influential at the national grand strategic level of planning. If such influence is lacking, the probability of the military being tasked to achieve an end-state beyond its capability is very high. Entering conflict with an unachievable end-state, knowingly or unknowingly, will ultimately lead to strategic defeat, irrespective of brilliant tactical combat victories. Sun Tzu emphasised that security strategies must be developed with the long-term objective of enhancing the position of the nation to a level where it is unassailable, while at the same time being able to overcome the challenges that arise in the process. Sophisticated strategists will create a position of dominance before challenges materialise and this is fundamental to victory. Victory achieved through the application of such a security strategy that is aligned with the national policy and well grounded on broad military philosophy will almost always meet the nation's objectives.

In contemporary conflict, creating a position of dominance requires adequate control of the air, which is also a primary requirement for the success of any military strategy. Air power, when appropriately used, can dominate all aspects of the operational environment.

The Third Principle. Lasting victory can only be achieved by the employment of a highly developed effects-based strategy that acts on the cognitive domain of the adversary.

*Thus,
Ultimate excellence lies,
Not in one hundred triumphs in one hundred conflicts;
Those who have supreme skill,
Use Strategy
To bend others without coming to conflict.*

Sun Tzu believed that supreme excellence lay in the employment of a strategy that compelled the adversary to change their belief system to our preference without going to war. This is the core of an effects-based approach to national security. Therefore, it is clear that an effects-based strategy is not a new, modern concept. Sun Tzu enunciated such a strategy with the unambiguous injunction that the effects must be created both in the physical and cognitive domains of the adversary as required. One of Sun Tzu's major convictions was that by creating cognitive effects, that change both behavioural patterns and belief systems, it would be possible to avoid physical conflict. An effects-based security strategy developed on the best possible combination of all elements of national power and formulated at the highest level of national security command is the optimum way to ensure the security of the nation.

Air power is a non-replaceable capability in enforcing an effects-based strategy. Its inherent speed, reach and responsiveness provide the wherewithal to be an effective deterrent force or, when necessary, to apply lethal force in a time-critical manner with precision, discrimination and proportionality in order to create the desired strategic effect.

The Fourth Principle. While physical conflicts will be predominantly military led, all elements of national power must be involved in resolving confrontations and should

provide inputs throughout the planning, execution and post-campaign phases of the campaign.

*Settle on the best plan,
Adjust to the situation,
Develop external dynamic.
Influence events,
And master opportunity;
This is the dynamic.*

Viewed from a very broad strategic perspective, confrontations need not always lead to wars or military campaigns. Therefore, conflicts—physical or otherwise—to secure the nation are the realm of all elements of national power and success can only occur with an agile leadership enforcing a whole-of-government approach. While articulating the efficacy of a whole-of-government approach to national security, Sun Tzu also cautioned about the dangers that could ensue if a nation was taken to war by an incompetent politico-military leadership. He, therefore, listed the essential elements that the leadership should possess to ensure victory.

There are five essentials to triumph in war—

*Know when to challenge and when not to challenge;
Understand how to use the numerous and the few;
Have the high and the low rank share a single will;
Is prepared and yet waits the opportunity;
Capable leaders operating unhampered by the Ruler.*

These Five, point the way to victory.

The detailed interpretation of each of these elements will depend on the particular element of national power being considered. However, it is worth mentioning that Sun Tzu considered political interference in the conduct of the war as detrimental to success in combat. This has timeless application.

Further, strategic situational analysis and planning at the appropriate level of command prior to and during the conduct of a campaign is essential for victory. At the highest levels, the analysis must take into account the context and repercussions—political, economic and social—of going to war. This will shape national initiatives and also the strategy for the military campaign. The final campaign plan must be joint, with the air campaign stemming from it and directly contributing to achieving joint campaign objectives. It is especially important for air forces to ensure that the air campaign is dovetailed with the strategic plan of the joint campaign because of two primary reasons. First, air power has the potential to rapidly create effects across the spectrum of conflict well beyond the area of operations, which could lead to unwarranted escalation of limited campaigns. And second, even tactical

air actions have the potential to swiftly create strategic effects with long-term consequences and must, therefore, be applied with caution.

The Fifth Principle. Comprehensive knowledge of the enemy and a clear understanding of one's own capabilities are foundational requirements for victory.

*Know the other and know yourself;
One hundred challenges without danger;
Know not the other and yet know yourself;
One triumph for one defeat;
Know not the other and know not yourself;
Every challenge is certain peril.*

As a corollary, Sun Tzu also states that incorrect or insufficient knowledge is certain to bring defeat. In any conflict, picking the winning strategy is greatly influenced by the knowledge of adversary's intent and capabilities, comparative size of the forces and accurate information regarding both the physical and virtual environment prevailing in the battlespace. In other words, Sun Tzu firmly advocated information superiority as a war-winning factor. This fact has not changed through the ages, the difference only being the manner in which information is collected, collated and disseminated. In the military arena, air power is critical to ensuring information superiority in addition to other crucial roles that it plays in ensuring national security. Astute combinations of different air power capabilities, when applied in a contextual manner, can play a distinctly deterrent role and also rapidly escalate or contain a situation at will.

The Sixth Principle. The overall cost of winning a war should not be such that it debilitates the economy of the nation and compromises its future security stance.

*A nation drains the public coffers
And impoverishes the people
Supplying the force at a distance;
...
As the nation's wealth is depleted,
Its strength is compromised.*

Sun Tzu stated that every action initiated by the state must be beneficial to it in the broader context of the nation's wellbeing. The concern here is the impact of an extended campaign on the overall economy of the nation. This is an extension of Sun Tzu's primary advice that, if a nation must engage in war, all attempts must be made to achieve victory through a short and swift campaign. This is one of the most valued strategies in war. By achieving swift victory, the leadership will also be able to advance the overall national security posture. This principle distils the inherent connection between the economy of a state and its security, while also providing the best possible course of action if war becomes inevitable.

An air force of 'strength'—not merely numerical, but with resident high-end capabilities and the in-built capacity to employ force multipliers—is a strategic element within the

national security equation. An air force that possesses adequate balanced capabilities, when employed within a clearly laid down and tangible air strategy, can create effects that transcend the battlespace and achieve swift strategic results. Air power's rapid response and capability to provide both lethal and non-lethal solutions to emerging threats support the concept of advancing national security in a cost-effective manner.

The Seventh Principle. Surprise and momentum, individually and in combination, are war-winning factors.

*In war,
The Straightforward will lead to engagement;
The Surprising to triumph.*

Sun Tzu conceived of the element of surprise not merely as attacks launched when the enemy is least expecting it but also as unusual or irregular actions—actions that would create asymmetry, either contextually in the short term or strategically in the long term. The element of surprise can be employed at all levels of war, from the strategic to the tactical, with great effect. In contemporary terms it can be translated to innovative use of military forces, which is a powerful force multiplier with the capacity to turn the tide of conflict in its favour. Surprise is indelibly connected to deception, in the cognitive domain through the creation of illusions and in the physical domain through more direct means.

Momentum of a force encompasses the physical and cognitive domains and can be created by a number of methods.

*Hence, skilful Warriors:
Have devastating Momentum and precise Timing.
Their
Momentum is like a tautly drawn crossbow;
Timing is like the release of the arrow.*

Sun Tzu explained that, while momentum could be a force of change that alters everything in its path, it is most effective when released at the appropriate time. When a force is able to practice deception, exploit the element of surprise and aggressively release its momentum in a timely manner, it is certain to be on the road to victory.

Air power is a vital element in achieving this synergy. The element of surprise is best realised through pre-emptive strikes on the enemy's centres of gravity and its effect is enhanced through deceptive manoeuvring and other means to deny the adversary advance knowledge of the impending action. Air power has the capability to not only influence but also control the tempo and direction of a conflict. Therefore, skilful employment of air power can enhance the momentum of one's own force and restrain that of the adversary.

The Eighth Principle. A force's freedom of manoeuvre is fundamental to its success in a campaign. Manoeuvre by itself is a cardinal principle in all contemporary concepts that govern military operations.

Manoeuvre is determined by advantage;

...

During swiftness, be rushing as a wind;

...

During immobility, be still as a mountain.

Be inscrutable as the dark;

Strike like a thunderbolt.

Sun Tzu believed that forces in the field must be manoeuvred at the opportune time, even before the conflict, to ensure that they are always positioned advantageously. However, he also cautioned that manoeuvres must only be undertaken to improve one's own positional advantage. He stated that the decision either to concentrate or disperse the force must be arrived at after studying the prevailing situation. One of the main objectives of pre-conflict manoeuvring is to observe the adversary in order to identify their weaknesses and strengths in capabilities and deployment. This could also be achieved through preliminary probing missions. Essentially, the primary requirement is for commanders to have strategic situational awareness of a high order. Providing accurate situational awareness regarding the evolving battlespace is a primary contribution of air power to the pre-conflict phase of a joint campaign.

Sun Tzu's exhortations regarding the conduct of manoeuvre can be easily adapted to the application of air power. In the contemporary context, air power assures freedom of manoeuvre, firstly, by ensuring that adequate control of the air is exercised over and beyond the theatre and, secondly, by facilitating safe and rapid manoeuvre through the optimum employment of airlift capabilities as required. Using air mobility to position and re-position the force increases the virtual mass of numerically limited forces and also reduces their vulnerability to asymmetric ambushes. Air supply of deployed forces secures open logistic lines that could otherwise be susceptible to adversary attacks. The insertion, sustainment and extraction of special force elements in hostile terrain are also easiest and safest to achieve through airlift. These air power capabilities are highly prized in contemporary conflict scenarios.

The Ninth Principle. One of the fundamental ways to achieve victory in conflict is by creating an imbalance in the adversary's forces.

*Those skilled in combat
Take the initiative over the others,*

...

When opponents are fresh, tire them;

When satisfied, starve them; When calm, unsettle them.

Appear at locations to which they must hasten.

Hasten to unexpected locations.

Sun Tzu stated that a primary factor that permits one to attain superiority is the capability to manipulate the adversary through preparedness, physical action and psychology. In this

context, preparedness is not merely physical alertness but includes the ability to create fresh concepts within the operational art of which the enemy would not be aware, thereby creating an imbalance. Conceptive agility and innovative employment of the force that permit carefully targeted actions can create an imbalance in both the physical and cognitive domains of the adversary. Air power is ideally suited to create such imbalances because it has the capability to operate, simultaneously if required, at all levels of the conflict and in distinctly different theatres. Further, its tactical actions can be tailored to create cascading strategic effects within the broader effects-based campaign.

Air power's ability to create effects simultaneously in geographically separated areas of operation, as well as in, around and beyond a particular theatre, both in the physical and cognitive domains is an asymmetric capability that cannot be neutralised easily. This is especially important in contemporary conflict where the adversary is diffused and reliant themselves on asymmetry to succeed. Conventional forces with adequate air power capabilities have a war-winning element in their hands.

The Tenth Principle. Triumph in battle and overall strategic victory in a conflict are heavily dependent on the skill, sophistication and professional mastery of the commanders of the force. I will cover this broad topic of leadership as one basic principle, although Sun Tzu emphasised a number of different leadership principles spread across all chapters of the book. Further, no attempt is being made to relate any of the leadership principles specifically to air power, since they are common characteristics of good military leadership across all Services.

Sun Tzu repeatedly emphasised in a number of different ways the need for commanders to study the conduct of war and be adept at the development of strategy.

*Those skilled in strategy,
Cultivate the moral law,
Understand military philosophy and the art of defence;
And strictly adhere
To method and discipline;
Hence, they are masters of triumph and defeat.*

Commanders with a clear understanding of military philosophy and other elements of national power will be able to create a strategy that unites and focuses the war efforts of a force and, through it, that of the nation. This is buttressed by their ability to assume the moral 'high ground' by the correctness of their actions. This forms an indelible part of professional mastery, as the overarching knowledge of military commanders is known in contemporary terms.

The major character traits that are necessary for success in command are professional mastery, moral courage, ethical integrity, patience, knowledge, superior decision-making ability and vision. Professional mastery by itself is an adroit combination of a number of factors.

*A Superior Leader who follows Tao,
Evaluates the opponent's formula for triumph
Calculating the difficulty and distance of dangers and obstructions.*

*Those who employ this knowledge
Will surely be victorious;
Those who do not employ this knowledge
Can be certain of defeat.*

It consists in having mastery of the environment in which the force operates: for example, mastery of air power in an air force commander, awareness of the morale of the force and the ability to ensure that it is maintained at the required level, a discerning implementation of the concept of centralised control and decentralised execution in the conduct of a campaign, the talent to recognise the opportune moment and the agility to transition from a defensive to an offensive stance, and a clear grasp of the strategic strengths and weaknesses of the opposing forces, to name a few. Considering the vital role that a commander plays in ensuring the triumph of the force, a skilled commander with the necessary characteristics and intuitive skills is an asset that cannot be replaced. Such a commander will make the force indomitable.

*The leader who understands Strategy
Presides over the destiny of the people;
And guarantees the nation's security.*

CONCLUSION

The Art of War contains many principles that could be explained at different levels of war within the spectrum of conflict. It is not only the oldest, but perhaps the best treatise from which to identify lessons and principles by which air power can be efficiently employed. The focus of this paper has been to view some of these principles, selected at random, through the lens of contemporary air power employed within the broader perspective of a joint campaign. From this analysis, it is clear that Sun Tzu's text of military philosophy is as valid today as it was in ancient, warring China. *The Art of War* is a multifaceted thesis and air power is a complex capability. Therefore, making the connection between the two at the strategic level is an intricate and nuanced process. The contention in this paper has been that there is a deep and tangible connection—informative, practical and philosophically useful—between Sun Tzu's timeless aphorisms and the more modern concepts for the optimum employment of air power. I believe that this is indeed so.



DISCUSSION

Mr Drew Ninnis (Strategic Policy Division): Thank you very much for the talk. I was interested that you highlighted that two of the essential characteristics of a good commander, for Sun Tzu, were moral strength and self-examination, and I was wondering, given that we are in the business of trying to create good commanders, what we should understand that Sun Tzu was meaning by these and how do we apply them in a contemporary context. Should they be selection criteria for promotion, for example?

Dr Kainikara: The question of moral courage cannot really be quantified. One cannot look at a person and say that this gentleman or this lady has moral courage. It only gets exhibited in times when moral courage needs to be exhibited; then you realise that this person has it or this person doesn't. So, what we can do is not in terms of selection processes. What we can do is to make sure that our leadership, right from the early days, operates within a context where they are not brought to a situation wherein a decision has to be made on a moral ground, which means that, institutionally, the force has to be morally sound. That is the best way to train a person to take morally correct decisions. We cannot really identify it in the selection process as a tick in some paper.

Air Commodore John McGarry (RAAF – Defence Signals Directorate): Sanu, I'll put a question to you. In light of the importance of a national strategy and the contribution that air power or any element of the national power can make to an overall successful campaign, what good points and bad points can we take from recent air campaigns over the last two decades, where we saw either air power employed effectively as just one element of national power or even ineffectively as a sole element of national power?

Dr Kainikara: It is not air power alone. Any element of the military force can be misused or used incorrectly. I can only say that, when I look at historical examples, where air power has been dissipated or air power was not used in the correct manner, if you really analyse the planning processes of that campaign and subsequently see the way they were executed you will find that both planning and execution were not aligned with the strategic goals that were set. In some of the cases, the strategic goals themselves were unachievable, so in two ways it does not work. If the alignment is correct and if the quantum of air power that is put into the campaign is adequate, it will always achieve its aims.

Dr Pooshan Navathé (Civil Aviation Safety Authority): You've presented the term, 'Tao', as used by Sun Tzu, on four or five of your slides and I'm just trying to understand the construct of the term and how it was presented. Perhaps you could clarify this.

Dr Kainikara: Sun Tzu used the term, Tao, in two or three different ways. In the slides I put up, Tao actually means the process that combines the rest of the things that were happening. So, it is actually a process that he is talking about. In some other of the more tactically oriented stanzas that he has written, Tao could be equated in modern terms to a system or a combination of systems, like a system of systems.

Mr Andrew Cruickshank (Defence Science and Technology Organisation): My question is about the meaning of the word 'nation'. In thinking of Sun Tzu versus what we now think of as nations, there has obviously been a lot of condensation. Australia is a very multicultural nation and the unifying connections in society and language and culture that would have been there in his time are not so prevalent in ours. I'm wondering if there is a trajectory of what a nation is and where that might end up in the future and how that would affect this doctrine.

Dr Kainikara: A nation is essentially a group of people who believe that there is commonality of interest in defending the small piece of land that they have got. If you really look at the basic definition of 'nation', even at the time that the first villages came about after human beings were hunter-gatherers, when these villagers defended that piece of earth from invaders it became a nation. So a nation can have completely homogeneous ethnicity or it can have completely heterogeneous ethnicity—ethnicity or multiculturalism doesn't come into a nation. A nation, basically, is something where all people have some basic beliefs which they are willing to protect, even by the use of force. It's not really in terms of delineated boundaries alone; it's also a thinking process. What has happened from Sun Tzu's time and the warring states of China, where they were protecting their borders, now what we are talking about is national interest—that itself is something that is borderless. But we are still saying that, as a nation, we will protect our national interests. So, that is how the development has taken place in our understanding of what a nation is. Even then, there is an underlying factor of the area that we are talking about—the borders. So, it has become a combination purely because of the evolution of our thinking, and trade and globalisation and a whole lot of other factors come into it.

Flight Lieutenant Alexander Cave (RAAF – Australian Defence Force Academy): You spoke about the tyranny of distance being a drain on the public purse. In the operations that we see ourselves involved in today, do you see air power as negating the tyranny of distance or do you see it as something that we still need to be conscious of, given that we are operating at great distance for long periods of time?

Dr Kainikara: The use of air power to transcend distance by itself is something that is considered a strength of air power. But that comes with the caveat that, if you are going to use this capability that we have got for extended periods of time, it may not be cost-effective. There is always a tie up between what a nation can afford, in terms of spending on a war and capability—some nations may be able to do it for two years, some may be able to do it only for two weeks. So the question of the capability of air power in terms of reach and penetration is secondary. The primary thing is what is the nation capable of doing, not only in terms of resources but also in terms of the national ethos and in terms of domestic support. So, once again, it's a multifaceted thing.

AIR AND SPACE INTEGRATION IN A CONTESTED ENVIRONMENT

MR JOE ROUGE

INTRODUCTION

Good afternoon, ladies and gentlemen. What I would like to do today is to tell you about how space has become a key part of air power and then to talk about an effort that we did a little bit over a year ago in trying to determine how important, in fact, was space to air power.



Figure 1: Outline

What I want to talk about first is how space is really creating a new way of war, what the effects are and how do we utilise it. Then I want to talk about the contested and congested environment, and how we evolved to that. I think the real key here is not that we are there, but the fact that we have evolved to that and what actions have we taken along the way. I want to talk about this from not just a military point of view. One of the things we tend to forget when we think about space, especially from the Department of Defense or other areas, is that space is in fact part of our national and our international economy. Lastly, I want to talk about what we are doing right now in the US Air Force, in particular, but across the US in general to deal with the congested and contested environment.

TRANSFORMATION OF WARFARE

Let us talk about the old way of warfare (Figure 2). This way of warfare we all knew as 'attrition warfare'. The idea was very 'surface centric'. It was really a force-on-force. We would put forces up against each other and we would basically try to destroy each other by

attacking directly or trying left hooks or right hooks but, essentially, in nearly hand-to-hand combat as much as possible. It took many weapons to kill a single target. Casualty rates and collateral damage were very, very high. In the beginning, if you think about air power at that point, it was a supporting force. Essentially, air power provided us with reconnaissance and it provided some attack, but it really was in a supporting role.



Figure 2: Old Way of Warfare: Attrition

If we think of the transformation (Figure 3)—and the great transformation really was Operation *Desert Storm*—this was where for the first time we utilised space completely and across the entire medium. Some of that was due to the fact that we were in a terrain-featureless environment in which it was very hard to determine where we were. In fact, it was interesting because I remember one of my sons, my oldest son, was in *Desert Storm* as a combat engineer with the Marine Corps and one of the key things a lot of parents were doing was to buy GPS receivers to send to our kids so they would have them to be able to use in combat, because we could not get them out there fast enough within the military. So, the real key there was we were starting to think about a very ‘air centric’ world, where air power was a real key. Now I will not disagree with the statement made earlier that, ‘Yes, air power had certain effects, but then it took ground power to actually be able to destroy the Iraqi forces’.

We also started talking for the first time about nodal attacks. We started talking about going after the centres of gravity of a country, and actually being able to do it. Now we had attempted that in World War II, and I will show you some numbers later about World War II, but those were very difficult things to obtain. The evolution of air power allowed us to

do that. Precision guided munitions played a key role. Seven per cent of our munitions in *Desert Storm* were precision guided. The rest were essentially dumb bombs.



Figure 3: Transformational Warfare: Precision

How has that changed? If I look at our current way of war it really can be described as the ‘hybrid way’ (Figure 4). It really is a combination of many different things. It is cyber warfare, it is air warfare, it is ground warfare, it is maritime warfare and space warfare all combined into one. It is very network centric. That is what we are all obtaining or that is what we are all trying to obtain, a network centric capability, so we can really share all the information so that in real-time we can operate and be able to achieve our goals. It is joint and it is coalition, and that is a big change, because for us in the United States we have been joint for a long time, but now truly coalition operations require that we are now able to share information. We are able to share our situational awareness. We are able to share the targets and actually decide who is going to take on which targets and who is going to provide what level of defence of which areas. We are starting to use things like unmanned aerial vehicles (UAVs) and they have become a very key player. We are starting to have much more integrated command, control, communications and I would call it surveillance, reconnaissance and intelligence, because it is really in that order that we try to do these things. We are trying to bring all those things together. So, even within the United States, we have to think about both the intelligence community and the military working together in real-time in an operating theatre and that is a big change.

The use of precision weapons has increased from 7 per cent to 70 per cent; that is quite a change. Part of this is the ability to re-target and re-task systems in real-time. If you think

back a few years ago, when a sortie went out they had maybe one or two possible targets. If those targets were not to be able to be engaged because either they moved or something else happened, essentially the sortie came back with its weapons and they were not able to be used. Now, we can in real-time re-target and re-task our systems. Probably the hardest part though is the last dot point in Figure 4. The enemy has a choice now. In the past, the enemy had many fewer choices. He could essentially slug it out with us and that was not going to be very successful. Now, he has got unconventional ways of being able to operate and to be able to deal with us. For example, the enemy is now using space himself. When I first came to this business 35 years ago, there were essentially five or six nations that had space capabilities. Today, if you have a credit card, you are a space power. You can buy ISR and you can buy communications, you can buy navigation, you can buy a lot of capabilities just with a credit card. So, all of a sudden, people are starting to use that against us and they are starting to find other ways of being able to attack us.



Figure 4: Current Way of War: Hybrid

Let me show you some numbers to illustrate the effect of precision. During World War II we attempted to go after for some ball bearing factories and Figure 5 gives you a comparison with today. In World War II, we had 1500 bombers and 9000 bombs trying to kill a 6500-foot target. If you go all the way to today, a single pass of a B-2 bomber can drop 16 x 2000-pound weapons on 16 separate targets. That is a phenomenal change. Now, why has that change occurred? Let us talk about some of the reasons.

The numbers in Figure 6 show the progression of how we have gone from non-precision to precision weapons, from Kuwait in 1991 to Iraq in 2003.



Figure 5: Global Positioning Systems and Precision Strike

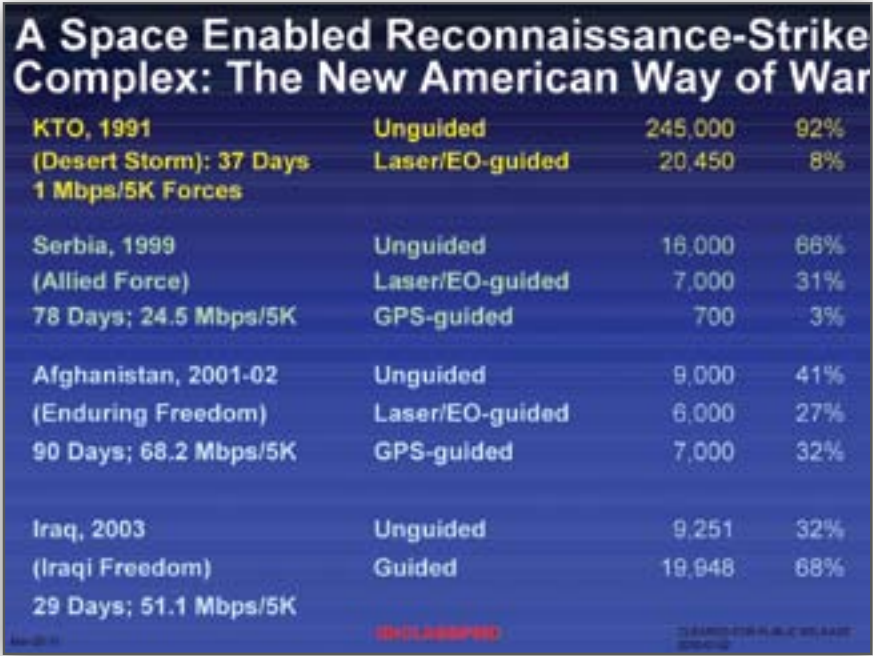


Figure 6: A Space Enabled Reconnaissance-Strike Complex: The New American Way

The key to that precision I would argue is two things: first, being able to precisely locate the target and, second, being able to actually attack the target very precisely with low collateral damage and relatively small weapons. In fact, if we think about things like small diameter bombs, they are built around the concept of a small weapon with very, very high precision. So these are the kinds of changes that we are going through. If I take a broader sense of how the warfighter depends on space, Figure 7 shows a range of things that we think about.

DEPENDENCE ON SPACE

Missile Warning. We are able on a worldwide basis to detect the launches of tactical through strategic missiles and in fact, surprisingly, even share that information, and we did that during Y2K (Year 2000 problem) with the Russians. So now we have even changed the way we think about missile warning. We think about it as being, in a sense, something that we want to do to reduce the chance of conflict between nations.

Intelligence, Surveillance and Reconnaissance (ISR). UAVs, airborne systems and others are wonderful platforms in non-contested and non-denied areas, but in many denied areas we do not have that choice and so ISR from space becomes a key ingredient.



Figure 7: Today's Warfighter Depends on Space

Communications. This is probably the one that is the most revealing to most of us. If you think about our current operations, between 90 and 95 per cent of all the communications (that is the supporting of UAVs, our command and control and other systems in theatre)

are coming across commercial satellites. Up until five years ago, we in the Department of Defense in the US were talking about that in the end we would go to military communications satellites; that would be our base and we would only buy a little bit of commercial. We are now baselining that we are going to have to buy a certain amount of commercial regardless and then we will try to flex with a military communications systems. So, even that change is radical in the way we think about things.

Global Positioning System (GPS). I will talk a little bit more about it later but GPS is one of those things that are so revolutionary that it is really a little hard to believe. It is interesting, as a young officer 35 years ago my first job was to try to put GPS on a re-entry vehicle for a ballistic missile. After we demonstrated we could do it, I went into see, at the time, the Commander-in-Chief Strategic Air Command and I briefed him on this wonderful technology we had developed and he looked at me and he said, 'Lieutenant, you don't understand, I'm never going to be dependent on an outside system'—an interesting comment made 35 years ago. Now, all of our systems are built around GPS, not only the positioning but also the timing aspects of GPS.

Weather. You are all familiar with the weather aspects. They affect all of our operations on a day-to-day basis—understanding what the weather is and what the impacts of that weather are. It affects even our reconnaissance systems. It tells us when we can take pictures and when we cannot, and what systems we are going to have to use—radar versus optical and things of that kind.

Let me read a quote. I think this quote is important. It was written by, at the time, a relatively obscure, now ex-Secretary of Defense as part of a report that he was submitting to the President of the United States, called the 'Space Commission Report':

History is replete with instances in which warning signs were ignored and change resisted until an external, 'improbable' event forced resistant bureaucracies to take action. The question is whether the U.S. will be wise enough to act responsibly and soon enough to reduce U.S. space vulnerability. Or whether, as in the past, a disabling attack against the country and its people—a 'Space Pearl Harbor'—will be the only event able to galvanize the nation and cause the U.S. Government to act.

We are on notice, but we have not noticed.¹

I think many of you know who that was. That was Secretary Donald Rumsfeld and he was Chairman of the Space Commission. The report was delivered in January 2001, right after Rumsfeld was nominated to be the new US Secretary of Defense. The Space Commission was convened to determine how the US should react to the threat in space and how we should be better organised in space. At that point in time, people were starting to realise

¹ Report of the Commission to Assess United States National Security Space Management and Organization, Washington, DC, 11 January 2001, available at <http://www.dod.gov/pubs/spaceabout.html>, accessed 5 August 2010, p. 25.

that space had become a dominant aspect of the way we conducted both military and intelligence operations, and our economic operations. Figure 8 shows the kind of things that space does for us.



Figure 8: Space Capabilities Supporting the Intelligence Community (IC) and Department of Defense (DoD)

Space gets us into a mode of actually being able to do predictive battlespace awareness. You can actually look ahead. You can actually watch somebody come out of their garrison and you can watch them proceed. You can start having truly operational situational awareness, where you have multiple systems simultaneously working together. And let me point out, this is not just from space but from air and from ground and from other mediums as appropriate. You are able in an integrated whole to bring all this data together and then communicate it to the right players, to an aircraft commander as he is flying along to give him real-time situational awareness. Precision strike I have already spoken about. Compressed kill chain is another important development. I remember, in the past, how hard it was when somebody popped out with a ballistic missile; for example, the Scud attacks during Operation *Desert Storm*. They would pop out, launch and go back in again and we could not get to them fast enough. Compressed kill chain is one of the things we are able to do now.

Let me talk about the trends (Figure 9), because I think the trends are where a lot of us have missed this. If I go back to when I came into the military, space was essentially a strategic asset. It was used by our strategic forces to target our intercontinental ballistic missiles

(ICBMs), our sea-launched ballistic missiles and our bombers. It was essentially the system that gave us the warning, the ISR and the survivable command and control to manage our nuclear forces. It was not used by our tactical forces. In fact, it was resisted by our tactical forces because they really had all they needed in the force structures and systems that they had.

Essentially, you had two nations in space, the United States and Russia (or, at the time, the Soviet Union). Then you had other countries, like the Europeans and China and others, who were along with one of those two nations—Australia was one of those who were along with the United States. It was used by national leadership for strategic warning and tactical warning. It was the method by which the nation knew that it was about to come under attack or that the enemy was developing a new set of weapons systems that we were going to have to counter. It was essentially unchallenged, but let me try to put that into context. The Soviet Union and the US both had anti-satellite systems but the point was that we had an agreement between us that said, 'If you take on any of our national systems, we consider that an act of war. We consider that the beginning of a nuclear conflict.' So, essentially, we had an uncontested, stand-off type of situation, and it basically supported very deliberate and very stovepipe planning.

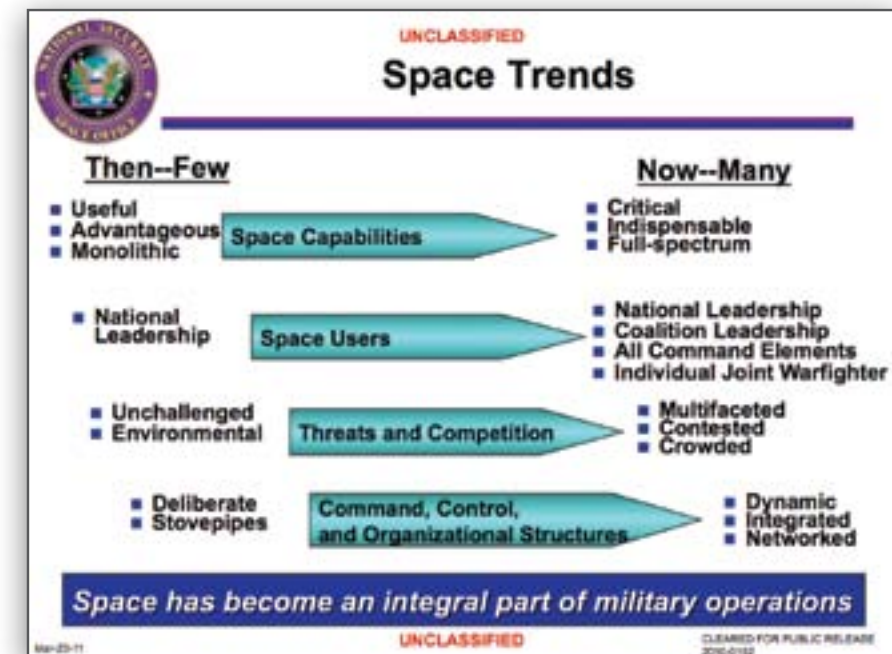


Figure 9: Space Trends

Now, what has changed? First of all, space is being used by all levels of forces, tactical, operational and strategic. It has become indispensable, I would argue, in many areas. It covers the full spectrum of warfare, from counterinsurgencies today, where we are

supporting our troops in the field, all the way up to the high end. It is now used by not just national leadership but by coalitions, and it is used by all command elements all the way down to the warfighter in the field.

I would now like to turn to the congested and contested and competitive aspect. There are no longer just two nations or two groups of nations that are providing space capabilities. Essentially, there are now over 20 countries that own satellites on orbit. There are another 40 or 50 countries that are about to own satellites on orbit within the next 10 years, so we need to think about that in a very different way. It is also very crowded. Let me give you some numbers: 1100 active satellites in space today and about 20 000 pieces of debris or active satellites that we are tracking. Now, it does not sound like a bunch when you think about the 'big space' theory but that proposition did not work so well with the Iridium and the Cosmo satellites that ran into each other last year and, by the way, created another two or three thousand pieces of debris. Now, when I say 20 000 pieces of debris, let me just put a caveat on that. That is the number of pieces of debris that we can track today but we believe that the actual number is 10 to a 100 times that, and those are objects that are big enough to destroy a satellite—those are bolts and things like that that can destroy a satellite. So we have to think about that.

When we get down to the bottom right-hand side of Figure 9, it is very dynamic, it is very integrated and very networked and, in fact, space turns out to be the network in many cases. It is, in fact, the extension of our ground networks that allows you to connect to someone who is out of reach of our ground system. When you add that to an aerial layer of communications systems, you now have a very, very robust capability if you think that all the way through. At the same time, there is an emerging set of threats: direct-ascent ASAT (anti-satellite) weapons, as demonstrated by the Chinese in 2007; laser attack; RF jamming; potential small satellites on orbit, correlatable ASATs of all different kinds. One of the interesting challenges has been that we have gone from very large satellites (thousands of kilograms) down to satellites that weigh a kilogram. Interestingly, a one-kilogram satellite can kill a big satellite just as easily as another big satellite. It does not take much when you are travelling at the velocities we are talking about. So every little satellite could in fact be an ASAT if someone wanted to use it that way. Ironically, however, we have taken out more satellite systems with backhoes, by somebody cutting the power or cutting the communication cable, than we have by taking down an actual satellite! So you have to think this all the way through and consider all the consequences of this.

But let me just point out, it is not just the military and the intelligence community that depend on space. Think about our economies. Let me give you an example. In the United States alone, in farming we save between five and ten million dollars a day in the use of water by utilising GPS to help level fields so that we do not have a lot of water run-off. That is just in farming and that is only one aspect of it. If you think about it from the point of weather satellites and climate satellites etc., the total effects on farming are in the area of a 100 million dollars a day—so very significant effects. Think about your daily life. Think about how you communicate. When you go to an automatic teller machine (ATM) the most likely aspect is that that ATM timing is coming from GPS. Think about almost everything else you do today. In the United States we were able to put three times as many trains on a railroad track

by the use of GPS than we could before, because we now know exactly where everybody is and we are able to control them with a lot more precision. Same thing with trucks, same thing with tags that we put on containers so we know where the containers are and what is in the containers and things of that kind. So space has become a really important aspect to our commercial world. That also brings up an interesting challenge. Are we defending space for military purposes, or are we defending space from the point of view of whole-of-nation or whole-of-nations? In fact, I would argue that is what we have to do, think about it from a whole-of-nations point of view.

Figure 10 illustrates how our reliance on space has grown and continues to grow every day.



Figure 10: Our Reliance on Space is Growing Every Day

If you go back to the early 1960s and you look at the bottom two parts of the background chart in Figure 10, they show the military/intelligence space plus space exploration (that was NASA, the National Aeronautics and Space Administration) and you can see they were the dominant aspects. If you go out today and look at this chart, by far the most dominant aspect is commercial. In fact, let me give you a number: about 255 billion dollars in the space economy last year—that is direct dollars. That does not count all the effects that space has, that is just the direct dollars. Now more than three-quarters of the nations of the world have economies of that size or less. So, think about how big that is and how important that is. Because of that, there was a determination that we in the US Air Force needed to take a look at what would happen if we did not have space. What would it mean to the Air Force?

This study was really a ‘quick look’, trying to do an assessment of what the impacts of the loss of space or the loss of portions of space would be (Figure 11).

DAY WITHOUT SPACE STUDY

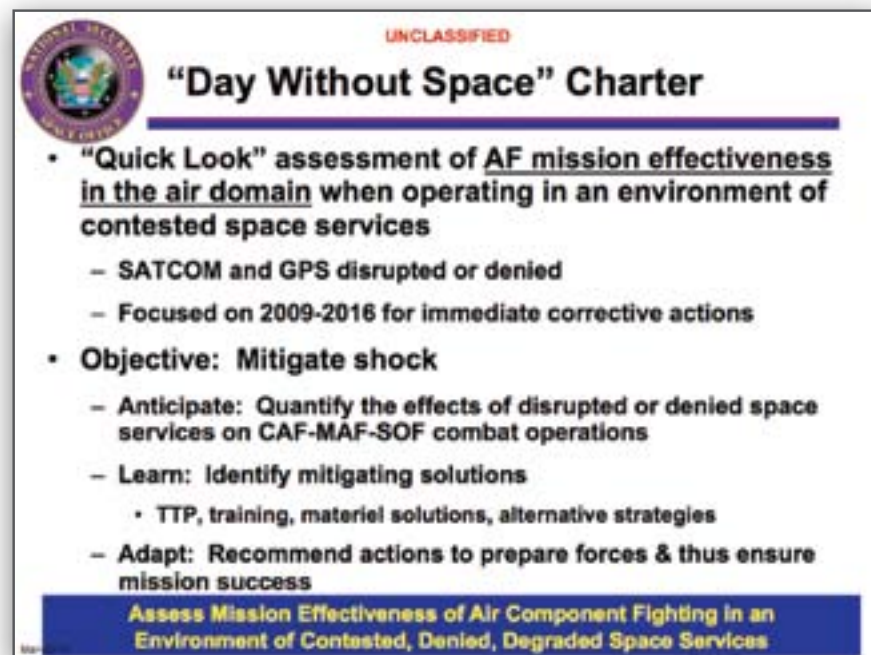


Figure 11: 'Day Without Space' Charter

What we did was to take out only two things: satellite communications (SATCOM) and GPS. It turns out, if you take out SATCOM, you take out a lot of your ISR because a lot of that came over SATCOM back over to your systems. So, we just took those two out and we focused on an immediate time frame, not 20 years from now but over the next five or seven years. As shown in Figure 11, the objective of the study was not to determine how we fight without space, but to mitigate the shock if we ever had a contested environment and we lost space. What would we do about it and how would we try to preclude that happening? So that is the way we tried to do it. What we tried to do was to anticipate and quantify the specifics. Now, I am not going to get into the specifics and I think you can all imagine why—because of their classification. But let me just tell you, we went through every weapons system in the US Air Force and tried to determine where it used space and why it was or was not dependent on a space capability. The idea was, could we learn from that in such a way that we would become less dependent on that capability or could we find a way of working around that loss if we thought it through ahead of time? So we thought about tactics, techniques and procedures (TTPs). We thought about materiel solutions. The ‘biggie’ we thought about was training. Could we actually train people to operate without a

particular capability or system? Then we thought about alternative strategies. If you could not use that, what would you use instead of it? The idea was to try and find a way to adapt to this changed environment and to this contested environment.



Figure 12: Why is This Important

Why is it important? I think Figure 12 illustrates this pretty well—our dependency, a contested environment and a heightened interest within both the US and, candidly, the world about space situational awareness. The Europeans now have a study ongoing as to how they are going to get better space situational awareness. As you are probably all aware, we have been sharing space situational awareness with the world on a website called ‘spacefacts.org’, where you can sign in and you can get information about your satellite and the likelihood it is going to collide with somebody else’s debris or other satellites. We also wanted to understand the dependencies and we wanted to understand how things like UASs (unmanned aerial systems) and others were dependent on space and how they could be replaced and what were the combinations that we could make between these systems. The US Air Force Chief of Staff basically charted a study—the ‘Day Without Space’ (DWOS) Study—and we went off and did that study.

DWOS STUDY: INITIAL FINDINGS

Figure 13 shows some of the initial findings of the DWOS Study.

The key is that you cannot look at this as an Air Force only problem. It is not. This is across the military, this is across the intelligence community and, more importantly, this is across

the whole nation. It could not just be done from an Air Force viewpoint. So, we took advantage of the work the US Navy and US Army had done in this area and, vice versa, the Air Force work is now being used by the Army and the Navy to understand how we do things.

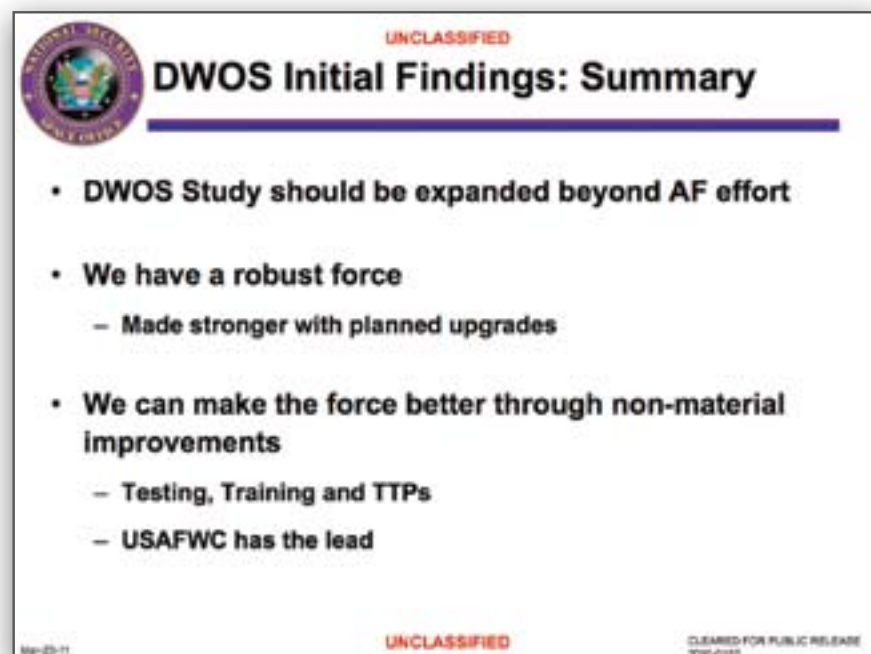


Figure 13: DWOS Initial Findings: Summary

I need to point out that we do have a very robust force and there are a lot of things that we are doing to make the force even stronger. So, I want to emphasise that this is not one of those 'Chicken Little' situations where the sky is falling. It is not. We have, in fact, thought this through pretty well, so in a lot of cases we have got a lot of capability still remaining. But we can make the force a lot better with some non-material solutions and, specifically, in the testing of our systems, understanding what effects there are when our systems are challenged and how do we work around it, and in our training and our tactics, techniques and procedures (TTPs). The lead agency on this is the US Air Force Warfare Center (USAFWC).

DWOS STUDY: OPERATIONAL TESTING

Figure 14 addresses operational testing. As part of our operational testing, we need to do a better job of having realistic environments. It is very difficult to do testing in a GPS jamming environment at our test sites, because then we would also take GPS down for the airliners, the trains and everybody else in the area. So you have got to really think this through as to what you do and how you test in a jamming environment, and what are the consequences

of that, but you still need to characterise the environment and understand what it is so that, when a flight crew or a ground crew or a naval crew sees jamming, they are able to actually recognise and understand what it is. Because the first thing we always think about when our systems go down is, 'Obviously, the hardware's broken or the software's broken'. We do not think about the fact that there may be somebody actively trying to take down our capability.

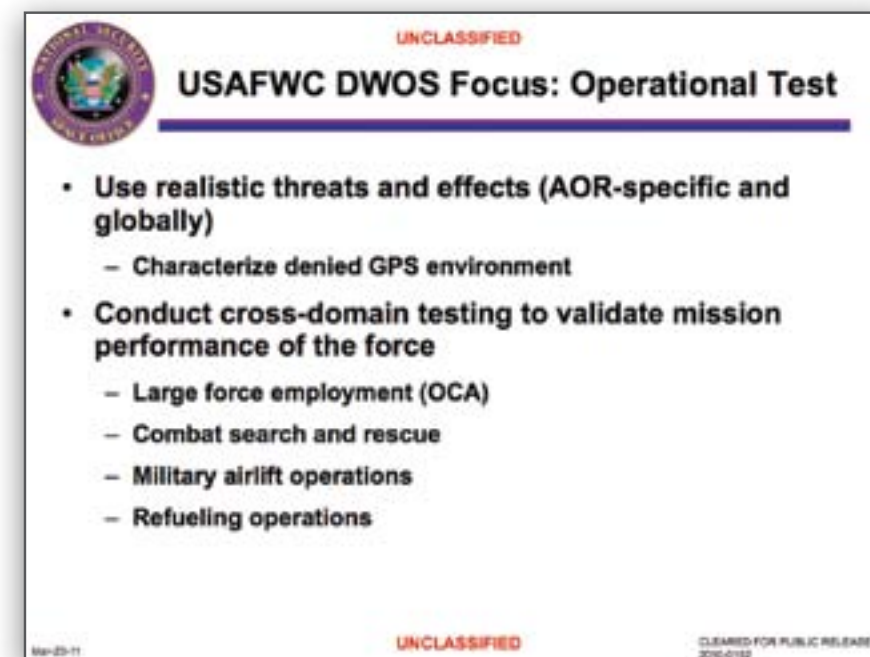


Figure 14: USAFWC DWOS Focus: Operational Test

We also need to conduct cross-domain testing so that we understand the ramifications and the impacts, and the possibilities of being able to solve our problems across domains. For example, if I lose satellite communications in a dense jamming environment, can I, in fact, replace that with an aerial layer in that environment and then connect from that aerial layer back, through SATCOM, to the States or back to our command centres or intelligence centres. So those are all things we need to think about. We need to think about it for a lot of groups, such as combat search and rescue. These guys are going to have to go in deep. What does it mean when they are in a jamming environment? What does that do to them, how do they operate and what are the kinds of procedures they would need to do?

Airlift operations are another area. We think about airlift as not being a big deal. The problem is, if they take down your GPS and your communications, it makes airlift a lot harder. In fact, one group said, 'Well it's no problem, we'll just stand off'. The answer was, 'Yes, but you are not getting what you need into the theatre'. So a lot of these options, like the tankers will stand off, pose their own problems. Yes, the tankers can stand off. The only

problem is that it is going to take that much more fuel to go to the tankers so that you can get fuel and then come back into the theatre again. So you have got to think all these things through.

DWOS STUDY: TACTICS DEVELOPMENT



Figure 15: USAFWC DWOS Focus: Tactics Development

The development of TTPs was, in a sense, the first priority, because the very first thing that the top specialist in each of the weapons systems thought about was, 'Well, we used to do it before space systems, so can't we just go back to that?' The answer was, 'Yes' but the only problem was that we had not trained our aircrews to do that in a long time because we had now developed very efficient and very effective systems and, therefore, we had walked away from those kinds of capabilities. So we have to go back and think about those and resurrect those.

The 561st Joint Tactics Squadron is developing a tactics bulletin—it put it out almost immediately after the study was done—telling people that here are some things you need to think about, here are some things you need to add to your training and here are some new techniques and procedures you might want to think about. I think the response by the Air Force has been outstanding because they have immediately taken this on and decided how to go and do this. But one of the real problems is in the next area, training.

DWOS STUDY: TRAINING

Figure 16 lists some of the training issues that came out of the DWOS study.



Figure 16: USAFWC DWOS Focus: Advanced Training

How many of you have spare training time? If you do, please come and see me because we would love to use some of it. What we found out was that, if you are going to train people to operate in a space-denied or space-challenged environment, you need to determine what you are not going to train them on. What are the systems you are not going to do? That became the real challenge; what do we not do and how much emphasis do we put in this area? So we need to train to operate in the way we plan to operate in this contested environment. We need to have to have much more robust scenarios to actually be able to see if our training works and to be able to actually train everybody, not just at the 'Top Gun' exercises or the 'Flags', but to be able to do this on a daily basis. How are you going to do that training? What is the way to do that?

Modelling and simulation is another important issue. You are probably not going to be able to do full force-on-force training in this kind of environment. So what modelling and simulations can you do and what kind of things can you add there?

DWOS STUDY: FUTURE SYSTEMS

One of the key questions that we asked was how do we build future systems, given that we have an environment that will be contested, and this is where we started thinking about this from a much broader viewpoint (Figure 17).

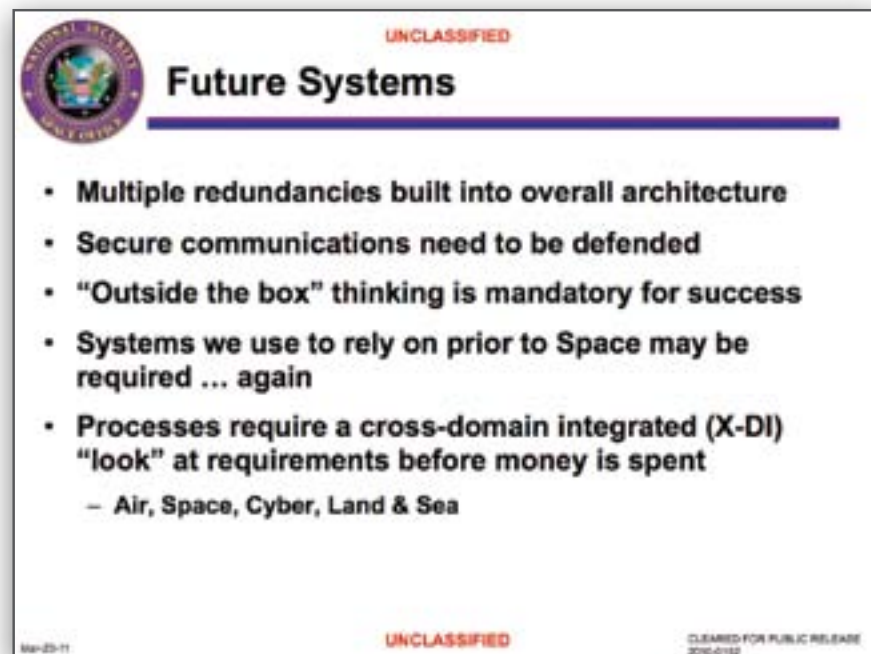


Figure 17: Future Systems

The tendency that we have in the military is to think about an individual system and we do not think about it with any broader architecture. So this is an area in which we have taken a much broader view in starting to think about this from an architectural point of view. How can you create capabilities that are resilient to the loss of a part of a capability in one area? One of the key things that came of the DWOS Study was that you really do not want to have a 'day without space'. What you want to do is be able to deal with a space-contested day, not live without the capability, because we do not really have the force structures and all the capabilities to be able to go back to the way we used to operate. So we have to think this through from an architectural point of view.

Secure communications turns out to be one of the key issues. You need to guarantee secure communications because that is, in fact, what makes us as powerful as we are from the point of view of our air forces—that ability to communicate and that ability to make sure that that message is going to get through to the right people in a way in which they can use it. We are going to need some 'outside the box' thinking. We cannot just do this force-on-force, we have to think about other ways of doing this. If he does this, what can I do in contrast that will be a 'game-changer'? How can I do that in a way that he is not going to be

able to respond fast enough? We may even have to go back to relying on things we used to do before we had space capabilities.

Let me just give you a little vignette. I was sitting down with some naval officers that work for me and I asked them, 'What would you do if you did not have GPS? Could you navigate at sea?', and one of them reminded me that the last ship that he was on did not have a sextant and, more importantly, there was nobody on his crew that knew how to use one. Maybe we need to bring some of these things back but we need to train the people in how to use them, because a lot of these capabilities have been lost as we have found other ways of doing things.

The most important thing in all of this is that, like any other domain, you cannot think about the space domain by itself. You have to think about this as part of a cross-domain solution. This has to be thought about as air, land, sea, cyber and space. You cannot do this and think about this problem from a space-only point of view.

OPERATIONALLY RESPONSIVE SPACE

Let me just talk about one solution set that has some rather unique options—operationally responsive space (Figure 18).



Figure 18: Operationally Responsive Space

We talk about operationally responsive space in three tiers:

- **Tier-1.** The first tier covers those assets/capabilities that are already there but you could use in a different way. An example of this may be the use a commercial imaging satellite to provide the capability I need in a certain area—that is not what I normally do but I could use it that way. I also might use missile warning data in a different way because it has other characteristics that I do not normally use, and the confidence might not be so great that I can use it strategically but tactically I might be able to use it. Tier-1 things are those that we need to be able to do literally in a matter of minutes to hours, so you have to pre-plan them and, essentially, you have to have a playbook—these are all the various options that we have if we are in these kinds of environments.
- **Tier-2.** Tier-2 is essentially a ready reserve. Think about this as being like a U-2 wing, where you have got the aircraft and you have multiple payloads. Here, we would have spacecraft and multiple payloads that would be able to be put together, launched and turned on operationally in a matter of, maybe, 20 hours to seven days. So think about that and think about that capability.
- **Tier-3.** You are always going to have some level of technological shock and the real key is how you react to that. Today, it takes us seven to ten years build a new space system. The idea in Tier-3 is that we could respond with a new technology on orbit in less than a year. Now, it will not be a large constellation but it will be enough to be able to actually exploit the technology or counter a technology in less than a year. If you think about this, it turns out that this is really where a lot of the world has gone. This is really state-of-the-world—small satellites, very responsive. Surrey Industry, for example, in Great Britain can build you a satellite in less than 24 months. You order it and 24 months later they have it on orbit for you, operating. It is a whole different environment.

Now the advantage of this is that, because it is state-of-the-world, these are systems that we could share. I find it kind of ironic that, if you stand in a field any day of the week and you look up, between 30 and 50 imaging satellites will cross over your head twice a day within about an hour period because they are all sun-synchronous. What would happen if we just spread those out? There would be one there every 10 minutes—we would change the world and we would have persistent surveillance. Now, yes, they are all different resolutions, but you can work that out. So, if you think about state-of-the-world, you could actually create some coalition capabilities that would be very, very powerful without having to worry about state-of-the-art and all of the security problems we have with state-of-the-art systems.

CONCLUSION

Let me conclude in the following way: a lot of people will say, 'We don't need space. We've got these wonderful things that are working for us'. If you think the scenes depicted at Figure 19 are funny, let me tell you that I have heard this more times than you want to believe.

It turns out that we do need space, but we also need air and we need cyber and we need ground and maritime. We need all these mediums because all these mediums together are

what provide our nations the power that they have economically, militarily, politically and informationally. That is really what it is all about.



Figure 19: 'I Don't Need Space'

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DISCUSSION

Air Commodore John McGarry (RAAF – Moderator): Certainly, some thought provoking stuff there in terms of our dependence and reliance on space-based capabilities and I'm sure we should have a flood of questions for Mr Rouge, so I'll open the floor to questions.

Mr Nathan Rickard (Air Operations Division, Defence Science and Technology Organisation): Joe, I was just interested in your appreciation for the duality of space—the commercial and military aspects. Can you explain some of the strengths and weaknesses of this?

Mr Rouge: This is one of those areas in which the United States is really different from the rest of the world. We have chosen, essentially, to not talk about dual-use systems. We essentially have commercial/exploration—you know, NASA—and then we have military systems or intelligence systems. The problem is we broke our own rules when we started using commercial communications satellites and then commercial imaging satellites. The problem with that is—and this whole issue of duality is a two-edge sword—yes, we get extra capability, but we've now put systems at risk that most people would argue were never at risk before. But the problem is, what are you putting at risk? Are you putting at risk just the military intelligence aspect or are you putting the economic aspect at risk? And the answer is, both. In fact, what I find ironic about space—and this is one of those things if you've done a lot of reading on air power and maritime power and sea power, the very first thing we talk about in air power is that we want air superiority, then we utilise the domain—in space we went the other way. We've been utilising the domain for 50 plus years and now we're talking about assuring the domain. It's kind of an ironic thing. But that really crosses over, because what are we protecting? Are we just protecting our military systems or systems we use in the military intelligence community, or are we protecting every system up there because it is part of our economic base? Let me tell you, that's a hard choice and that's where the United States is right now, in the process of trying to figure that out. But I will tell you that, for example, the Europeans have declared all space systems dual use. In that case, obviously, you have to protect everything. So we're going through that process right now and trying to really understand that, because if you truly call it dual use, listen to what you're saying because you're now declaring it sovereign, protected, assured and all those other things, and that's something you've got to think through as you go through that process.

Group Captain 'Doc' Millar (RAAF – Defence Imagery and Geospatial Organisation): Just a question on your backup systems. Can you elucidate any more on how far you are going back? As somebody who was trained on a Kollsman sextant 28 years ago, the idea of a JSF [Joint Strike Fighter] having a Kollsman sextant fitted is a bit beyond the pale. Is there an alternative in these systems? I don't see any.

Mr Rouge: Yes, there are and let me just say that some of the technologies that we are pursuing are things like chip-scale atomic clocks and very, very small miniaturised INS systems. We're talking about putting those in GPS receivers and so a handheld receiver

would have the ability of operating not just in a contested environment but also in a crowded environment. Let me give you an example. City canyons are just as bad as jammers and going into buildings is just as bad or worse, and so we're thinking about and we're developing technologies to be able to actually incorporate into GPS receivers the ability to operate for periods of time without having a GPS signal. So those are the kinds of things that we're thinking about. No, I would not propose to put a sextant in an F-35 but I might put one on a ship and that's again something you have to talk to the Navy about. I'm not a naval officer, so I will not go any further on that one. But we are thinking about those kinds of solutions and one of the things we're trying to do is figure out how we can use what we have in a different way, rather than building all new systems. We can't afford to build all new systems, so what we're trying to do is find ways to modify the systems and, in many cases, it's just the procedures. How can I operate procedurally in a different way or how can I change my tactics so that if I know that I'm being jammed—for example, GPS jamming—what do I do? Do I give up on the target or do I attack the target differently? That's a new set of tactics and, if I've been trained to do that, I can probably still attack the target. It may take more passes, it may take more weapons, but I've got to think that through ahead of time. So those are the kinds of things we're trying to deal with, not just material solutions but I will argue that tactics, techniques and procedures are, in fact, by far the most important things, because those are things we can do right now. If you really want to mitigate shock, do that right now because by the time we get new weapon systems in it's going to be too late and somebody will have already challenged you beforehand.

Mr Andrew Wallace (Defence Imagery and Geospatial Organisation): A quick question with regards to spacecraft defence. We talk about the possibilities of various governments taking out spacecraft in space. Is there any thought to defending those craft, either physically or putting in international agreements which would stop attacks on spacecraft?

Mr Rouge: Let me try to give you a couple of answers to that because there are really different directions one could go. Direction number one is to 'up-armour' everything. I don't think that we can afford it and I don't think the world can afford it because you can never up-armour anything to be invincible. So the next question is: what's next? Well, you could replace, with things like ORS, Operation Responsive Space, but again you can only go so far. Let me tell you what I think and this is a personal opinion and I will be very blunt about it. Coalition operations and a 'coalition of the willing' is, I think, a very powerful way of going about it. Let me just give you an example. Let me just argue that, to do a mission in space, it takes 12 satellites. Let's say the US got a coalition together and built the first three and said, 'Here folks, you have a choice. You can buy more of the same. I can give you the design and you can build your own, or you can build to an interface. We need nine other people or nine other spacecraft up there.' Now we have a coalition system and we put everybody's flags on them, and now taking on one is taking all. Now is that a very powerful deterrent? Well, it depends on who the enemy is, right? It depends on how much he's willing to take you on. But those are the kinds of concepts. In fact, interestingly enough, that concept was brought out for the first time by Admiral Mullen, currently the Chairman of the Joint Chiefs, when he came out with a paper four years ago called 'The Thousand-Ship Navy'. The way Admiral Mullen talked about the Thousand-Ship Navy is not that we, the

United States, would ever have a thousand ships—in fact, he argued we’re probably never going to get much above 300—but there are 700 other warships out in the world and if we work together we could have, in fact, a Thousand-Ship Navy. That’s kind of what’s operating off Somalia right now where we have a coalition of the willing that are working together. Could you create such a coalition in space? I would argue yes. In fact, you have it today. If you look at the commercial world, the commercial companies, very few are American companies. They’re international firms, they’re firms from Europe, from Asia, all over the world, and in a sense you’ve got a coalition of systems up there today that are commercial. Could you do the same thing in a military way? My argument is absolutely you could. But those are the kinds of things you have to think through. The key to that is two problems that you’ve got to face. One is, are you willing to share the data and then, two, are you willing to be dependent upon somebody else’s system? Let me tell you that those are two very, very difficult problems. The first one can be solved with state-of-the-world because the data itself shouldn’t be classified. The only thing that will be classified is maybe the timing of when you looked. But the second one, the dependency one, that’s hard because now you have to have people that are willing to be interdependent on other people. Is that a solution to the problem? I would argue that it is *one* of the solutions to the problem—it’s not the only one. I would argue you’ve got to do all of these things. You’ve got to use some level of protection, some level of reconstitution and recovery, and some level of coalition operations or let me call it ‘dispersal’. Spread it out over so many satellites that it takes a lot to take them out. In fact, if you did it right, you could offer that to all countries in the world to join the coalition and, if they chose not to, you now have defined a rogue nation. You define those who aren’t willing to be a part of the system. Interesting strategy—again it’s a personal opinion, it’s not an official opinion of the United States, it’s a personal opinion—but having been in this business a long time I think it would be an interesting thing to watch happen.

Air Commodore John McGarry (RAAF – Moderator): Joe, could I take that thought just a little bit further then and reflect back on the question we had earlier about the dual use of the systems. Given the growing interdependency of world economies upon trade and transactions across multiple international boundaries, doesn’t the dual-use argument that the Europeans are advancing, in fact, strengthen the possibility that space becomes less contested?

Mr Rouge: I think it does. The real question is how far you’re willing to go with it and I think most people would argue that dual use in some form we’ve already been doing. So, to an extent, for us saying that we don’t have dual-use system is almost ironic. The real question is: with whom and who are the players you’re willing to operate with? My argument is, any player who’s willing to play by a set of rules that says, for example, we will not create debris in space, we will not attack each other’s space systems, we will come to the aid of anyone who is attacked in space, if you could create those kinds of rules—‘rules of the road’, maybe—some type of informal coalition of the willing, I think you can do all these things. The real question is: how far do you have to go and how much do you have to formalise

this? I mean, as some of us who have been in this business a while know—I was involved in the SALT and START treaties²—if you try to do this in a treaty form it’ll take you 10 years. It’ll take you 10 years just to define the terms, let’s be candid here. So the real question is: how can you do this in a much more logical way? As many of you are probably aware, there are some codes of conduct and rules of the road concepts that are being brought out by the Europeans and others at the United Nations COPUOS [Committee on the Peaceful Uses of Outer Space], so there’s some possibilities out there that I’m sure all the governments will be exploring trying to determine what makes sense.

Warrant Officer Ian Kuring (Army History Unit): Something that’s occurred to me while you were speaking and that is: how easy or how difficult is it to jam signals between satellites and earth, and is it localised? Is it a worldwide effect? I know that there are many satellites up there for a GPS system, for example. So how easy or how difficult is it to jam communications and GPS signals?

Mr Rouge: Let me talk about communications first. A communications uplink station can also be used as a jammer. If instead of putting a clean signal out you put a noise signal on an uplink, you can essentially jam that uplink. Now, it depends on how well the system is constructed. If it’s constructed well enough and has auto gain control and things like that, you might be able to actually not be jammed. But the reality is that it is not hard to jam most of the commercial SATCOM systems. It is much harder to jam the military systems, but the commercial ones are very easy to do. As for GPS, well, you saw GPS jamming in *Iraqi Freedom*. Those were jammers that were bought on the market out of former Soviet Union states. So, yes, GPS jamming is doable but everything is relatively localised. If you get to big jammers that cover big areas, they become big targets and so you have to think that through. Are you willing to be a target? But small jammers can jam small areas and can do some damage in little, small areas. Again, what’s the effect on the weapons system? It may be almost nothing because, if you’ve acquired the signal ahead of time and you’re on your way in, you can probably survive without it. So it just depends on tactics of the enemy as to how they use them and then your tactics in response as to how effectively you can counter those. But essentially anything in the RF spectrum can be jammed; let’s be very candid here. That’s the same thing for your air-to-air communications links. Anything can be jammed if somebody’s willing to put enough power and enough assets out there. The question is: how effective is it? How permanent are the locations that they’re doing this from? If they’re permanent locations, obviously they become your number one target on your target list. But again there are cases in which you can’t go ‘downtown’. You can’t go against the target for other reasons. They may place a target in the wrong place, or they may place a target in an area that we have not yet attacked. So those are the kinds of questions that you have to ask. Are there anti-jam systems? The answer is, yes. Are we developing them? The answer is, yes. Are they foolproof? The answer is, no. Are they getting closer to that? Yes, and I really can’t get more specific than that.

² SALT – Strategic Arms Limitation Talks. START – Strategic Arms Reduction Treaty

Air Commodore John McGarry (RAAF – Moderator): Joe, can I thank you very much on behalf of the group for a very informative presentation. For those who hadn't been exposed to space and our dependencies and the capabilities that it brings, it was most enlightening and has probably given us all some thought as we look forward to future ADF capabilities as to how do we both maximise those uses but also guard against the potential vulnerabilities inherent in them in a way that continues to leverage the best advantages. So thank you very much.

HAS AIR POWER REACHED ITS POTENTIAL?

DR BENJAMIN S. LAMBETH

INTRODUCTION

It is really a special treat to be back in Australia again after way too many years. I have had the privilege of speaking at a number of these conferences going back to 1986, but this is my first time back 'down under' in more than 10 years, and I cannot say how much of a joy it has been to get together with some of my old Aussie friends again. The subject that Air Marshal Binskin asked me to speak to this afternoon happens to be totally appropriate, because it resonates perfectly with a RAND study I have just begun under the sponsorship of the US Air Force Vice Chief of Staff on much the same subject. I must say also that I appreciate Joe Rouge having preceded me because he has said a number of things that I will underscore and punctuate in the course of my own remarks.

Ten years ago I published a book called *The Transformation of American Air Power*.¹ Its intent was to describe the evolution of the American air weapon from the disappointments of Vietnam through *Desert Storm* and its performance in Kosovo in 1999 to the dawning of the 21st century. I chose that title for the book very carefully. However, very shortly thereafter, the word 'transformation' unfortunately became so debased in Washington that it ended up meaning just about what anybody wanted it to mean. I believe, however, that what I sometimes now disparagingly call the 'T-word' still contains much power and value if it is used with discipline. My dictionary describes 'transform' as 'to change the nature or character of something radically', and that is exactly what happened to the American air weapon and, I would add, to aspects of our allies' air weapon between the end of the Vietnam War and Operation *Desert Storm*. That pattern continued throughout the 1990s, right up to the major combat phase of Operation *Iraqi Freedom* that finally brought down Saddam Hussein's regime in 2003.

But then something happened along the way to derail the steady progress that we had seen air power evolve through since the US Air Force's renaissance after Vietnam in the mid-1970s, when our involvement in Iraq and Afghanistan metamorphosed almost overnight into a fundamentally different kind of counterinsurgency fighting that we have seen ever since and that has been dominated by *ground* forces and *ground* operations. With this almost overnight change, what I have called the 'transformed air weapon' that had reigned supreme throughout the five campaigns from *Desert Storm* through the major combat phase of *Iraqi Freedom* began to appear ever less relevant in the eyes of many. It is now more embattled in today's budget wars than it has been in my memory. So, in light of that change and with 10 years gone by, I have taken on a new project that, for lack of a better working title, I have chosen to call *American Air Power at the Crossroads*, because I believe that is an accurate characterisation of where it stands today.

¹ Benjamin S. Lambeth, *The Transformation of American Air Power*, Cornell University Press, Ithaca, NY, 2000.

So, to start out with the proverbial bottom line up front, let me borrow some language from the synopsis of my presentation that appears in your brochure and say that the transformed air posture that the United States, in particular, developed and that figured so centrally in the first three weeks of Operation *Iraqi Freedom* now faces, I believe, a real danger of becoming 'untransformed', if you will, by what I personally see, and what I suspect many of my American colleagues in the room here also see, as an excessive fixation on here-and-now challenges of the moment to the exclusion of all else. So, I would say, in answer to the question posed in the title of my presentation, that air power can now safely be called mature at this stage in its development, at least for the kinds of wars that we have fought between Vietnam and the first three weeks of *Iraqi Freedom*, but it has by no means attained its potential when we consider the new challenges, both at the low end, as we now see in Iraq and Afghanistan—less so in Iraq and more so in Afghanistan—and also at the high end of the conflict spectrum that we will have to contend with for the rest of our lives. So again, having been assigned this topic could not have been more perfectly timed to force me to get an early start on coming to terms with how we move transformed, but now unfortunately stalled, air power back onto a fast track again.

SCOPE OF PRESENTATION

Figure 1 provides an indication of the route plan that I am going to follow in this presentation.

To begin, I will speak about air operations from the first Gulf War of 1991 through the major combat phase of Operation *Iraqi Freedom*, with the intent to spotlight what I regard as the main unifying theme that runs throughout the five uninterrupted success stories of air application from *Desert Storm* through the two Balkan air wars, *Deliberate Force* and *Allied Force* in 1995 and 1999, and then the major combat phases of Operation *Enduring Freedom* and Operation *Iraqi Freedom*. I will next offer a look at how that record of performance has shown that air power has now reached a state of maturity, at least for those kinds of wars against those kinds of opponents. I will then say a bit about what the current counterinsurgency challenge has done to undermine our earlier assumptions, possibly even overly smug assumptions, about the transformed nature of air power when it comes to the lower end of the conflict spectrum. I will do the same with regard to new challenges we see at the high end when you look at what China is doing, in particular, with its area denial and anti-access capabilities it is now evolving. From that, I will turn to some personal impressions—and let me underscore that this is a very personal perspective—regarding a rut, I hope a fleeting rut, that I see that American air power in particular has fallen into, for a number of reasons, over the past several years. I will then turn to some of the most important new mission areas where air power will need to make further progress before it will come close to attaining its potential at both the high and the low end of the conflict spectrum. I will only do a brief 'touch and go' on space, because Joe Rouge has basically said what needs to be said in that regard. Finally, I will conclude with some personal reflections on where air power might best proceed from here, assuming—and this is an important assumption—that senior leaders have the wisdom and perspicacity to make the right judgement calls and the right investment choices.

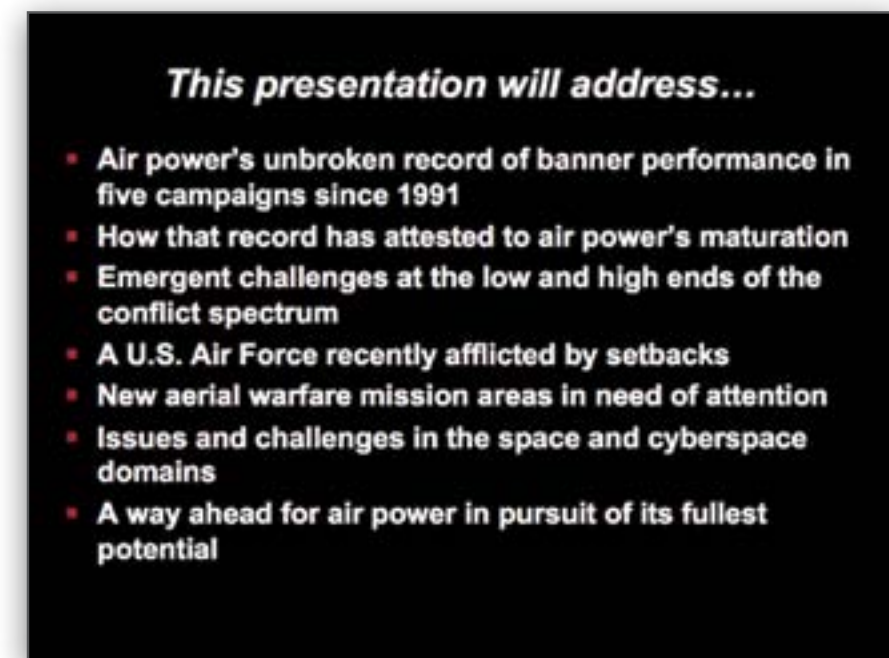


Figure 1: Topics to be Addressed

HISTORICAL PERSPECTIVE

To offer a quick history lesson (Figure 2). When Coalition air performed so remarkably during the five-plus weeks of *Desert Storm*, many tended to dismiss that performance as a one-off anomaly. You know, it was the open desert setting, or the clear weather, or the unusual vulnerability of Iraq's armoured forces to precision aerial attack, or any number of other possible circumstances that somehow made the first Gulf War an exception to the rule that it takes 'boots on the ground', and ultimately in large numbers, in head-to-head combat to prevail in major combat in high-intensity warfare. For a time, that argument made sense to many because, after all, this was the first time air power had demonstrated that kind of a performance. But then, over the 12 years that followed, we saw a succession in which air power prevailed again and again; over the Balkans twice, in Afghanistan in 2001 and 2002, and then again in the first three weeks of *Iraqi Freedom*. Those were all very different patterns of performance, and in none of those cases, with the arguable exception of Kosovo, did the air weapon do the work all by itself. But I believe we can fairly say that in each of those cases, the air component was the main enabler of all else that followed by way of producing the desired result at such a low cost in terms of friendly and non-combatant enemy lives. Said another way, what was demonstrated throughout that span of history—featuring five successful air power performances in a row—was *not* a succession of atypical anomalies, but rather the bow wave of a fundamentally new American way of warfare, really an allied way of warfare, in which the air component had turned in a radically improved performance by the air weapon over all else that had been seen up to that time.



Figure 2: An Unbroken Series of Air Power Successes

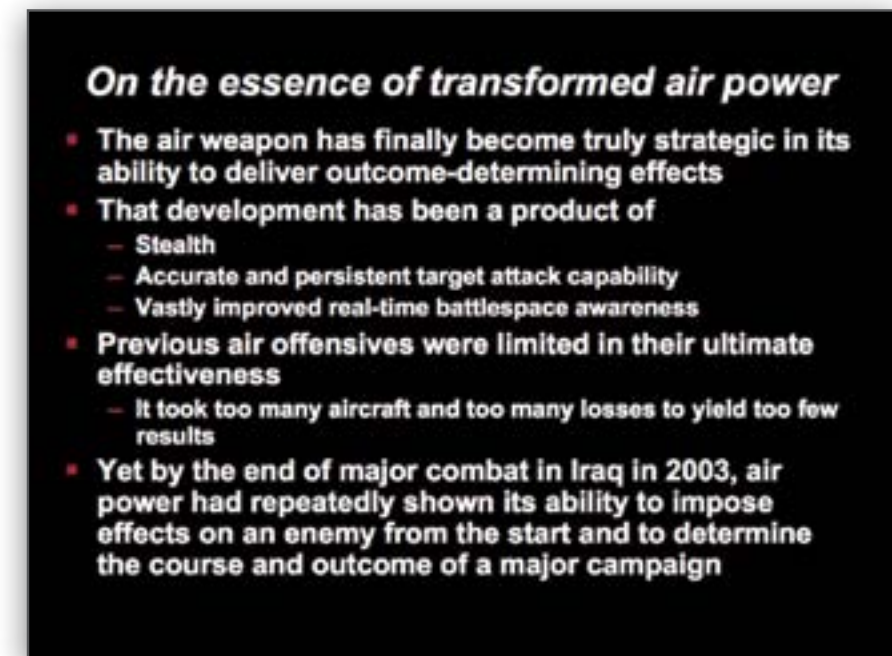


Figure 3: On the Essence of Transformed Air Power

SO WHAT?

This brings us to the 'so what' question (Figure 3). What overarching lessons should we draw from this pattern of experience? I believe that what we saw from 1991 to 2003 was a process in which air power had evolved to a point where it had finally become truly strategic, in the sense that it was able to produce outcome-determining effects in each case. This was not the case before the advent of stealth, highly accurate all-weather precision stand-off attack capability, and the much-improved battlespace awareness capability that we had acquired from our intelligence, surveillance and reconnaissance (ISR) assets. Earlier offensives were of limited effectiveness because it took too many aircraft and too many sorties and too many losses to produce too few results. But by March and April 2003 (and arguably even by 1991), air power had reached a point where it could make its influence felt quickly and could impose effects on an enemy from the start of combat operations in a way that would have a governing influence on the course and outcome of the remainder of major combat.

THE AMERICAN CONTRIBUTION TO THE AIR POWER EQUATION

I need to beg your indulgence now, for at least a bit, in letting me focus at least part of my comments here on the American contribution to the air power equation (Figure 4), because it really is a fact that, after all is said and done, only the United States in the world today maintains a full spectrum of land- and sea-based strike assets, intercontinental-range bombers, and a supporting inventory of tankers, airlift and ISR assets that allow us to truly engage in global power projection.



Figure 4: The American Contribution to the Air Power Equation

This is not to diminish in any way the many strengths and advantages of the air arms of our allies around the world. It is simply an acknowledgement of the central truth of the fact that American air power is unique in its breadth of offerings to a joint and combined force commander. Shortly after the first Gulf War, retired Air Vice-Marshal Tony Mason of the RAF, who has also spoken from this podium more than once, explained this as what he called the 'differential' between American air power and that of all other countries in terms of size, reach, extent of sustainability, and breadth of services provided. Even today, despite a range of new activity at the very high end in several air arms around the world, it is still the United States that remains home to most of the really cutting-edge technologies that have made the critical difference and seen the development of aircraft like the B-2 and the F-22. Although, I would hasten to add, it will bear watching to see how the Russian T-50 fifth-generation fighter that just flew a month ago today will evolve now that it has, for the first time, broken the longstanding American monopoly on stealth. I just wanted to put this down as a place marker to say that, in many cases when I speak of air power, I am really talking about American air power primarily, if not exclusively.

WHAT DISTINGUISHES TRANSFORMED AIR POWER?

I do not like the term 'lessons learned' because they usually are not, but we can draw some abiding conclusions from the experience of air power's accomplishment between 1991 and 2003 (Figure 5). First and foremost, there is no longer a need to amass forces against targets as there was between World War II and Vietnam. As we saw as recently as March and April of 2003, improved battlespace awareness, heightened aircraft survivability, and increased weapons accuracy have all made possible achieving the *effects* of mass without actually having to mass. And you saw the chart that Joe Rouge showed contrasting what a wave of B-17s could perhaps do in 1944 with what a two-ship element of F-117s could do in 1991. Now I will be the first to grant that *all* force elements in *all* Services, thanks to technology evolution and advances in precision, have now gained the opportunity, in principle, to achieve greater effects from the use of smaller forces. But what is distinctive about air power, and I will emphasise this point, is that in my judgement, it has pulled well ahead of surface forces in its *relative* ability to achieve outcome-determining effects, thanks not only to its advantages in stealth, precision stand-off all-weather attack capability, and information dominance, but also as a result of air power's abiding advantages, ever since Day One, in speed, range and flexibility. It now allows commanders the opportunity to neutralise an enemy's forces from stand-off ranges with virtual impunity and, in so doing, reduce the threat to ground forces, who now no longer have the obligation to go head-to-head early on with the risk of sustaining high casualties that that such close combat used to create.



Figure 5: What Distinguishes Transformed Air Power?

AIR POWER HAS BECOME THE ENABLER OF CHOICE

Today, air power offers the ability to achieve outcome-determining effects from the opening moments of conflict. And that, I would suggest, is a unique feature of air power. I believe that what has been going on here, and I suspect that most airmen in the audience here would concur, has been less a linear improvement in joint and combined operations and more a fundamental transformation in the relationship between manoeuvre and fire. With deep-attack, stealthy aircraft like the B-2 to kick the door down and with stand-off sensor platforms like the Joint Surveillance Target Attack Radar System (JSTARS) to provide very fine-grained awareness of the battlespace to joint force commanders, we now have, through the air weapon, the ability to reduce the workload on the land component, to say nothing of minimising, if not negating altogether, the danger of them having to go into head-to-head combat early on and engage enemy troops within lethal range of return fire. Also, with the addition of the critical ISR piece of the equation, it has altered the way we might best prosecute a joint fight in an air/land situation by having the air weapon fulfil functions that traditionally were fulfilled at a higher cost by the land component. This means that air power has become increasingly the 'swing factor', at least for the kinds of wars we have seen up until 2003. This is a message that our friends in green do not always appreciate hearing. Nevertheless, it is my sense that it may mean that the role of land forces in joint and combined warfare has now become less to *achieve* victory than to *secure* it, at least in major combat of the sort we have seen up through 2003.

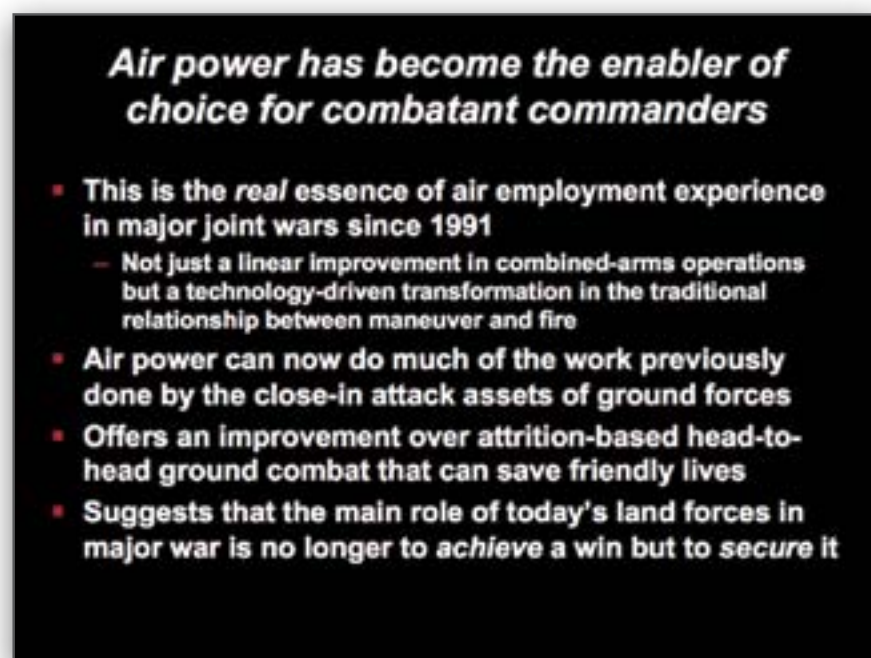


Figure 6: Air Power Has Become the Enabler of Choice

AIR POWER AND LAND FORCES HAVE REVERSED ROLES IN JOINT WARFARE

I believe that the single most important pay-off we have seen from the air weapon since 1991 has been its ability to achieve situation control from the very outset, so that the first blow can shape the course and outcome of all else that follows. It now enables the achievement of strategic goals through simultaneity. General Deptula, when he was still Colonel Deptula, referred to this as 'parallel warfare'. Rather than plodding through the slow, systematic, attrition-driven process of tactical- through operational- to strategic-level objectives, we can now go for the jugular directly. This is a very different kind of use than what the classicists like Giulio Douhet and Billy Mitchell envisioned when air power was just a faint glimmer of what it is today. Air power today offers the ability to bring about an early neutralisation of the other side's capability, but not by going against traditional targets like leadership, infrastructure and economic potential that proponents of strategic bombardment used to press for in years past. Today, even though those may be appropriate targets in some circumstances, it is really now the enemy's fielded forces and capacity for collective action that have become the most lucrative targets for air application. And, as I will say a bit more about in a few minutes, the initial attack today can even be surreptitious into an enemy's computers with 'ones and zeros', rather than with kinetic force, to pave the way for fire and steel to follow. Let me again stress that none of this adds up to an all-purpose substitute for a balanced force, including capable land and maritime forces. But the sort of transformed air capability that I've described has now allowed commanders to rely on air power—and when I say air power, I really mean air, space, information, intelligence,

and cyber, that whole concatenation that works in the third dimension—to conduct deep battle for the greater extent of a campaign from afar and to minimise the need for ground forces to engage in close combat early on.



Figure 7: Air Power and Land Forces Have Reversed Roles in Joint Warfare

TRANSFORMED AIR POWER OFFERS NEW AND UNIQUE FEATURES

I have listed in Figures 8 and 9 some distinctive features that have converged over the past two decades to make air power transformed. I will not go through each of those points individually. I would just say that, taken together, they are largely what accounts for the US Air Force, in particular, now being able to make a claim to wielding global vigilance, global reach and global power. When you factor into that the US Navy's 10 carrier strike groups, they represent the core essence of what American air power offers joint and combined force commanders today.

Now, some of the features listed in Figures 8 and 9 are shared by our allies—the one mainly represented in this room today (the RAAF) is at the top of the list in that regard. Particularly with respect to operator competence, it is second to none. In other areas, however, such as reach, awareness, sustainability, and air operations centres, these are uniquely American contributions to the air power equation.



Figure 8: Transformed Air Power Now Embraces New and Unique Features



Figure 9: Transformed Air Power Offers New and Unique Combat Attributes

AIR POWER'S ASCENDENCY IS CHALLENGED

We now come to one of two 'flies in the ointment' that, without them, I believe I could have wrapped up my remarks right now with a happy ending. The first of these concerns what we have seen in Iraq and Afghanistan since 2003.

Early after the smoke was settling in *Desert Storm* in 1991, it seemed to most folks that air power had finally become the tool of first choice for joint force commanders. That was reinforced in the two Balkan air wars and again in the major combat phases of *Enduring Freedom* and *Iraqi Freedom*. On that point, in fact, even before the second Iraq war came on after the turn of the century, Loren Thompson, an American defence analyst, made the comment at about the time the second Bush Administration entered office that not only did it look like air power could win wars, but there was a new crop of policymakers ready to embrace that message. That view was reinforced, I believe, by the stunning three-week major combat phase of Operation *Iraqi Freedom* that was not *won* by air power but was largely, I believe, *enabled* by air power. By the end of the major combat phase, when Saddam's statue came down on 9 April 2003, it really looked as though we had finally seen the emergence of a new style of warfare; again, at least with respect to high-intensity combat.



Figure 10: It Seemed Air Power Had Become Ascendant

The downside is that the end of major fighting in *Iraqi Freedom* ushered in a new type of warfare for the United States not just in one way but in two (Figure 11).

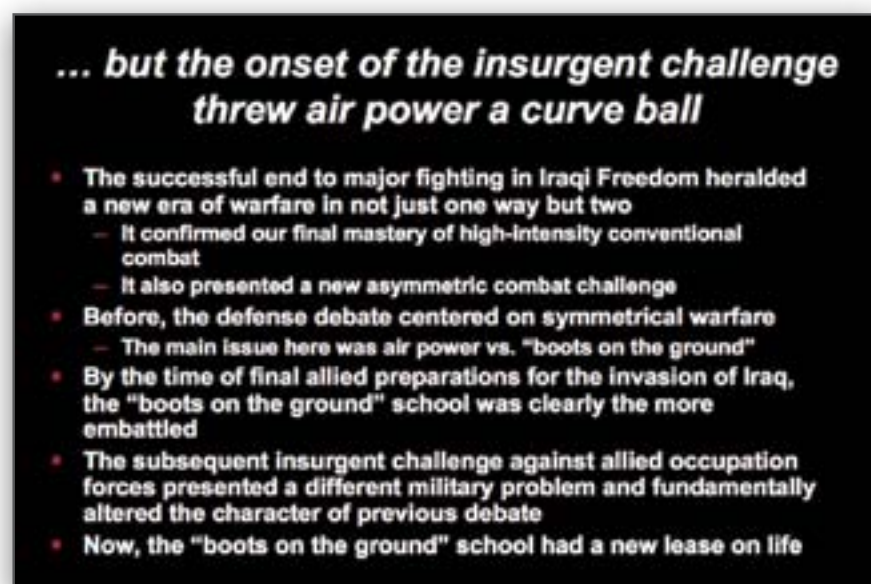


Figure 11: Onset of the Insurgent Challenge Threw Air Power a Curve Ball

It confirmed our final mastery of high-end combat, but at the same time, it brought us, for the first time really since Vietnam, face to face with a new type of asymmetric warfare that now seems likely to persist for the rest of our lives. It first became apparent within days of the occupation of Iraq, when it was clear that the occupation force was under-resourced for the new stabilisation challenge that it faced and for the incipient insurgency that it had to deal with. A similar challenge emerged in Afghanistan shortly thereafter as we took our eye off that ball and the Taliban saw a vacuum into which they could move. Before that occurred, the main focus in the American defence debate—and I suspect in other major capitals around the world as well—was on symmetrical warfare. And the big issue, as you all will recall, was air power versus 'boots on the ground'. By the time allied forces were ready to cross the berm in *Iraqi Freedom*, I believe the 'boots on the ground' school had become the more embattled in the debate. But as the insurgencies continued to grow and became more frustrating and more difficult to deal with, we found a type of enemy behaviour that was completely different from what we had experienced before. Today, as you all know as well as I, the 'boots on the ground' school has attained a new lease on life as ground forces, rather than air forces, have now become those bearing the brunt of battle and are demanding the greatest burden of resources for sustenance. As a result of that, we now have a situation where the air weapon, which had reigned supreme for all those years from *Desert Storm* to 2003, has now been called into question.

Since the start of counterinsurgency combat operations in Iraq and Afghanistan, airmen have waged an uphill battle to defend the air weapon's continued relevance (Figure 12). Rebecca Grant will discuss this in more detail tomorrow, and I do not want to say anything now that will pre-empt what she might have to say for you. I would just point out that Central Command's air component is contributing a lot more than it has been given credit

for in areas ranging from armed overwatch to on-call close air support (CAS), persistent ISR, inter- and intra-theatre mobility, medical evacuation (medevac), you name it. But we have found ourselves now in a situation in which, although the use of fighters with targeting pods to perform the non-traditional ISR mission has been supremely effective, it is a very expensive way to do that mission. It can be done much more cheaply with remotely piloted aircraft like Predator and Reaper, which are only now coming into the force in numbers, not only more cheaply but also more effectively because of their longer dwell time. Also, those nonstop operations with our fighters have been beating the life out of them; they were not acquired and fielded with the intent to be flown that hard and for that long on an open-ended basis. The same can be said for the unopposed close air support mission; we could do that much more cheaply in a permissive environment with a light-attack aircraft like an AT-6, which we do not yet have in any numbers. I would say this is one area in which our so-called transformed air posture in the late 1990s through to the early 21st century that looked as though it had neared perfection for that kind of war has a way to go before it will have achieved its full potential for the lower-intensity wars that we will face in the decades ahead.

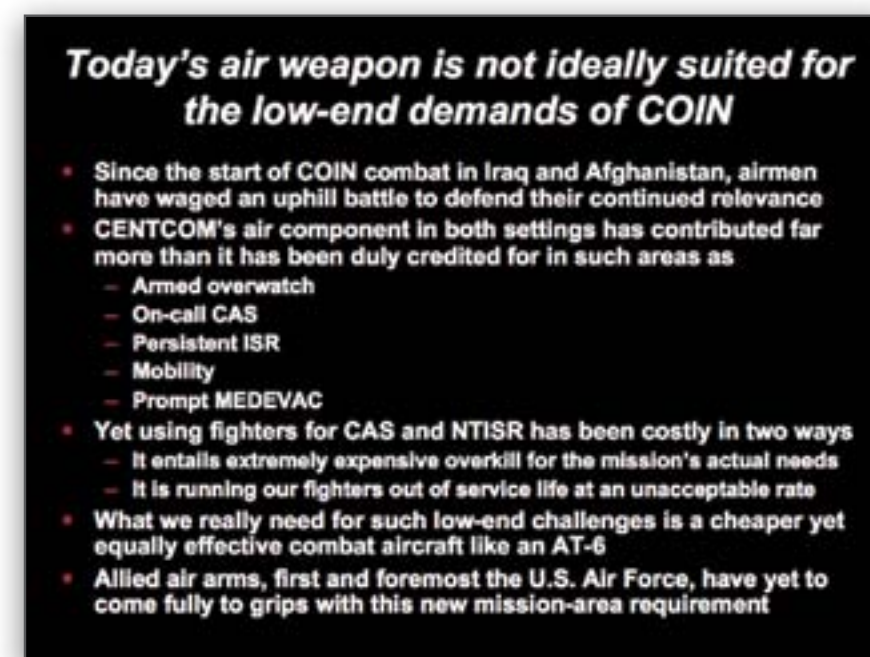


Figure 12: Today's Air Weapon is not Ideally Suited to Counterinsurgency

The second 'fly in the ointment', if I can call it that, has to do with the high end—a newly-emerging challenge of a sort that we have not had to contend with since the Soviet Union's demise (Figure 13). I will just offer a high-speed overview of this. It has called into question the adequacy of our existing force to deal with the anti-access capability that China has begun to present, in particular with its double-digit surface-to-air missile (SAM)

capability, which can only be penetrated safely and operated in effectively by stealthy aircraft like the B-2 and the F-22, coupled with fourth-generation air superiority fighters that have tremendous air-to-air persistence, and a counteroffensive conventional ballistic missile capability that puts our forward bases and forward-deployed carriers at risk. This is something very new under the sun, and I would suggest that today's American and allied air postures are not well configured to deal with that challenge.



Figure 13: High-end Anti-access Challenge has also Stressed Transformed Air Power

And, as shown in Figure 14, even low-end threats have their high-end aspects.

Those of you who watched Israel's experience against Hezbollah in 2006 and then subsequently, when they did a better job of it, against Hamas in the Gaza Strip in late 2008 and January 2009 saw a different kind of low-end threat that involves highly-disciplined non-state actors with capabilities very much like those one would expect to find in an organised conventional armed force, that put handwriting on the wall for a very different kind of low-intensity fighting that is going to require some high-end capability to deal with it. Hezbollah and Hamas are both forward combat arms of Iran, using what has come to be called a G-RAMM threat (for guided rockets, artillery, mortars and missiles) intended to hold at risk friendly civilian populations, as those terrorist organisations did against Israel in 2006 and 2008. These threats, as the Israeli Air Force was quick to learn, are difficult to geolocate and eliminate, even using today's strike and ISR assets, without very close ground involvement as well. They represent yet another challenge that today's air weapon is going to have to contend with before it can be said to have 'reached its potential'.



Figure 14: Even Low-end Threats now Feature High-end Dimensions

AIR POWER UNDER DURESS

Now let me turn to what I referred to earlier as a rut that I see American air power, in particular, as having fallen into, mainly as a result of the insurgencies in Iraq and Afghanistan but also because of the severe resource crunch that has lately come to affect us (Figure 15). Any of you who have followed the institutional fortunes of the US Air Force over the past two years will know just what I am talking about here.

At the centre of this predicament, and I would call it just that, is what I see as a tectonic change in the way the US Air Force has fared within the Washington policy community in the past two years in the distribution of roles and resources by the US Department of Defense. I will try to refrain from dwelling on this any more than I have to, because we are here to talk about air power writ large and not about the particular current travails of the US Air Force, which I hope are transitory. But, at the same time, I would submit that engaging the question of whether air power has reached its potential without grappling with this issue would be kind of like trying to write a rendition of Hamlet without any reference to the Prince.

It all began with the emergence of first hints a couple of years ago that the Secretary of Defense and the then Chief of Staff of the US Air Force were not on the same page when it came to assessed priorities. Let me emphasise here that I am not being judgemental. I just want to give you some facts as I have seen them unfold. In a speech to the Air War College back in April 2008, the Secretary enjoined the audience, almost entirely of Air Force

officers, to 'consider whether there is more the service [Air Force] might do to articulate and codify the unique role of air power in instability operations'.² The Secretary went on to complain that he had been 'wrestling for months' to get more ISR assets into the theatre but 'because people were stuck in old ways of doing business, it's been like pulling teeth'.³ He did not refer specifically to US Air Force airmen but I believe there was no mistaking who the implied culprits were here.



Figure 15: A US Air Force under Duress

Personally, I believe that behind that remark was a fixation on here-and-now concerns in Afghanistan and Iraq juxtaposed against an assessed US Air Force focus on the out-years—what the Secretary referred to as 'next-war-itis'—particularly with regard to the Air Force's insistence on pressing ahead with its F-22 fighter, despite the fact that it was not appropriate for the ongoing wars in Iraq and Afghanistan. There is much other associated detail—I will not rehash it all—but just about a month later, in early June 2008, the Secretary of Defense asked for and elicited the resignations of the Secretary of the Air Force, Michael Wynne, and the Chief of Staff of the Air Force, General 'Buzz' Moseley, who, by the way, was the

Air Component Commander for the major combat phases of both Operation *Enduring Freedom* and Operation *Iraqi Freedom*.

The main reason given for those dismissals had to do with asserted laxity in nuclear weapons surety. To give you some background on this, what had happened was that in August 2007, munitions technicians inadvertently loaded six nuclear-tipped cruise missiles on board a B-52 at Minot Air Force Base in North Dakota, which flew to Barksdale Air Force Base, Louisiana, and sat on the ramp for a number of hours before the error was finally discovered. Then, less than a year later, and purely through an accounting error, Air Force personnel discovered that a fuze component for a Minuteman ICBM had been inadvertently sent to Taiwan.

These incidents represented serious oversight errors, but they were not potentially catastrophic, fortunately, and the Air Force leadership stepped out immediately and smartly to deal with them. But the fact remains that with the ensuing senior leader dismissals, we saw a sea change almost overnight in the character of the US Air Force leadership and institution. There were those who thought that the causation for those dismissals was the reason as just given. But I believe that many privately—not just in the US Air Force but among others who watched this process carefully—saw the fundamental difference instead as being between the Defense Department leadership and the Air Force on investment priorities, with the F-22 being the real lightning rod in that regard.

About a year later, the F-22 program was summarily terminated, prematurely in my opinion, at the 187 aircraft that had been authorised up to that time. There were those who argued that the reason was because the Administration wanted to free up money to deal with the nation's economic crisis, to help fund President Obama's stimulus package. But the Secretary said very categorically: 'It wasn't even a close decision and, even if we'd had unlimited money for Defense, the decision would have been made to terminate the F-22'. A week later later, the new Air Force leadership publicly acceded to that decision without protest. General Schwartz (the new Chief of Staff), I believe clearly discomfited by it, nonetheless said: 'Two hundred and forty-three is the right number; 187 is the affordable force'. I would just point out to you that the US Air Force's own agreed and sought-after low-risk F-22 force size had been 381 aircraft. But that is enough said on that subject.

Another impediment to American air power's realising its potential any time soon has come from what I have characterised in Figure 16 as a new look in force development that has been directed by the current American defence leadership. Again, I am not being judgemental, I am simply describing reality. The current US Defense Secretary has disparaged investment in what he calls 'exquisite systems' and has instead called for pursuit of greater numbers of systems that represent, as he put it, the '75-percent solution'. He also has spoken out against acquiring weapons just 'to overinsure against a remote or diminishing risk' so as 'to run up the score in capability where the United States is already dominant'.⁴

² Robert M. Gates, US Secretary of Defense, Speech to US Air War College, Maxwell-Gunter Air Force Base, Montgomery, Alabama, 21 April 2008, <http://www.defense.gov/Transcripts/Transcript.aspx?TranscriptID=4214>, accessed 2 August 2010.

³ *ibid.*

⁴ Robert M. Gates, Secretary of Defense, Department of Defense News Briefing, The Pentagon, Arlington, VA, 6 April 2009, <http://www.defense.gov/Transcripts/Transcript.aspx?TranscriptID=4396>, accessed 2 August 2010.



Figure 16: New Constraints on American Force Planning

For the first half of my professional life, I was a serious student of the long-term competition between the United States and the Soviet Union. During those years, if I remember correctly, the universally-agreed categorical imperative was to strive for the very best that technology and good judgement would allow when it came to hedging against the possibility of a war with the Soviet Union. It was always taken for granted that however unlikely such a war might be, the consequences of its occurring, if it did happen, were sufficiently grave that there was every good reason to justify the cost of getting as much of a combat edge as we could.

But that is not where we are today. Where we are today in the United States is that the Services, by direction, will now aim simply for *sufficiency* where they used to aim for *dominance*, and they will pursue only systems deemed pertinent to the most likely missions. In years past, it was always taken as a given by responsible American defence professionals that overmatching for overinsurance was the name of the game. The ‘F-22 overmatch’ was entirely appropriate toward that end. You do not want a fair fight; you want to be the biggest ‘gorilla in the sky’, if only for its sheer intimidation effect. That is why Israel chose the F-15 in 1978, and I believe it was the main rationale behind why we pursued the F-22, with the original Advanced Tactical Fighter requirement having been laid down that same year.

Just to be clear, my intent here has not been to bemoan the recent misfortunes of the US Air Force alone. The US Navy has been likewise affected, as Figure 17 shows.

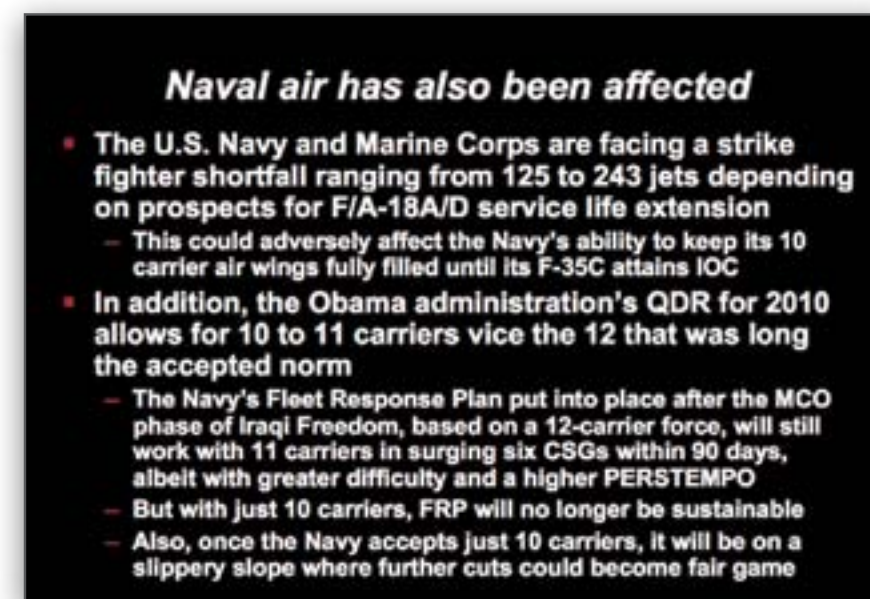


Figure 17: Naval Air Has Also Been Affected

The Navy and Marine Corps are now looking at a strike fighter shortfall across both Services ranging from 125 to 243 aircraft, depending on whether the service life of their F/A-18As through F/A-18Ds can be extended from 8600 hours at the low end to 10 000 hours at the high end—very high hours indeed for a fighter aircraft. That shortfall has threatened the Navy’s ability, for the near term, to keep its 10 air wings filled pending the arrival of its F-35C. Also, in its recently released 2010 Quadrennial Defense Review (QDR) last month, the current US Administration has now authorised 10 to 11 Navy carriers, rather than the standard 12 carriers that was the planning norm all but taken for granted since the Vietnam War. After the major combat phase of *Iraqi Freedom* ended, the Navy implemented what it called its Fleet Response Plan (FRP) that essentially doubled the availability of carriers and carrier air wings on call. It also allowed for as many as six carriers to be ready for tasking within 90 days simply through the common-sense application of smarter resource management practices derived from the business world. When USS *John F. Kennedy*, the last of the conventionally-powered carriers, was decommissioned without a planned replacement, that ran the Navy down to 11 and they said: ‘Well, yes, we can still sustain FRP with 11 carriers, albeit with harder work and a higher personnel tempo’. But now, the current US Administration is talking about not refuelling USS *Abraham Lincoln* when she comes up for that major reservicing in a couple of years. If that happens, we will then be down to 10 carriers. With that number, the Fleet Response Plan will no longer be sustainable. At the same time, the Navy is now on that slippery slope where it will have gone from 12 to 11 to 10, where it becomes that much easier for the budget cutters to keep going relentlessly one notch at a time further. So that is another American reality, as I see it, that I trust is a passing one.

What will it take to get us beyond where we are today? I believe Step Number One is shown in Figure 18 that I have called 'Getting Serious About Long-range Strike'.

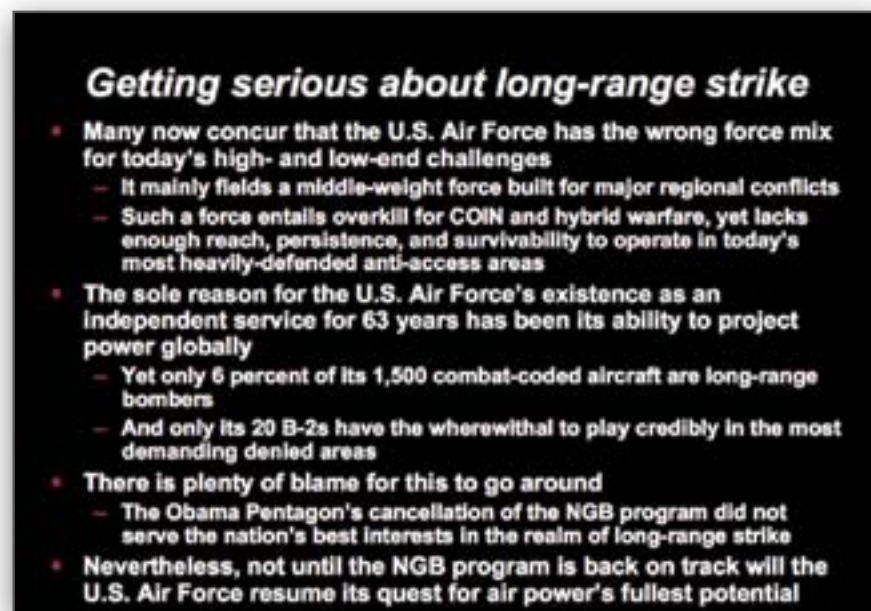


Figure 18: Getting Serious About Long-range Strike

There is a growing belief, even among many of my US Air Force friends, that we are not configured with the right force mix for the post-Cold War, post-major combat challenges we have now come to face today. We have a force that is configured mainly for the kinds of wars we fought in the Middle East and over the Balkans in the last 15 to 20 years, when what we really need is a force configured for both the new high-end and the new low-end threats that many of us now see emerging. When it comes to 'rubber on the ramp' and to making proper investments, it will mean getting away from the middle-weight force that we now have today, which I believe one can arguably say represents overkill for the kind of low-end threats we face and yet lacks the reach, persistence, sustainability and survivability that it will need for the most heavily defended war zones like, for example, the Taiwan Strait area. Today, just to take a round number, the US Air Force maintains about 1500 combat-coded aircraft. Only six per cent of those are bombers, and once the F-117 was retired in 2008, that left only the F-22s and B-2s as platforms that could survive and operate in areas defended by the most capable double-digit Russian SAMs. People, including US Air Force airmen, tend to forget that, first and foremost, the abiding reason for the US Air Force's existence as a separate and independent Service for 63 years has been its ability to project kinetic power globally by means of long-range strike aircraft. Yet, throughout most of its evolution since Vietnam, what the Air Force has become instead is a short-range force facing a world dominated by long-range challenges. There is ample blame to go around for this. In the 2006 QDR, the Bush Administration directed the Air Force to start a

next-generation bomber (NGB) that would initially be operational by 2018. The USAF aggressively signed up to that challenge, and yet only four years later—actually before the most recent QDR was issued—that decision was rescinded in favour of still further 'study' to look at what the NGB might be, turning on whether it should be manned or unmanned and a number of other questions. So there is yet another bridge that will have to be crossed before air power, now mature air power, can be said to have attained its full potential.

SPACE

Let me now talk briefly about space. Joe Rouge gave you a fine tutorial on this subject and has spared me the need to do more than just a 'touch and go' on a couple of key points. We cannot even begin to address the question of whether air power has reached its potential without considering the offerings of space, which has long been a crucial part of the air power equation. Figure 19 outlines the space mission spectrum.



Figure 19: The Space Mission Spectrum

Up until now, the US Air Force has limited itself largely to the first two of the four space mission areas—space support, which is putting objects on orbit and sustaining them; and space force enhancement, using assets on orbit to further enable terrestrial operations. The third mission area, space control, will involve the actual imposition of effects, both kinetic and non-kinetic, once it becomes developed into a routine practice. Conceptually, there is really no difference between space control and control operations in the other two mediums, namely, air control and sea control. It is just a matter of desirability, feasibility and

cost-effectiveness for the pay-off being sought. However, unlike air control and sea control, space control so far has failed to take root because of a lack of consensus as to whether we really want to not just militarise—space has been ‘militarised’ since the first reconnaissance satellite was launched in the early 1960s—but to ‘weaponise’ space. But I believe that is about to change, and I will say more on that in just a second. The last space mission area is force application. We have not begun to go there yet because of, again, widespread popular concern about weaponising space. I believe that at some point downstream that will happen. It will be driven either by technological possibility or by assessed threats.

Figure 20 addresses the question of space priorities.

A question of space priorities

- **Opinions vary widely regarding the most important next steps in military space exploitation**
- **However, the U.S. Air Force must make hard choices, since it can't do everything it wants all at once**
- **There is a fair case to be made that Step One should entail further locking in the integration of today's on-orbit assets with the needs of terrestrial warfighters**
- **A closely-related top priority is replacing indispensable assets that are obsolescing or that stand at the brink of failure due to aging**
 - The current constellation of DSP satellites for missile launch warning and attack characterization represents a particular case in point

Figure 20: A Question of Space Priorities

As far as next steps are concerned, I believe it will be essential for the survivability of any new ISR assets that may be migrated to space that they be protected first before we put them there. Figure 21 shows why implementing a space control regime has become an urgent imperative. I believe the Chinese anti-satellite (ASAT) test in January 2007 drove that point home, particularly for those of us who are not specialists in this business. Investment in first-generation space control measures has now been rendered essential *just to keep us in the business of space enabling*.

Implementing a space control regime has become an urgent imperative

- **The Chinese ASAT demonstration in 2007 was proof positive that assets on low and medium earth orbits are now at risk**
- **It underscored the criticality of timely space control measures simply to keep us secure in the space force-enhancement business**
- **Our growing dependence on space-based assets has naturally made them ever more attractive targets for potential enemies**
 - GPS offers an especially telling example here
- **This vulnerability should be a major planning factor in any move to migrate critical air-breathing assets to space**
- **It also should counsel putting in place adequate space control measures first**
 - Otherwise, the result could be space-based assets of greater vulnerability than the air-breathing assets they superseded

Figure 21: Implementing a Space Control Regime has Become an Urgent Imperative

Figure 22 considers whether JSTARS and AWACS should move to space.

Should the JSTARS and AWACS missions move to space?

- **Many space professionals have pressed hard in recent years to migrate JSTARS to the new high ground of space**
- **They also have pressed hard for a similar move by AWACS just as soon as the more challenging technology demands for that mission can be met**
- **Yet just because an ISR mission can be performed from space doesn't mean that it should be without the fullest prior deliberation**
- **Cost-effectiveness should be the principal driver here**
- **That will mean first developing and validating the needed technologies and then determining the most rational roadmap for any such move**

Figure 22: Should JSTARS and AWACS Missions Move to Space?

I would simply note here that, just because an ISR mission *can* be performed from space, it does not necessarily follow that it *should* be without the fullest prior deliberation. Space control is an essential precondition for such force enhancement migration, such as putting JSTARS and AWACS into space. Otherwise, in migrating our asymmetrical technology advantages to space, we will just run the risk of migrating our asymmetrical vulnerabilities there as well.

CYBER WAR

Just a few words briefly about warfare in cyberspace (Figure 23). This is a subject that I do not know much about. In fact, I will even confess that until only a few years ago, when the USAF leadership began talking about standing up a new major Cyberspace Command, the word 'cyberspace' was not even a part of my working vocabulary—which indicates how far we have come in this domain and how quickly. Cyber war has actually been with us for quite some time. Perhaps it even goes back as far as the wireless telegraph—for as long as we have been exploiting the electromagnetic spectrum for military purposes. As early as the 1970s, the commander-in-chief of the Soviet Navy, Admiral Gorshkov, made the now-famous comment that the next war will be won by the country that can best leverage the electromagnetic spectrum.

I believe it is safe to say that cyberspace has now become regarded as a warfighting domain no less important than the atmosphere and space. Only the imagination is the limit, at this point, to what even a near-term cyberspace warfighting repertoire might entail. Figure 24 shows some possible cyberspace mission applications.



Figure 23: Thinking About Cyber War

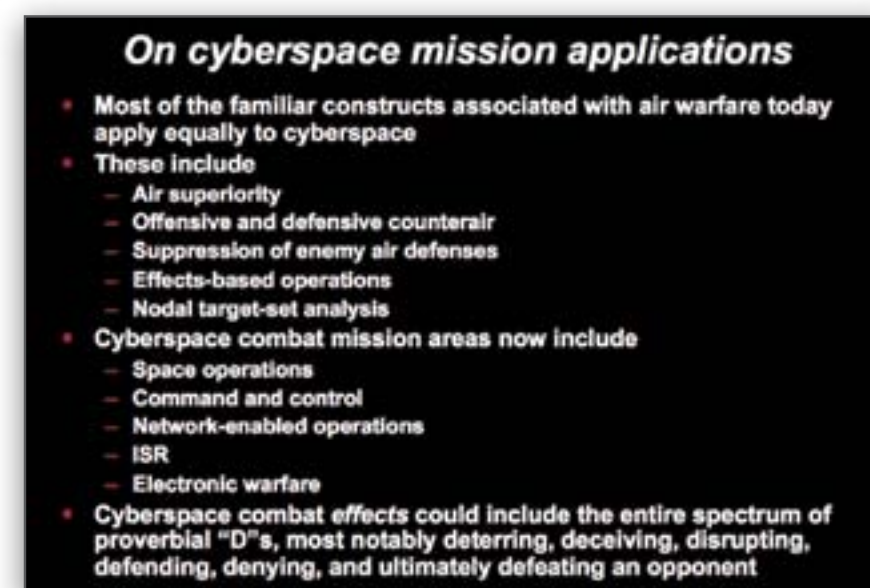


Figure 24: Cyberspace Mission Applications

I can envisage combat mission areas in cyberspace ranging from space operations to command and control, ISR and electronic warfare. It is hard, certainly for one who has not had access to the innermost compartments of the cyberspace world, to imagine what sort of an actual backlog in cyberspace warfare experience we have accumulated so far. However, I believe we can get some hints going back as far as *Desert Storm*, when it was let known later by US officials that we were able to access Iraqi email communications by both computer penetration and tapping landlines. Also, after the Kosovo campaign of 1999, it was reported by US officials that we were able to put false signals into the Serbian Integrated Air Defence System (IADS) to make Serb operators see what they were predisposed to see. As just one hint regarding the possibilities here, I would put to you an intriguing comment that General John Jumper—at the time the Commander of US Air Forces in Europe—made right after the end of the Kosovo campaign when he said that, instead of sitting and talking about kinetic attacks and large ECM pods that bash electrons, we should be talking about microchips that manipulate electrons and get into the heart and soul of a SAM system like the SA-10 and SA-12, and tell it that it is a refrigerator, rather than a radar.

Figure 25 addresses downstream tactics. Again, the sky is the limit to what can be done simply by way of clever tactics, techniques and procedures (TTPs) created by smart operators. I can imagine sitting around in a brainstorming session and someone coming up with the idea that wouldn't it be wonderful if we could come up with some new-in-principle cyber weapon that would command, for example, a salvo launch of the other side's SAMs as a precursor to a kinetic attack against a highly-defended target. By the same token, in air-to-air combat, one can imagine an intriguing way of gaining the starting advantage not by the classic means of a beyond visual range (BVR) missile shot in the face to force a desired reaction, but rather by some clever way of pushing a button in your cockpit about 40 miles

before the merge and illuminating the fire warning light in every enemy fighter cockpit—or shutting down his digital engine electronic control, or something similarly diabolical in that vein. To me, this is still in the realm of fiction for now. But it offers at least a hint of possibilities yet to come. In that regard, however, I would leave you with the age-old rule of thumb that a tactic tried twice is no longer a tactic, but a procedure.

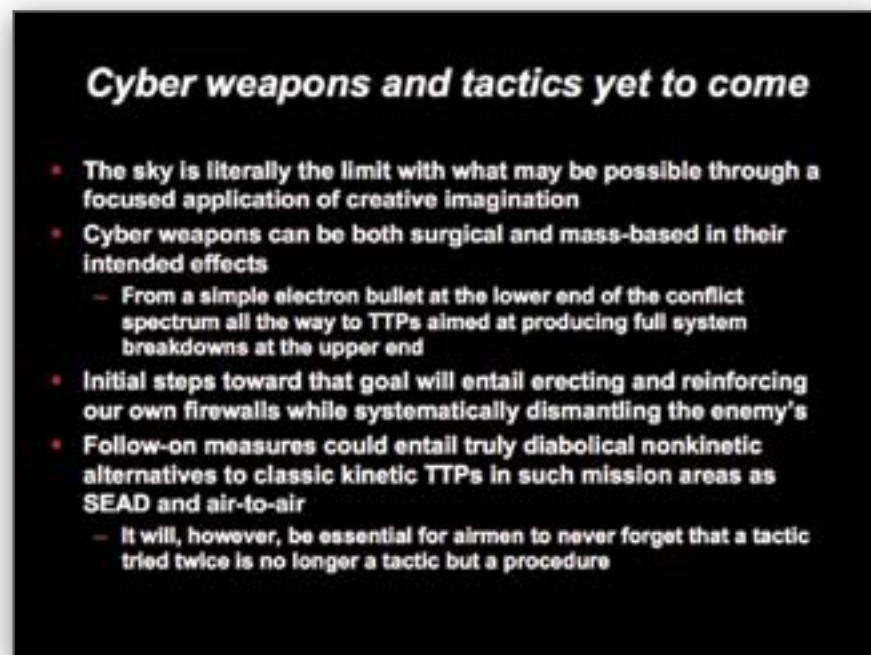


Figure 25: Cyber Weapons and Tactics Yet to Come

Figure 26 provides some further thoughts of my own on a mission-area agenda for tomorrow's cyber warriors. I can only presume and hope that American and allied airmen are already pursuing actively at least some of these measures.

CONCLUSION

This brings me to my last chart (Figure 27). I want to leave you with some 'where-do-we-go-from-here?' reflections. These will not be profound by any stretch, but I hope they will at least offer you some food for thought—and perhaps also illuminate a path ahead for air power's continued quest for whatever its ultimate potential may be.

I began by noting my belief that air power had matured for the sorts of wars that we had fought up to 2003. I believe that the areas in which American and allied air capabilities face their greatest stresses today are in the new high-end and new low-end challenges that we will face for the remainder of our lives. Particularly at the high end, the new stresses we now face will put a premium on stealth, reach, and persistence in denied airspace like we have never seen before.

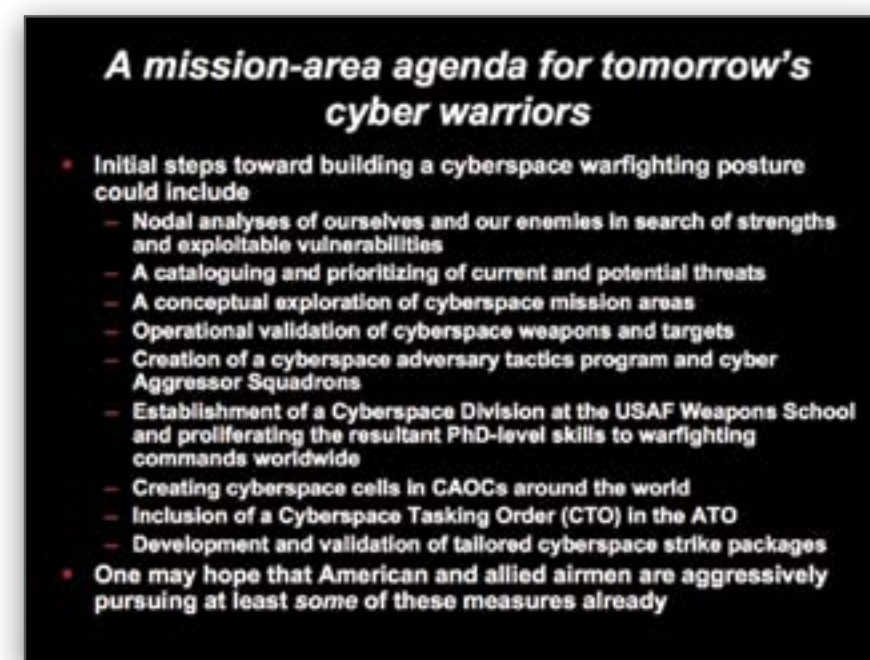


Figure 26: A Mission-Area Agenda for Tomorrow's Cyber Warriors

With regard to doctrine development, I believe that air power theory has now evolved to a point where we can begin talking about building a kind of 'unified field theory', if you will, that cuts across domain lines, across the air and space, information, and cyberspace regimes. I would add, in this regard, that a major pitfall to be avoided is the pursuit of separate theories for each medium. Space and cyberspace, like the atmosphere, as Clausewitz once said about war writ large, have their own grammar, but they do not have their own logic. Taken together, they represent a common challenge, and doctrine for that challenge needs to be developed in a holistic way. In addition, while I would allow for—and even warmly welcome—*organisational differentiation* among the various activities in these three domains of the vertical dimension, I would insist on *operational integration* among them. Space, cyberspace and the atmosphere will all be exploited for a common purpose. I can see a case for separate career fields and separate *organisations* for each medium, but *not* activities isolated from the others in their own hermetically-sealed stovepipes.



Figure 27: Whither Still-transforming Air Power

Let me just end on this note. Today's defence debate should *never* have been allowed to degenerate into what I see, at least in my country, as the stark juxtaposition of either focusing on the here-and-now or on the more distant out-years. Yes, counterinsurgency may well be our only consuming combat challenge of the moment. But there is an infinite amount of future waiting to unfold before us, and we are not, by any stretch, past the era of bigger wars yet to come. Colin Gray, a friend and colleague whom I have known since the mid-1960s, is fond of arguing that, just because it has been blue sky for a week or a month on end is no reason for one to give away one's foul-weather gear. One does not have to specify *who* the adversary downstream may be to make the necessary hedges now, because if we wait until we need the capability, it will be too late.

I will end with what I would put to you as a useful perspective for thinking about where air power is and where it needs to go and the challenges it needs to face. Just the other day, I saw a captivating quote from the Royal Air Force Chief of the Air Staff, Air Chief Marshal Sir Stephen Dalton. He commented in a speech at the International Institute for Strategic Studies in London that:

Air and space power isn't an optional luxury that can be added to an ... operation on the ground or at sea; rather, it provides the essential foundation for any ... military endeavour ... It sets and shapes the critical conditions before and during operations on the ground and at sea ... Air power is an essential defining capability, so everybody has a stake in it ... [It] is, and must be, our comparative advantage over potential opponents in future conflict ...

and our advantage must not be squandered by non-experts who do not really understand the third dimension, or relative time and space advantage, that mastery of the air can deliver.⁵

Sir Stephen then added:

... for the sake of our future security, ... Afghanistan must serve as a *prism* to view the future, not as a *prison* for our thinking. A bespoke counter-insurgency force with niche capabilities won't provide ... political decision takers with a flexible military lever of power for the mid to long-term⁶

When will air power reach its ultimate potential? This may sound like a truistic cliché, but the short answer is *never*. It is much like perfection and the horizon: the closer one approaches it, the farther away it recedes. For my part, I would simply urge all who have a vote in determining the shape of today's and tomorrow's air weapon never to lose sight of the fact that the *only* reason that our adversaries have been driven to low-end asymmetric strategies is because we absolutely dominate in the air and space. We can never afford to take that comparative advantage for granted.

With all of that said, I will just leave you with this bone to chew on:



Figure 28: Will There be a Sixth-generation Fighter?

⁵ The International Institute for Strategic Studies, Air Chief Marshal Sir Stephen Dalton Address, 'Dominant Air Power in the Information Age', at <http://www.iiss.org/recent-key-addresses/air-chief-marshal-sir-stephen-dalton/>, accessed 1 October 2010.

⁶ *ibid.*

I appreciate the opportunity to share these thoughts with you, and I will try my best to take your questions.



DISCUSSION

Air Commodore John McGarry (RAAF – Moderator): Ladies and gentlemen that was quite a provocative discussion and I'm sure you have many questions. We are a little bit short for time but I think we can afford to get a couple of questions in before we break for afternoon tea.

Mr Jason Kennelly (Faculty of Science and Technology, Queensland University of Technology): I have a quick question. Do you believe that the evolution of warfare means that an air force's ability to achieve a high level of maturity along the capability continuum is iterative or do you believe that warfare is evolving so rapidly that the same level can not be achieved in the future?

Dr Lambeth: I believe that warfare itself does not change. Warfare, as Clausewitz astutely commented, is, at a rock bottom, the continuation of politics by other means. The nature and character of warfare will be an abiding constant henceforth; what will change is the *means*. And the means will be a function, I think, of technology opportunity and clever imagination, as each of the mediums that I just spoke to evolves over time. General Ron Fogleman, when he was Chief of Staff of the US Air Force, addressing the US case, spoke of an 'air force' evolving into an 'air and space force' and ultimately evolving into a 'space and air force'. I can certainly see the instrumentalities of warfare evolving in ways that none of us in this room can imagine today. But the abiding essence of war will be what it has been ever since the days of sticks and stones. I believe that is a baseline premise that we need to never forget.

Dr Malcolm Davis (Strategic Policy Division): Military technology develops in a series of waves. We have gone from Blitzkrieg in the 1920s and 1930s, through to nuclear weapons, through to precision strike and information dominance in the 1980s and 1990s. If we think of the next wave as potentially being centred around speed, and I'm thinking here specifically of directed energy weapons and hypersonic capabilities, do you think that we are on the right track to be prepared to ride that wave forward or are we going to be overwhelmed by it?

Dr Lambeth: There are surely people in this room who are more technically competent to answer your question than I am. The best reply I could give turns on a point that I mentioned toward the end of my remarks, and that is the need to anticipate and hedge in a seemly fashion, lest we get caught by technological surprise. If one waits until the challenge is at our doorstep, it will be too late. Ultimately, we are limited, it seems to me, only by available fiscal resources and human imagination, driven by assessed operational challenges in governing where we go and in what direction we proceed. I see this process as really part of a never-ending offence-defence dialectic that, again, has been with us since the days of cavemen fighting with sticks and stones. It will be an iterative process. It will be point and counterpoint, it will be cat and mouse—use whatever metaphor you like—but I do not see this process ever ending.

Mr Andrew Wallace (Defence Imagery and Geospatial Organisation): You spoke a lot about the effectiveness of air power in the Middle East conflicts and in the Balkans, and yet here in the Asia-Pacific region and Central America we've got a much different terrain, like dense jungles. Do you see air power being able to deliver the same sort of effects in this terrain type as it did in the Middle East and the Balkans?

Dr Lambeth: I believe the Serbian Third Army learned over time that foliage does not hide armour from all sensors. Again, I'm not a technologist, but I do believe, or I'm certainly led to understand, that the kind of multi-spectral sensor technologies that we've been developing up to now—certainly in my recent experience—are taking us to a point where there really is no sanctuary. The open desert environment is very different than the jungle environment, and the jungle environment will pose different challenges to an air commander. But it seems to me that, ultimately, with the right application of technology and with the right driving mission need, these problems can be accommodated. They're different, but they can be accommodated.

Air Commodore John McGarry (RAAF – Moderator): Thanks very much Ben. Ladies and gentlemen we'll wrap it up there. For those who haven't been following closely the debate that has raged in the United States for the last three years or more, what you have received this afternoon is a fascinating insight into a number of the dimensions: the competition between high-end and low-end capabilities, the allocation of scarce resources, the emergence of Cyber Command and the role of the single Services versus the intelligence agencies, and who should own Cyber Command. For those who aren't aware, US Cyber Command is a sub-unified command under the model, below STRATCOM [Strategic Command], and each of the single Services have their own individual cyber commands that, as I understand it, will be components of US Cyber Command. So there is a number of what we would call 'contested concepts' that Ben has alluded to during the course of his talk, not to mention some interesting politics in terms of the way the administration and the Air Force hierarchy in the United States have interacted over the last couple of years. So there is a lot of food for thought. I encourage you as you go to afternoon tea to perhaps dwell on and consider some of those, and I'm sure Ben would be more than happy to take further questions outside. On that note, I would like to say thank you very much to Ben for a most interesting presentation.

PERCEPTION, REALITY AND 21ST CENTURY STRATEGY¹

DR ALAN STEPHENS

In 1962, the artist-come-pop-psychologist Andy Warhol famously depicted cans of soup as art, thereby changing the context in which viewers of his canvas ascribed value to those particular objects. Among other things, Warhol was demonstrating how perception can become reality. His point was cleverly made, but it was scarcely original. Ideas, analyses of events, strategies and so on, do not necessarily have to be sensible, logical or even truthful to create an effect, they simply have to be believed.

The purpose of my paper today is to discuss perception and reality as they relate to air power and military strategy. I need to make two important points at the outset.

First, the topic 'perceptions of air power' is worth an entire conference in its own right, not just one section of one presentation. The subject is longstanding, complex, and often emotive. Few better examples of this reality can be found than a report into command arrangements in the Australian Defence Force (ADF) written in 1988 by then Brigadier John Baker, subsequently a general and Chief of the Defence Force.² Among other things, Baker suggested that the proper use of air power was not well understood, an educational and public relations failure he attributed primarily to air forces. His observation was characteristically astute in its broader implications.

Two decades later, perceptions of the utility of air power remain contentious, as demonstrated, for example, by the current widespread criticism of Remotely Piloted Vehicle (RPV) operations in Afghanistan.³ In a familiar reaction, RPV strikes have been singled out for their alleged excessive collateral damage by a spectrum of critics, including Western media, politicians and academics; Afghani and Pakistani officials; and the Taliban. Even the West's senior in-theatre commander has joined in. In an extraordinary statement, US Army General Stanley McChrystal has asserted that the use of air power in Afghanistan 'contains the seeds of our own destruction'.⁴

¹ A similar version of this paper is published on the Williams Foundation website. See <http://www.williamsfoundation.org.au/research/download/perception-reality-21st.pdf>, accessed 1 October 2010.

² Brigadier J.S. Baker, *Report of the Study into ADF Command Arrangements*, Headquarters Australian Defence Force, Canberra, March 1988.

³ The name 'Remotely Piloted Vehicle' (RPV) is used instead of the more common 'UAV' (Unmanned Aerial Vehicle) or 'UAS' (Unmanned Aerial System) to avoid any suggestion that such platforms are autonomous. Most UAVs and UASs are operated in real-time by remotely located pilots and systems crewmen.

⁴ Quoted in Dexter Filkins, 'Stanley McChrystal's Long War', in *The New York Times Magazine*, 18 October 2009, p. MM36.

Yet if there is one success story to emerge from the fiasco in Afghanistan, it is the use of RPVs for intelligence, surveillance and reconnaissance (ISR), and for precision strike—capabilities that represent the Coalition's single greatest military comparative advantage. American counter-terrorism officials have praised the RPV program as a 'resounding success' which has eliminated scores of terrorist leaders and 'thrown their operations into disarray'.⁵ Furthermore, the respected New England Journal of Medicine has reported that air attacks, including those by RPVs, have been responsible for only five per cent of all civilian casualties in the Middle East and Central Asia, compared to 20 per cent for small-arms fire and 33 per cent assassinated by insurgents.⁶ Contrary to General McChrystal's bizarre assertion, investigations by Afghani and United Nations officials have revealed that most civilian deaths attributable to the Coalition are caused by Special Forces.⁷ In other words, perception and reality are seriously at odds.

The second key point is that the warfighting model favoured by the West for about 600 years, based on invasion and occupation, is no longer tenable. The model's decline started with the French reoccupation of Indochina in 1945, gathered pace during the American war in Vietnam, and reached terminal velocity with the invasions of Afghanistan and Iraq. Western strategists can no longer ignore the profound implications of globalisation and interdependence; and they can no longer ignore the profound distinction between wars of necessity and wars of choice.⁸

Simply put, the era has passed in which predominantly white, predominantly European, predominantly Christian armies could stampede around the world invading countries their governments either don't like or want to control. The practical and ethical effects of globalisation have made that kind of mentality obsolete. Moreover, the subjects of invasion have learnt how to extract costs that far exceed any benefits an occupying force might realise.

These days, once we deploy an invasion force, the Viet Minh, the (Algerian) FLN, the Mujahideen, Hizb'allah, Somali warlords, the Taliban, al-Qa'ida, and their ilk, fight on their terms, not ours.⁹ They are adaptive, imaginative and, perhaps most important, infinitely patient. Thus, today in the Middle East and Central Asia, the most advanced armies the world has ever known are spending trillions of dollars trying to counter homemade roadside

bombs and socially-primitive suicide bombers. Regardless of the short-term outcomes of the invasions of Afghanistan and Iraq, it will be decades before the West fully understands the full cost of its actions there.

Those two key points—realities if you will—establish the context for my presentation. I now want to turn to the topic of perception.

PERCEPTIONS OF AIR POWER

A revealing insight into popular perceptions of air power can be gained from two of the best-known air campaigns, both from World War II: the Combined Bomber Offensive against Germany and Italy, and the bombing of Japan.

Sixty-five years after the event, forests are still sacrificed to the debate over the effectiveness and morality of the Combined Bomber Offensive (CBO). It is rare for a semester to pass without someone, somewhere, in some university, convening yet another seminar on the rights and wrongs of the CBO.¹⁰ The reality of that academic phenomenon suggests that the campaign is widely regarded as both immoral and a failure—were it perceived otherwise, we would have stopped revisiting its detail long ago.

Three observations are pertinent here. The first is that under the Hague Conventions dealing with the laws of armed conflict as they existed at the time, the campaign was legal. Whether it was moral is another matter, but the CBO is scarcely unique on that score, not only in relation to World War II, but also to many other wars fought in the years since.

The second observation concerns casualties. During World War II, less than five per cent of civilian deaths were caused by air attack; that is, 95 per cent were killed by other means.¹¹ Numbers in themselves can never tell a story, or distinguish right from wrong, but they can expose double standards.

In a campaign lasting five years, the bomber offensive killed some 500 000 German civilians. By comparison, the siege of Leningrad by the German Army killed about one million civilians in three and a half years; while in just eight months the siege of Stalingrad killed one-half to three-quarters of a million civilians. Twenty years earlier, during World War I, the Royal Navy's blockade of Germany had starved to death some three-quarters of a million civilians and was a major catalyst for a subsequent revolution that claimed many millions more. Forty-five years after World War II, a very different but no less lethal form of coercion created a similar outcome, when the trade embargo enforced by the United Nations against Iraq from 1990 to 2002 was responsible for the deaths of 350 000 to one million civilians, many of them children. None of those indicative actions, or scores of

⁵ 'CIA to Expand Use of Drones in Pakistan', in *The New York Times*, 4 December 2009; and 'US drone strike kills 20 in NW Pakistan: officials', in *The Sydney Morning Herald*, 18 January 2010.

⁶ Cited in 'Air Power and Collateral Damage: The Strategic Effect', in *Pathfinder*, Issue 126, Air Power Development Centre, Tuggeranong, January 2010.

⁷ Richard A. Oppel and Rod Norland, 'U.S. Is Reining In Special Forces in Afghanistan', in *The New York Times*, 15 March 2010.

⁸ The phenomenon of globalisation is characterised by economic and social interdependence, transparency, and accountability; and it is impelled by instantaneous worldwide communications, computers and mass rapid international transport.

⁹ FLN is an acronym for the National Liberation Front (French: *Front de Libération Nationale*), an Algerian nationalist movement that eventually won power from the French in 1962.

¹⁰ Most recently in Australia, see Emeritus Professor Igor Primoratz, 'Terror Bombing of German Cities in World War II: A Case Study in Applied Ethics', Special Lecture, School of Humanities and Social Sciences, UNSW@ADFA, Canberra, 28 October 2009.

¹¹ 'Air Power and Collateral Damage: The Strategic Effect'.

similar events, attracts anything like the continuing opprobrium of World War II's bomber offensive.

My third and last observation concerns the effectiveness of the bomber offensive. Notwithstanding the unfavourable public perception, the fact is, in what for the Allies was a war of national survival, and also for Australia the only war of necessity we have ever fought, the CBO arguably made the single greatest contribution to victory, other than the Soviet campaigns on the Eastern Front. For some four years the bomber offensive was the only Allied campaign that took the war directly to the Nazi homeland. Additionally, it alone was the second front in Europe that the Soviet Union desperately needed, noting that, ultimately, World War II was won and lost on the Eastern Front. After a slow start, in the final 18 months the CBO brought Nazi Germany and its war economy to its knees. Contrary to popular opinion, it did not stiffen German morale—quite the opposite, it made the workforce depressed, resentful and unproductive. The campaign caused massive dislocation and destruction of war production, and it greatly facilitated the advance on Berlin of armies from both Western and Eastern Europe.¹²

Five months after victory in Europe, the atomic bombs dropped on Hiroshima and Nagasaki by the United States Army Air Forces ended World War II in the Pacific without a single Allied soldier having to set foot on the Japanese home islands. These were terrible events, and it remains a deeply chastening and emotional experience to visit the memorial at Hiroshima. Yet, had an invasion been necessary, the Allies may have suffered as many as a million casualties, and it is likely that many millions of Japanese soldiers and civilians would have died fighting or by suicide.¹³

None of the foregoing is intended to justify the killing of civilians by one means in preference to another, or by any means at all. The purpose of the discussion has been to examine the nature of perceptions—nothing more, nothing less.

That dichotomy between perception and reality in relation to air power persists today, as recent campaigns have shown. Over the past 20 years, Western coalitions have fought five major wars: Operations *Desert Storm* (1991), *Deliberate Force* (1995), *Allied Force* (1999), *Enduring Freedom* (2001), and *Iraqi Freedom* (2003). The latter two continue today under the nebulous rubric of the 'global war on terrorism'.

¹² See Richard Overy, 'World War II: The Bombing of Germany', in Alan Stephens (ed.), *The War in the Air 1914–1994*, Air Power Studies Centre, Canberra, 1994, pp. 113–134.

¹³ For commentary on estimated US casualties had an invasion of the Japanese Home Islands been attempted, see Richard B. Frank, *Downfall: The End of the Imperial Japanese Empire*, Random House, New York, 1999, pp. 338–9. During the battle to capture the southern island of Okinawa in early 1945, 94 000 Japanese civilians died—about one-quarter of the prewar population. Most committed suicide rather than be captured by the Americans, or were murdered by Japanese soldiers to prevent surrender: see '1945 suicide order still a trauma on Okinawa', in *The New York Times*, 21 June 2005. When it seemed possible that the Japanese Government might surrender following the atomic attacks, a group of senior officers planned a coup to overthrow the 'peace-seekers' and install a new government, 'the objective of which would be literally victory or [national] extinction'. Franks, *Downfall*, p. 317.

The continuing wars in Iraq and Afghanistan have been characterised by highly successful air campaigns, followed by ground invasions which have become enduring quagmires. Indeed, the grave situation the West continues to face in both places is a direct consequence of the presence of our armies of occupation. It is 50 years since so-called 'expeditionary' forces from the United States and its allies, including Australia, occupied Vietnam, with all of its disastrous consequences, yet we still do not seem to understand that one person's expedition is another person's invasion.

It is not as though we lack precedent to inform. Operations *Deliberate Force* in 1995 and *Allied Force* in 1999 in the former republic of Yugoslavia were noteworthy for the fact that the allied combat commitment was largely limited to air power, with land power, when needed, being provided by indigenous troops. Each campaign was successful, achieving its political objectives with few allied casualties.

Yet in the early days of Operation *Allied Force*, media comment generally consisted of a chorus of misperceptions regarding the alleged limits of air power, with the choir being led by such international luminaries as John Keegan, Gwynne Dyer, Lawrence Freedman and Martin van Creveld, soon to be joined locally in calls for a ground invasion by the voices of, among others, Greg Sheridan, Paul Kelly and Michael O'Connor.¹⁴ John Keegan at least was sufficiently gracious to acknowledge a week before Serbian leader Slobodan Milosevic capitulated in June 1999 that perhaps, 'rather as a Creationist Christian ... being shown his first dinosaur bone', his perception of air power might have been wrong for the past 40 years.¹⁵

Misperception extends to images of leadership and to campaign planning. Historically, the theory and practice of warfare has properly concentrated on armies and their commanders. Occupying territory and defeating the enemy army almost invariably was the key to (ultimate) political victory, because the army embodied the state through its relationships to the sovereign, the church, the ruling elite and the treasury. Often, the army also physically blocked enemy forces from access to the civilian population. Thus, beat the army and you beat the state. However, during the past seven decades, it has become increasingly evident that war is now concerned more with acceptable political outcomes than with seizing and holding ground, just as it has also become evident that air power has constantly expanded its ability to influence, even control, behaviour in all environments. These developments imply a fundamental shift in how wars should be planned and commanded. But that has not been the case.

¹⁴ John Keegan, 'Are the Air Strikes Working?' and 'Mistakes of the Blitz are being repeated', in *The Daily Telegraph*, 31 March 1999 and 11 May 1999; Gwynne Dyer, 'Future of just wars is not up in the air', in *The Canberra Times*, 1 July 1999, p. 11; Lawrence Freedman, 'Air power has yet to win a war', in *The Times*, 5 June 1999, p. 17; Martin van Creveld, 'The Impotence of Air Power', in the *Bangkok Post*, 25 April 1999; and Michael O'Connor, 'Political airheads are way off target', in *The Australian*, 13 May 1999, p. 13. See also Robert D. Novak, 'Pyrrhic Peace', in the *Washington Post*, 7 June 1999, p. 19; and John Prados, 'The Mess Made by Bombing Belgrade', in the *Washington Post*, 4 April 1999, p. B01.

¹⁵ John Keegan, 'Modern Weapons Hit War Wisdom', in *The Sydney Morning Herald*, 5 June 1999, p. 17.

Of the five campaigns under review here, four—*Desert Storm*, *Allied Force*, *Enduring Freedom* and *Iraqi Freedom*—were commanded by army generals, and each initially applied combat power primarily with aerospace force. (The reference is to all aerospace-derived capabilities, not just air forces. Much of the air power was generated from space, naval and army platforms.) Yet the commanders concerned—Generals Colin Powell and Norman Schwarzkopf in the Gulf, General Wesley Clark in the former republic of Yugoslavia, and General Tommy Franks in Afghanistan and Iraq—all had a limited, perhaps even inadequate, understanding of how to plan and conduct a predominantly aerospace campaign.¹⁶

Powell and Schwarzkopf never fully appreciated the strategic nature of the air campaign constructed for them by the United States Air Force (USAF) and were always preoccupied with the ground phase of the war. Clark's air campaign (which he insisted on controlling personally down to the most detailed level, despite his unfamiliarity with almost every aspect of air operations) has been described as little more than a disconnected series of 'random acts of violence', in which his response to the desultory results of the early weeks was to demand more and more targets to attack, with little regard to the effect (if any) their prosecution might have. And Franks' involvement in the ill-conceived Operation *Anaconda* (which he later described as 'an unqualified and complete success', in contrast to the British Royal Marines' judgment that it was 'a military disaster') says more about his army background than anything else.¹⁷

The performance of all four stands in sharp contrast to the mastery of his brief demonstrated by USAF General Michael Ryan during *Deliberate Force* in 1995, one of the few occasions on which an airman has held a significant joint operational command.¹⁸ But it is perceptions that matter, as indicated by recent reports from the United Kingdom of an attempt to replace Air Chief Marshal Sir Jock Stirrup as Chief of the Defence Staff because he allegedly does not understand land warfare.¹⁹

¹⁶ For commentary on Powell and Schwarzkopf, see David Halberstam, *War in a Time of Peace*, Bloomsbury, London, 2001, pp. 47 and 51; and Eliot A. Cohen, *Supreme Command*, The Free Press, New York, 2002, pp. 190–1. For Clark, see Benjamin S. Lambeth, *NATO's Air War for Kosovo*, Rand, Santa Monica, 2001, esp. pp. 199–204. For Franks, an original assessment is provided by a senior Chinese PLA officer, Lieutenant General Liu Yazhou, in 'Interview with Lieutenant General Liu Yazhou', *Heartland: Eurasian Review of Geopolitics*, Gruppo Editoriale, L'Espresso/Cassan Press, Hong Kong, January 2005. For Operation *Anaconda*, see Benjamin S. Lambeth, 'Operation Enduring Freedom, 2001', in John Andreas Olsen (ed.), *A History of Air Warfare*, Potomac Books, 2010, pp. 265–9. See also Stephen Budiansky, 'Of Tools and Tasks: Air War – Striking in Ways We Haven't Seen', in *The Washington Post*, 26 April 2003, p. B01.

¹⁷ For an excellent summary of the Balkans air campaigns, see Benjamin S. Lambeth, 'Reflections on the Balkan Air Wars', in *Air Power History*, Spring 2010.

¹⁸ See Robert C. Owen, *Deliberate Force: A Case Study in Effective Air Campaigning*, Air University Press, Maxwell Air Force Base, AL, 2000.

¹⁹ Michael Evans and Francis Elliott, 'Forces Chief Sir Jock Stirrup Faces Calls to Stand Down Early', in *The Times*, 11 January 2010.

THE END OF AN ERA

I now want to return to the point I made in my introductory comments regarding the West's outmoded strategic mentality. Historical eras come and go. In the case of warfare, such delineations are commonly identified with the emergence of 'revolutionary' technological developments, such as the bow and arrow, gunpowder, mechanised forces, aircraft, and so on. Western defence forces, including the ADF, have managed technological change exceptionally well. But it is questionable whether they have managed strategic thinking as effectively, noting that in recent decades superficially successful battlefield actions have rarely been translated into satisfactory political outcomes.

In an era variously described as 'the age of the unthinkable', as a time of unprecedented interdependence, and as a period of radical realignment of world power, we need to define change less in terms of mere technical competence, and more in terms of adapting our thinking to the prevailing political and social context.²⁰ Only by understanding the context of the 21st century will military organisations retain their utility—indeed, even their relevance.

For some 600 years, the West has controlled the levers of international affairs through its domination of ideas, politics, trade, culture, finance, technology and, not least, warfare. Plainly, there have been exceptions, such as the magnificent cultural, scholarly and military achievements of the Ottoman Empire from the 13th to the 20th centuries; Japan's brief period of domination in the Asia-Pacific; and the Soviet Union's ultimately failed but nonetheless extraordinary experiment with Marxism-Leninism in the 20th century. Overall, however, it is fair to say that for six centuries the West, led first by old Europe and then by the United States, has enjoyed an era of unprecedented pre-eminence.

A central feature of this era has been the assumed right of the West to invade, occupy and exploit non-Western polities; that is, in today's idiom, to conduct expeditionary wars of choice in the pursuit of self-interest. This is no longer acceptable. The distinction between wars of necessity and wars of choice must become the intersection for the end of this obsolete model of strategic thought, and for the beginning of the new.

Without exception, wars lead to injustice and depravity. They also invariably generate unintended consequences, which may turn out to be worse than the alleged *casus belli*.²¹ Using the Australian experience as an example, a case can be made that, of the many conflicts in which we have fought, only World War II was a war of necessity. In other words, it was our free choice to participate in World War I, Malaya, Korea, Vietnam, Afghanistan and Iraq. Sixty thousand Australian deaths from a conflict that was supposed to be finished by Christmas 1914 is all that needs to be said about the unintended consequences of the

²⁰ See for example Bill Clinton, *The Interviews*, *Newsweek*, 21 December 2009; Joshua Cooper Ramo, *The Age of the Unthinkable*, Little, Brown and Company, London, 2009; and Philip Bobbitt, *The Shield of Achilles: War, Peace, and the Course of History*, Anchor Books, New York, NY, 2003.

²¹ See Kenneth J. Hagan and Ian J. Bickerton, *Unintended Consequences: The United States at War*, Reaktion Books, London, 2007.

Great War, while it will be decades before we understand the full costs of the campaign against 'terror' in Iraq and Afghanistan. After almost 10 years it is still not possible to foresee a satisfactory political resolution in either place.

The West's campaigns in Iraq and Afghanistan have been dominated by generals who persistently confuse arithmetic with strategy. So frequently has the mantra that more 'boots on the ground' can defeat insurgents been chanted that for many media commentators it has become a self-evident truth, to the extent that the full scope of its implications has not been tested.²² The fact is, though, that there is no self-evident truth here.

For example, the more than one million sets of boots eventually on the ground in Vietnam could not win the war for the United States between 1962 and 1975. Similarly, the Israeli Army's massive, near-permanent presence for 40 years in the occupied territories has made no difference whatsoever to Israel's long-term security prospects. On the contrary, it is because boots on the ground are unlikely ever to provide an answer that Israel has assembled an arsenal of some 200 nuclear weapons as its (perceived) ultimate security safeguard.

At a time when the West's strategic preferences are being severely challenged, if not confounded, by militarily primitive groups, fashionable concepts such as 'war amongst the people' and its subset, the 'three block war', claim to reveal a way forward. So-called 'war amongst the people' is not a new phenomenon.²³ Urban and rural masses have been part of the fabric of war from the time of the sieges recorded by Thucydides 2500 years ago to the suicide bombers of today's megacities.²⁴ And it was as true for Thucydides as it is today that the context of warfare shaped by 'the people' has often been decisive, especially when one protagonist is perceived as indigenous and the other as foreign. What is relatively new is the people's ability to decide the outcome of military conflict, not through the force of arms, but in the court of world opinion.

In the meantime, the perception that Western armies are capable of translating these theories into practice provides a justification for expeditionary operations, which in turn imposes a disturbing character on national defence policies. The concept of the three block war, for example, has been promoted with considerable success. But it is an intellectual house of cards. First postulated in the late 1990s by the then Commandant of the US Marine Corps, General Charles Krulak, the concept attempts to define a model by which land forces can successfully operate in an unfamiliar, hostile, primarily urban environment. That the theory grew out of the persistent failure of Western armies to cope with precisely those conditions during expeditionary campaigns in places like Vietnam, Somalia, Iraq, Afghanistan, Bosnia, the Gaza Strip and the Lebanon seems to escape attention.

²² Greg Mills, 'Ten Counterinsurgency Commandments from Afghanistan', Foreign Policy Research Institute, April 2007, available at <http://www.fpri.org/enotes/200704.mills.afghanistancounterinsurgency.html>, accessed 1 October 2010.

²³ General Sir Rupert Smith, *The Utility of Force: The Art of War in the Modern World*, Allen Lane, London, 2005, esp. pp. xiii–xiv, 3–4 and 327–31.

²⁴ Thucydides, *The Peloponnesian War*, Penguin Books, Harmondsworth, 1975.

Krulak speculated that in any three contiguous urban blocks a soldier might be required to deliver humanitarian assistance in the first, act as a peacekeeper in the second, and fight a life or death combat in the third.²⁵ (Some theorists have since suggested a fourth 'block' in the form of information operations.) The theory itself is an accurate enough description of the complex and challenging environment now favoured by many of the West's enemies. The problem is finding an army capable of satisfying the model's demands.

Australia's pre-eminent strategic scholar, Robert O'Neill, has identified the qualities Western land forces need to operate successfully within the settings of expeditionary operations, war amongst the people, and the three block war.²⁶ His findings describe an army whose hypothetical standards frankly stretch credibility.

According to O'Neill, a successful expeditionary campaign demands soldiers who are able substantially to 'erode' the cultural barriers that separate them from the people they are trying to help. In itself, that is a sensible objective. But when those barriers are listed as language, religion, social morés, and a knowledge of local history, geography, institutions and economics, the argument strains belief. And if that is not enough—remembering that in many circumstances these same soldiers are going to be, properly enough, in fear of their lives—they also have to master civilian skills (for civic aid programs) and have some capacity to 'enter into an informal exchange with indigenes'.²⁷

At the risk of labouring the point, we should always remember that to the local population our 'expeditionary' troops are their 'invaders'. The distinction is not merely semantic: it is fundamental to any credible analysis of the contemporary battlespace. It is difficult to avoid the conclusion that Professor O'Neill's army of the future is based more on wishful thinking than on an objective analysis of what armies can, and cannot, do.

The truth of the matter is that, rather than assimilate with the various populations whose countries they have invaded, occupation forces prefer to isolate themselves. There is a very good reason for this: armies of occupation are far less likely to be killed if they operate from secure bases, a reality the Israelis and the Americans have tacitly acknowledged in the Middle East.

²⁵ Charles C. Krulak, 'The Strategic Corporal: Leadership in the Three Block War', in *Marines Magazine*, January 1999; see also Max Boot, 'Beyond the 3-Block War', in *Armed Forces Journal*, March 2006; General John Abizaid, 'Combined Civil/Military Responses to National and International Events', in *The Future Australian Defence Force: Learning from the Past, Planning for the Future*, Australian Defence College and Royal United Services Institute Seminar 2007, Canberra, 16 May 2007; and Lieutenant General Ken Gillespie, 'Lessons Learned from Contemporary Operations', in *The Future Australian Defence Force: Learning from the Past, Planning for the Future*, Australian Defence College and Royal United Services Institute Seminar 2007, Canberra, 16 May 2007.

²⁶ Robert O'Neill, 'Restoring Utility to Armed Force in the 21st Century', a paper prepared for the Strategic and Defence Studies Centre 40th Anniversary Seminar Series, Australian National University, Canberra, 15 August 2006.

²⁷ *ibid.*

From the first day the state of Israel was established in the former British mandate of Palestine in 1948, the Israelis have been fighting amongst the Arab people of the Middle East. Conflict has ranged from major wars to the constant struggle to contain terrorist attacks, in recent years often by suicide bombers. Given the clash of cultures that characterises this situation, it is probably unrealistic to expect that the Israeli Defence Force could ever fully assimilate itself within the diverse range of Islamic states and interest groups whose incursions it must attempt to prevent. Indeed, the decision taken in 1994 to erect a number of security fences to control the movement of non-Israelis and Arab Israelis into and out of Israel is a telling monument to the realities of war amongst the people. The first barrier was completed in 1994 in the Gaza Strip. Work on the second, a much more ambitious project along the West Bank frontier, was started in 2002; by August 2008 some 408 kilometres of the total of 703 kilometres approved by the Israeli Government had been constructed. Three gates are opened for 20 minutes each day to allow the strictly controlled entry and exit of those Palestinians permitted access to their jobs or relatives on the other side of the wall.

The Israelis have every right to protect themselves, and the walls have greatly reduced the incidence of terrorist attacks. In the context of this presentation, though, the most telling commentary on the barriers comes from the names they have been given by the protagonists. To the Israelis they are 'security fences'; to the Arabs they are 'racial segregation walls' and 'apartheid walls'. The sad terminology could scarcely be further removed from the simplistic notions of war amongst the people and the three block war.

Similar problems in Iraq and Afghanistan have seen similar reactions. Western soldiers and mercenaries have been employed to turn both Baghdad and Kabul into heavily fortified, restricted-entry zones, in which the Coalition's senior leadership, their support staff, and Iraqi politicians and civil servants are isolated from the people they serve.²⁸

A degree of success has been claimed for the 'surge' of ground forces into Iraq in mid-2007. This perception, which for obvious reasons suited the Bush Administration, and which continues to suit the Obama Administration, its political allies and their senior military commanders, has become accepted wisdom. The perception has not, however, been adequately tested.²⁹

On the positive side, the incidence of terrorism has decreased. Furthermore, the 62 per cent of voters who defied terrorists to cast their ballots in the parliamentary election of March 2010 displayed courage and commitment. The comparatively high turnout of Sunni voters was especially heartening, given that many had boycotted the previous parliamentary election in December 2005. On the other hand, the total turnout in the post-surge election

(that is, March 2010) was 14 per cent less than in 2005.³⁰ Of more concern, though, is the likelihood that the inconclusive result will lead to a period of 'protracted political uncertainty' and possible violence.³¹ In particular, the strong performance of the radical faction led by Moktada al-Sadr almost certainly will mean that, regardless of the final composition of Iraq's new parliament, it will be anti-American.³² The situation is, to say the least, complex.

Writing early in 2008, some six months after the start of the surge, US Army Vietnam veteran and now college professor Andrew Bacevich attributed the initial reduction in the level of violence more to the policy of offering arms and bribes to Sunni insurgents than to 'the influx of additional American troops'.³³ More recently, author and journalist Thomas Ricks has shared Bacevich's scepticism, arguing that the surge has not achieved its stated aim of creating 'a breathing space in which a political breakthrough could occur'; on the contrary, he believes that Iraq's leaders have used any breathing space to move backwards, not forwards. Motivated primarily by self-interest, they have failed to address such major challenges as political power sharing, a fair distribution of oil revenues, relations with Iran, and how to manage the emergence of an effectively independent Kurdish state in the north.³⁴ In Ricks' opinion, 'all the basic [political] questions that vexed Iraq before the surge are still out there unanswered'.³⁵

Seven years after the invasion, two and a half years after the surge, and a month after the March 2010 election, Iraq is still a country confronted by 'extreme levels of violence, an economy in tatters, and a culture of endemic corruption'.³⁶ We are unlikely to know the difference between perception and reality until all American forces have been withdrawn, a process that should be completed by the end of 2011. Ricks' depressing prognosis is that a civil war is 'almost certain'.³⁷

The outlook for Afghanistan is no less disturbing. Even more than in Iraq, developments there bear an uncomfortable resemblance to the disaster of Vietnam. The most disturbing feature is that, once again, the West is fighting a war of dubious legitimacy, on behalf of an

³⁰ 'Nouri al-Maliki takes early lead at polls', in *The Australian*, 9 March 2010; and 'Iraqi opposition leader Iyad Allawi alleges widespread election fraud', in *The Australian*, 12 March 2010.

³¹ Timothy Williams and Rod Norland, 'Allawi Victory in Iraq Sets Up Period of Uncertainty', in *The New York Times*, 26 March 2010.

³² Anthony Shadid, 'Followers of Sadr Emerge Stronger After Iraq Elections', in *The New York Times*, 16 March 2010.

³³ Andrew J. Bacevich, 'Surge to Nowhere', in *The Washington Post*, 20 January 2008.

³⁴ Thomas Ricks, 'Understanding the Surge in Iraq and What's Ahead', Foreign Policy Research Institute, May 2009, available at <http://www.fpri.org/enotes/200905.ricks.understandingsurgeiraq.html>, accessed 1 October 2010.

³⁵ *ibid.*

³⁶ 'Nouri al-Maliki takes early lead at polls'.

³⁷ Ricks, 'Understanding the Surge in Iraq and What's Ahead'.

²⁸ James Hilder, 'Stop building walls, Maliki tells US', in *The Australian*, 24 April 2007, p. 10; and Robert Fisk, 'Divide and rule: America's plan for Baghdad', in *The Canberra Times*, 12 April 2007, p. 15.

²⁹ 'For Obama and Press, Iraq Falls Off Radar', in the *Washington Times*, 4 March 2010. Before his election, President Obama opposed the surge. However, as Afghanistan and domestic issues such as health reform and the struggling economy have increasingly demanded his attention, he seems to have been content to avoid controversy over Iraq.

illegally elected government, whose administration is massively corrupt.³⁸ Nor, after nine years, have any of the West's political objectives been realised. Osama bin-Laden and Mullah Omar remain free, and have become potent rallying points for disaffected Muslims around the globe; the country has not been liberated from the Taliban; Western-style democracy has not been embraced; living standards have not improved; and modernity and prosperity remain a chimera, except for a small, corrupt elite.

When Western occupation forces leave, as they surely will within the next few years, the embryo Afghan National Army (ANA), like the South Vietnamese Army 40 years ago, will have to assume full responsibility for national security. But according to many reports, again like the South Vietnamese, the ANA often is badly led, under-trained, often unmotivated, and ill-disciplined.³⁹ There is also the non-trivial matter of recruiting and retaining the 400 000 professional soldiers it is estimated that the ANA will need to do its job, a task many commentators regard as utterly unrealistic.⁴⁰

The West's challenge in the Middle East and Central Asia is not one of arms, but of culture. Pakistani officials have a unique and intimate knowledge of Afghanistan, of al-Qa'ida, and of the Taliban; indeed, Pakistan's Directorate of Inter-Services Intelligence has long been a sponsor of the Taliban. Many of those officials are derisive of the West's attempt to win hearts and minds, dismissing the expeditionary force's clumsy efforts as 'mission impossible'.⁴¹

Any suggestion that Western armies can fight 'amongst the people' is a dangerous myth. There is little risk in predicting that the West will have neither the patience nor the fortitude to endure the 30 or so years that almost certainly would be needed to achieve some kind of military resolution in Central Asia. It is probably just as well too—the last thing we want is to foster future generations of bombers who, unlike our armies, will be expert at waging war amongst their own people.

21ST CENTURY STRATEGY: 'CONTROL AND PROTECT'

There is no question that our enemies in Afghanistan and Pakistan are dangerous and need to be contained. However, if any enduring success is to be achieved, it will come from the application of 21st century concepts, not from obsolete military thinking, which leads me to my last section on defence policy determination.

³⁸ Amin Saikal, 'No way Obama can describe war in Afghanistan as "just"', in *The Canberra Times*, 16 December 2009; and Kim Barker, 'Letter from Kabul: Solving Afghanistan's Problems – What the United States Must Overcome in Afghanistan', in *Foreign Affairs*, 30 November 2009.

³⁹ Bill Deane, 'Doubts about the Afghan National Army contrast starkly with official shows of optimism', in *The Canberra Times*, 18 February 2010; and C.J. Chivers, 'Marines Do Heavy Lifting as Afghan Army Lags in Battle', in *The New York Times*, 20 February 2010.

⁴⁰ M. Nariz Shahrani, 'President Obama's "New" Afghanistan-Pakistan Strategy: Why it is Unlikely to Work', Public Lecture, Australian National University, Canberra, 20 October 2009.

⁴¹ Riad Kahwaji, 'Local Realities Clash with U.S. Policy in Tribal Belt', in *DefenseNews*, 23 April 2007, pp. 1 and 8.

The start point for any policy determination should be the classic strategic continuum of 'Shape-Deter-Respond', under which we seek to shape events to our broad national interests, to deter potentially aggressive behaviour that may be inimical to those interests, and to respond if necessary by projecting force. Note that the focus is on the top end of the continuum rather than on the lower end, as is the case with expeditionary campaigns. 'Response' should be a last resort, not a preferred first option.

One logical outcome of applying the shape-deter-respond continuum to the context of the 21st century is a strategy that above all else seeks to 'control and protect'.

An analogy of sorts might be drawn with the notion of 'containment', perhaps the West's single most constructive strategic concept since World War II. Formulated by the celebrated American Foreign Service officer George Kennan, containment was intended to restrain emerging Soviet power, and was based on the premise that the US's actions should be determined by what the Soviets probably *would* do, not by what they *might* do. Thus, rather than emphasising confrontation and aggression, the policy sought to contain Soviet expansionism through a range of diplomatic, economic, political and cultural initiatives. In essence, containment was informed by best-case rather than worst-case analyses.⁴²

Translating that approach to the military domain of the 21st century, we should seek to control our strategic environment, protect our people and values, and cooperate closely with our friends, allies and neighbours. By drawing on our key advantages of high-quality people, advanced technology, and the ability to plan and act with decision superiority and precision, from a distance, the strategy reflects how we want to operate rather than how our potential enemies might want us to operate, or how we might be compelled to operate in remote expeditionary operations. Thus, we are acting asymmetrically.

'Control and protect' directly addresses the context of the 21st century because it:

- unambiguously distinguishes between wars of necessity and wars of choice,
- maximises our comparative advantages,
- minimises the risk of unintended consequences,
- does not invent threats, and
- recognises that there are things we *cannot* do, and that we *should not* do.

The core capabilities required to implement the strategy probably would be 24/7 long-range ISR and precision strike, which implies a force structure based on Special Forces, submarines, ISR systems, long-range strike platforms, RPVs and the like. Prototypes of the strategy in action might be discerned in Operations *Northern Watch* and *Southern Watch*, two little-known but remarkably successful United Nations-sanctioned campaigns which contained selected elements of Saddam Hussein's regime in Iraq between 1992 and 2003.⁴³

⁴² George Kennan ('X'), 'The Sources of Soviet Conduct', in *Foreign Affairs*, July 1947.

⁴³ Air forces from the US, the UK, France, Saudi Arabia and Turkey were involved. There were no allied operational casualties.

It is important to stress that 'control and protect' does not imply that Western defence forces should forgo the ability to occupy hostile territory. Land forces are an integral component of the strategy, but they will be land forces of a different mindset from those of the 20th century. The most useful soldiers in the 21st century will be those whose defining characteristics are speed, precision and a fleeting footprint, and who are skilled in exploiting information superiority and stand-off firepower.

A doctrine for that model was published almost 10 years ago by the American Army officer, Robert Scales, who proposed a combined arms methodology in which armies 'would not need to occupy key terrain or confront the mass of the enemy directly'.⁴⁴ Scales envisaged doctrinally and technologically advanced land forces using fast-moving air and surface vehicles to make rapid and unexpected manoeuvre one of their primary qualities. They would also work as an integrated whole with air strike forces, with the lead element at any one time being decided by the enemy's disposition.

A key feature of the model is the brevity of the occupation phase. It is only when Western armies overstay their strictly limited welcome and try to become something they cannot that serious problems are created.

The Scales doctrine seemed to be in evidence in the months leading up to the invasion of Iraq in March 2003, when a small group of American, British and Australian Special Forces won a remarkable victory. Their objective was to ensure that western Iraq was free of Scud missiles which might have been fired at Jordan and Israel, thus dangerously broadening the pending war. Not only did the allied forces meet that objective but also they effectively controlled about one-third of the Iraqi landmass. According to the then Chairman of the US Joint Chiefs of Staff, General Richard Myers, the key to that extraordinary achievement was the 24/7 availability of air ISR and strike, which was fully integrated with the action on the ground.⁴⁵

This little-known 'control and protect' style of operation may represent the epitome of the 95-year history of air/land warfare. Yet if my recent survey of leading Western military journals over the past 10 years is any guide, General Scales' forward-looking concept has not generated much debate.⁴⁶

CONCLUSION

It is one thing to identify a strategy for the 21st century, it is another thing altogether to have it widely understood and officially endorsed. Notwithstanding Western air forces' 90-year history of winning, air power has a perception problem.

⁴⁴ Robert L. Scales, 'Checkmate by Operational Maneuver', in *Armed Forces Journal International*, October 2001.

⁴⁵ General Richard Myers, quoted in 'US Push to Base Forces on our Soil', in *The Weekend Australian*, 17 January 2004, p. 001.

⁴⁶ See, for example, *Parameters*, 2001–2009; the *Australian Army Journal*, 2003–2009; and the *RUSI Journal*, 2001–2009.

To the extent that air power receives public recognition, frequently it is in the negative form of collateral damage. No matter that every year so far in the 21st century some 100 000 civilians have been killed by small-arms fire in warfare (that is, one million and counting) and another 7000 or so by land mines (that is, 70 000 and counting), it is the perception that matters.⁴⁷ Air power's image must be addressed if defence strategies are going to break free from their 20th century mindset.

Education invariably is the start point for any such endeavour. As far as the RAAF is concerned, it is gratifying to be able to say that, starting with the initiatives taken by Air Marshal Ray Funnell in the late 1980s, there has been nothing less than an institutional air power education revolution. The process must now be extended. It is time to shape the strategic debate.

To say that there is a dearth of informed public debate on the use of air power would be an understatement of masterful proportions. Newspaper features, television reports, academic papers, journal articles, online reviews and the like that promote strategies based on our proven military strength and that reject strategies based on our proven military vulnerability are few and far between. Why, for example, was the notion of the land force 'surge' the only option seriously discussed during efforts to think our way out of our current quagmires in Iraq and Afghanistan?⁴⁸ One answer is that, first, there are not enough people contributing to the air power debate in general; and second, there are not enough air power advocates in influential positions in particular. The contrast with the land warfare debate is striking.

Yet the reality is that the strategy favoured by the West for the past 600 hundred years has become militarily untenable and ethically unacceptable. Air and space power has the potential to make a major contribution to any change for the better, but too often perceptions are uninformed. That will have to change if Western strategy is to enter the modern era, and represent legitimate military and social values in the 21st century.



⁴⁷ The category 'small-arms fire' includes rifles, pistols, machine guns, rockets and the like.

⁴⁸ A notable exception is USAF Major General Charles Dunlap: see his article 'Do We Need "Airminded" Options for Afghanistan', 24 November 2009, at <http://sitrep.globalsecurity.org/charles-dunlap/>, accessed 1 October 2010. See also *An Air Force of Influence: A Strategic Framework for the Future Air Force*, Air Power Development Centre, Tuggeranong, March 2008.

DISCUSSION

Air Commodore Mike Bennett (RAAF – Moderator): Dr Stephens has explained pretty well where we have come from. He's also put up a good case for where we currently are and a good suggestion about, maybe, where we can go to into the future. I think that would have raised a few questions out there. So have we got somebody who would like to kick off the question period?

Air Marshal Ray Funnell (RAAF Retd): Alan, I think you've heard me dilate on this before, and this is civilian leadership when it comes to the use and misuse of military power. You've given a fair old serve to military people in the misapplication of military power, but it has been my contention that civilian leaders and those who advise them have very little knowledge of and no experience in the application of military power. As a consequence of which, it is frequently misused. In particular, instead of been seen as the political instrument of last resort, it is quite often elevated much further up that particular hierarchy. Now when I talk about those who advise them, I'm not only talking about civilian advisers, I'm talking about military advisers as well. Where and when are we going to see military advisers in this country, and in the US and others, who are willing to stand up and tell the boss, 'Hey man, this isn't the smart way to go'. When are we going to get the people with not only the knowledge but also the moral courage to tell their civilian leaders exactly what they're heading into when it comes to applying military power in the ways we have done in the recent past?

Dr Stephens: I think it is the case that it's very difficult to detect a great level of understanding of military affairs in the modern Australian Parliament. There are one or two people with military service but the enormous number of Members of Parliament, post-World War II, who had service have moved on. There's no easy answer to your question other than that, from the point of view that I'm presenting, nothing's going to happen unless people like us pick up the challenge and somehow, first of all, educate the decision-makers and, secondly, greatly elevate the level of the debate. I think your comment, which I agree with wholeheartedly, extends to the media—certainly in Australia but far less so in the United States where, in my opinion, there's an exceptionally talented print media press corps in particular. In Australia, the media are dreadfully ignorant of military affairs, generally. That's not going to improve unless people from the kinds of backgrounds represented here today pick it up and do something about it. If I could make an unpaid commercial *en passant*, that's one of the major reasons why the Williams Foundation was

formed about a year and a half ago out of sheer frustration with the poor standard of the defence debate in Australia.⁴⁹ But it will only get better if we make it better.

Air Commodore Mike Bennett (RAAF – Moderator): Sir, I'd like to comment on that as well. You heard from Air Marshal Binskin this morning that Air Force is keen to expand the knowledge of our Air Force people and, in doing so, events like this have been reintroduced and will continue to progress every two years. As a follow-on, our PMET (Professional Military Education and Training) system is being reviewed through Project AFTER [Air Force Training and Education Reform Project] and one of the outcomes of that is to try and generate that knowledge in our very junior people so that when they get to that point, when they become more senior, the knowledge is inherent. But we aren't there yet.

Squadron Leader Jonathan Durden (RAAF – No 2 Airfield Defence Squadron): Sir, my question pertains to your reference to the campaign in Iraq as a 'quagmire'. Given that Iraq is now liberated from Saddam Hussein; it now has a democratically elected pluralistic government, which is broadly sympathetic to Western concepts; it's ramping up its oil production and, indeed, its entire economy; and, as you mentioned, American forces are about to leave by the end of 2011; I was wondering in what terms you would describe success in that campaign?

Dr Stephens: As I mentioned in my presentation, accepting with some qualifications the points you've just made, all of the outstanding political issues in Iraq still exist. The huge issue of power sharing between Shi'ites and Sunnis hasn't been resolved. None of us has any idea—and we won't until the American troops and forces have gone—what the Sunnis will do. They may well have been just sitting on their hands for the last two years waiting for us to go home. There's the issue of power sharing and revenue sharing with the Kurds, who are effectively running their own state in the north of the country. While the security situation in certain definitions has improved in some places on the ground, in my opinion, there's been no worthwhile progress towards a workable political solution. I would like to take that one step further, because it gets back to the basis of why the West is in Iraq and why it's in Afghanistan. It's just an enormous centre of gravity 'misanalysis'. There certainly won't be a military resolution of the global war against terror. There will be no political resolution in Afghanistan or Iraq or Pakistan, or anywhere you care to name, until the so-called 'Palestinian Question' is resolved. That's at the heart of this whole thing and until that question is resolved, it doesn't matter what, in this case, the Iraqis do with some of their money and some of their political institutions, it's irrelevant. My point here fits back into the broader model of the social and political context of the 21st century that is fundamental to the points I was making about strategy today.

Squadron Leader Chris McInnes (RAAF – Headquarters Joint Operations Command): I like the idea of wars of necessity and wars of choice. How do we tell the difference between

⁴⁹ The Williams Foundation is an independent research organisation whose purpose is to promote the development and effective implementation of national security and defence policies as they impact on Australia's ability to generate air power appropriate to Australia's unique geopolitical environment and values. See <http://www.williamsfoundation.org.au/>, accessed 1 October 2010.

those in the future? I'd argue that the governments of the day probably thought all of our wars have been *necessary* for one reason or another. So as a military force, how do we hold our hand up and say, 'Hey boss, this one isn't necessary'.

Dr Stephens: Clearly, it's a very important decision, and I don't think I'm using 20/20 hindsight. One way that the scales can be lifted from our eyes is perhaps to know a lot more than sometimes we have when we've entered into expeditionary campaigns. For example, the West's ignorance of Vietnam was staggering before we entered into the war there. I would have thought that if we'd known more about its history—whether or not we might be getting ourselves involved in a post-colonial war of national liberation etc., rather than what was perceived as an apparent monolithic world communist movement—if we'd known more about that, then perhaps the distinction between necessity and choice might have been much clearer than was the case. Second, acknowledging that this is a difficult distinction to draw doesn't in any way imply that we shouldn't make every endeavour to do so. There are too many recent examples where, I would argue, that hasn't been the case. The distinction is so important that we have to be better at it. Yes, it may be hard but that's too bad, we must do better.

Neil James (Australia Defence Association): Thank you, Alan, for your comments on the standard of public debate and I agree totally, and that's why the Defence Association's out there every day trying to improve it. I would just like to make one quick observation before my question. One of the problems in getting a good sustainable public debate on defence issues in Australia is that there are too many people who only argue them from a particular air-centric, land-centric or maritime-centric point of view, and until people look at it in an integrated fashion we're not going to get anywhere. My question is about your defensive containment in Iraq, as an example. Now, I was in Iraq during that period and containment clearly failed and that's one of the reasons why the war eventually occurred because the strategic and economic costs of maintaining the huge forces required in the Middle East to make the UN sanctions work and make the containment work attracted governments, particularly in the United States and in the United Kingdom, to eventually invading the country and finishing the problem once and for all, instead of maintaining containment for 30 years. Containment itself using air power on its own didn't work. What was required was containment that involved the full range of military and economic functions.

Dr Stephens: Thanks Neil and I'd like to acknowledge Neil James's contribution to the defence debate in Australia. Neil is one of the very few people who always makes a great deal of sense when he appears; he's made a very big contribution. My simple response, Neil, would be that we shouldn't have been there in the first place. Iraq, clearly, under Saddam Hussein was an odious place, but it wasn't a threat to the West and we didn't need to contain them. We didn't need to do anything. We should have applied the 'shape-deter-respond' philosophy. We should have decided that we'd be getting ourselves involved in a war of choice, not one of necessity. I think that particular mindset simply must be taken on board in the 21st century. If there's any themes that have emerged during today it's the frequent reference to change, to the Asia-Pacific century, to shifting demographics, to the BRIC countries [Brazil, Russia, India and China] etc. taking over. It's a different world and

we simply cannot do things the way we used to do them any longer, and included in that 'cannot do' is invading places just because we don't like them.

Group Captain Peter Layton (RAAF): Alan, just a question about your distinction of breaking up wars into wars of choice and those that which are not of choice. You mentioned right at the start that mainly Western armies have been rampaging around the world for the last five or six hundred years. Those wars, by and large, have been successful for us and, to be honest, the West is doing OK in a global sense, as are all of those people who would like to be modern as well. I would say that most nations, to be honest, are relatively satisfied with the world as it is. So, from our distinction, you could make a choice between different kinds of wars, if you like to maintain the status quo or, as the Americans tried to be in Iraq, to be a revolutionary power as Kissinger said and to impose regime change in a particular direction that they wish to go. Military power to me seems well suited for the status quo—or at least our kind of military power is—we can stop bad things from happening. Military power, as we have it at the moment at least, is not well suited for regime change in a world of six to seven billion people, shortly to go up to nine billion people. There is a certain amount of sense in that 'wars amongst the people' argument because there's a lot more people now than there were say 50 years ago. Regime change to me doesn't seem well suited for military power. Now, I can immediately say of course, the argument against that is that you can impose regime change by just killing everybody. The Russians tried that in Afghanistan in a sense by killing 1.5 million Afghans but it didn't work too well. Your comments on regime change or wars of the status quo, to which is air power best suited?

Dr Stephens: Thanks Peter, that's probably a good note to end on. You've given me the opportunity to make an important point to underpin my presentation. Reduced to its fundamentals, the outline that I have given this afternoon has nothing to do strictly with armies, navies and air forces. It's about how we regard ourselves in the 21st century and how we participate in what I believe is a radically different world than the one that we dominated for six hundred years. I've suggested an approach that I've called 'control and protect', with maybe a bit of containment tacked on the side. If you accept that, you would then fill in the gaps with certain military capabilities; they may be of one kind or another. I've suggested a particular kind and I would be delighted to hear people argue that the implementation of this approach would perhaps require different capabilities. My point here is, and I'll conclude with this, the issue is about what's acceptable, what works, what we can do, and what we can't do in the 21st century, and I'm saying that what we have been doing doesn't work anymore.

Air Commodore Mike Bennett (RAAF – Moderator): Thank you, Dr Stephens. We've had a pretty robust discussion today around a range of topics and I think Dr Stephens has provided an alternative future that we probably need to have a bit of a think about and consider along with a whole range of other futures. But I must admit I support you, Alan, in your thinking that the need to have the discussion is the most important part of getting there. Would you all join with me in thanking Dr Stephens for a most thought-provoking discussion?

A HISTORY OF AUSTRALIAN AIR POWER AND IRREGULAR WARFARE

DR CHRIS CLARK

In July 1917, Arab irregulars directed by Prince Feisal bin Hussein, later King of Iraq (1921–1933), rushed the Red Sea port of Aqaba from out of the desert and captured the place from the Turkish forces which occupied it. Following this unexpected success, it became possible for the British to supply the means to answer the attacks mounted against Feisal by German airmen supporting their Turkish allies in World War I. In May 1918, a special air detachment was formed in Cairo, specifically to work in the area of desert south of Beersheba with the columns of the 'Arab Uprising'.¹ This was intended as a permanent attachment to Lieutenant Colonel T.E. Lawrence (by then already famous as 'Lawrence of Arabia'), working as Feisal's principal military adviser.



Figure 1: T.E. Lawrence and 'X' Flight Area of Operations

¹ F.M. Cutlack, *The Official History of Australia in the War of 1914–1918 – Volume VIII – The Australian Flying Corps in the Western and Eastern Theatres of War, 1914–1918*, Eleventh Edition, Angus and Robertson, Sydney, 1941, p. 148.

Officially known as 'X' Flight, RAF—and unofficially as the 'Lawrence Air Force'—the detachment was landed at Aqaba and moved up to Maan, situated on the strategic Hejaz railway to Mecca, which was then practically besieged by Feisal's Arab Army. While the Flight's two B.E.12a aircraft were flown by three pilots from the RAF's No 14 Squadron, it is germane to the theme of my paper today to note that the ground maintenance staff were mechanics of the Australian Flying Corps.² On this basis, it is not too much to claim that Australia's experience of air power in irregular warfare actually extends back more than 90 years.

With such a long history to draw upon, it might reasonably be imagined that there are a few lessons to be derived from that experience. I am particularly mindful that it was T.E. Lawrence who wrote, in a letter to British military historian Basil Liddell Hart in 1933, that, 'With 2,000 years of examples behind us we have no excuse, when fighting, for not fighting well'. The example of the Middle East in World War I prompts the observation that we should not always think in terms of ourselves having to deal with, and defeat, an irregular campaign mounted *against us*. Air power has also played a part in campaigns of this type which our side has mounted *against our foes*.

With that thought in mind, I would like to take a few moments to consider further what transpired in the case of Colonel Lawrence's operations with the Arab forces. It turned out that the decrepit B.E.s of X Flight did not prove very satisfactory, being hopelessly outclassed by the superior aircraft types used by the enemy.³ Consequently, when the Arabs moved up to Azrak, east of Amman, in preparation for the great British offensive in September which would become known variously as the Battle of Nablus, Sharon or Meggido, or even Armageddon,⁴ it became necessary to detach other, more modern, aircraft to support their operations. The Bristol F.2B fighters that were provided came from No 1 Squadron of the Australian Flying Corps based at Ramleh, and the crews of these machines found that the business of fending off the attacks mounted against Lawrence's forces by the Germans, from their airfield at Deraa, provided plenty of fierce air combat.⁵ Without that support, the Arab Northern Army would, in all probability, have simply melted away, because many of its fighters began going home in the face of the bombing to which the Germans subjected them.

Maintaining a protective shield at a distance across the desert presented a problem in regard to supplies of fuel, ammunition and the spares needed to keep the Bristols flying. To meet this need, the Australian officer in command of the RAF's 40th Brigade, Lieutenant Colonel Richard Williams, decided to make use of the giant Handley Page O/400 twin-engined bomber which had arrived in theatre only in late August. This machine had been allocated to 1 Squadron and was now pressed into service as a 'supply ship'. Loaded up with

a tonne of oil and petrol in cans, the Handley Page flew into Azrak—to a joyful reception by the Arabs who were now fully convinced by the aircraft's sheer size that British air power would ultimately prevail.⁶



Figure 2: No 1 Squadron Bristol Fighters at Ramleh

Apart from acting as an 'aircraft auxiliary' that helped equalise the air situation for the Arab guerillas, 1 Squadron had met another special need. One of the major problems faced by Lawrence in working in with Allenby's operations concerned communications. Wireless transmissions then often lacked sufficient range, and there were not enough aircraft available to run what was known at the time as a DRLS (Dispatch Rider Letter Service) on a daily basis. The solution was for a courier pigeon service to be used. Accordingly, 1 Squadron was called upon to deliver a supply of birds to Azrak initially, and afterwards to parachute more pigeons in small cages to the forward positions occupied by Lawrence's forces.⁷

Aircraft were also used to drop messages at preselected report centres, to ensure that the Arabs were kept apprised of developments as Allenby's great offensive gathered pace.⁸ Previously, aircraft from No 1 Squadron had been employed to collect Lawrence from his desert headquarters for direct meetings with Allenby and then return him afterwards.⁹ These missions continued even during the height of 'Armageddon',¹⁰ which is certainly what Allenby's final push became for the Turks. Six weeks after General Chauvel's Desert

² *ibid.*

³ *ibid.*, pp. 148 and 163.

⁴ *ibid.*, pp. 148 and 151–171.

⁵ *ibid.*, pp. 164–165.

⁶ *ibid.*, p. 164.

⁷ L. W. Sutherland, *Aces and Kings*, Angus and Robertson, Sydney, 1935, pp. 111–12.

⁸ *ibid.*

⁹ Cutlack, *The Australian Flying Corps in the Western and Eastern Theatres of War, 1914–1918*, p. 124.

¹⁰ *ibid.*, p. 163.

Mounted Column breached the Turkish line at the coast, Turkey sued for peace. Two weeks after that, fighting also ended on the Western Front with Germany's surrender.



Figure 3: Handley Page O/400 Bomber at Azrak¹¹

This description of events in the Middle East Area of Operations in 1918 offers some interesting insights into the uses of air power during an irregular campaign. The 'Arab Uprising' undoubtedly played an important supplementary role in Allenby's plan for defeating the Turks in this theatre with his conventional military forces. There may be arguments over how much the General actually depended on Lawrence's guerillas, but there is no question that they were a very effective distraction at a critical juncture. By diverting attention and tying down significant Turkish forces, the Arabs helped to create a weakness in the area where Allenby planned his breakthrough. Air power had been the vital factor which sustained the Arab fighters in the field, both maintaining their morale and will to fight by shielding them from the coercive effects of enemy air attacks, while also maintaining the communications which ensured that the Arabs' pinprick efforts were fully coordinated with the bludgeon blows of Allenby's regular forces.

Before switching our attention from the Middle East in the aftermath of World War I, we should focus briefly on the nearby Horn of Africa. There, a charismatic Muslim cleric had

¹¹ Painting by Stuart Reid: Australian War Memorial, ART14279

been causing problems for the British administration in Somaliland for 20 years, by staging incursions from across the border with Ethiopia. When this warlord (the 'Mad Mullah' as the British referred to him) mounted a fresh incursion in 1919, the British decided on a new tactic to contain him. We have it on the authority of Lieutenant Colonel Williams that, soon after the final cessation of hostilities in Syria, he was 'warned by RAF Headquarters to be prepared to take No 1 Squadron to Somaliland'.¹²

This move did not, in fact, happen, not least it seems because Williams pointed out that the RAF could not send his squadron anywhere until they had obtained the consent of the Australian Government. The result was—as the world now knows—that it was D.H.9A light bombers sent from England in January 1920 that put an end to the Mullah's depredations within a matter of weeks. But for Williams pointing out the national control issue, an Australian air unit would probably have played the leading role in proving the 'air method' doctrine which shaped Britain's approach to colonial policing during the 1920s and 30s, most famously in Iraq, but also in Aden, Palestine and on the North-West Frontier with Afghanistan.



Figure 4: D.H.9As of Z Squadron at Berbera, Somaliland, 1920

Less than two years later, Williams found himself at the head of the Air Force which was formed in postwar Australia. In the two decades which separated the end of World War I and the start of World War II in 1939, there were no instances of Australian air power being employed to deal with episodes of irregular warfare or, indeed, any combat operations at all. This contrasted with the experience of some of Britain's other Dominions. In South Africa,

¹² Sir Richard Williams, *These Are Facts: The Autobiography of Air Marshal Sir Richard Williams, KBE, CB, DSO*, Australian War Memorial and Australian Government Publishing Service, Canberra, 1977, p. 104.

for example, the Air Force was deployed against (white) goldminers engaged in violent labour disputes on the Witwatersrand in 1922—not merely in reconnoitring the strikers' positions but bombing them also. The South African Air Force (SAAF) even suffered its first combat losses at this time, after miners shot down two aircraft and killed or injured some crew members. Later that same year, and again in 1925, the SAAF was sent to help suppress 'ethnic rebellions' in the region now known as Namibia.¹³



Figure 5: Wing Commander Richard Williams

The development of the Royal Australian Air Force in its benign strategic environment had a side effect which, in retrospect, was quite salutary. When first formed, the RAAF had been equipped with a range of combat types that Britain decided were surplus to its needs after World War I, including S.E.5a fighters, and D.H.9 and D.H.9A bombers. As these collectively reached their end-of-life in about 1928–29, they were all replaced by a single general purpose type, the Westland Wapiti, although subsequently a handful of Bristol Bulldog fighters were also purchased.

The significance of the choice of the Wapiti lay in the fact that this aircraft had been developed for service on the frontiers of Britain's empire, and its designers had consciously incorporated—purely for reasons of economy—as many D.H.9A parts as possible. It was

¹³ Herman Potgieter and Linden Birns, *More than Game: A Salute to the South African Air Force*, Air Report, Morningside, South Africa, 1995, p. 10.

the same consideration of cost that prompted Australia to purchase this aircraft for the RAAF, along with its apparent suitability for Army cooperation work. There was never specific recognition, that I know about, that the RAAF was being largely equipped at the outset of the 1930s for little more than a colonial policing role.



Figure 6: Westland Wapiti

During World War II, there was some Australian participation or involvement in what were notable episodes of air support for irregular ground campaigns in enemy-occupied Europe. Individual Australian airmen flew on missions in support of the French Resistance, for example, and to resupply the Polish Home Army during the 'Warsaw Uprising' of August 1944. Generally, these men were serving within RAF rather than distinctively Australian units, but something of this experience did remain with the RAAF for a considerable time afterwards. For example, the future Air Commodore Peter Raw, who served as commander of the RAAF contingent at Vung Tau, South Vietnam, in 1966–67, flew in support of the Warsaw Uprising and was awarded the Polish Cross of Valour.

Occasionally, the RAAF connection was more direct. From late 1943, the Kittyhawks of the RAAF's No 3 Squadron were frequently among the Allied aircraft which flew across the Adriatic from bases in Italy to strike in support of partisans and Allied commandos operating in Greece, Albania and Yugoslavia.¹⁴ Air operations in the Balkans were aimed at sustaining the activities of local irregular forces and targeting the road and rail communications utilised by the occupying Germans—in short, achieving the same sort

¹⁴ John Herington, *Australia in the War of 1939–1945 – Series 3 (Air) – Volume IV – Air Power over Europe, 1944–1945*, Australian War Memorial, Canberra, 1963, pp. 68, 110, 328–9, 332, 340–1 and 353.

of effect as with Lawrence's Arabs 25 years or so earlier. The Commanding Officer of 3 Squadron in this period was one Wing Commander Brian Eaton, later to achieve two-star rank before retiring from the RAAF in 1976.



Figure 7: Air Commodore Peter Raw



Figure 8: Group Captain Brian Eaton

Moving closer to home, to the Asian and Pacific theatres during World War II, we find the same pattern of air support for both commando-style and guerilla operations. In Burma, for instance, there is the striking example of the Chindit raiders—the ground force which, in 1943 and again in 1944, mounted long-range penetration operations into enemy-held territory under the charismatic command of the British Brigadier (and later Major General) Orde Wingate. Since these involved a designated 'Special Force' rather than local guerillas, it may even be held to be case of regular forces acting in a highly irregular way. Paradoxically, Wingate's previous service at the head of the guerilla band known as 'Gideon Force' in present-day Ethiopia in 1941 had earned him the unofficial title of 'Lawrence of Abyssinia', in recognition of 'certain similarities' to T.E. Lawrence, who was reportedly his distant relative.¹⁵

Without re-entering the debate about the value and cost of Chindit operations, it should be noted that they were crucially dependent on air power for any chance of success—particularly in the case of Operation *Thursday* in March 1944. The whole idea of inserting

six large columns of troops at separate locations some 300 kilometres behind enemy lines in a matter of hours, to establish defensible strongholds where they could be resupplied and maintained, and from which they could strike out to disrupt and destroy enemy lines of communications, was only feasible if dedicated air power was available to support the entire scheme.



Figure 9: Brigadier Orde Wingate

A key part of Wingate's concept for Operation *Thursday* lay in the intention that aircraft would provide the resupply, and much of the fire support that the columns might need to overcome any significant Japanese resistance they encountered, and also destroy targets that were found. Underpinning all of it was the requirement that Allied air forces in the area would be able to maintain air superiority for the duration of the operation. None of this could, in fact, be guaranteed, given the vagaries of weather and the unreliability of radio communications in jungle terrain.

Nonetheless, to facilitate and coordinate the air resources that were committed to supporting *Thursday*, each of the mobile columns had a RAF Section comprising an officer and two radio sergeants travelling with it. The role of each section was to arrange for air drops and act as forward air controllers in providing for close air support whenever required. The Australian connection in all of this was that some of the officers heading each RAF Section just happened to be Australians, though few of these—so far as is known—had any remaining connection with the RAAF itself. Probably one of the best published

¹⁵ David J. Innes, *Beaufighters over Burma: No. 27 Squadron, RAF, 1942–45*, Blandford Press, Poole, Dorset, UK, 1985, p. 52.

accounts of this episode is the 1984 book, *Out of the Blue*, written by Terence O'Brien from Maitland, New South Wales.¹⁶

Also serving in the India-Burma theatre were over a thousand Australian airmen, mostly members of the RAAF, although all were serving in RAF squadrons. Notwithstanding that Wingate's Special Force in *Thursday* had the dedicated support of a US Army Air Forces unit, No 1 Air Commando, in his earlier operation during 1943 there were many other RAF units involved in supporting his 'Phantom Army' in the field.¹⁷

Even closer to home is the example of the clandestine operations mounted by Australian Special Forces in Borneo and Timor, as well as Ambon, Sumatra and Lombok. Although these were essentially commando-style operations for intelligence-gathering purposes, an additional and important part of them involved organising, training and arming the local populations to undertake guerilla resistance against the Japanese. The air support required for these operations led to the formation of No 200 Special Duties Flight at Leyburn, Queensland, in February 1945. Equipped with specially modified Liberator long-range bombers, this unit was used to paradrop personnel from the Allied Intelligence Bureau (AIB) and Services Reconnaissance Department (SRD), along with supplies, behind enemy lines in the occupied territories.¹⁸ Previously another RAAF Liberator unit, No 24 Squadron in the Northern Territory, had been utilised for this type of work.¹⁹

The other RAAF element relevant to these operations was the Catalina flying boats. In part, the purpose behind SRD operations was to insert parties into North Borneo (codenamed *Agas*) and northern Sarawak (*Semut*), ahead of an Allied offensive in the Brunei Bay area and Labuan Island scheduled for June 1945. But they also entailed bringing out local people who were in a position to provide intelligence about navigation and landing beaches—information that was crucial for planning the amphibious *Oboe* assault landings. These extractions, and returns, were accomplished using the slow but sturdy Catalinas.²⁰



Figure 10: Liberator Long-range Bombers



Figure 11: Catalina Flying Boats

¹⁶ Terence O'Brien, *Out of the Blue: A Pilot with the Chindits*, Collins, London, 1984.

¹⁷ Innes, *Beaughters over Burma*, pp. 54–7.

¹⁸ Phil Dynes, *Leyburn's Liberators and Those Lonely Special Duties Air Operations*, self-published by the author, Gloucester, NSW, 1999.

¹⁹ Michael Nemes, *Tocumwal to Tarakan: Australians and the Consolidated B-24 Liberator*, Banner Books, Canberra, 1994, pp. 130–2.

²⁰ Ooi Keat Gin, 'Prelude to invasion: Covert operations before the re-occupation of Northwest Borneo 1944–45', in *Journal of the Australian War Memorial*, No. 37, October 2002, paras 23–31.

From these irregular campaigns in the last stages of the Pacific War, we turn to the first of the post-1945 conflicts in which the RAAF became involved. The Malayan Emergency had actually been declared two years before Australia agreed in 1950 to a British request for RAAF air units to become committed. The conflict itself arose out of the turmoil of postwar decolonisation, in which communist-inspired nationalists attempted to oppose the re-imposition of British authority over Malaya after Japan's surrender. Many of these guerillas were, in fact, the same fighters who Britain had armed, trained and supported to oppose the wartime Japanese occupation, but to the British they were now all 'terrorists' and 'bandits'.

Although the Malayan Races Liberation Army (MRLA) never numbered more than 8000 fighters, even this small organisation presented a formidable threat to overcome. Ultimately, it would take 12 years and the mustering of a reported total of 350 000 personnel to defeat this insurgency.²¹ Australian ground troops did not join the conflict until October 1955, so for more than five years it was air power that formed the core of our involvement.

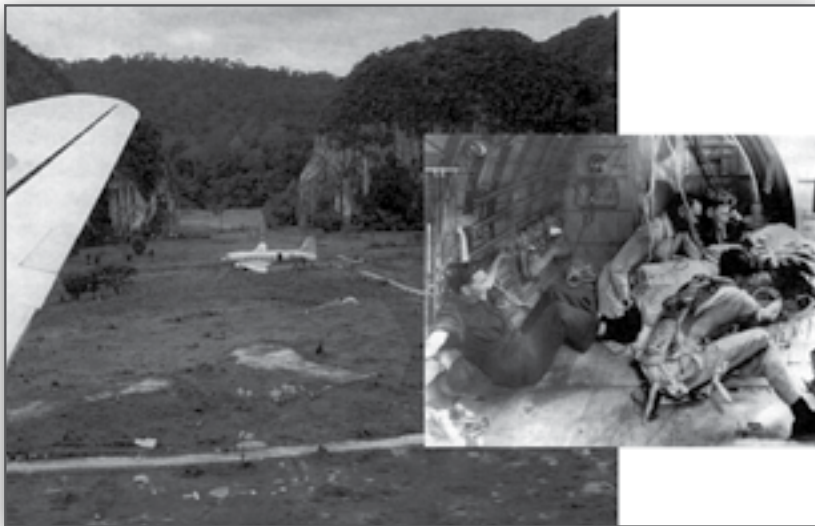


Figure 12: C-47 Dakota Transport Aircraft Delivering Supplies

The Australian air contribution to the Malayan campaign took two main forms. First to arrive, on 19 June 1950, were eight C-47 Dakota transports of No 38 Squadron. These were used to move general cargo and personnel across the theatre as far as Ceylon (Sri Lanka) and Hong Kong, often delivering resupply to troops in the field by parachute. The Dakotas also undertook casualty evacuations and participated in psychological operations such as leaflet drops. A week after the RAAF aircraft took up station at Singapore, Australia became committed to a new conflict, and the strain subsequently imposed on the RAAF's

²¹ George Odgers, *The RAAF: An Illustrated History*, Child & Associates, Sydney, 1989, p. 141.

transport organisation resulted in half of 38 Squadron's Dakotas being transferred to Korea in November. Two years later, the squadron was withdrawn back to Australia.

Two days after the Korean War began, the Australian Government also decided to commit a bomber unit to Malaya. Thus, No 1 Squadron, equipped with six Avro Lincolns which had been developed during World War II from the famous four-engined Lancaster, also joined the conflict in July 1950. For the next eight years the long-range Lincolns struck at the MRLA in their jungle hide-outs, in the process delivering a staggering 30 000 tonnes of bombs—around 85 per cent of the total tonnage of bombs dropped in the campaign.²²



Figure 13: No 1 Squadron Lincoln Bomber and Crew

No 1 Squadron returned to Australia in July 1958, their place being taken by a squadron of Canberra jet bombers and a couple of squadrons of Sabre jet fighters. The new RAAF units were only incidentally associated with the anti-guerilla campaign, because the principal rationale for their presence lay in the British Commonwealth Strategic Reserve which had been established to defend Malaya against both external and internal attack. The Malayan Emergency still had another two years to run, however, so inevitably the Canberras and Sabres took part in a few strikes at guerilla bases before the campaign was finally declared as 'over' in July 1960. Even then, in 1964 the RAAF provided a helicopter unit, No 5 Squadron,

²² Alan Stephens, *Going Solo: The Royal Australian Air Force, 1946–1971*, Australian Government Publishing Service, 1995, p. 249.

to strengthen army counter-terrorist operations that were still proceeding along the Thai border.



Figure 14: No 2 Squadron Canberra Bomber



Figure 15: RAAF Sabre Jet Fighters

The purpose and achievement of the bombing effort, against an elusive enemy able to use the concealment of the jungle in a way that would have been the envy of Lawrence's desert fighters 45 years earlier, has been hotly debated ever since. Some commentators regard bombing operations in Malaya as 'wholly unsuccessful', and as having probably done 'more harm than good by killing innocent people and destroying their crops and homes'. Defenders have justified it with claims that the bombing's true effects remain largely unmeasurable, because they lay in harassing the enemy in his jungle camps and keeping him constantly on the move, breaking down his morale and wasting away his military capacity and effectiveness.



Figure 16: RAAF Iroquois Helicopter

Whatever might be said in favour of the jungle-bombing effort, its utility or necessity undoubtedly diminished as the conflict moved into its later stages. The worst of the threat posed by the MRLA had effectively passed by 1955 and the outcome of the conflict was never in doubt from that point. At least the Lincolns had proved effective in the role in which they were employed, unlike the Canberras, which were tried but found generally unsuitable. After flying six bombing missions in their first year in Malaya, they flew none at all in the last 11 months of the conflict.

The contribution of the supersonic Sabres was seemingly even more problematic. As well as being used for bombing and strafing suspected enemy positions, they were put to generating sonic booms in an attempt to simulate artillery fire and panic the guerillas into breaking cover—a tactic which has been described as showing that 'the use of offensive air capabilities in Malaya was moving into the realms of the ridiculous'. Perhaps the most

truthful analysis came early on in the campaign from Lieutenant General Sir Harold Briggs, the man who devised the plan that led to eventual victory, when he observed in 1950 that 'air strikes were being used because no other effective way of attacking the enemy fighters had been discovered'.²³

Probably there is something to be said for both sides of this argument, but the aspects that were indisputable were the campaign's overall costs, protracted duration and generally unspectacular results to show for all the effort and manpower expended. For proponents of air power the truly unsettling feature was the fact that such should have been the outcome in circumstances where the adversary had no air assets operating in his own support, and thus should have been wholly vulnerable to decisive coercion from the air.

The debate over the use of air power in Malaya provided an interesting introduction and counterpoint to what was virtually an adjoining conflict in Indo-China. Australian air commitment to this new theatre of operations in South-East Asia was again a protracted affair, lasting from 1964 until 1971, and again it called for a mix of capabilities drawn from the RAAF in the form of squadrons of Caribou transports (the last of which we retired last year), Iroquois utility helicopters and Canberra bombers. Also sent were some specialist groups, such as photographic interpreters and forward air controllers. In the context of this conference, there is probably little to be achieved from focusing on the contribution that these elements made to the conduct and outcome of the conflict, and perhaps more from offering some widespread observations.

First, we might care to focus on the extent to which the Vietnam experience can be said to truly represent irregular warfare. It undoubtedly started out as a genuine guerilla insurgency by a coalition of nationalist movements within South Vietnam, not all of whom were communist inspired, despite the derisive dismissal by the Diem regime of all opponents as 'Viet Cong' (Vietnamese Communists). This phase of what was more a civil war came to an end, however, with the 'Tet Offensive' of 1968, when the insurgents emerged from their jungle hide-outs in an attempt to inspire a general uprising across the southern republic. The strategy was a military disaster, even though a public relations and psychological triumph.

Thereafter, resistance to the Saigon Government was carried on primarily by regular forces of the People's Army of Vietnam (PAVN) sent from the North. It can and should be contended, therefore, that from 1969 the struggle was essentially a state-on-state affair, even though the PAVN side chose to stay with guerilla tactics. There were two main reasons for the North Vietnamese approach. The first was political, the second practical. Allied forces in the South enjoyed such massive air superiority that conventional notions of holding ground and defending front lines gave way, of necessity, to using cross-border sanctuaries, continual concealment, and hit-and-run tactics.

The nature of the response that the RAAF was called upon to make in this conflict was also along lines that could also be regarded as traditional in an irregular war: first and foremost, a contribution of transport capability (both for battlefield mobility and inter-theatre

sustainment); supporting capabilities such as intelligence, surveillance and reconnaissance (ISR); and only lastly strike. These elements were not sent with any logic or particular purpose in mind. Their dispatch was determined by political considerations, essentially because they were available and notionally 'spare' within the RAAF organisation at the time.

That organisation, by the way, then had as its primary focus developing the ability to cope with a major regional conflict fought out along conventional lines, not the sort of war then occurring in South Vietnam. During the period of the Vietnam War, the RAAF was engaged in taking into service a raft of major combat platforms and systems which related to what was seen as its primary focus—Mirage fighters, F-111 fighter-bombers and Orion maritime patrol aircraft. Even the types of aircraft sent to Vietnam were not optimised for the conflict they were entering, which led to improvised programs to develop such things as helicopter gunships to ensure that an adequate level of fire support could be provided to the Army's counterinsurgency ground operations. The protracted nature of the conflict also inspired additions to the number and types of aircraft acquired for the RAAF, necessitating newer model Iroquois helicopters, and Hercules transports capable of aeromedical evacuation back to Australia.

With our forces still engaged in the Middle East Area of Operations, it is probably too soon to be talking about our RAAF commitments in Iraq, during the insurgency following the overthrow of the Saddam regime in 2003, or the ongoing war in Afghanistan against the ousted Taliban regime and its supporters, as though these can yet be studied as history. Of course, they *are* already history, but the evidence for working out what the verdict of history should be has certainly not been fully collected. I therefore propose to move on to the make some concluding observations about what our 90-year exposure to irregular warfare has meant for the RAAF, and I will leave it to you in the audience to match the thoughts that I offer with what we are presently hearing back from our most recent and still current operational commitments.

I have already mentioned that the conflicts waged on the irregular pattern in which Australia has taken part have, it seems, all drawn on a familiar range of air capabilities and roles. Interestingly, it has been the same range of capabilities regardless of whether the insurgency in question is one that has been mounted against the side we were supporting, or one that we mounted or helped to mount against our adversaries.

These have not been at the high end of the scale of combat capabilities that the RAAF has maintained in its force structure since World War II. Instead, they lay mainly in the category of supporting systems: transport for resupply and communications, systems that contribute to intelligence collection, reconnaissance, psychological warfare or morale building/shattering. Only in certain circumstances has there been the need for, or opportunity to commit, direct combat capabilities, and where that has happened it has almost never entailed the use of our very top-end systems.

It would seem reasonable to imagine that this will continue to be the pattern for the future. The logic underpinning the tactics of irregular warfare has too many similarities to what prompts non-state and weak-state adversaries to resort to asymmetric warfare for that to change in any meaningful way. Regardless of whether it is dressed up in constructs such as 'liberation struggle', 'popular war' or 'holy duty', irregular warfare is the resort of a side that lacks the means

²³ *ibid.*, p. 253.

or muscle to take on a more powerful adversary on equal terms. As the disparity between the main military powers and the rest of the world grows, so, too, will the likelihood of irregular warfare being the most common form adopted by adversaries of the future.

There is in this a danger that the particular and lesser needs of irregular warfare could become the principal standard for judging what capabilities we will take into our future Air Force. Although in this paper I have focused my discussion on instances where the RAAF has engaged, or has been engaged, in irregular warfare, this has not been the only form of commitment in which either the Australian Defence Force as a whole or the RAAF in particular has been required to join. The examples of the Korean War which started 60 years ago this June, and the overthrow of Saddam Hussein in 2003, readily spring to mind. It also has not picked up on a few conflicts where Australian ground forces were engaged in irregular operations, but received their air support from other than the RAAF. The example of Kalimantan during the 'Confrontation' campaign of 1962–66 comes to mind here.

History demonstrates the dangers of lacking enough of the high-end systems needed for those conflicts that start off at the other end of the spectrum from irregular warfare. Australia had that experience in 1939, and again in 1941–42. So, too, did Argentina in 1982, when it attempted to use its turboprop Pucara counterinsurgency aircraft in the defence of the Falkland Islands it had just seized from Britain. This was the only type that the Argentine Air Force had in substantial numbers that was capable of using the short runway at Port Stanley and other airfields. The numbers destroyed on the ground and in the air say a lot about the folly of attempting to 'dress up' for a war beyond what you envisaged, whereas you might just get away with 'dressing down' for something less than you prepared.



Figure 17: Derelict Argentinian Pucara Aircraft

In this session, I have reviewed the historical record for instances where Australian airmen have grappled with the requirements of irregular warfare. Along the way I have attempted to highlight the point that, in both the World Wars, the guerilla-style campaigns in which Australian airmen flew in support were only adjuncts to much larger conventional operations. I have not been presenting an argument that irregular warfare has been the sole or even dominant form of warfare which the ADF has, or could potentially have faced. Irregular warfare is a form of conflict in which Australian airmen have been involved for close on 90 years, but it has never been the sole challenge the RAAF has faced. If the record of history is anything to go by, we will be facing conflicts of this type well into the future, along with warfare in other forms against which we must be prepared to act.



DISCUSSION

Air Commodore Leo Davies (RAAF – Moderator): Thanks very much Dr Clark for giving us a different perspective on irregular warfare, whether that is from the perspective of us fighting those that are performing irregular warfare or us actually using irregular warfare to our own advantage. You highlighted there a point that most of us in air forces around the world understand; that is the significance of the key elements of conducting any sort of campaign—logistics and communications. I also noted the point that armed reconnaissance began long before Reaper and Predator. Perhaps then a current focus on what is possibly unbalanced about the way we are preparing ourselves now for irregular warfare, whether that is the fight that is happening today or the fight that might happen in 10 years time. These aspects might give you some food for thought and I invite you to ask Dr Clark some questions now.

Air Commodore John Meier (RAAF – Headquarters Joint Operations Command): Following on from Dr Lambeth's presentation yesterday and your talk today, basically outlining that there is an enduring theme of irregular warfare for air forces since we started, is it perhaps time for us to realise that an additional component of a balanced air force is an enduring irregular capability, much the same as the Americans are doing with their light attack requirement and AFSOC [Air Force Special Operations Command]?

Dr Clark: Australia has followed that line at various times. For example, if you think of the Macchi, it was an aircraft acquired for follow-through jet training of fighter pilots, but it had a secondary role that could have been extremely useful in the ground attack sphere. That would have been of great use in irregular warfare. Probably it is more a case of keeping that in mind with some of the systems that we acquire in future. As I indicated in my talk, though, I think the danger we've got is where irregular warfare becomes the yardstick, and we find people arguing on the grounds of cost whether or not we need the high-end systems, when the correct answer ought to be that—on the basis of our historical experience—we probably need both. We need that balanced force. How that balance within the force is adjusted is not really something I can answer as an historian.

Air Commodore Mark Lax (RAAF): I wonder if you would comment on the growing synergy between air power and Special Operations, Special Forces, that we are seeing now and its relationship to irregular warfare operations.

Dr Clark: It's very interesting that we've seen the use of Special Forces as the primary medium of our ground involvement in a number of our most recent campaigns of irregular warfare. I think this question of how we structure ourselves to cope with irregular warfare isn't a problem that's just struck Air Force. I'm sure some of you in this room will recall a debate that was aired publicly, probably 18 months ago, where Army—or sections of Army—were complaining that it was primarily the Special Forces that were being utilised for operations when other parts of the Army could just as well contribute. So, it seems to me that the other Services have this same conundrum to resolve. I'm sure the 'white-suiters' in

this gathering would probably nod their heads and say, 'Yes, we are having the same problem as well. We're looking at things like piracy as our justification or the low-end irregular sort of conflict that we need to deal with.' I pointed out in my paper that military advice often doesn't count so much in determining the scale and form of contribution that Australia makes in how it responds to irregular campaigns. It is usually political considerations that shape that and I can't see any reason to expect that that would change. It's always going to be a matter of political judgement; firstly, whether we get involved in those conflicts and what form our contribution will make. Quite often, as it has been in the past, it will be what have we got that can actually contribute to either an allied effort or what is spare that we can afford to do without for what's obviously going to be, on the basis of what we have seen, a protracted conflict. That seems to be the other rule of thumb that is emerging.

Squadron Leader Chris McInnes (RAAF – Headquarters Joint Operations Command): Most of the examples you have provided were basically Air Force people 'rocking up' and going flying, doing as they were told. Could you provide an insight into how that was commanded and controlled, and whether the RAAF has contributed to how air power was employed in those campaigns, how the campaigns were conducted overall and whether or not we've got some lessons to learn for the future?

Dr Clark: Well, about the only one of the postwar campaigns that Australia had any say over would have been the Malayan campaign, and that was only because of an arrangement which was struck that shared the AOC [Air Officer Commanding] Malaya position for the RAF between British and Australian officers. So you had Air Vice-Marshals Scherger, Hancock, Headlam and Eaton of the RAAF who filled that role in Malaya over about a decade. They could have been said to have some sort of command and control responsibility over the conduct of operations, but it was still within a political construct which was shaping the campaign against the guerillas, and it obviously didn't make a great deal of difference whether it was an Australian or a British officer in that position. In Vietnam, in particular, the sort of Air Force headquarters that we provided was never of a national kind, never of a type that actually was in a position to have a shaping say over how the conflict was being fought, particularly in the south. It had no contribution at all, of course, in the air war that was being fought over the north. Really, it was little beyond unit command that mattered. In terms of command and control, it is always going to be shaped, I think, by the level of commitment that the RAAF is called on to make. It is going to be very difficult to see more than a coordinating role—that is somebody placed within a CAOC [Combined Air Operations Centre] or something like that—when we've only got small detachments of transport aircraft or Orions, such as in the Middle East, for example. I think that is probably going to be the ongoing trend and I don't know that we could expect, reasonably, that that is going to change.

Air Marshal Ray Funnell (RAAF Retd): This concerns the Malayan People's Anti-Japanese Army, and I am thinking now of Spencer Chapman's book, *The Jungle is Neutral*, and the support given to that Army in the period from 1942 to 1945. Was there no air involvement in any of that? I'm just trying to think back on the book but, as an historian, could you inform me if there was any air involvement?

Dr Clark: I'm pretty sure that the British were providing support to the Malayan People's Anti-Japanese Army. It was coming though from India and Burma, once the Japanese had been pushed out of there. Certainly, there weren't Australians that I'm aware of flying directly in support of those operations in the same way as we were, for example, in Borneo. But I'm sure I have read that there was support, mainly resupply and the provision of leadership in the form of British commandos that were helping instruct and train that Army that ultimately turned against the British.

Air Marshal Errol McCormack (RAAF Retd): From the perspective of a 'bog rat' [junior officer] sitting on alert in Malaysia during *Konfrontasi* [Indonesia-Malaysia Confrontation]—you mentioned it in passing—I had the impression that there was enough confrontation, enough agitation, from the Indonesians for the 'Brits' to do something serious but they never did. As a result, I believe that when Sukarno departed the scene, things got back on track fairly quickly. The only fighting that I know of was in Borneo and yet there were quite a few incursions into Malaysia. Would you care to comment on the British approach to the problem? They could have done a lot of damage but didn't.

Dr Clark: They certainly had contingency plans drawn up that had the Indonesians continued incursions, particularly into airspace, they could have responded. The Indonesians adopted a tactic of flying fighter missions directly towards the Malaysian mainland and forcing aircraft at Butterworth, for example, to scramble in preparation for intercepting; whereupon, the Indonesian aircraft immediately turned back—basically, they just had the fun of provoking. There were changes of the rules of engagement that meant, had Indonesian aircraft been found over Malaysian territory, they could have been shot down. The Indonesians, obviously, were aware of that and did not let that happen. Later, as a result of the clandestine operations and pressures being placed across the border from Kalimantan, and the fact that Indonesian aircraft were crossing the border and strafing villages on the Malaysian side of the border, we detached Sabres to Labuan for a period of time to mount patrols. There were instances where high-level aircraft were detected but these intruders escaped before they could be either intercepted or even identified. But the British had developed contingency plans that had the Indonesians pressed on either of those fronts, our Canberras, for example, would have been involved in bombing strikes on the Indonesian mainland. So, the plans were certainly there—they are well known and they are documented—but I think everybody was well aware that this was going to be an irregular war that stayed just that.

General Gary North (USAF – Commander Pacific Air Forces): Just a comment. In your discussion, where you said the RAAF was merely in a coordinating role in the CAOCs and what have you, I take a bit of umbrage at that to point out that the RAAF has, as has the RAF, sent key leaders to serve in the CAOC—from the CAOC Director to the Battle Cab Director—and throughout the spectrum of the air campaigns in Iraq and certainly now in Afghanistan. Many are in the audience—Kim Osley is not but he was a CAOC Director, Leo Davies next to you was a Battle Cab Director for a long period of time, Geoff Brown for five months, Mel Upfield was a CAOC Director—and they served as key and integral parts. In fact, it might be instructive to have those folks who have served since 2003 in the Middle East to just raise their hand because the contribution is certainly much more than

'coordination'. It's very directive in the current fights and so, while there might not be 'iron on the ramp' in some cases, from the Air Force perspective the leadership of the airman contributing to the ongoing fights has been instrumental and very directive in how the air war has been applied across the spectrum from regular to irregular.

Dr Clark: Thank you for your comments, General. As I said in my talk, I was deliberately holding fire on the more recent conflicts because all the evidence is certainly not in, certainly not in the Office of Air Force History. We have been conducting interviews with a lot of participants in the MEAO [Middle East Area of Operations] and we have made a point of interviewing a lot of the officers who have contributed in the way you have described, but at this stage I don't think we have done a detailed analysis of those records or transcripts to ascertain exactly what the situation was.

Mr Mark Schweikert (Capability Development Group): You glossed over it a little bit, but I would like to ask about the RAAF's contribution to the forward air controller role in Vietnam, because it wasn't just forward air control, they were also conducting close air support missions for the US Air Force in the OV-10 Bronco aircraft. It's interesting that we had a question earlier about the US Air Force's current requirement for a light attack aircraft, which might see the Bronco resurrected for that role. I understand that we had 10 or 20 pilots, or something like that, as forward air controllers in Vietnam, who walked away with a 'swag' of medals and so forth. I wonder if you could comment further about that, given the irregular warfare nature of that exchange.

Dr Clark: The Australian contribution to the tactical air support system in Vietnam took two forms. Firstly, we had a small number of fighter pilots who served directly in USAF Phantom fighter units and they were conducting attack operations in support of ground troops. Second, we actually contributed, in total, about 36 fighter-trained pilots who served in Vietnam as forward air controllers and they served over quite a long period of years, but it was only in the last couple of years that we had them operating the OV-10 'Bronco'. That aircraft was simply the successor aircraft that the forward air controllers were flying. It just so happened that, unlike the previous two types that our forward air controllers flew—the Cessna O-1 'Bird Dog' initially and then the O-2 'Super Skymaster', which were simply light civil aircraft types that were adapted for forward air control purposes—the OV-10 was purpose designed for the forward air control role. It carried a range of weaponry that, in fact, made it suitable to engage the target itself in the interval before fighter support could be brought onto the scene and called in to make the heavier strike with their ordnance. So, it's not quite correct as you have indicated there that the OV-10s were intended as close air support aircraft in their own right. They were still there primarily for forward air control purposes; it's just that they were able to contribute to resolving fights on the ground in ways that their predecessors could not.



AIR POWER'S CHALLENGES IN AN AGE OF IRREGULAR WARFARE

DR REBECCA GRANT

Irregular warfare rose to high prominence in thinking about air power during operations in Iraq and Afghanistan in the decade of the 2000s. The challenge for air power theory is to discern how irregular warfare shapes the operational concepts for the joint campaign. What makes this so interesting to encounter at this point in time is that the strategic environment, technology evolution and the direct experience that we have taken from Iraq and Afghanistan have shaped what we see as the employment of air power in the joint campaign. That is going to be my subject this morning: looking at how air power in irregular warfare has both shaped and given us more challenges in what this future operational concept will look like. To get at this point I am going to circle back into history and look forward as well at some of the challenges that we have.

What Is Irregular Warfare, Anyway?

- Nothing new in history
- Usually, a defender's strategy
- Exploits terrain, population, and skills
- "Low Intensity"
- Few constructed campaigns
 - Different center of gravity
- Nonlinear battlespace



"Who can doubt that of all Confederate generals he was the most successful practitioner of the strategy of dispersal, of harassment, of terror, of attrition, of what we now call irregular warfare." – Henry Steele Commager, on Nathan Bedford Forrest, 1909

Figure 1: What is Irregular Warfare, Anyway?

Starting with history, what is irregular warfare in the first place? Well, we Americans, in a certain period of our history, like to think that we were pretty good practitioners of that. I think you could look at a lot of the campaigns of our Revolutionary War (the American War of Independence) as having a strong irregular warfare component to them. Our Civil War

was a little bit different but some of it, too, emphasised irregular warfare. In the American tradition, there was a special glory for military commanders who scored success in irregular warfare campaigns. One of the most famous of these characters was a General named Nathan Bedford Forrest. He fought on the losing Confederate side, and he is famous now primarily for a great phrase you see frequently in briefings and discussions at War Colleges. The phrase was: to get there 'firstest with the mostest'. This is always attributed to him and in this he was a little bit like Alexander of Macedon who was very much one for saying, 'Here's the enemy. I think we'll just go jump over that river or over that ford and take them.' This idea of quick and rapid action was really central to this style of command.

As we ask ourselves what is irregular warfare, the first thing that comes often, of course, is that it is nothing new. We tend to define it more typically as a defender's strategy, something that can exploit population and terrain, and our Confederate General Forrest was very good at doing that. We think of irregular warfare as low intensity—though I am sure it is not low intensity for those who are involved in it—and it does not really fit our grand notions of what operational campaigns look like. It does, however, give us a strong sense for the nonlinear battlespace, and this is very key to my discussion this morning. That is a phrase I am going to come back to again and again, because it is here that I see air power and irregular warfare making some of the biggest contributions to our evolving concepts of operations. So I will just leave you with the quote in Figure 1 about how Forrest was a master of this strategy, of cunning, harassment and attrition. I will have a little bit more to say about Nathan Bedford Forrest towards the end of my talk.

What is Airpower, Anyway?

- Hatched from 19th Century concepts of landpower and seapower
- Born to seek centers of gravity
 - "The advent of airpower which can go straight to the vital centers and entirely neutralize or destroy them has put a completely new complexion on the old system of making war." – Mitchell
- Airman's gift is theater-wide perspective
- Ability to see, strike, control and support surface maneuver
 - Includes logistic support
- Ability to achieve objectives independently
- Domain is air, space and cyber




Figure 2: What is Air Power, Anyway?

I think the next question then is: what is air power, anyway? There are so many ways to define it; whether it is security forces, securing air power protection, or bombers, satellites or cyberspace. For the purposes of this discussion, it is important to remember that air power, at least initially in the 20th century, was based on some unfulfilled wishes for land power and sea power concepts. Quite a lot of what we saw was an ability to bend the unique characteristics of air power to the constraints and challenges of surface manoeuvre. The quote in the second bullet of Figure 2 nicely captures what is so special about air power. It is from our General Billy Mitchell, who was the first air component commander to lead a large force of aircraft in a combined arms offensive late in World War I at St. Mihiel. He singles out the uniqueness of air power and its ability to go directly to those centres of gravity, to do the kinds of things that land armies or navies at sea had long wanted to do and had never been quite able to achieve. I think we have to take a little bit more than this, of course. One of the primary gifts that air power gives to the theatre commander is that gift of perspective. In World War I, that was looking over the next trench or providing observation for the corps artillery. Today, that perspective is out to low earth orbit and beyond, and it goes through cyberspace as well. That perspective is always there and we have come to rely on it so much for how we assemble the pieces of surface manoeuvre, as well as for how we assemble air campaigns. Of course, this domain that we talk about today is air, space and cyber. When I talk about air power today, I mean all three of those things. Air power is what you do across the air, space and cyber domains.

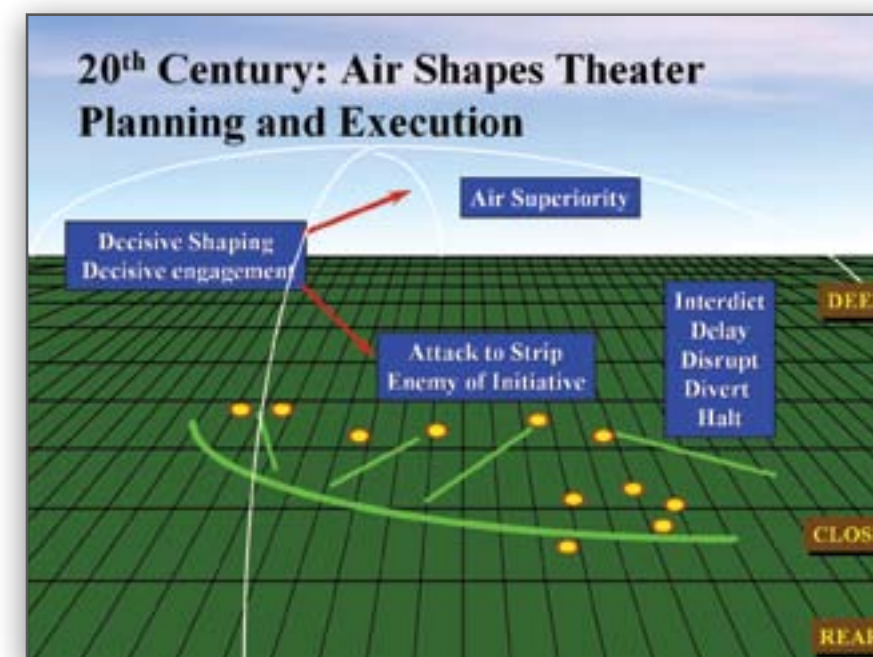


Figure 3: 20th Century – Air Shapes Theater Planning and Execution

This next part is the doctrinal portion of my talk. Figure 3 shows how all of that came together in the 20th century. Here is what air power is supposed to do for you. This is just a drawing that you could have put up almost any time during the 20th century for it shows the primary links between the air and the ground component. The air folks were supposed to gain and maintain air superiority, and in some cases that took a really long time to do. Then the question was how would this be applied. It would be applied deep in attacks well beyond the forward line of forces, it would be applied up close in close air support and close engagement and, of course, we would have a protected rear area with secure bases from which to mount the air power and the land offensives as well. So all that we talked about of what air power was doing in and around the operational concept was pretty much fitted into one of these areas. How decisive was it in shaping a follow-on forces attack? What was the best way to employ it up close? This was what air power was supposed to do. This was the use of air power by the Allies after the Normandy invasion to chase around Rommel's Panzers and prevent them from getting in close. This is what was supposed to happen if the Warsaw Pact ever crossed the line. This is how we saw the Coalition use air power against Saddam Hussein's forces in 1990–91. You could just imagine those forces arrayed anywhere up on this chart because it was primarily a linear battlespace—Napoleon would have known exactly what to do with this type of battlespace. And, wow, did air power ever do a good job! I am moving back here a little bit into Ben Lambeth's territory, but by the end of the 20th century, particularly as embodied in *Desert Storm*, air power had gotten really, really good at setting the conditions for and controlling surface manoeuvre.



Figure 4: What is Air Dominance

Figure 4 is provided to remind us of what air superiority really looks like—what it does for the joint campaign is shown in the text in the box—and how much work it takes. That little pie graph up in the corner shows you strike sorties flown to achieve this result in Operation *Desert Storm* in 1991. The blue represents strategic attacks to achieve air superiority, including airfield attacks, and the green shows the preponderance of sorties, sortie after sortie after sortie, flown against the fielded forces—evidently, not hitting that one unit that Mr Duncan Lewis mentioned yesterday as having still had 38 of his 39 tanks still in place. Part of the whole art of the application of air in this time was to be able to say, ‘You know, I want to pound the heck out of this unit but this unit sitting over here, they can just sit there and stay in place, so I’m ready for them.’ So the preponderance of sorties are used within what is still a linear fight against enemy ground forces. In Operation *Desert Storm* we saw an absolute ability of air power to dominate and set the terms of engagement. There has always been a little bit of a rub about this between the air and land components because I think airmen and soldiers often have a different view of what ‘decisive’ is.

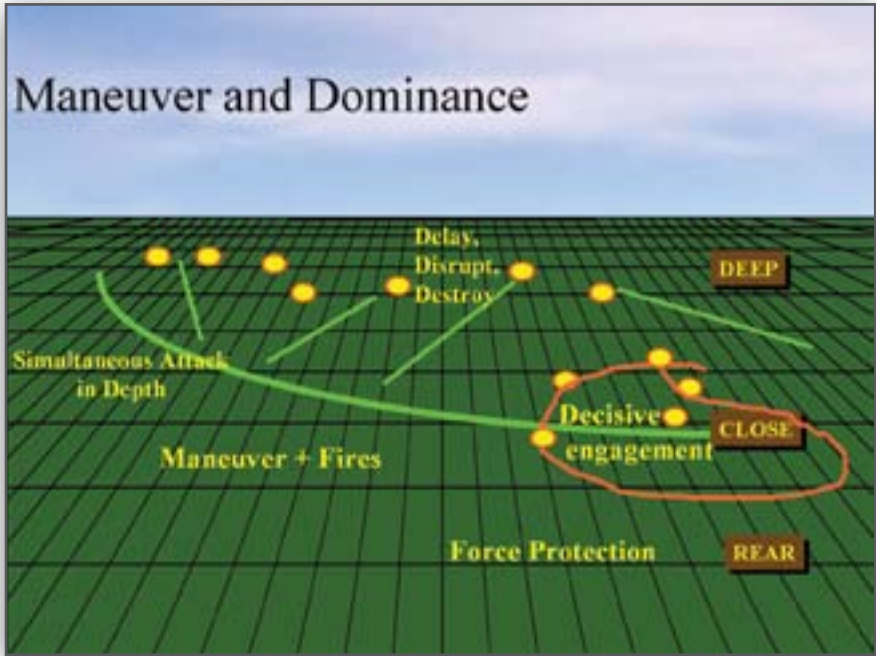


Figure 5: Maneuvre and Dominance

I am not going to go into the airman's piece of it on this chart (Figure 5). I just want to remind us that for the land component, at least within US Army doctrine, ‘decisive’ is always defined as that close engagement moment (the circle on the right in Figure 5) when you close with and destroy the enemy. Anything else is not quite the essence of fighting and winning the nation's wars. From this springs a great deal of the doctrinal debate and discussion that we have had in the US about what really is the proper role of air power. Is it really making a contribution if it is beyond the horizon and you do not see it? Let me point

out though that this fits within a linear battlespace concept where friendly forces are on one side of the line and the enemy is on the other. I am here, I am the good guy, and you are the bad guys. We see each other so closely and we know exactly how we want to control that engagement. However, I am going to tell you in a few slides that this is different when you look at irregular warfare in the nonlinear battlespace

So air power meets irregular warfare, again. The photograph shown in Figure 6 is, to me, one of the iconic images from the early part of Operation *Enduring Freedom*. I put this up here because it is a wonderful picture. The man sitting on this horse is a US Air Force special tactics controller, a special operator trained to be able to call in air power, and this picture obviously symbolises the work of these gentlemen with the Northern Alliance in Afghanistan in the fall of 2001. What is iconic about it from the perspective of air power and irregular warfare is the ability of this guy on this horse to call in a preponderance of any type of fires that he wants, and these could be from a B-52 or they could be from F-18s, anything within that joint air component. The ability to bring this into play in largely uncontested airspace starts to become a hallmark of what we see in the next decade of air power and irregular warfare.



Figure 6: Air Power Meets Irregular War ... *again*

However, let us pull back to the broader strategic picture and here we are again looking at a nonlinear battlespace. It is here, as I said at the beginning, that I am going to argue is the real point of contact between our theories of air power and our theories about irregular warfare and how we need to understand both to get inside this operational concept.

A nonlinear battlespace is exactly what we had in Afghanistan (Figure 7). There were specific areas in the north that were attacked, and I am talking about the earliest phases here in the fall of 2001, and there were areas in the south. But this was not a case of bringing in an army that was supported shoulder to shoulder and corps to corps. This was a case of using a very small number of US and coalition ground forces, highly specialised forces, with Northern Alliance and other forces at that time to begin to have the type of effect. So we see here that one of the prime models for air power and irregular warfare will be this ability to exploit the nonlinear battlespace. But it is important in moving forward that we be able to really understand the difference and ask: how much do we take from irregular warfare? How much do we use that to shape the forces going forward? Figure 8 shows some of the keys, in terms of the elements that go with them.

Nonlinear Battle

- Non-contiguous battlespace concept rising to dominate future concepts
 - Similar to OEF's non-linear operations, but with additional forces
- Choice of the adversary employing guerilla and insurgency tactics

Afghanistan, 2001
Air Force and Northern Alliance Areas of Operations

What are the consequences for airmen?

Figure 7: Nonlinear Battle

Firstly, linear—Napoleon would have understood this—you have got massed armies, you have mass manoeuvre, firepower and certain types of air control measures, and we will see tremendous change in the air control measures. You have clear rear areas that support relatively safe bases. Move into nonlinear and you have got a whole different thing. Your objectives are effects-based. They are not necessarily to get to the next terrain objective; that may be a sub-effect if it is desired but that is not always the primary effect. Your manoeuvre forces are not necessarily seeking to hold a broad front like the armies moving across Europe in World War II, and you have no true rear areas. This becomes a hugely important piece of the canvas of air power in irregular warfare.

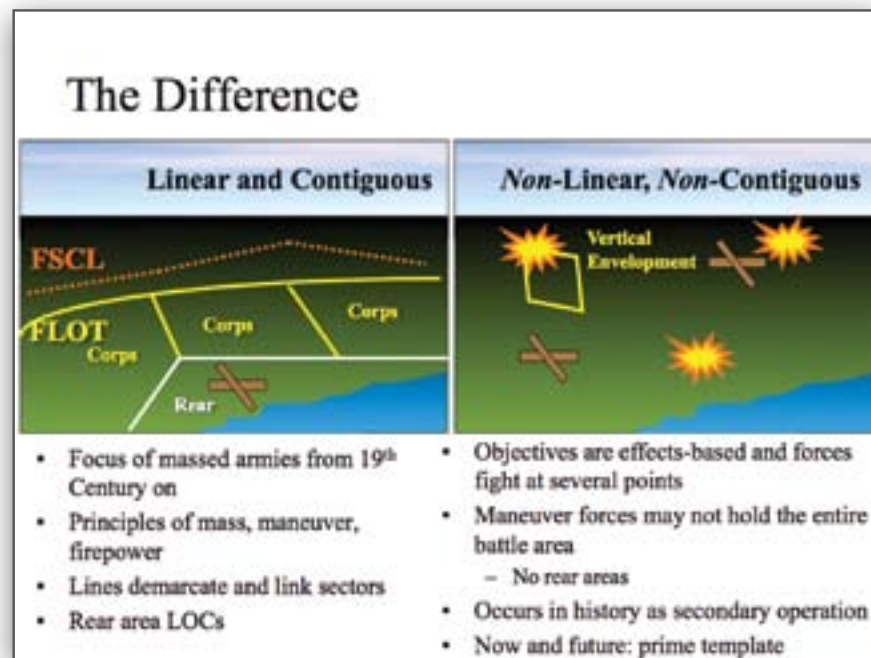


Figure 8: The Difference Between Linear and Nonlinear

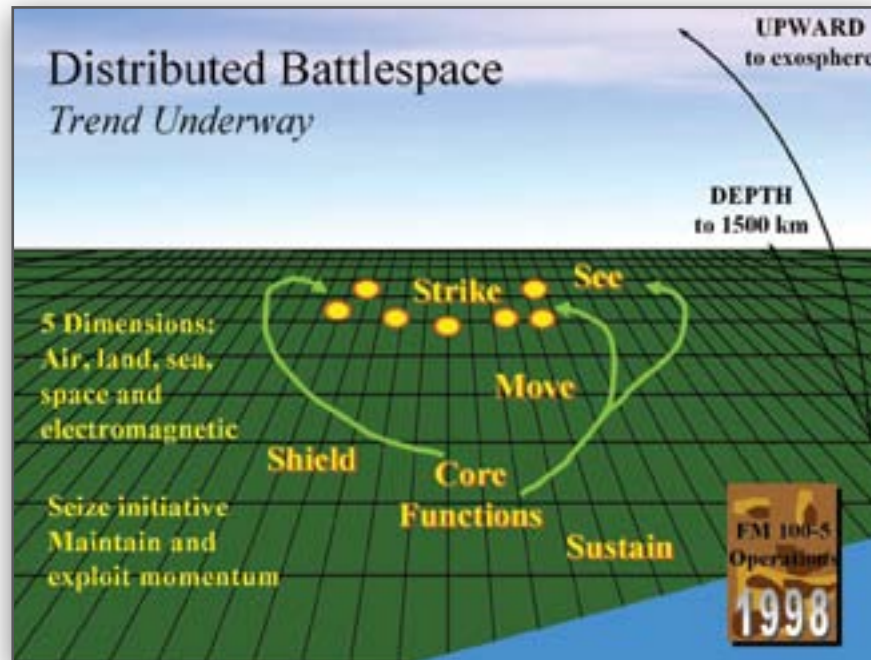


Figure 9: Distributed Battlespace: Trend Underway

It is interesting and I think very important to note that, even before the conflicts of 2001 and on, there was a trend towards looking at the nonlinear battlespace already underway within US military circles (Figure 9). It was a little bit of a refinement of the old concepts of encirclement and destruction.

The essence of it was that manoeuvre and fires would not necessarily always go in a linear fashion, supporting shoulder to shoulder, corps to corps. If you had enough dominance in the air and if you had flexible and direct fires, armies could use this in order to leapfrog further into enemy territory, surround an objective and take it with less fuss, less casualties and in less time. These thoughts were already percolating in US Army doctrine before the experiences of Kosovo, Afghanistan and Iraq that came into shape in the nonlinear battlespace. So Figure 9 is shown here as a marker and I will be coming back to this point in the end to say that this was something we were thinking about anyway due to technology advances, and it has really been hastened and changed by our experiences with irregular warfare.

Just to catch up here with a sort of strict definition of this, not only the US Army but also the US Marine Corps has pretty fully bought into a concept, which in this case they call distributed operations. It is the essence that I was talking about from the last slide (Figure 9): the ability to single out an objective and effect that you want to achieve and not mess with the whole linear concept of attriting and destroying the forces to get to it. It is a natural for air power. If you think back to the Billy Mitchell quote in Figure 2, you want to reach directly to those objectives. It is the essence of effects-based operations. So we see this coming together from many sides:

- first, within our land component doctrine, considering how best to use technology;
- second, an ability to rely on the tremendous air superiority and control of manoeuvre achieved throughout the 20th century; and
- third, changes pushed by the strategic environment with its emphasis on countering insurgency and terrorism.

Let us step back into history for a minute to make the central point of the next few slides and that is that this nonlinear battlespace stuff is completely a natural for airmen. This is, in a way, even more than the perfection of control of manoeuvre achieved in *Desert Storm*. Even more than that, the ability to master the nonlinear battlespace is just front and centre to what air power does.

The photograph in Figure 11 shows some of our US air commanders, and I want to point out the gentleman on the right, who is retired US Air Force Major General John Ellis. He is still alive; he has just turned 97 years old and is a tremendous character. The gentlemen to his right are some of the fighter commanders that helped to mount the air operations.

There are two air power operations that I want to speak about specifically to show you from a historical example how important this nonlinear type of operation can be. I am going to back way up to the Pacific in the early part of World War II.



Figure 11: So Natural for Airpower: USAAF Commanders

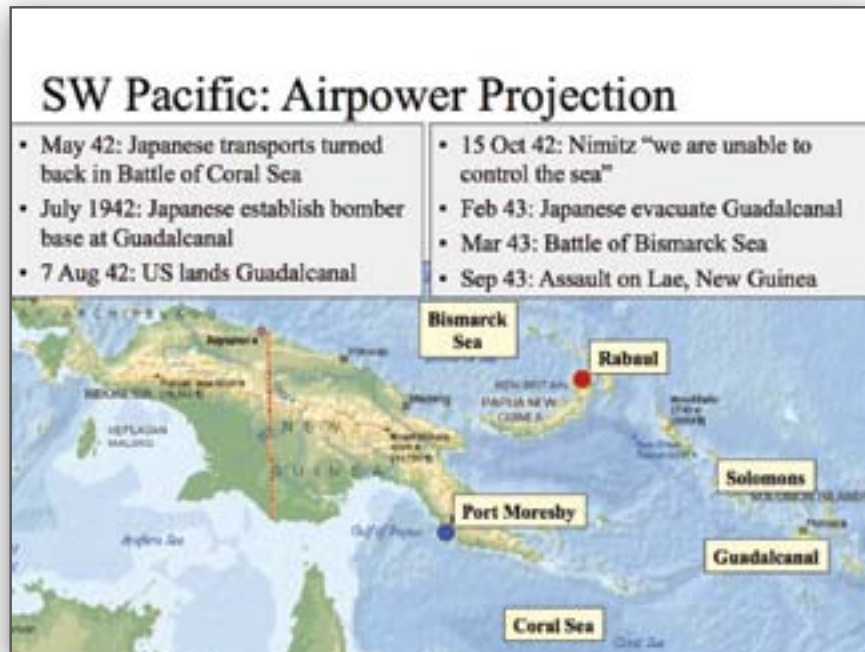


Figure 12: South-West Pacific: Airpower Projection

At this point there was an attempt to fight a campaign in the South-West Pacific that was very much based on making sure that the Japanese at the time did not control enough bomber bases to block the sea lanes. A lot of what was going on here was intended to keep open the lines to Australia. Figure 12 shows some of the major campaigns fought in the region over this period. The US was really struggling with the control of the sea. We have a great obsession with Guadalcanal and all that, but it is easy to forget how tough a time our Navy had and they were regularly getting defeated. In the six major battles around Guadalcanal, the Japanese had just tremendous night-fighting capabilities and the Navy was, frankly, unable to control the sea there many times. That made the other fighting that was going on just that much more important; the ability to cling to this.

One of the earliest efforts by General MacArthur and his air commander, George Kenney, was the assault on the Japanese-held airfield at Nadzab, in New Guinea. Figure 13 provides details of the way the operation was carried out. MacArthur was famous—he was like Nathan Bedford Forrest and Alexander, as well—I don't think there are too many Japanese Owas a type of nonlinear campaign, leapfrogging up ahead and using all the best of air mobility and rapid strike to put together a basically nonlinear operation that achieved the objectives at the time, which were to be able to hold what was required, to maintain control of the air and gradually reassert control of the sea. Kenney put this pretty well when he talked about what air power's strengths were and the importance of airfields (Figure 14).

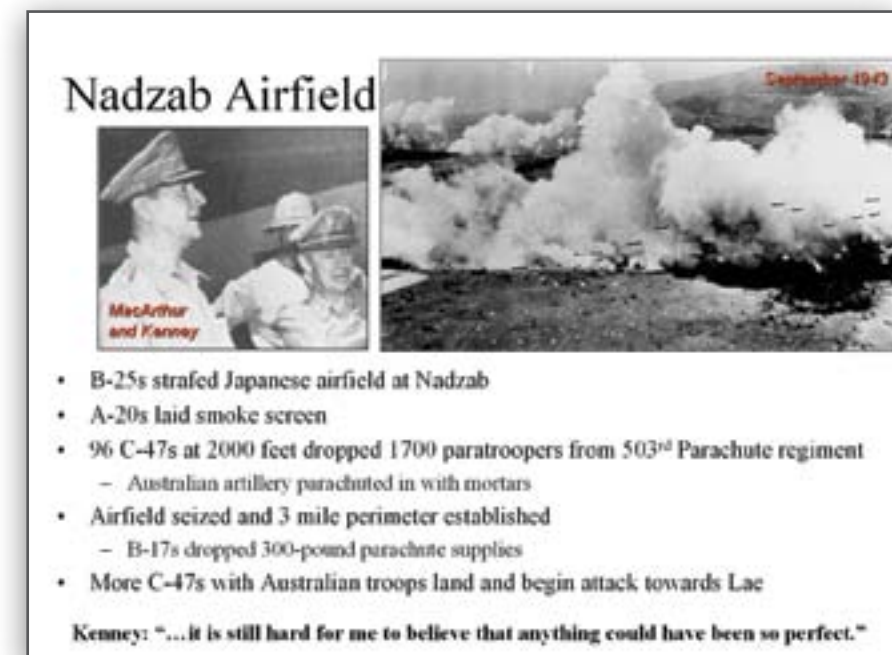


Figure 13: Nadzab Airfield

Airpower's Strength



- Advanced airfields critical to air superiority and ground scheme of maneuver
- Airfields secured by combination of air assets and ground forces under airbase control
 - Often used Australian ground forces
- All combat support delivered by air
- Nonlinear operations seized initiative
- Allowed rapid execution, surprise attack
 - Capitalize on signals intelligence

Figure 14: Airpower's Strength


Here we see the corollary to it, which is, if you are going to do nonlinear battlespace operations, you have got to have secure air power projection to make it work. The key to their success they felt was the ability to manoeuvre so rapidly, a hallmark of nonlinear battle space.

Finally, I would like to look at Operation *Thursday* (Figure 15), which Dr Chris Clark just talked about.

Operation *Thursday* is another example of bold use of irregular tactics within a larger campaign to quickly achieve objectives in the nonlinear battlespace. The history of the air commandos is an absolutely fascinating one. I think what we often tend to forget here is that they could not necessarily take air superiority for granted. Dr Clark did a good job of pointing out how this all depended on being able to hold control of the air. But to a great extent, control of the air was something that you went and got on a daily or weekly basis, not something that you achieved over time and then took for granted, particularly in this theatre. What it enabled was a larger execution of the commander's objectives using this nonlinear battlespace concept. So we can see, I think, with the way that this was done what a natural fit air power has always been within this nonlinear battlespace concept. The question then that that leads us to really is: how much of this is right for the future? (Figure 16)

Operation Thursday

- Air commandos lift British troops behind Japanese lines
- 5 Mar 44: C-47s depart India, tow gliders to landing zone Broadway in Burma
- Cadre of 900 air commandos set up air base for air and ground attack on enemy
- 10,000 men, 1000 mules, 250 tons supplies
- 2000 casualties evacuated



Objectives:

- fly-in of troops
- evacuation of casualties
- supplies by air
- close air support
- air superiority

Figure 15: Operation Thursday

The Right Format...for the Future?



Non-Linear, Non-Contiguous



<p>Some Non-linear operations</p> <ul style="list-style-type: none"> • Lae (Nadzab airfield), 1943 • Burma, March 1944 • Inchon • Panama • Afghanistan 	<p>Common traits:</p> <ul style="list-style-type: none"> • Unity of effort – joint forces <ul style="list-style-type: none"> – But fragmented, non-contiguous battle area • Close air support and interdiction • Logistic support by air • Required secure airpower projection
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Figure 16: The Right Format ... for the Future?

This is something that preoccupies the American Defense establishment and I think we often do not take it to a high enough level. We say to ourselves: do we need light attack aircraft? What are the pieces of kit that we need? How many more Predator and Reaper orbits do we need? I am sure David Deptula will give you a great discussion on the intelligence, surveillance and reconnaissance (ISR) aspects of this shortly. But the question really is: to how much do we want to shape our future operational concept around the ability to execute irregular warfare? I think what we are seeing is that we are not going to want to give up the ability to operate in the nonlinear battlespace and that that will take certain characteristics and traits.

What I am going to next do is talk a bit through Afghanistan and Iraq and our recent experiences, and try to underscore that point. My basic point will be that, yes, our irregular warfare experiences have changed and strengthened our operational concept. It is not as if we are saying, let us now construct *everything* around irregular warfare, but, rather, let us take the indispensable tactical and operational lessons and use that to construct what we will do going forward.

All right, the first one:

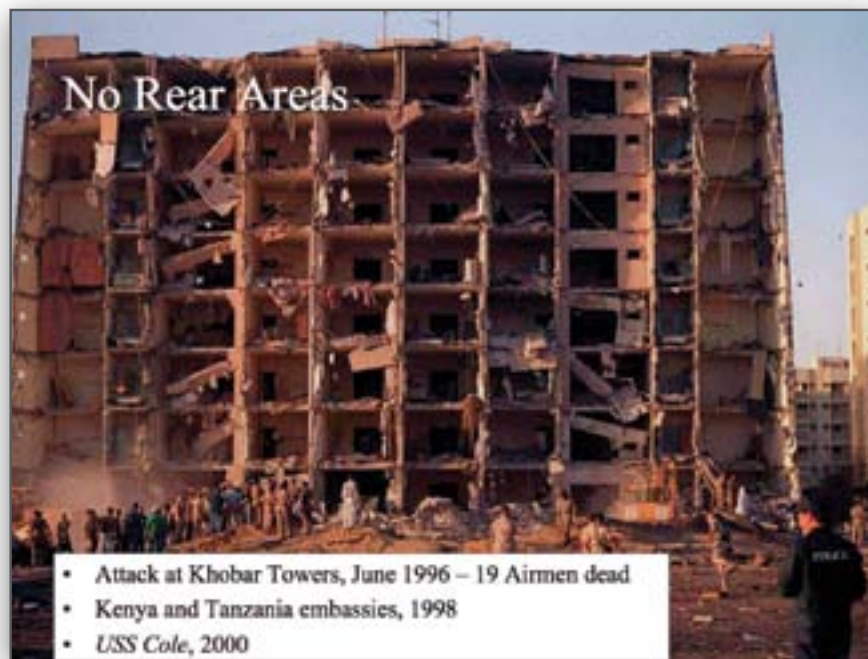


Figure 17: No Rear Areas – Attack on Khobar Towers, June 1996

Some of you may recognise the photograph in Figure 17 as a picture of the barracks at Khobar Towers in Saudi Arabia, hit by a terrorist attack in June 1996. This really was, for the US Air Force, a tremendously difficult moment and a wake-up call that there are no secure rear areas, and we began to see that change here. I do not think, as a nation, that we

completely grasped what it would mean, or what the subsequent attacks on the embassies and on the USS *Cole* would mean, but we certainly know now that we are in a condition where we have no rear areas. So, that linear battlespace concept of rear, close and deep has already, I think, pretty much changed irrevocably. Whether you want to attribute that to irregular warfare or the strategic conditions, I would say that is something that we will never again take for granted in the same way.

At the same time we saw at the end of the 20th century a new pinnacle in the ability to deliver precise effects. The chart in Figure 18 documents the number of strike sorties flown in the Kosovo Engagement Zone (KEV) during NATO's campaign in 1999. I think what is interesting about Figure 18 is really just the shape of the curve and what it shows you is that it required a pretty intense concentration of air power in order to achieve objectives. This is not cumulative, this is strikes per day. You can see they start out with not much because that campaign was planned initially as, sort of, 'All right, let's plan for 72 hours and then see what we have to do.' The answer was that what they needed was a lot more strike platforms. They came in from the US, they came in from NATO and they came in from the carrier in the Mediterranean, and it required a real pressure on the fielded Serbian forces in order for air power have its effect. There were attacks going in on the strategic target set at that time and there was diplomacy in place—there always will be—but what we see here is a sharp reminder that sometimes it really does take a concentration of air power on the fielded forces to achieve the kind of control that you want.

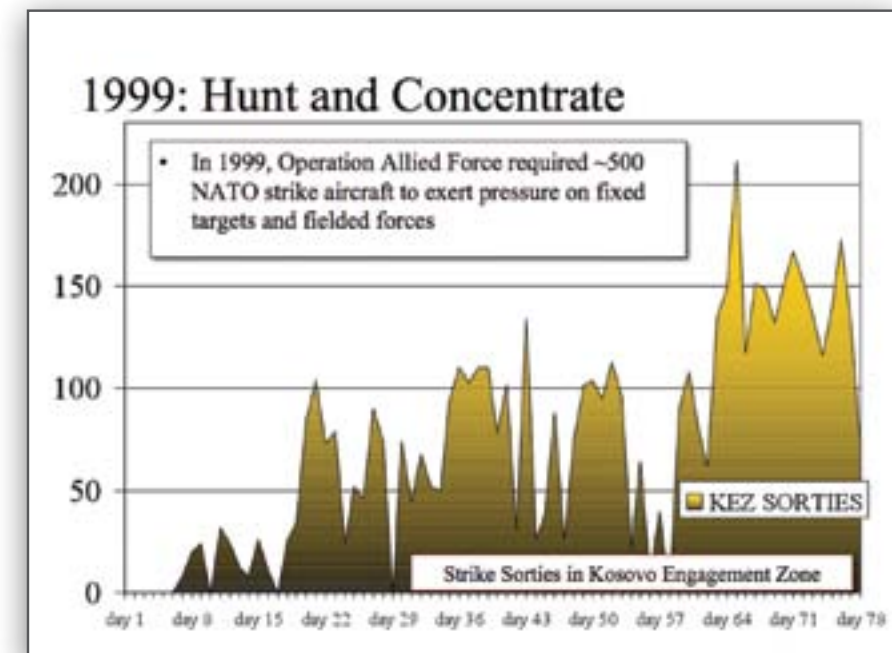


Figure 18: 1999: Hunt and Concentrate

Figure 19 shows where they meet up again:



Figure 19: Where do They Meet?

The pie graph in Figure 19 for Operation *Allied Force* in 1999 shows the number of what, at the time, were called 'flex' targets, meaning targets whose coordinates you did not know when you took off, versus targets with fixed coordinates. It was about 43 per cent 'flex' in 1999. Barely two years later, by the fall of 2001 after about the first week of Operation *Enduring Freedom*, something much closer to 80 per cent of the targets were 'flex' targets, meaning that aircraft were launched to a particular area, perhaps with some targets pre-briefed, but generally awaited calls from controllers on the ground saying, 'All right, what I want you to do is go over there and get that or go over there and get that'. Within a matter of about two years then you have a tremendous change, driven by the technology on board the aircraft, the precision, and the maturation of the air operations centres; nonetheless a huge change in the way that air power is applied and it is this gateway in no small part that makes possible the role of air power and irregular warfare that we have seen subsequently in Afghanistan and Iraq. So let us not forget that this, at least, came from planning for regular high-intensity conflict. It was not something that was thought up in response to an irregular environment; however, it has been tremendously useful within that irregular environment.

Figure 20 looks at Afghanistan in the fall of 2001. The dates shown are when these cities were considered cleared or had fallen out of Taliban control. I think the things that pop out from this slide are, first, the rapidity with which this happened and, secondly, again, a nonlinear battlefield. Now, let us not think for a minute that there were not those in the US

who thought about maybe doing this with land forces. But the practicality of it was zero. How are you possibly going to encircle Afghanistan with land forces, looking at the different nations that border there? It would have taken months, even if you would have gotten all the diplomatic agreements that you wanted to do it. It is difficult enough to secure the bases in the theatre to support the tremendous inpouring of Coalition air power. So, we see here a quick reliance on the nonlinear battlefield and the full use of simultaneous operations, precision, everything you can best do, including the use of C-17s to drop humanitarian relief on night one of this operation and the use of Navy carriers to fly a preponderance, in this case, of the air control sorties—kind of an unusual feature but something that they responded to quite well.

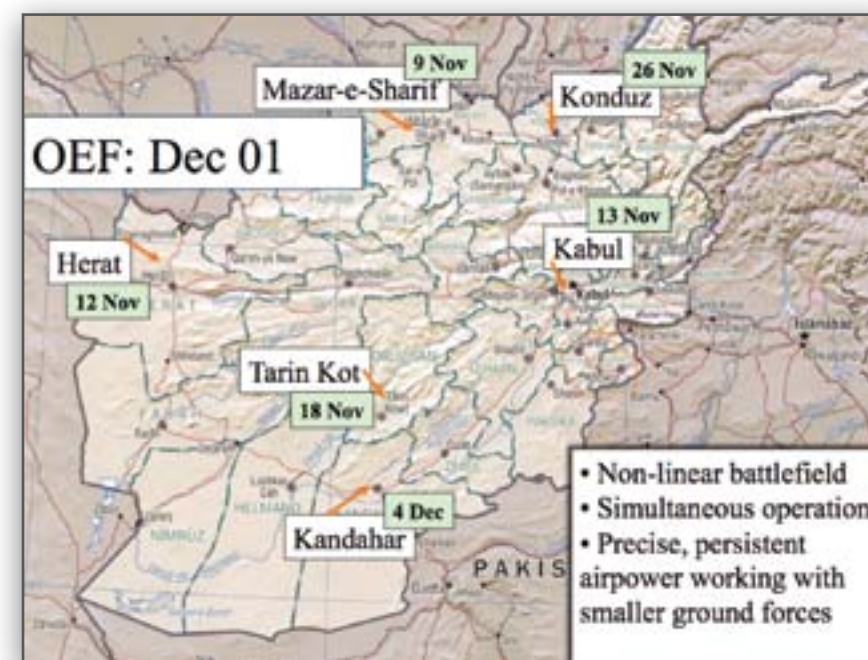


Figure 20: Operation Enduring Freedom, December 2001

Of course what is interesting to airmen in this phase is that, for the first part, this is done largely without a large ground force in place (Figure 21). It is really the middle of November before you see a ground force presence come into the theatre and when it happens, say in Kandahar, marines are airlifted in and their purpose is to begin to change the way the fight will go, but essentially they are coming into an area that has already been secured. That is, secured by whatever was achieved through air power and through the use of small forces on the ground.

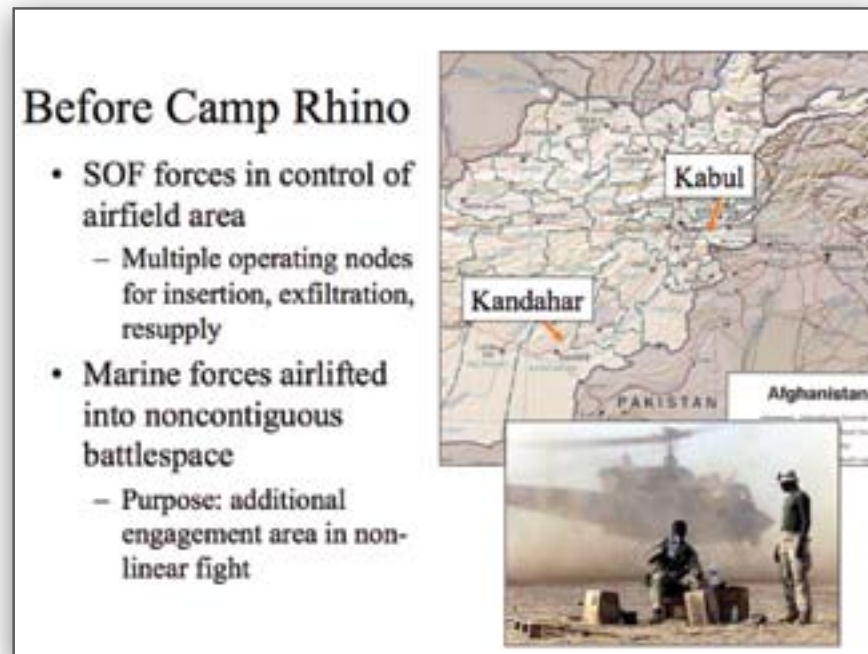


Figure 21: Before Camp Rhino

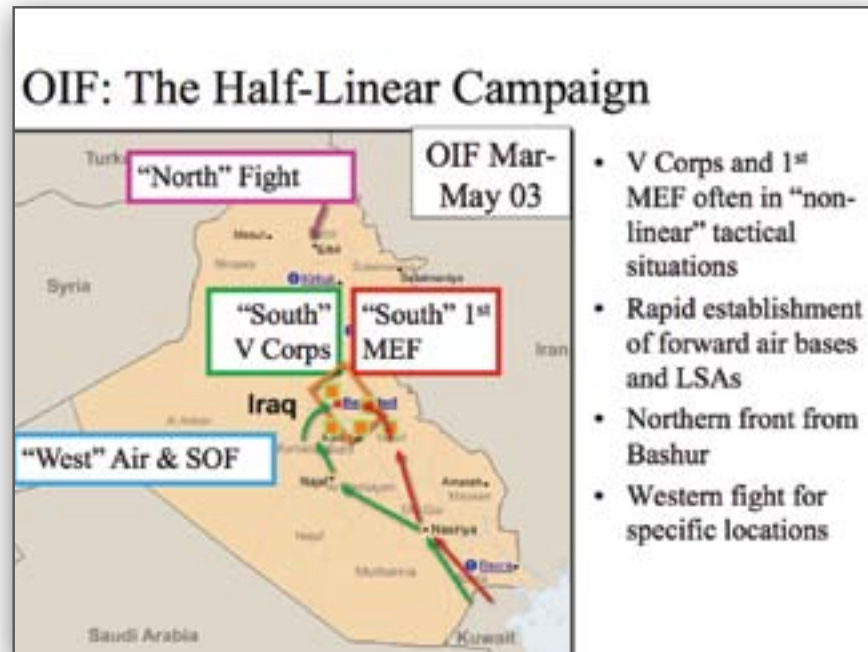


Figure 22: Operation Iraqi Freedom – The Half-Linear Campaign

But it is never quite so simple. Forward ahead two years to Operation *Iraqi Freedom*, the major combat operations phase, and you see what I would call a blend (Figure 22). I suppose if you have to look for one scenario that is more likely going forward, you could do worse than to look at the one shown in Figure 22. I always like to call this half-linear operation, because there are aspects of this drive on Baghdad that are very linear, very traditional in look. They are certainly not traditional in pace, in the rapid movement and the support of air rolling through the deep battle and letting the ground forces come ahead. At the same time, we see components of this that are really much more pure irregular warfare, nonlinear battlespace, such as the ‘West’ fight (Figure 23).



Figure 23: The ‘West’ Fight

The ‘West’ fight is an attempt to assist Special Operations forces and others in securing some key areas, airfields that might launch missiles and some other key sites. It is done in the case here where the land forces really are best described as being in support of the air. There are a certain number of aircraft, with diverse range I might add, from the F-14s and F-16s to B-1s and lots of others, devoted to this ‘West’ fight and they are able to trawl through the kill boxes, or the way the boxes are defined at the time, and to apply firepower where it is needed. So, as you have got the linear piece with the Army and the Marine Corps driving up towards Baghdad, you have got a very nonlinear battlespace fight going on as part of it, as part of one of the five air wars of Operation *Iraqi Freedom*. You could do worse than take something like this as a model and say that you may have some linear and regular and high-intensity fighting going on, but you will always, perhaps, have these other pieces

attached to it. Doubtless, we will not see anything exactly like this again but it is not a bad model if you think of the distribution and the percentages of the weight of effort.

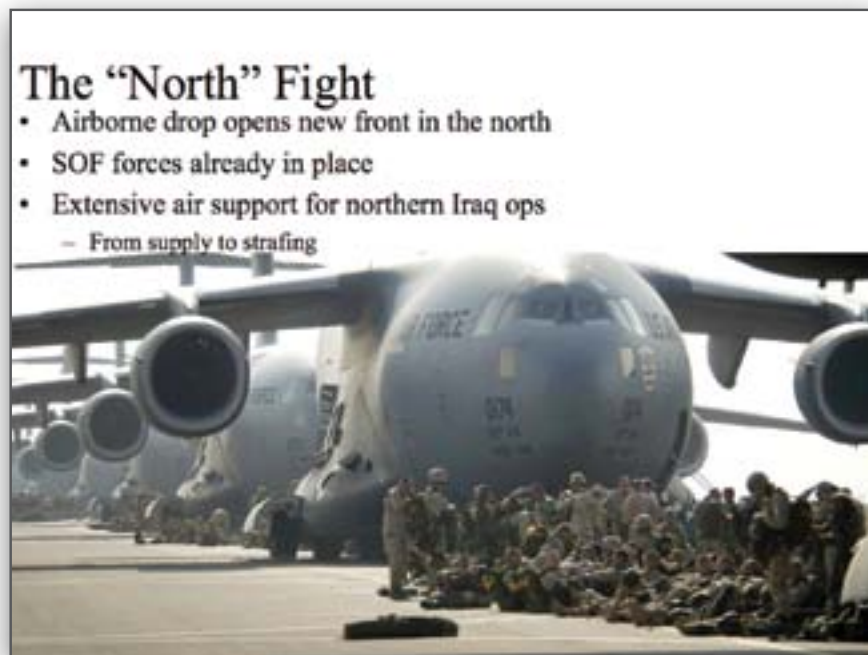


Figure 24: The 'North' Fight

The 'North' fight is a little bit similar in that it was planned to be, perhaps, a more traditional operation (Figure 24). Issues with air base access turned it into something that would have been familiar to Operation *Thursday* and Orde Wingate and all those folks, the ability to bring in paratroopers onto a barely prepared airfield down in a box canyon and then to use that to help support Special Operations forces. Of course, the 'North' fight was backed heavily by Coalition air, carriers involved again from the Mediterranean and a large distribution of other air resources that helped to focus the 'North' fight. They were able to call in, just as that special tactics controller on the horse had done, some very precise attacks. You begin to see a lot of use of strafing, which then becomes a hallmark of the campaigns in Iraq and Afghanistan, in particular. Here you have the ability of air power again to take a kind of a nonlinear approach as an adjunct of a larger campaign.

It is time now, I think, to look at the specific elements that make this work, and I will use Figure 25 as my chart to pivot off into the next discussion.

The air component did a lot of planning for how things would go in the urban environment of Baghdad in 2003. It is interesting, back in the 1990s we all talked a lot about urban operations and urban warfare, and it has been supplanted, understandably so, by the real-world experiences that we see coming out of Iraq and Afghanistan. But the point here was to try to make air power so preponderant and so precise that any ground force individual

there in Baghdad could call on very precise, very rapid delivery of air fires. That is just the great historical lineage that comes up, whether from the use of air against Rommel's Panzers in World War II right out through *Desert Storm*, this ability to stack aircraft over Baghdad and focus the fire down where it needed to go. That is the tremendous dominance of the air component in again controlling surface manoeuvre and here it is supporting friendly surface manoeuvre. As we know, that fight did not turn out to be as intense as some feared it would and that was all good, but we see from this what we are always going to want to have the air component deliver and that is that preponderance of precise firepower.

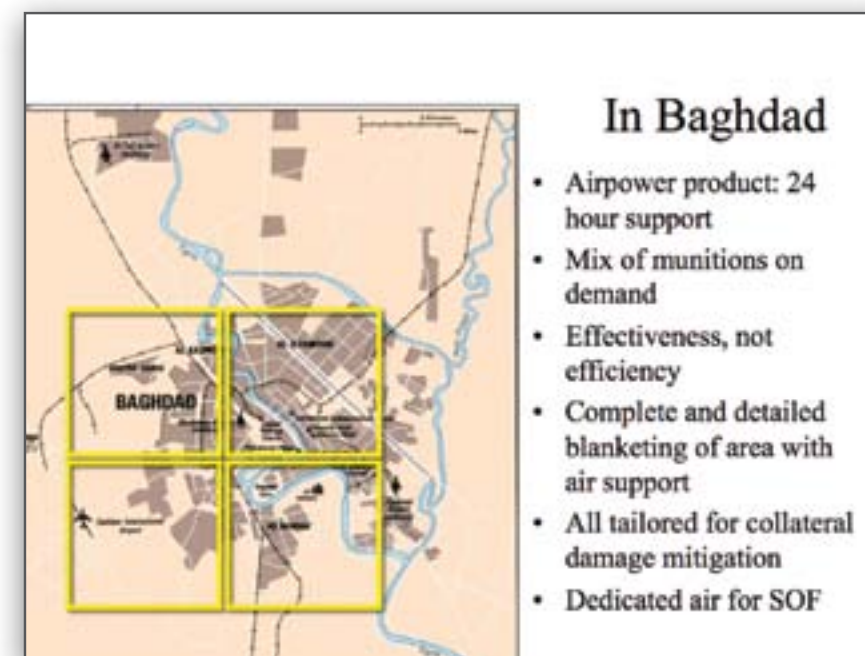


Figure 25: In Baghdad

OK, some of the other elements that have changed. The major combat operations phase is long over, but if you go through some of the airfields in Iraq in the mid-2000s they are not the safest places in the world (Figure 26).

There is quite a bit of mortar attack on the airfields and we begin to see and to really take on board the fact that air bases now will have to be defended. We look at examples, such as the RAF Regiment and the US security forces who begin to move outside the wire—they do proactive patrols in the towns around the airfields—and we see from this that, as essential as the airfield is, we are past the point now where we can say it is in a safe rear area. So any concept of joint operations, of irregular operations, going forward will have to look at how you secure air power projection. It is simply *the* most fundamental thing. I think our grandfathers back in World War II would have understood that inherently. They dealt with a lot more threats and attacks on their bases and we have seen that again here, and that

would be, along with precision firepower, one of the key elements that we will not want to give up going forward.



Figure 26: Balad circa 2005

Figure 27 addresses some of the marvellous innovation that has occurred associated with aerial resupply and airdrops.

Yes, airdrops have been going on for a really long time. They dropped mules in Operation *Thursday* and the latter part of the Vietnam War saw a lot of aerial resupply, particularly after the Easter Offensive of 1972, but the Central Command has taken this to a completely new level and largely since the middle of 2005. We are now at a point, and obviously General North was so very instrumental in all of this, where you have got airfields where you can have things that the ground forces might want stacked and waiting, and they are on call, not dissimilar to what you would look at for on-call close air support (CAS). So we have begun to rely on aerial resupply not only to keep convoys off roads but as just a regular way of doing business. I think it is hard for us to overstate how important this precision air drop has become and I do not think that in any future joint concept we will want to move away from this. Everything about the nonlinear battlespace requires innovative aerial resupply and I think all our future commanders are going to want to have this type of ability going forward. A huge number of airfields have been constructed within Afghanistan to help support this, but that ability to go out and drop you what you need to the ground forces has reached a level of magnificence that we could not possibly have imagined. So that is something cultivated out of irregular warfare but very central, I think, to any concept of nonlinear operations going forward.



Figure 27: US Central Command Air Forces (CENTAF) Airdrops

Then we get to precision strike, the tipping point. The two charts here (Figures 28 and 29) really have one message and that is the swing from a focus on air operations over Iraq—the time these charts begin back in 2004—to a concentration on Afghanistan in 2008.

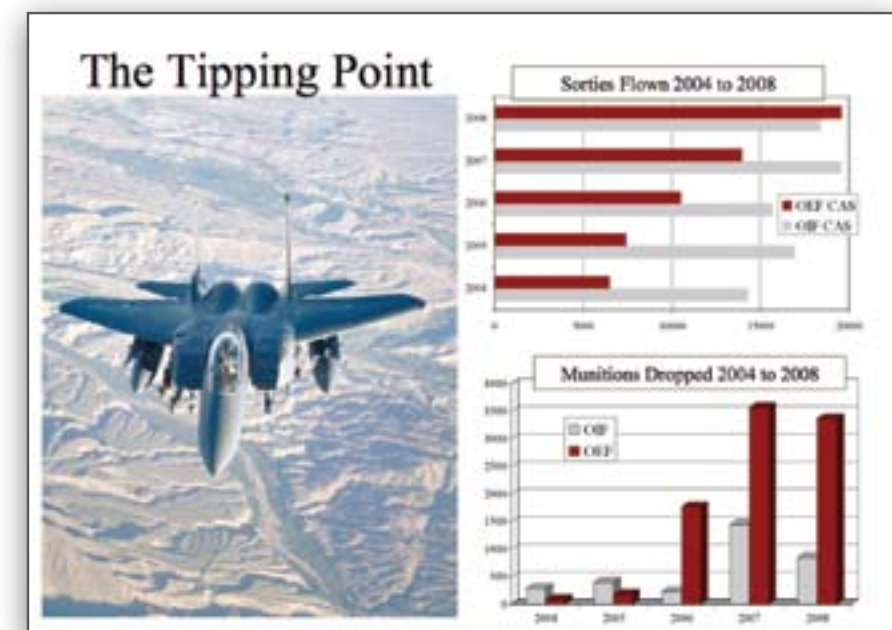


Figure 28: The Tipping Point



Figure 29: Air Power in Afghanistan

Dr Clark was quite right to point out that we do not have all the history in and we have not looked at all the numbers for what has gone on in Iraq and Afghanistan, but I think there is one thing that is pretty clear and that is that the Coalition air component in Afghanistan has been able to deliver a tremendous resource in tailored effects. As we know, it is not always a bomb that is being requested. Low shows of force are often wanted. If you read through the operations summaries you see these over and over again—I want the B-1 to make a pass at 2000 feet—and it is used in a specific tactical way. It is used to break an engagement between an enemy force, Taliban or one of the other groups there, and a Coalition force. It is used for election security and then it is used, of course, for the specifics that you see captured in Figures 28 and 29. Those are assisting and breaking up firefights. No matter how carefully you chose the ground where you put a patrol, there is always the possibility for ambush. We see this over and over again. What makes that possible? Well it is the weight of effort on these charts. It is the ability of Coalition airmen to bring these weapons to bear and this is just a routine part of our air war in Afghanistan. Contrary to an impression that we may get back in the States, particularly, that it is a ground-centric war, and I do not take any real issue with that, it is also a war that is done with complete air overwatch, and I think the commanders on the ground are pretty blunt in acknowledging the value of that. So you airmen will always want to be able to provide this kind of precise and tailored firepower and air power effects from your strike platforms.

What are the central things from air power in Afghanistan that we really want to take forward? Well, I touched on a few of them and there are some others that are probably worth longer discussions, such as weather. I cannot imagine that you would want to work in

a lot of these situations without the ability of what is frequently an Air Force weatherman to be able to tell you what is going on and when you will be able to move in a certain spot. But I want to highlight the quote in Figure 29 about ISR. General Deptula will give you a much further exposition of this. The point I want to make simply is that we have really changed what we expect from our ISR and it has changed how we use air power in a strike role. We are not really out there to trying to get the foot soldiers. It is not like a close air support thing from a previous campaign. We are after very specific people. The knowledge and the ability to put together that chain and execute it come from the ISR assets. What we see from it though is a tactical lesson; it is a change. We now have through the air component the ability to go on a pretty precise hunt for key individuals. Again, I argue that we are *never* going to want to give this up. This is an ability that we have come to really rely on and it is going to be expected of you airmen in the future.

You can spend time with anybody in the Defense establishment in Washington or on the fringes of it or in academia discussing, ‘Hey, is Afghanistan really a model for the future?’ I say, well all right, let us just assume for a moment that it is. Here are the things that we would want to take from our experience of irregular warfare (Figure 30).

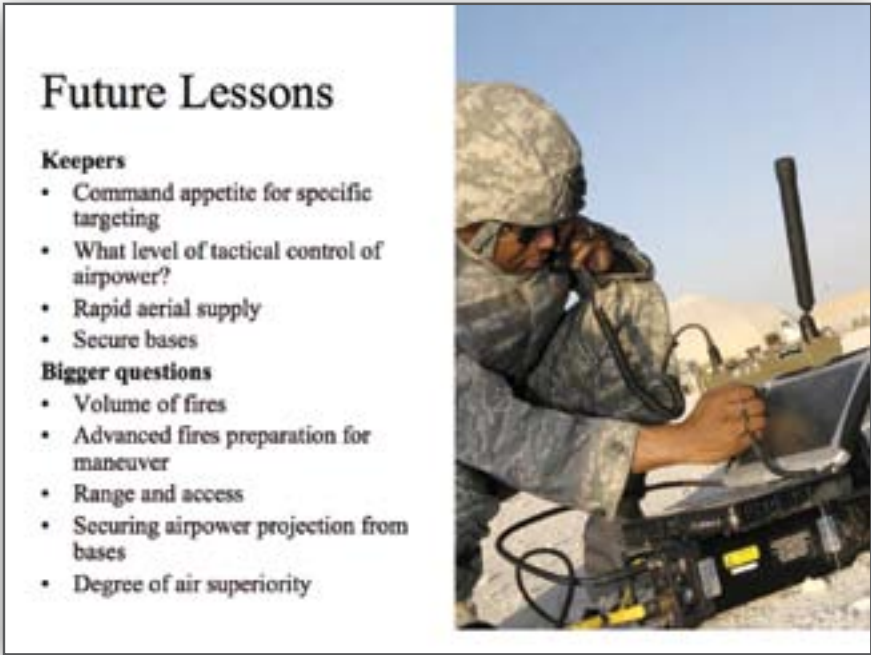


Figure 30: Future Lessons

Let us talk about some of them: the command appetite for specific targeting and the questions about what is the correct level for tactical control of air power. The Chief of the Defence Force talked about this a little bit yesterday in his warning not to ‘penny packet’ aircraft. But the fact is that we are always going to want to try to set what is the correct level

of control. How far down do we push that control? We might push it quite far down in a situation like we see in Afghanistan today but we want that centralised ability to apportion the resources, particularly when they are scarce resources. We are always going to want to have this rapid aerial resupply and we are going to need secure bases.

Now, here are the areas where the model diverges a little bit. As I have said, we have got to look at irregular warfare and how it affects our operational concept. Here are the areas where there may not be a direct translation, but it raises the questions that are key as we look at our future operational concepts. What about the volume of fires? For all the charts that I have shown, and we have seen a kind of dialling up and dialling back of air power in Afghanistan, we are not looking at the same volume of fires that you would find in a hotly contested ground battle or in highly contested airspace. So we want to ask: how are we still able to deliver the correct volume of fires in a different tactical situation? Very much connected to that, how do we want to use fires in advance preparation for manoeuvre? One of the great examples of this comes from an earlier episode in Afghanistan in 2002, which is Operation *Anaconda*. It went all right in the end, but it left both the air and land components with the sense that this was a very near run thing, almost a disaster, because they had not properly, for a bunch of reasons, coordinated the role of air and ground together. They made great efforts after that to make sure it did not happen again to the same level but, as our objectives change, we are going to have to remember that we still have to do a lot of preliminary work to see how air power best supports manoeuvre objectives. Finally, we have got to consider range and access, all the things that we are beginning to worry about a bit more; the ability to truly secure those air bases, whether it is from an insurgent mortar attack or a cruise missile attack and then, most of all, the degree of air superiority. We have had a tremendous advantage in air superiority in the last several years. We may have forgotten a little bit how much that is a requirement for our full operational concepts. You cannot really do nonlinear battlespace unless you have air superiority. Lastly, there is a lesson here in command relationships (Figure 31).

Obviously, Figure 31 is not a photograph from Afghanistan. This is a picture from the early days of the Normandy landings. I just love the body language here because here is Eisenhower, who has come ashore to talk to Bradley and his air commander, Pete Quesada. You cannot hear what they are saying, of course, but you do not really need to because it is just pretty obvious that Eisenhower wants to know: 'How's it going guys? What's up?' You can kind of see the confidence in Quesada's stance because he and Bradley actually had a very close relationship, they shared a trailer and spent a lot of time together, and they together produced some of the most effective air support to ground manoeuvre that we have ever seen. The good news is, there is quite a bit of this going on in Afghanistan as well. We were fortunate to hear one of the US commanders from Regional Command East talk about how closely he works with his Air Force counterparts and how critical the availability of air power is to his scheme of manoeuvre. He rather bluntly said that he can put his patrols out among the Afghan population, which is part of his mission now, and he can separate them widely because he can have air power over them in 11 minutes. That is the type of operational environment that you need, but it always has to come down to relations between the air and the land component that look like this. When they look like this, this is good and air power is really working and it is working to its fullest.

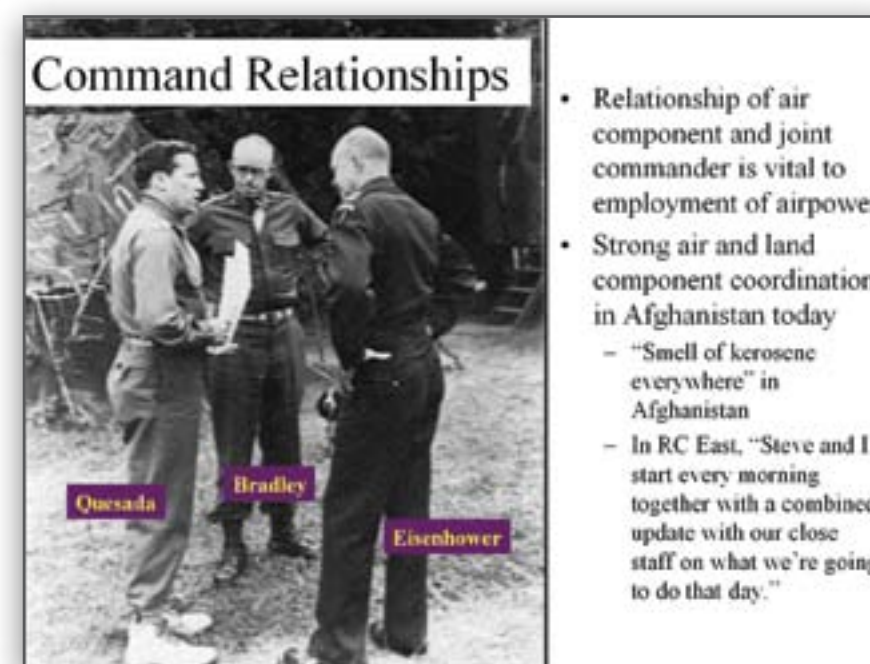


Figure 31: Command Relationships

So going forward, how do we see this concept shaping up over time?

We know the key elements (Figure 32). We have got to be able to project air power from austere bases. We have got to be able to capitalise on the natural dominance of the nonlinear battlespace that comes so naturally to airmen and is so useful for the type of strategic effects we want to achieve. This is going to mean, perhaps in future, inserting forces into a more difficult environment. Those are the areas that we will have to work on and be very careful with. We see this thinking continuing, at least within US doctrine circles, to try to capitalise on the ability to do this non-contiguous, nonlinear battlespace (Figure 33). It is simply quicker and more effective. It suits more the type of operations we see in the future, which will have effects-based outcomes. They will have effects-based strategy behind them and what we need to be able to do is to enable our forces, surface and air, to work across this entire space, while remembering all the fundamentals: secure bases, rapid aerial resupply, the ability to hunt high-value targets and the ability to put the ISR in place to support that. Same thing applies on the Marine Corps side (Figure 34). If you are looking at distributed operations in a littoral environment you have a lot of the same objectives.

So I think we have seen a tremendous set of lessons coming out of our irregular warfare experience that will help us for our nonlinear battlespace operations in the future, whether we would class them as regular or irregular operations.

So I think this is the challenge for you airmen (Figure 35):

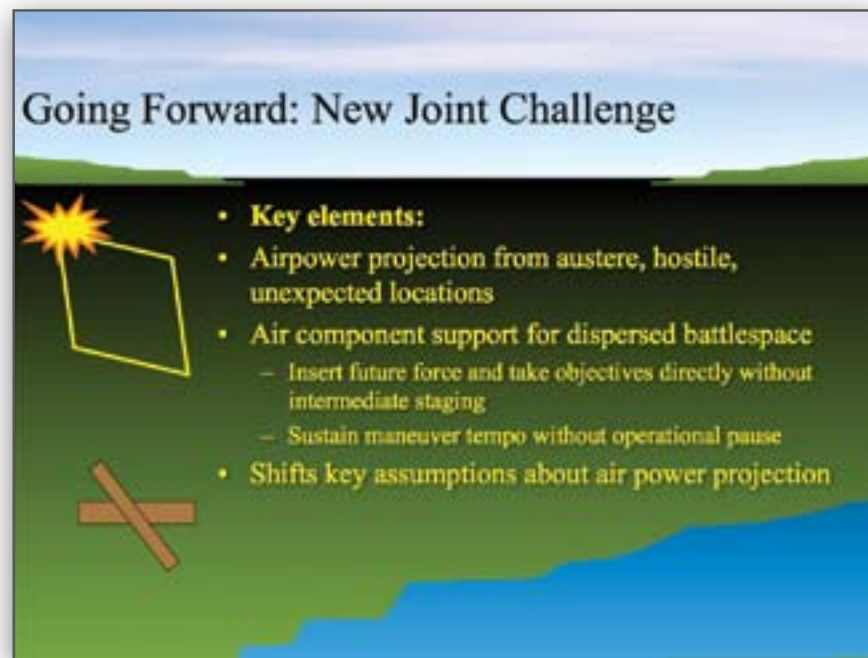


Figure 32: Going Forward – New Joint Challenge

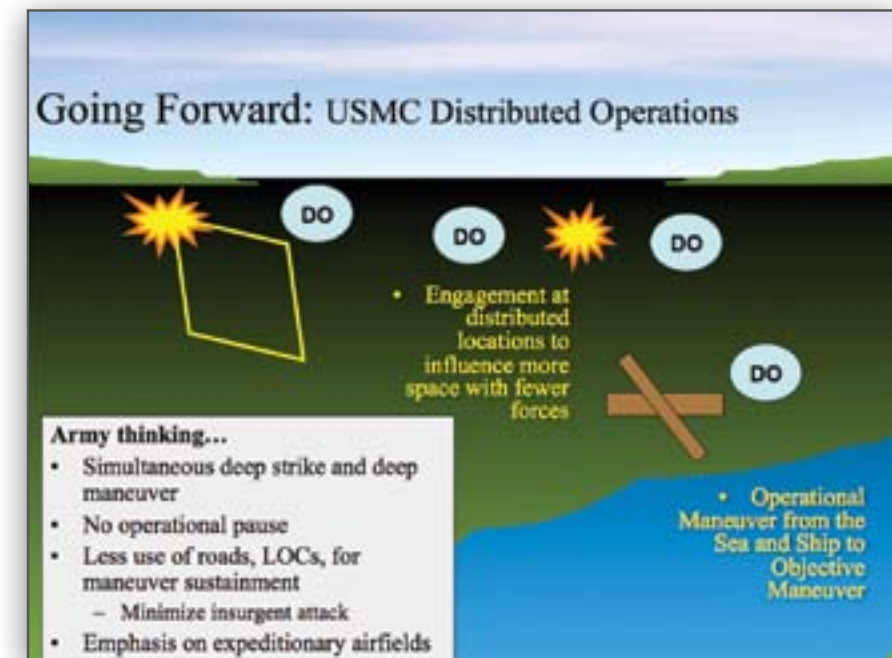


Figure 34: Going Forward – USMC Distributed Operations

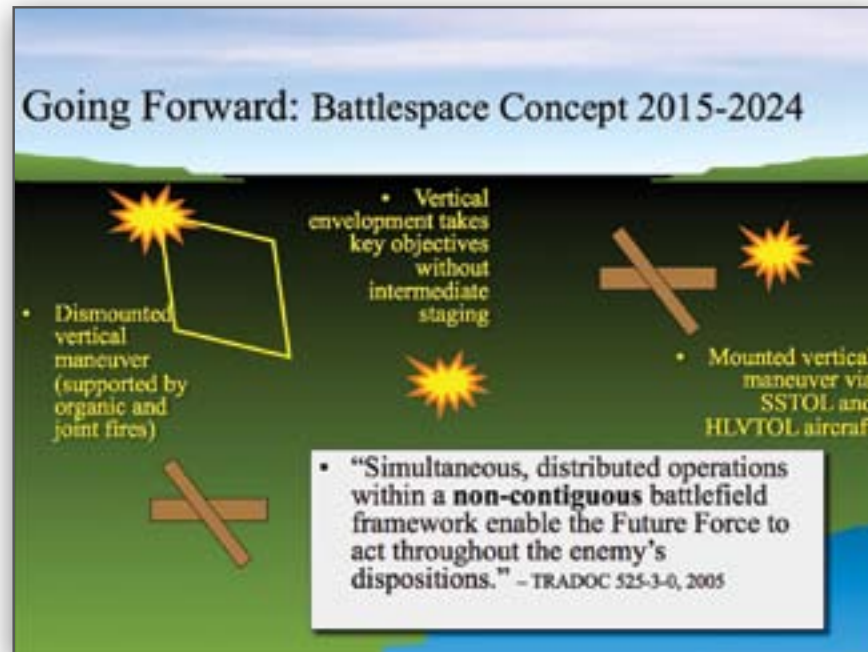


Figure 33: Going Forward – Battlespace Concept 2015–2024

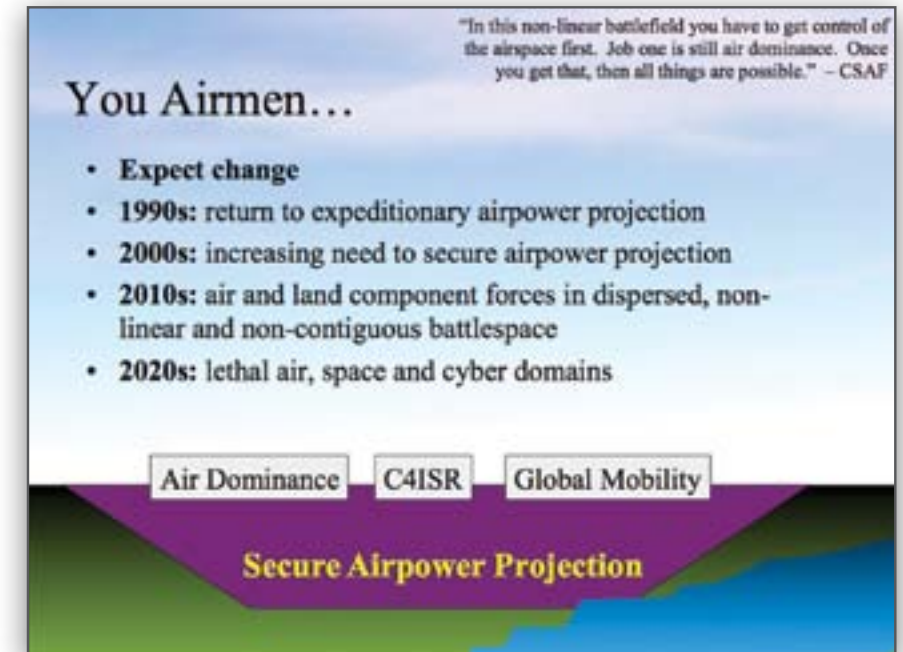


Figure 35: You Airmen must Expect Change

If in the 1990s it was to return to expeditionary operations and then in the 2000s an increasing need to understand irregular concepts to secure air power projection, we are now seeing discussion of how the air and land components work in a more dispersed battlespace. In the 2020s we cannot forget that we will face a far more lethal air, space and cyberspace environment, and still want to do all the things that we mastered in this past decade.

Let me just leave you with the last three slides focused on a reminder of that threat environment.

Even the last operations were not that easy (Figure 36). In 2003 the Iraqis managed to launch 2884 surface-to-air missiles (SAMs), mostly unguided over a relatively short period of time, peaking at 190 launches in one day. And this is after 12 years of Coalition operations and about a year of very serious preparatory attacks on that system. We saw something not dissimilar in Kosovo. So air threats are still out there. The need to maintain our skills in offensive counter air and air superiority is as important today as it ever was.

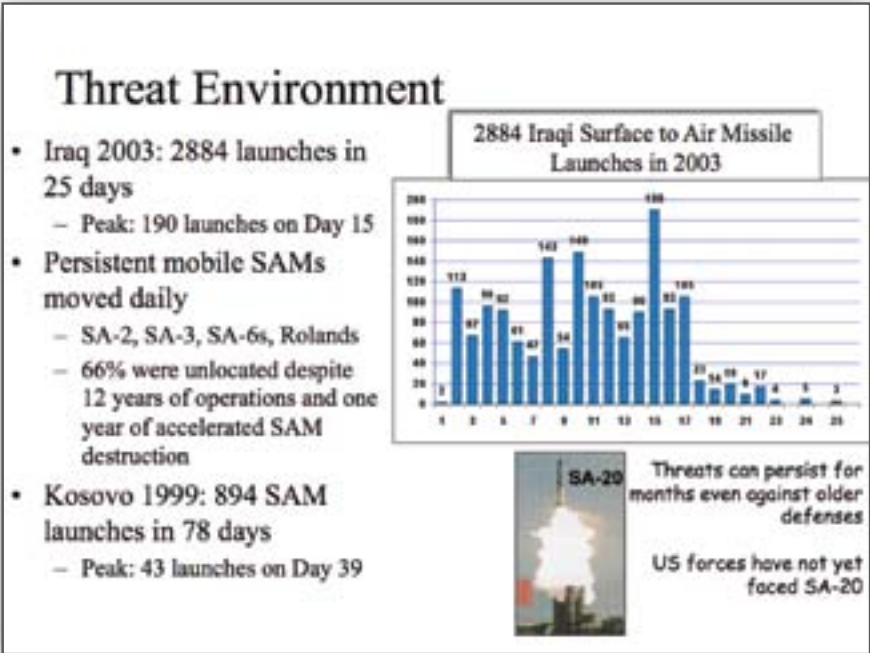


Figure 36: Threat Environment

And now, back to Nathan Bedford Forrest (Figure 37). Nathan Bedford Forrest had a great grandson named Nathan Bedford Forrest, who it turned out was, in fact, the first Brigadier General in the US Army Air Corps to be killed in action over Germany. So I think we can take this as an interesting reminder that we cannot quite know what the future holds. You see in the background of Figure 37 a picture of a B-17 cockpit hit by shells—obviously, this one survived. General Forrest, the younger, was killed on a B-17 raid on German submarine

pens at Kiel in the summer of 1943. One pictures it as being a low-level operation, full of all sorts of dangers. They had a pretty tough time in those types of operations.



Figure 37: Nathan Bedford Forrest and Shattered B-17 Cockpit, July 1943

I think we can never really tell from one generation to the next and multiple generations on whether we are going to be fighting in low intensity or fighting in high intensity. What we do know, though, is that there will be key elements of air power that we want to keep front and centre in anything we do. Those begin with control and dominance from the air, and from that you win the ability to control and support manoeuvre on the ground.



DISCUSSION

Air Commodore Leo Davies (RAAF – Moderator): Thank you very much Dr Grant. From your opening there of trying to get across to us what the challenges for air forces around the world are when we look at irregular warfare and nonlinear warfare, and also through the rest of your presentation, I gather that for many aspects of what air forces present as options for their governments we're actually doing a pretty good job in most of them. For the audience, you might want to look there in developing some of the questions that you want to ask Dr Grant that we should be perhaps considering nonlinear operations from an air force as being part of our bag of tricks, as part of what we currently do; that is strike and interdiction and counter air. Perhaps nonlinear operations are just another part of what air forces bring to offer. I also noticed throughout the presentation the reference to—and several of the speakers have mentioned this as part of key elements of their presentations—the requirement to remain professionally able to deliver the basics; that is logistics, resupply, aeromedical evacuation and defence of the means of generating air power; that is the air base. So on that note, I'd open the floor now to your questions.

Mr Charles Ikins (Strategic Policy Division, Department of Defence): I was wondering if you could speak more about the Marine Corps concept of the use of air power. I saw the reference of the three different fights in OIF [Operation Iraqi Freedom] but I didn't see the 'South' fight addressed and I was wondering if you could perhaps expand on that concept and on how the Marine Corps views it.

Dr Grant: Yes, I'll be glad to. As you know, the Marines have long had a real specialty in the way that they organise and control their air through their DASC [Direct Air Support Center], as they call it. They like to have a very close relationship between the tasking of air and their kind of division level manoeuvre. I would say, I think in a way it's a little bit easier for them because they are quite focused in the case of OIF on one particular division and its requirements. Their traditions of training young Marine officers to be air control specialists often give them quite an advantage. I mean, they can be very, very good at using air. I think it's important for us to remember though that the air that they use is joint and Coalition air, and that they are as likely, and by the numbers more likely, to have someone from the DASC calling for a B-52 or an F-18 Hornet or an F-16 or F-15 loaded with what they want, so there's not an exclusive bond of Marine-owned air and the air that Marines use in their tactical objectives. I think it's important to keep that in mind.

Pilot Officer John Hunter (RAAF – Australian Defence Force Academy): In the last 30 years we've seen the Soviet Union and the US involved in Afghanistan. My question is: what lessons did the US take away from the Soviet experience in Afghanistan and what lessons has the US failed to learn from?

Dr Grant: I have a friend who used to work for the CIA and he sometimes talks about the past in Afghanistan and talks about the war that we 'won' in Afghanistan, by which I think he means the support against the Soviet Union at that time. Initially, there was not

a lot of looking back at the lessons learned by the Soviet Union in Afghanistan. There has been some tremendous work done, not least by the Army at Fort Leavenworth and in other places on that, but I think now for us it's very much centred on the political ramifications. We're on a path at the moment where we have a strategy that is quite different from what the Soviet Union had set forth. I mean, you talk to any of the commanders and they will tell you that the strategy is to enable the Afghans and the Afghan National Army to do their tasks better. Most recently, I think we hear some notes of optimism in how that's going. I wouldn't at all want to undersell the challenges there but the basic strategy that the US is on at the moment and that NATO is on is quite different, I think, from where the Soviet Union was. There is an overriding lesson, which is you've got to take this place seriously, but there's not, I would say, a direct set of lessons looking back in the same way. The strategy is quite different and I think our technology application there is pretty distinctive as well.

Lieutenant Colonel James Roche (Army Headquarters): I just wonder if you'd care to comment on the challenges air power faces in urban environments and environments where the war amongst the people sort of predominates.

Dr Grant: That's a very good question about the challenges for air power in urban environments. Partly what you're implying too is in any place where you get a lot of non-combatants. It's a huge challenge and I talked earlier about how there had been a lot of thinking about how air power and other forms of military would be used in urban operations. What I think took all of us by surprise has been the difficulties associated with using it around non-combatants for so very long and in an irregular warfare environment where one sometimes thinks the other side doesn't hold the life of a civilian Afghani in the same respect that perhaps we do. I would just say two things. One, from a purely technical aspect, we've seen a tremendous progression in the ability to minimise effects. Collateral damage became really important in Kosovo, but it's gone six or seven levels beyond that. We've seen the development of specific weapons, such as the GBU-38,¹ that have helped in this enormously. I think in seeing the use of air power in terms of low passes and other things, we've really seen an effort to do everything we can to minimise it. The other lesson I take from it personally is how little most of us understand the procedures in place. I think, in general, our publics don't have a lot of tolerance or perhaps interest in going through and understanding that it really isn't a matter of airmen flying over and sliding the cockpit back and looking down and saying, 'I think I'll drop a bomb over there.' It's much, much more precise. Now and then you'll see a press story where someone's tried to go through the intricacies of how air is controlled and the tremendous job that the JTACs [Joint Terminal Attack Controllers] do, but I think we have, overall, a lack of appreciation for just how carefully air power is employed and I'm always sorry to see that. We should understand better than we do how carefully that weapon is employed.

Squadron Leader Mark Barry (RAAF – Command and Staff Course): I'm just wondering about this air power in the irregular warfare arena. With the way the US are doing it, do you see it being an evolutionary process that we're just continuing to refine and improve

¹ The GBU-38 is a 500-lb JDAM (Joint Direct Attack Munition) that uses the Mk 82 bomb body.

processes under current operational effects, or do you think that the US and all of us need to sit down and generate new doctrine for this type of warfare and approach it from the start?

Dr Grant: That's an excellent question and I'm not really sure I know the answer to it. I think some of it is naturally evolutionary and I've talked about how I thought there were aspects of this being discussed and in place even before the recent experiences. I would say it is incumbent on us to sit down and look at to what extent we need new doctrine and to what extent we need to use irregular warfare to alter the doctrine we have. I am not of the camp that says, here's all your doctrine and kit for your regular wars and then here's all the stuff for your irregular war. At the least, you could build an air force for irregular warfare and then find it wasn't very useful to you in other types of settings. So I don't believe in splitting the two up, but I think I would agree with the second part of your question and say it really is worth a concerted effort to look at where and how much we split our doctrine and force structure aside for irregular warfare and how much of it continues on in the main stream knowing that it may be applied at the high-intensity setting or in a low-intensity setting.

Mr David Carr (Air Operations Division, Defence Science and Technology Organisation): John Boyd, back in the middle 80s, coined that combat was between two complex adaptive systems. How far do you think air forces have come in target systems analysis of irregular opponents?

Dr Grant: That's a great quote. I think they have come light-years and General Deptula will talk a little bit more about this. When you look back to the abilities that we had say in 1989 and the abilities we have today, it's just staggering. I think a lot of that has been through tactics and practice and through the people involved in each part of this process and in the AOCs [Air Operations Centres]. But the ability to go and find these high-value targets and to put together that kill team, which is so much ISR dependent, I think we've come a really, really long way and I wouldn't want us to undersell the changes that have gone on on a daily and a monthly basis in the theatre there. I think it's come a long way from where it was when we started out. It's come a long way from 2005 and it has even further to come, but I would say the progress there in understanding that it is adaptive system has been just meteoric and tremendous.

THE INFORMATION IN WAR REVOLUTION: ISR AND RPA IN THE USAF

LIEUTENANT GENERAL DAVID A. DEPTULA

This morning I would like to talk a little bit about intelligence, surveillance and reconnaissance (ISR) and what we have done about it in our Air Force. There is an old adage that 'amateurs talk strategy and professionals talk logistics'. Well, amateurs still do jabber about strategy, but today professionals increasingly talk about information; how to get it, how to distribute it, and how to ensure that we keep getting it when and where we need it. So that is what I am going to talk about today. I am going to make sure I leave plenty of time for your questions.

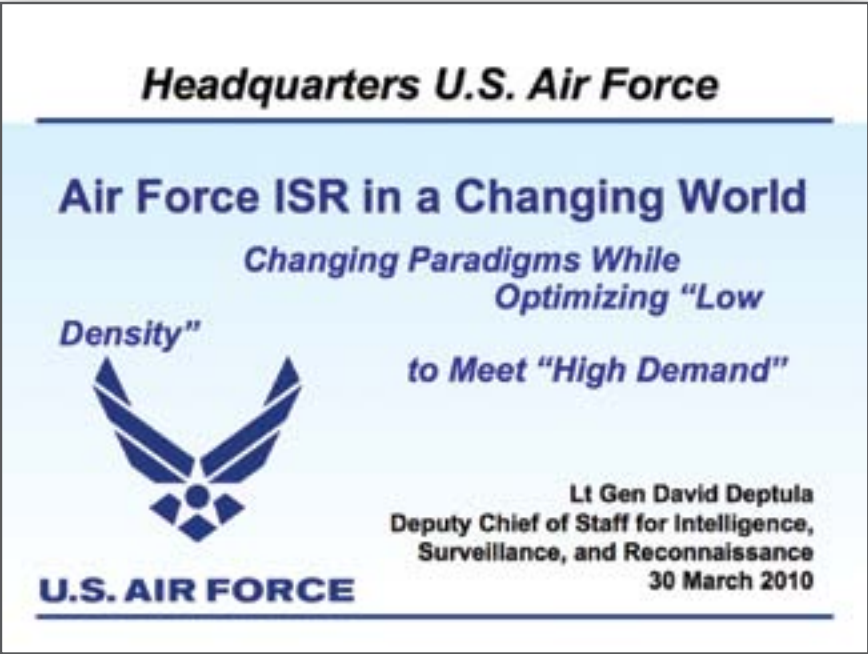


Figure 1: Air Force ISR in a Changing World

We are at a critical juncture in our history—at the centre of an 'Information in War Revolution'—one where the speed of information, advance of technology and designs of organisations are merging to change the way we operate and even think about crisis and conflict (Figure 2). As depicted in Figure 2, this change has dramatically shortened decision and reaction times, and reduced the number of systems it takes to achieve desired effects. Where it used to take months and thousands of airmen, and thousands of weapons, and thousands of aircraft with separate functions to attack a single target, today we can find,

fix and finish a target within single digit minutes. This evolution of technology information and culture underlies the ISR transformation we have accomplished in the United States Air Force (USAF) over the last three or so years and my motivation to move the USAF away from the traditional *segregation* of operations and intelligence to *integration* of operations and intelligence. If there is any one message that I hope you take away from this presentation today, it is integration, integration, integration is key. What I would like to do is introduce a new word for it so that we do not get hung up on who is doing operations and who is doing intelligence. Perhaps, we might adapt the term OPINT to move forward, something that maybe we can talk about later on or during the breaks.

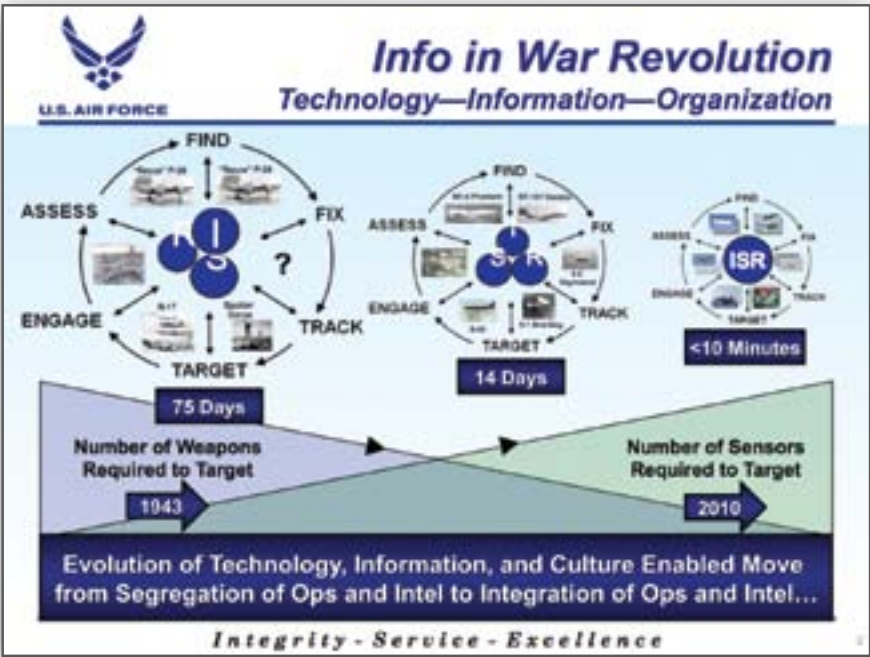


Figure 2: Information in War Revolution

Now everyone here is aware of the non-traditional threats we face, both at home and abroad (Figure 3), so I am not going to spend a whole lot of time on this slide. But just by the way of introduction, many of you would be aware of the recent US 'Christmas bomber', who attempted to detonate explosives on an airliner bound from Europe in US airspace. My takeaway point to you from Figure 3 is that mass disruption and destruction are no longer the purviews of nation-states. From improvised explosive devices (IEDs) in Afghanistan to internal terrorist attacks at home, we are faced with daunting challenges in this arena.



Figure 3: Non-traditional Threats



Figure 4: Traditional Threats

At the same time traditional threats have not disappeared (Figure 4). Both China and Russia have weapons programs underway that are specifically designed to deny the dominance that we have enjoyed for decades in the air. Given the proliferation of advanced technology, our advantage may be much, much more narrow than is commonly assumed. I would like to highlight here it is very important to note that it is highly unlikely that we will ever engage in a conflict directly with either China or Russia. In fact, what we want to do is build a relationship so that we progress as partners with these two great nations. But it is very likely that we will face their equipment in the conflicts in which we will engage in the future. I would tell you that we are not very good at predicting the conflicts that we end up in, but I will bet good money on the proposition that we have not seen the end of major regional conflict.

What that means is that we are faced with a myriad of ‘what if’ scenarios for which we must be prepared to engage and succeed (Figure 5), whether it is countering North Korean nuclear weapons and influencing the Iranian pursuit of nuclear weapons, and shaping both China and Taiwan’s go-to-war calculus to maintain peace in the region, as well as being ready for humanitarian crises like those in which US forces are presently involved in Haiti and Chile. Each of these will increase in speed, complexity and unpredictability as the information age matures.



Figure 5: Enduring Challenges: A Myriad of ‘What Ifs’

There is what I view as a sixth domain that is getting a lot of attention by our adversaries—a domain unlike the traditional air, land, sea, space and cyberspace domains that we commonly think of. It is the ‘media’ domain (Figure 6).



Figure 6: Adversary Information Operations

Today we face an incredibly media-savvy opponent, one who is very adept at using the camera as a weapon, using visuals to create desired effects not otherwise achievable. It is a great example of effects-based operations. This adversary is able to ‘oscillate’ reality and create global effects with relatively low-cost, low-tech efforts. They use information to deny us the use of ways and means they cannot directly counter, which enables them to influence perceptions around the globe. Air power is one of those military instruments they cannot deny us physically, so they do it with information, creating the effects that sometimes cause us to limit its employment ourselves.

We in the American Air Force have been through quite a journey in the last two decades trying to find the right ways to address the growing importance and increased demand for information (Figure 7). Not that long ago, in what I like to call ‘WW Desert Storm’, intelligence and operations were viewed as two separate and distinct functions. We learned slowly over the course of *Allied Force* and the early days of *Enduring Freedom* just how important ‘information in war’ was becoming. While we have made a lot of progress trying to fuse ISR with operations at every level of war, we still have a good distance to go in achieving truly integrated ISR across all domains using joint command and control architectures.



Figure 7: Information in War Revolution

Now this journey led me to harness four key tenets to underpin our ISR transformation in the Air Force (Figure 8):

- First, in the 21st century, ISR is not just support to operations, it *is* operations. By virtue of ISR presence alone we can affect enemy behaviour. As I think you have figured out, I am trying very hard to get rid of this historical friction that has existed between operations and intelligence, because you cannot have one without the other; it is simply a non-productive fissure. Probably the best example I have of this is that in taking out Al Zarkawi, the head of al-Qa'ida in Iraq in 2006, it took us about 600 hours of Predator time, thousands of hours of analysts' time and about six minutes of F-16 time. So I like to ask my operator buddies and others, 'OK, so which one was the operation?' And very quickly it becomes evident that we needed each one of those activities to achieve the desired outcome and talking about one piece or the other as operations or not, again, is non-productive.
- Second, I think it is very important to understand, particularly from an organisational perspective, that ISR is 'domain neutral'. We accomplish intelligence, surveillance and reconnaissance in each of the domains of air, space, sea, land and cyber. Many of you have heard and used the term multi-denominational when it comes to religions. I like to call ISR 'multi-domain-a-notional' because you do it in each one of them.

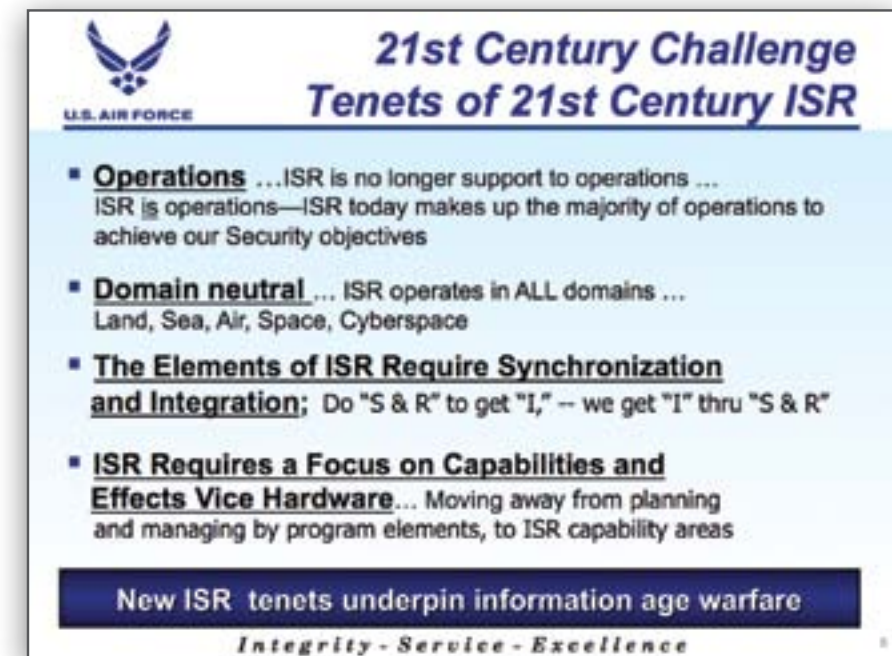


Figure 8: 21st Century Challenge: Tenets of 21st Century ISR

- Third, synchronisation and integration are inherent in ISR. When you think about it, we only do the 'S and R' to get 'I', and the only way we get 'I' is through 'S and R'. So, while each one of these elements requires different degrees of training and resourcing, it is important to treat them as a cohesive whole and indivisible. ISR is indivisible. Old structures that divide it slow down the ISR enterprise through sequential operations and sub-optimize the potential of treating all three in an integrated fashion.
- Finally, ISR is about capabilities and effects, not platforms. We are moving away from managing ISR by platforms and focusing on capability areas instead in the way we do business inside our Air Force.

So that gives you some background that lays the basis for what I am going to talk about next. Applying these tenets has been the basis of our Air Force ISR transformation effort for over 3 years now. Our vision, as shown in Figure 9, has been to transform ISR in the Air Force into a set of premier organisations, with the most respected personnel and the most valued capabilities. To achieve that we embarked upon a three-phase approach, tackling the challenges of organisation, personnel and capability as you see depicted in Figure 9, with the ultimate goal of achieving an ISR enterprise where the source is transparent, analysis is predictive, and distribution is immediate, and we are doing a pretty good job in that regard.



Figure 9: Air Force ISR: Vision and Approach

In the next few of charts I am going to give you a little bit of an insight on what we have done on each one of these three areas—organisation, personnel and capability.

Figure 10 shows you what we did in the organisational arena. One of the first things we did was to elevate the Deputy Chief of Staff for Intelligence to a three-star position. The A2 is the descriptor for the job that I hold and shortly after assuming that position I asked our Chief if he would consider changing the position to not just an intelligence focus but to ISR, because we never had a focal point in the Air Force for ISR. That was manifested in the fact that most of our low-density, high-demand aircraft were just that. They were in high demand but very low density because there was that constant battle between what do you invest in in terms of the ‘pointy end of the spear’ vice ISR. The bottom line is that he agreed. We had to go to our Congress to get approval to do that, but we made it happen. So now we have a focal point for ISR in our Air Force.

Probably the biggest ‘muscle move’ we have made organisationally was we moved the old Air Intelligence Agency, that used to report to our Air Combat Command, outside of that domain-focused major command (MAJCOM) and made it report directly to the Air Staff, and changed the name to the Air Force ISR Agency to emphasise the point that ISR is a ‘multi-domain-a-notional’ entity serving the purposes and the functions of the entire Air Force, not just one domain-focused organisation. As a result of that change, we were able to do some very, very significant changes that resulted in enhanced ISR capability for the warfighters. The way we did that was through an alteration of the organisational relationships of the Distributed Common Ground System (DCGS), which is a horrible

acronym because if you did not really know what it was, you would not have any clue. It is more appropriately entitled the Distributed ISR Analysis Fusion System. These are the people in the processes and procedures and equipment that take the information that comes off systems like the Predator, the Reaper, the U-2 and overhead systems, and turn that information to actionable intelligence that can be sent forth to users around the world, whether they are on the ground, at sea or in the air. What we did was move that group of folks in an organisation known as the 480th ISR Wing out from underneath Air Combat Command and made them part of the Air Force ISR Agency. What that allowed us to do was to create some new groups, titled as ISR Groups, that combined signals intelligence (SIGINT) functions that had formally resided in the Air Intelligence Agency with our principally imagery intelligence (IMINT) organisations that were separate in the 480th and put them into the same groups. I realise that this is pretty hard to follow with just words, so let me show you a diagram of what we did and perhaps that will help (Figure 11). But I cannot stress enough to you just how much of a change this organisational rebuild we have accomplished has been.



Figure 10: Air Force ISR Transformation: Organisation

On the left of Figure 11 you can see the way we were, and this was not that long ago—just under 3 years ago. If you look at the left side of Figure 11 and just focus on the colours there, you have got the yellow or orange-looking units that used to conduct signals intelligence (SIGINT) underneath the Air Intelligence Agency. You had those units located physically in Europe and in the Pacific, but the Europe and the Pacific major command commanders had no direct control or influence over them. As a matter of fact, some of them did not even

know what they did. Then you had the Distributed Common Ground Systems that were located in the US, in Europe and in the Pacific, who were under the direct control of those respective major command commanders, but they did not have any organisational ties with or among each other. We had ‘pockets’ of SIGINT and imagery intelligence (IMINT) and full motion video capability scattered across the globe, and no single geographic commander had the access to the ISR capability needed to prosecute information like today’s operations demand.

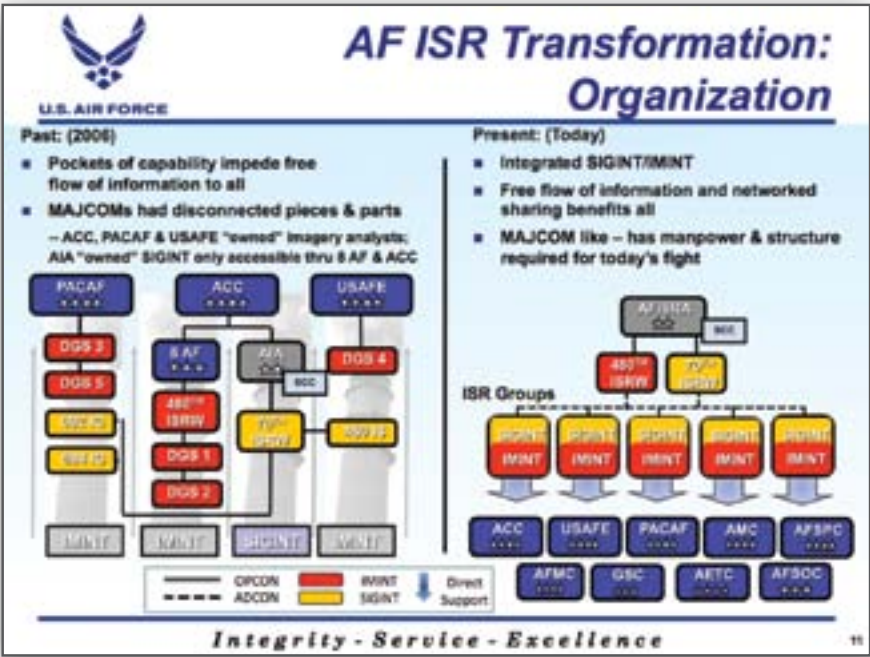


Figure 11: Air Force ISR Transformation: Organisation – Past to Present

On the right of Figure 11, you can see how we have better organised and distributed our SIGINT and imagery fusion capabilities across our five globally networked Distributed Common Ground Systems to give each geographic commander full access to Air Force ISR capabilities. By pulling out the ISR Agency and making it independent of any single major command, and then assigning the parent wings responsible for SIGINT and IMINT under that organisation, we were able to build these new ISR Groups that integrated each of what used to be segregated elements into each one of the new groups. The reason I dwell on this is because organisation is important, not just for being able to produce a line diagram to show where people work, but in actually turning out and improving product.



Figure 12: Air Force ISR: Organisation – ISR Groups

If you drill down one layer further (Figure 12), you can see we have now a set of ISR Groups that are integrated, standardised, and are tied together under a commander who can rapidly shift effort, but yet respond in a direct support relationship to the combatant numbered Air Forces in the particular regions to which they are assigned. It has really made a big difference in terms of product for the air component commander as he or she produces effects for a particular geographic combatant command.

Now none of this would have been possible without trained and ready personnel, and we have been very hard at work in this arena and we are seeing significantly improved results, as outlined in Figure 13. We have just moved our first Air Force officer into a combatant command (COCOM) J2 position in over eight years. Because we had not had an Air Force COCOM J2 in eight years, there had been some atrophy of the personnel system that raised people who were experts in ISR. So our efforts in this arena are focused to achieve an integration of precision and information into a cultural habit of Air Force ISR airmen—officers, enlisted and civilians alike. We have established an entire force management division to develop career paths from Lieutenant to General for the officer corps, and we have dramatically realigned our enlisted force to match the duties and tasks of ISR in the information age. We have also crafted a path for ISR civilians where none had previously existed.

Perhaps our biggest efforts have been in the capabilities arena (Figure 14).

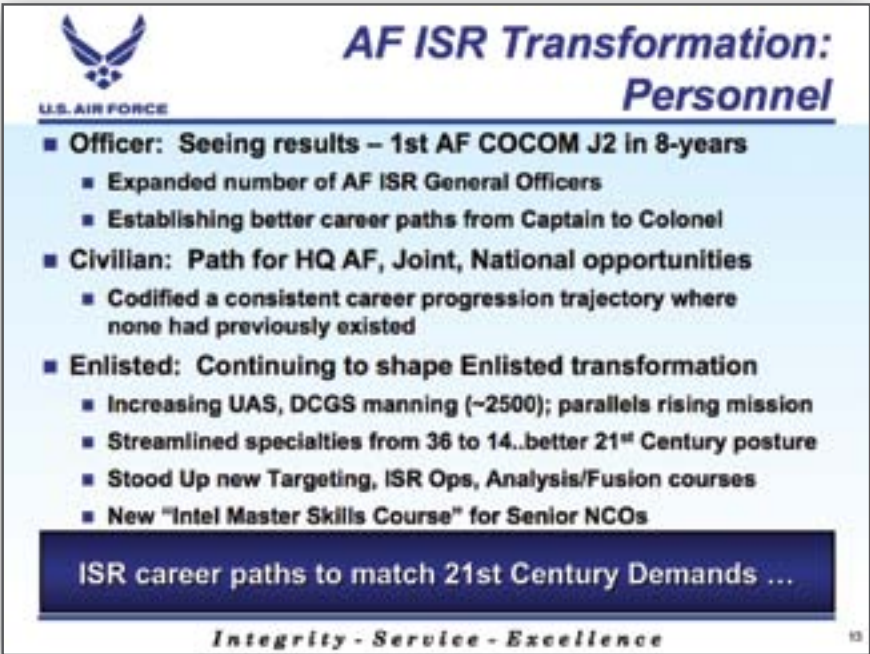


Figure 13: Air Force ISR Transformation: Personnel



Figure 14: Air Force ISR Transformation: Capabilities

We have codified all these efforts on improving capabilities, organisations and what we do with our personnel in three key documents: the Air Force ISR Strategy, ISR Flight Plan and our Remotely Piloted Aircraft (RPA) Flight Plan. In addition, we have rapidly expanded our RPA combat air patrols, re-established an Air Force human intelligence (HUMINT) program, acquired and deployed the MC-12 Project *Liberty* ISR aircraft in less than eight months, and added ISR and targeting centres of excellence at key locations to make sure that our ISR lessons observed become lessons applied.

Figure 15 shows one of our biggest capabilities advancements, and that is harnessing the power of the network. This is how we prosecute the data and distribute the information we collect off both our manned and remotely piloted systems. The focus of that data prosecution is spread out amongst our five Distributed Common Ground System (DCGS) nodes. As you can see depicted in Figure 15, there is one in Hawaii, is one in Korea, one in Europe, one in California and one in Virginia, and there are several other smaller total-force Air National Guard and Air Reserve ISR nodes around the globe.

Today we are able to put more eyes and ears 'on' an area or a target than at any other time in the history of US military operations, and through this distributed networked method of processing data we are able to produce the kind of information that our forces need and deliver it to them at the speed of light, anywhere around the globe. This incredible network also allows us to flex to contingencies seamlessly as happened recently over Haiti. We had a Global Hawk RPA over Haiti in less than 48 hours and our Distributed Common Ground System Operations Centres responding by processing over 3000 images that enabled effective relief operations.



Figure 15: Air Force ISR: Power of the Network

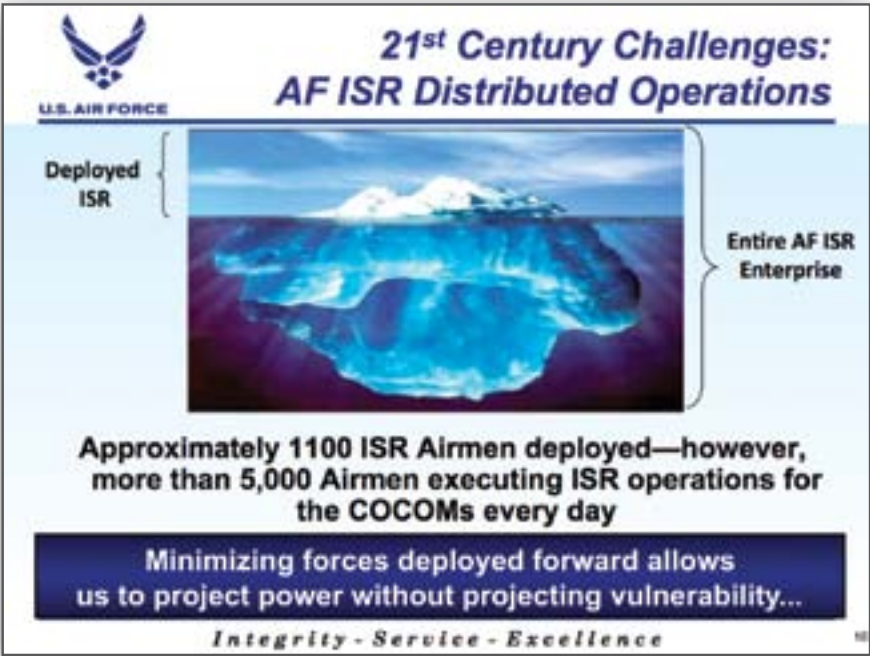


Figure 16: 21 Century Challenges: Air Force ISR Distributed Operations



Figure 17: Air Force ISR Strategy

Figure 16 gives you some insight into our growing ISR enterprise.

It is a distributed enterprise that I think is accurately depicted with the image in Figure 16. It is much different from historical experience. What is easily seen is what and who is deployed. What is not so obvious is that the majority of our ISR airmen are engaged from outside the area of operations (AOR), processing and fusing information in real-time and getting it back to the end users at the speed of light. This whole construct turns the traditional notion of ‘tooth-to-tail’ ratios upside down. The ability to achieve desired effects with a minimum of forces deployed forward allows us to project power without projecting vulnerability. Developing the technology and tools that make this process easier, faster and less manpower intensive are going to be vital as warfare in the information age matures.

As I mentioned earlier, we have codified our ISR transformation efforts in three key documents, and these are available on the net. The Air Force ISR Strategy² is the first (Figure 17). It sets forth the goals, objectives and criteria we measure our ISR enterprise with as a cross-domain integrated function. This is not a static document; it is one we will come back to adjust as the world and technology change around us.

Resourcing our ISR strategy is something that we have established a process for with our Air Force ISR Flight Plan (Figure 18).



Figure 18: Air Force ISR Flight Plan Basics

² United States Air Force, Lead Turning the Future: The 2008 Strategy for United Air Force Intelligence, Surveillance and Reconnaissance, Headquarters United States Air Force, Washington, DC, 4 July 2008, available at <http://www.af.mil/shared/media/document/AFD-081201-007.pdf>, accessed 1 December 2010.

This is truly is a step into the information age as this plan is an integrated network of automated tools and databases that we have opened up to allow direct input from our geographic combatant commanders and our Air Force major commands regarding ISR requirements. So that by knowing the entire panoply of technologies and systems that are out there today and tomorrow, and understanding priority requirements from the field, we will be able to provide the most effective ISR capability to meet warfighter needs as soon as we possibly can.

Finally, our Remotely Piloted Aircraft Flight Plan³ that we published just this past summer (Figure 19).



Figure 19: Air Force Remotely Piloted Aircraft Flight Plan

The RPA Flight Plan outlines not just platform potential, but looks at technology, risk and mission objectives for the future of remotely piloted aircraft in the Air Force. It identifies waypoints in terms of doctrine, organisation, training, materiel, leadership, personnel, facilities and policy out to 2047, which is the 100th anniversary of our Air Force.

I am going to jump into remotely piloted aircraft here and I think at the outset it is important to understand that there is a huge variety of RPA and they bring a wide array of capabilities and effects to the fight (Figure 20).

³ United States Air Force, United States Air Force Unmanned Aircraft Systems Flight Plan 2009–2047, Headquarters United States Air Force, Washington, DC, 18 May 2009, available at http://www.fas.org/irp/program/collect/uas_2009.pdf, accessed 1 December 2010.

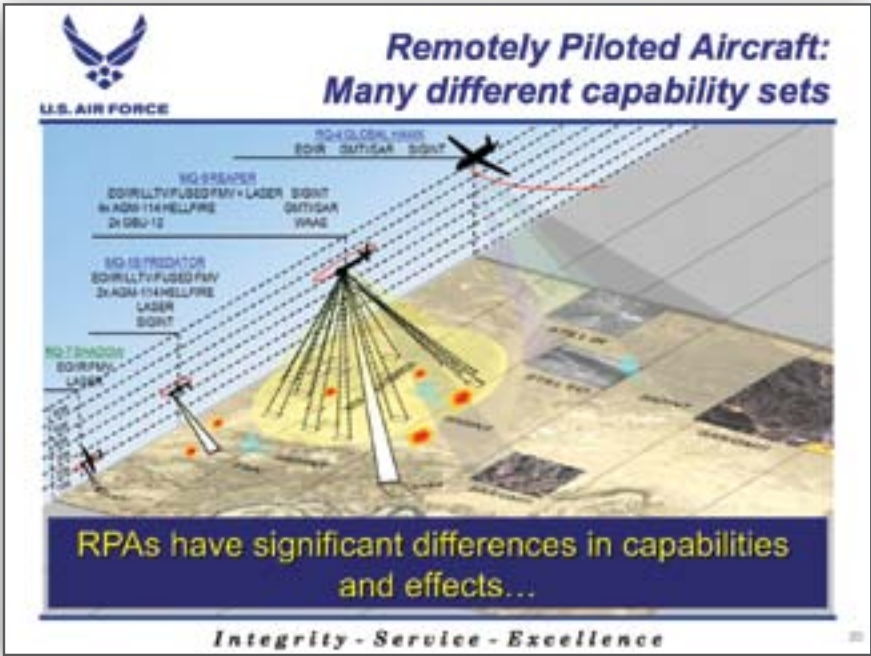


Figure 20: Remotely Piloted Aircraft: Many Different Capability Sets

One of the biggest problems we have today is that when someone says ‘RPA’ or ‘Unmanned Aerial System’ (UAS) everyone thinks differently about what that term means, based on their experience or what they last saw— they have a picture in their mind of whatever system they are most familiar with and that provides some challenges. People tend to imagine all RPAs as the same when, of course, they are not. There is a huge difference between a four-pound hand-launched Raven and a Global Hawk that can stay airborne for 30 hours and soar across half the globe.

Now some of you may be curious about our change in terminology. We in the US Air Force are changing the way that we refer to what previously have been called, and still are, unmanned aerial systems to more accurately reflect what they really are today, remotely piloted aircraft. The reason is that there is nothing ‘unmanned’ about these ‘systems’ at all, except the aircraft themselves. Figure 21 provides a nominal depiction of the 168 or so personnel involved in maintaining an MQ-1 Predator or an MQ-9 Reaper Combat Air Patrol (CAP) as a system, and that number does not even include the lawyers that go along with the system. By the way, there have already been some unintended benefits from the renaming that we did not even anticipate when we did this. Many of you understand the importance of dealing with authorities when operating these systems in ICAO (International Civil Aviation Organization) airspace or, in the United States, with the Federal Aviation Administration (FAA). I was giving a presentation a couple of weeks ago and one of the members of the FAA came up to me and he said, ‘Dave, you know the biggest single thing that you all have done to facilitate movement in the FAA bureaucracy is change the name, because now people in FAA actually understand that there is a pilot

controlling these aircraft’—an unintended consequence, but very, very significant in terms of something as simple as a label.

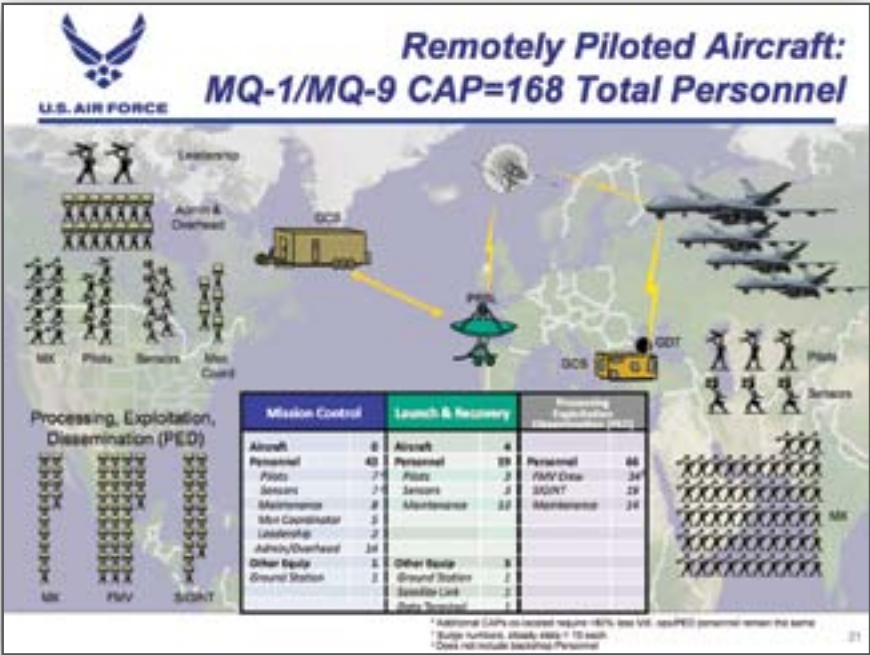


Figure 21: Remotely Piloted Aircraft: MQ-1/MQ-9 CAP = 168 Total Personnel

Our Air Force experience with remotely piloted aircraft since World War II has shaped our vision: what we believe about RPA, and what we put into this RPA Flight Plan that I told you about. We want to get the most out of these aircraft to increase joint warfighting capability while promoting Service interdependency and the wisest use of taxpayer dollars. In order to do that we need to address each of the four elements that are identified in Figure 22. How do we come up with an optimal joint concept of operations (CONOPS) to ensure that each one of the Service components operates effectively in the battlespace? This leads right into the airspace control piece. Many of you know that the way that we have deconflicted in Iraq and Afghanistan is by establishing restricted operating zones where you put up cone of airspace and say no-one else can come into that. That is OK in a remote place where you have one or two restricted operating zones, but when you have 15 or 20 of them over Baghdad and you are trying to get aircraft from south of town to the north of town to respond to a ‘troops in contact’ situation, who do you coordinate with to shut down those restricted zones as you move forward? That leads into the third element listed here. We have operated with impunity and with control of the airspace for over 20 years. What happens when a potential adversary launches not one or two, but ten, a hundred or a thousand hostile RPA into the battlespace? Who deconflicts? Who ensures we do not ‘frat’ the good guys while we are attempting to shoot down the bad guys? These are all very important issues that need to be addressed. Finally, the last one, it would be wise to

introduce standardisation, efficiency and effectiveness into the defence acquisition process of these systems *before* the aircraft are produced, not afterwards. So this is a whole set of areas that we do not have answers to yet, but that we need to continue to work collectively to resolve before we find ourselves in the middle of the next conflict without solutions.



Figure 22: USAF RPA Vision: What We Believe

A huge consequence in terms of optimising the capability of these systems is the consideration that has to be given to concepts of operation, particularly in an era of declining resources. I thought you might find the example illustrated in Figure 23 useful because it addresses just simply the difference in the way you apply these aircraft between two different popular concepts of operation. One is known as ‘Remote Split Operations’, the way with which I think most of you are familiar and the way we in the Air Force operate theatre-capable systems around the world. The other is ‘Organic Assignment’, which tends to be the Army approach to RPA organisation and employment.

The example I am going to give you (as illustrated in Figure 23) is a nominal four-division action somewhere around the world using 132 theatre-capable RPA. First, in both concepts, 12 aircraft are taken off the top for initial qualification training, so that leaves you 120 aircraft to deal with. In the United States Army we have 10 divisions, so in the ‘organic assignment’ concept we divide 10 into 120, and 12 aircraft are assigned to each division. It is a four-division deployment, and four times 12 are 48, so we have 48 aircraft going forward. The rest of the RPA, 84 of them (72 with the other six divisions and the 12 training aircraft) remain in the US. Now in order to produce one combat air patrol (CAP) or orbit it is going

to take four aircraft—one airborne, one coming, one going and one for training—because, remember, they are organically assigned. Four into 48 gives you 12 CAPs; that is where you get the 12 CAPs number that is shown on the right of Figure 23. Now, let us go over to the ‘remote split operations’ concept, shown on the left. Out of our 120 aircraft, we are going to take 15 per cent off the top to do centralised training. That leaves you 102 aircraft and we are going to send them all forward. This time we only need three per CAP because, remember, we are doing all our training centralised so we do not need that fourth aircraft. Three into 102 gives 34 aircraft orbits available for the four-division deployment. So there you go, you can have 34 CAPs or you can have 12 CAPs using the exact same input number and the exact same cost. Which one do you want to employ as a joint force commander in that particular theatre? Now that does not mean, and please do not misinterpret me on this, that individual units on the ground should not have direct ownership and control of their RPA or aircraft that can provide them immediate access to information; they should, but not theatre-capable aircraft. The joint force commander ought to be the one who determines the prioritisation of where those theatre-capable aircraft go. A lot of people tend to depict this as a difference in perspective between Army commanders and Air Force commanders, and it is really not. It is a difference in perspective between small unit commanders and theatre commanders, and how you optimise the use of available assets.

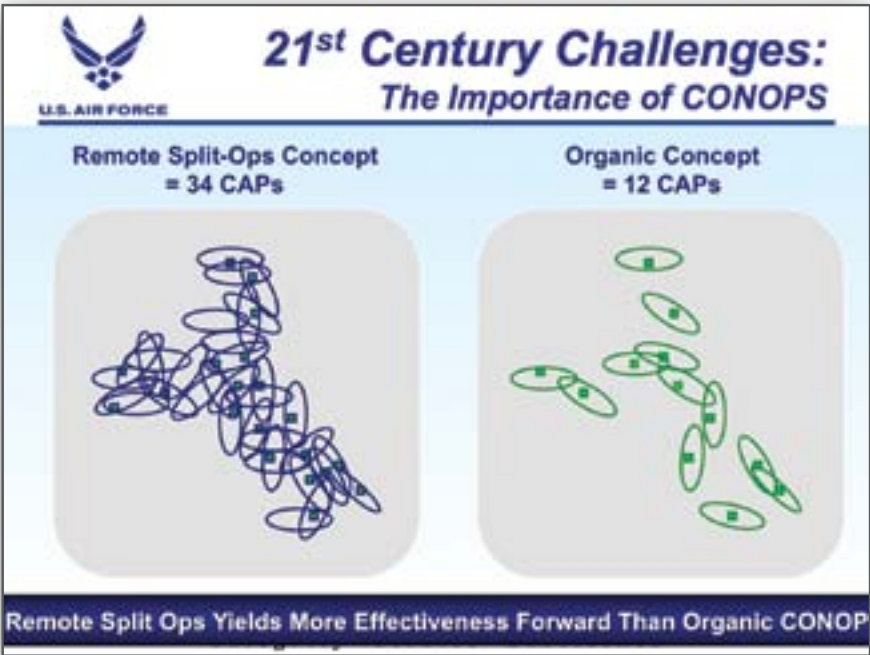


Figure 23: 21 Century Challenges: The Importance of CONOPS

Our experience has also revealed several tenets that we are using to chart our way ahead with these aircraft, as shown in Figure 24. We find RPAs to be compelling where a human in the aircraft would limit the mission; that is perhaps our number one advantage. You can stay

airborne well beyond the physiological limits of the human. At the same time we have not seen the end of manned aircraft. Accordingly, we are going to focus on seamless integration of manned and remotely piloted systems. Autonomy is going to be vital to alleviate some of the current system vulnerabilities. There is much value in taking an integrated systems approach, where the sensors, the weapons and the platform are designed seamlessly from the start. This is what we are trying to do with our MQ-X program. Modularity is going to be a key and critical design element. Adapting command and control with autonomy is going to be a challenge but that is a must. And it is most important to recognise that there is no single solution set because technology is going to advance and it is going to impact our way ahead.



Figure 24: Air Force RPA Vision: Tenets of RPA Evolution

I also want to make sure that you understand that we are not just limiting our look and building RPAs for only strike or ISR functions. We have a framework in our Air Force known as ‘Core Functions’; we have 12 of them in our Air Force (Figure 25). Recently, all the Services came up with a renewed core function list. What we did was to take a hard look at each one of our Service core functions and anticipate where remotely piloted technology could contribute. The main thrust of the Flight Plan balances present and future technology to identify where we can apply RPA potential in each of these core functions, today, in the near future, and in the long term.



Figure 25: Air Force Core Functions: What We Bring to the Fight

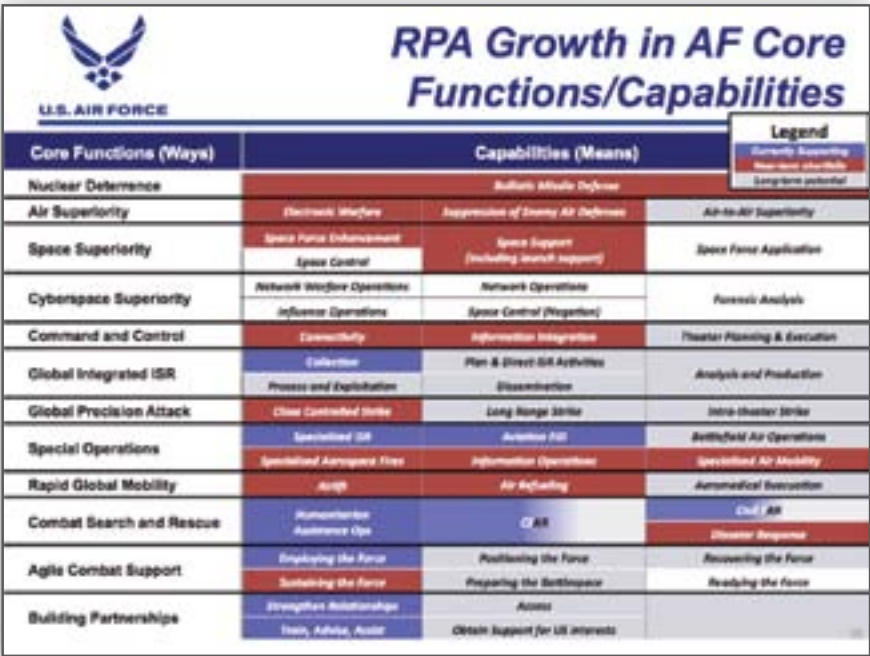


Figure 26: RPA Growth in Air Force Core Functions/Capabilities

This next slide (Figure 26) lists the core functions (ways) on the left and under capabilities (means) shows in red where we have near-term shortfalls, where they are currently contributing in blue, and then where there are promising areas to exploit in grey.

When we plotted our course to 2047 with these current shortfalls and potentials in technologies, and overlaid our mission areas, we began to discover which technologies would match which missions best (Figure 27). As I mentioned, we are looking beyond ISR and strike to what makes sense in each; maybe it is cargo or possibly it is one RPA ‘truck’ that can do the multiple missions of ISR, strike, electronic warfare and cargo movement. So, folding in technological advancements on the horizon, we built our Flight Plan to look at distinct sizes of RPAs: small, medium and large.

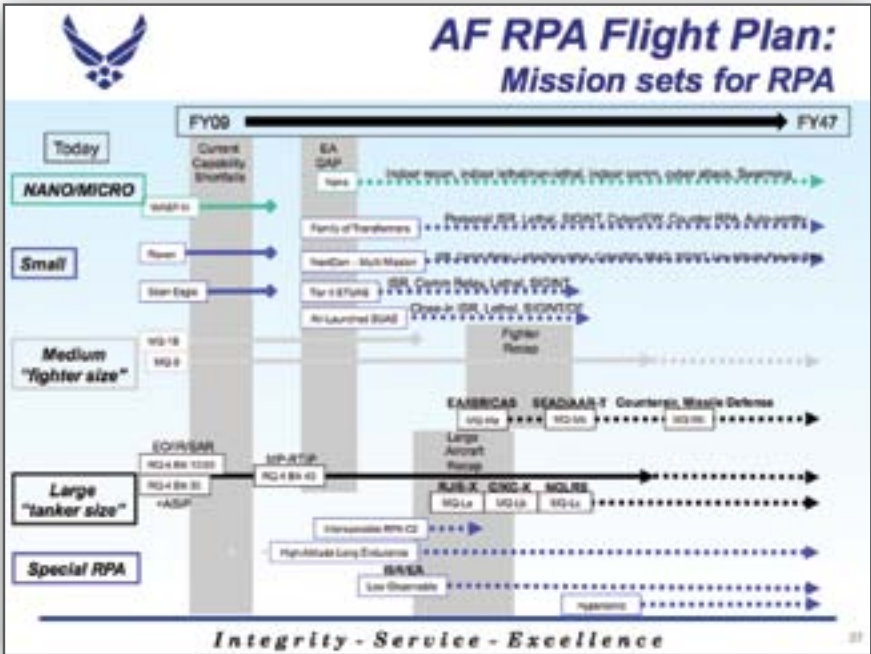


Figure 27: Air Force RPA Flight Plan: Mission Sets for RPA

Our first size set is really a ‘family of small systems’ (Figure 28), mostly in the low-altitude category. We see this set applying mostly to irregular warfare and anti-access solutions. This set encompasses nano and micro-sized RPAs that, over time, will include a set of expendable ISR and lethal payloads. Imagine an automated system the size of a fly that wanders around near a particular individual of interest, passing what that individual is saying inside meetings back to a Combined Air Operations Centre (CAOC)—some enormous potential here that will change the way we do business.

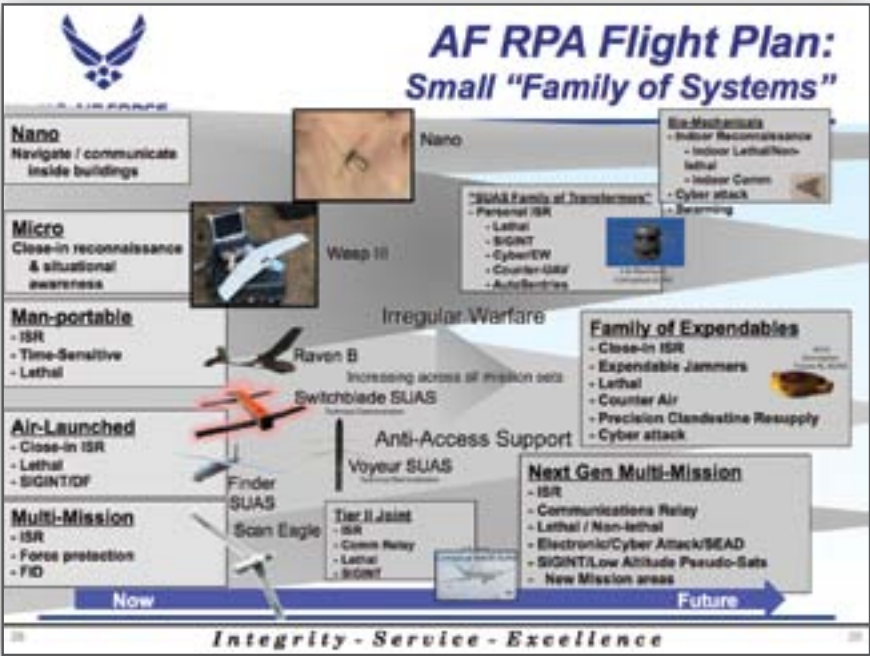


Figure 28: Air Force RPA Flight Plan: Small 'Family of Systems'

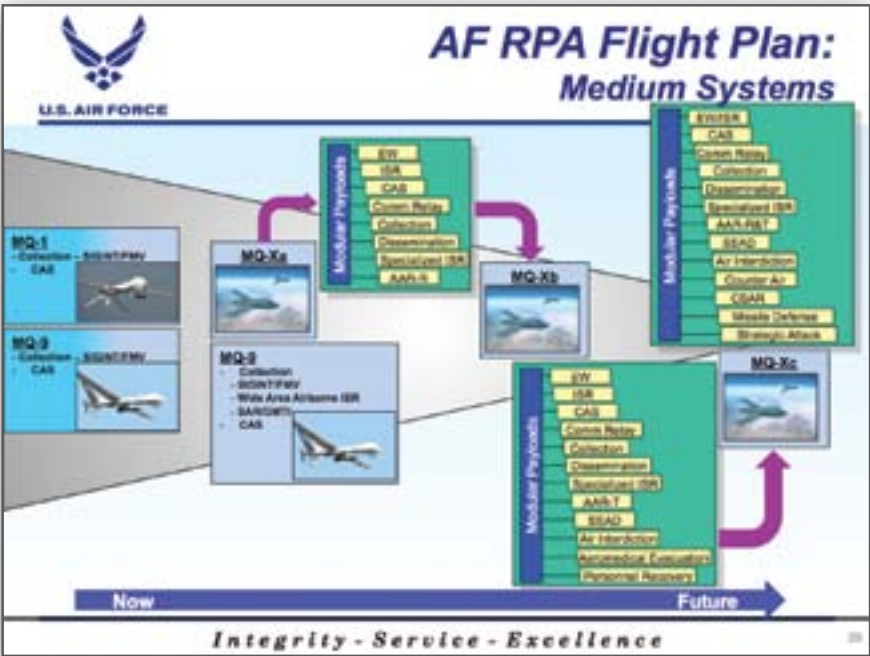


Figure 29: Air Force RPA Flight Plan: Medium Systems

Our medium sized systems (Figure 29) are where we see the most immediate opportunity. It is in this set we see modularity and plug-and-play capabilities that have the potential to enable a wide variety of mission sets. We intend to address these systems as much more than just aircraft, however, but rather as information action nodes integrated as part of a system of systems capable of executing a panoply of missions—ISR, strike, air superiority, missile defence and so on—each one of these systems able to be tailored to deliver the desired effects required of a joint force commander to meet the needs of a particular contingency.

Large systems (Figure 30) obviously have the capacity to carry bigger payloads. If you can carry a bigger payload, you can carry more power or more fuel so you have greater reach and you can do more stuff. So there is even more potential resident in large systems to act as information action nodes. In particular, as the reach, precision and capability to target our systems by threats grow, large RPA offer great potential to overcome anti-access challenges.

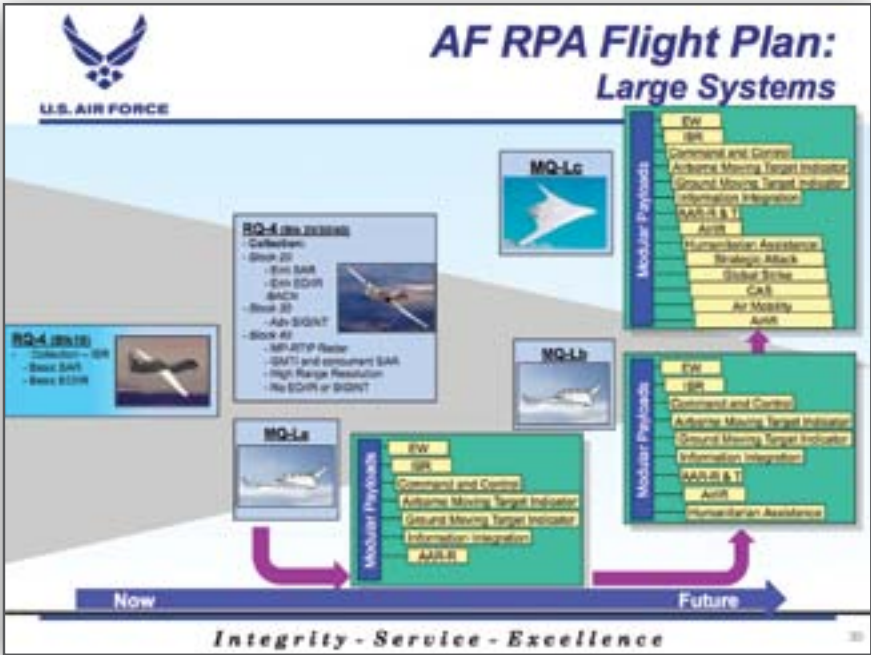


Figure 30: Air Force RPA Flight Plan: Large Systems

One area of the RPA Flight Plan that I thought you might be interested in hearing a bit more about is our MQ-X next generation RPA (Figure 31). We are looking for the MQ-X to combine fighter-like manoeuvrability and survivability with the endurance and sensor connectivity that is normally associated with ISR platforms, and we look towards modularity as a means to achieve flexibility to adapt to mission sets. It should provide the size, weight and power to allow numerous combinations of sensors, weapons, electronic attack and other payloads while providing the dash speed to allow packaging with other

aircraft and to respond to critical advances as they occur. Survivability will be the key. That is a tall order and we have gone back and forth with the commands involved to develop an initial capabilities document before we move forward. That has not been finalised yet.

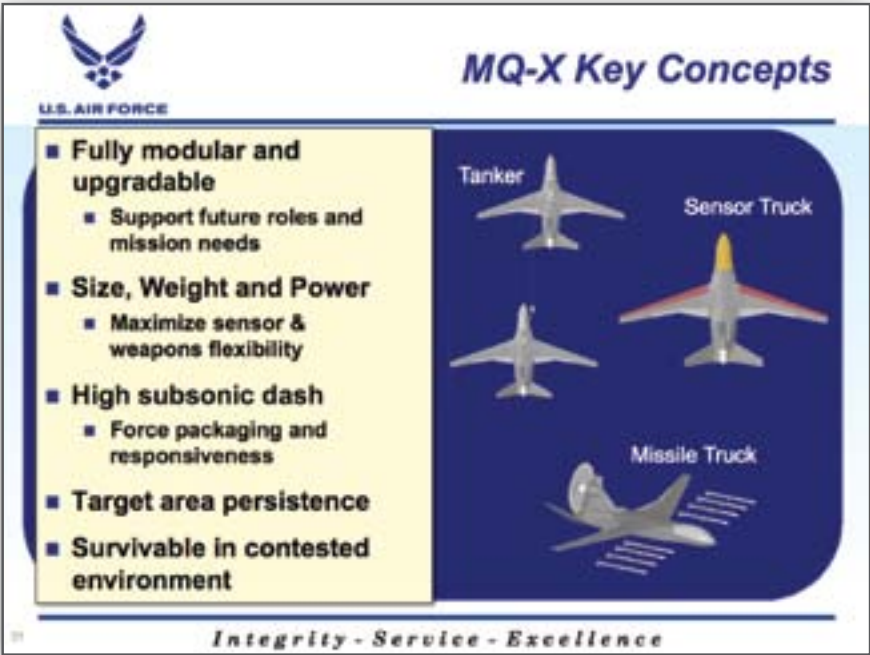


Figure 31: MQ-X Key Concepts

Now, all that said, it is not just about the platforms. Our RPA Flight Plan yields insight to all of the elements necessary to field, not just acquire, RPAs. Acquisition is one element, but we also need to address all those other Doctrine, Organisation, Training, Material, Leadership, Personnel, Facilities and Policy (DOTMLPF-P) parts that are going to effect RPA futures. Depicted in Figure 32 are the waypoints in each of these key areas that need attention. Down at the bottom on the 'Policy' line in Figure 32, the first one is the National Aerospace System (NAS). How do we operate these things in conjunction with manned aircraft operations? We cannot do any of these things in isolation because each one of these areas over the period of time you see depicted there impacts one another.

Now there is a flip side to all of these efforts to deliver more ISR and more RPAs, and it is one that goes well beyond just the Air Force. This is depicted in Figure 33.

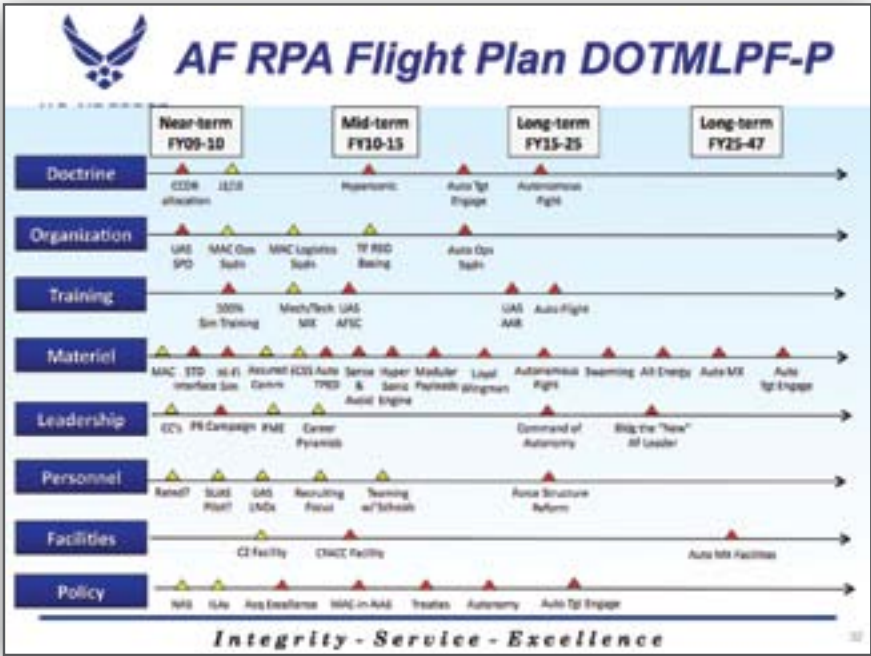


Figure 32: Air Force RPA Flight Plan DOTMLPF-P



Figure 33: 21st Century Challenges: Dealing with Data Growth (1)

We are fielding more and more sensors, collecting more and more data and having to respond to an ever-increasing demand for ISR, all at a pace and a volume that is unparalleled. What I like to say is that, in the not too distant future, we are going to be swimming in sensors and so we need to do what we can to ensure that we do not drown in the data that they provide. Accordingly, we need to apply the same level of effort to the processing and exploitation of data as we have to collecting it.

Let me give you a soon to be real-world example of this challenge (Figure 34). Today, one of our RPA provides one video feed to users on the ground. In a couple of months, Air Combat Command is going to begin acceptance of a wide area airborne surveillance system, known as 'Gorgon Stare'. What Gorgon Stare gives us is the ability to go from one CAP with one motion video downlink to 10 video downlinks and, after some processing, this can be split up and provide up to 65 separate video streams per aircraft to a dedicated ground receiver. In a future iteration, fielding about 18 months later, we are going to increase the extended area coverage of what these sensors are going to look at, as well as perhaps increase the number of downlinks. What this gives us is the potential to grow from 40 video feeds that we are doing today in the area of operations to over 3000 feeds, and that is just from Air Force RPA alone.

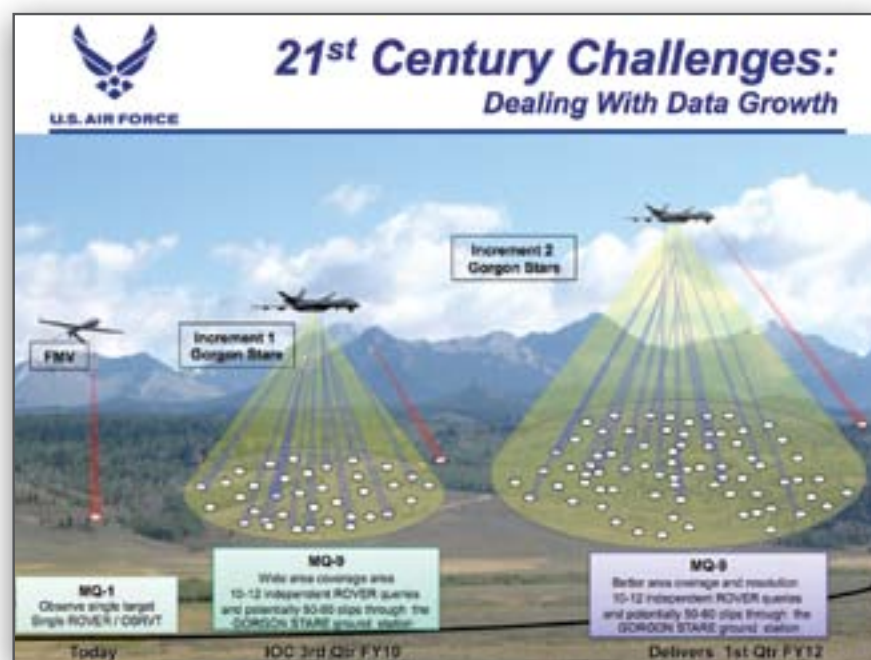


Figure 34: 21st Century Challenges: Dealing with Data Growth (2)

This is why I would suggest to you that the number of Combat Air Patrols (CAPs) or orbits should not be used as a measure of ISR sufficiency any more (Figure 35). There is a great big difference between the ISR brought to the fight by one CAP that is flown by an MQ-9

without a Gorgon Stare pod and one MQ-9 CAP that is equipped with a Gorgon Stare pod set. In the information age, and in an era of economic struggle, we have to start planning and thinking from an effects-based approach rather than from a platform or input-based approach.

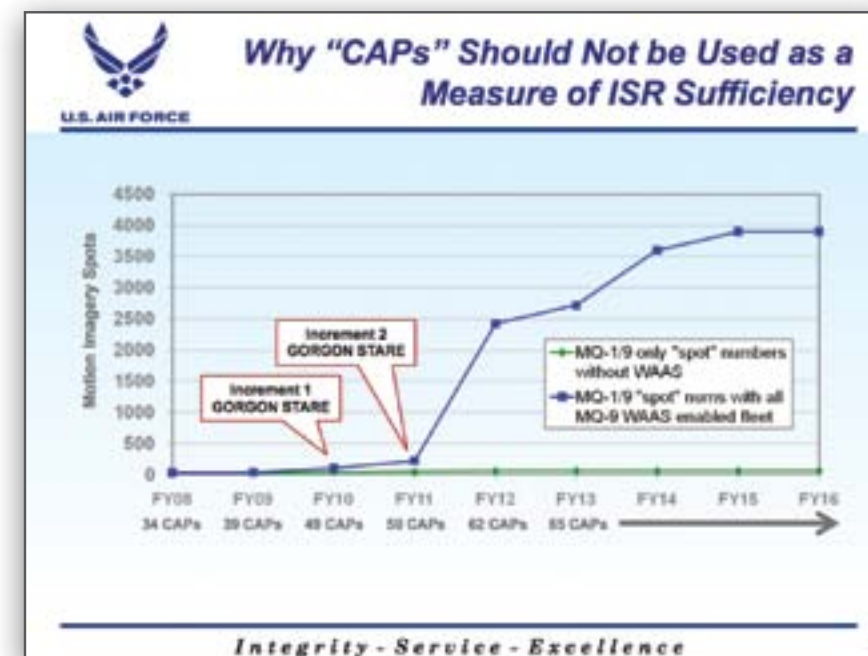


Figure 35: Why 'CAPs' Should Not be Used as a Measure of ISR Sufficiency

This point is re-emphasised in Figure 36. The fastest way to get more ISR to the fight soonest is to increase the capability of each aircraft—that is, to focus on the *output*—rather than adding more platforms, which is a resource *input* measure. Figure 36 shows our current wide area airborne surveillance (WAAS) fielding plan with incremental actions: one in FY 10 yielding 65 video spots per pod set, one in FY 11 with another 65 spots per pod and then one beginning in FY 14 with up to 65 spots per pod. The black line shows you the increase in motion video by adding this wide area airborne surveillance system over the blue and the green lines and what we get from going to 50 CAPs and then 65. So we are going to be looking to further accelerate and increase the wide area airborne surveillance program and try to get people to understand that you get more 'bang for the buck' by improving the output of the systems that you have now, as opposed to just adding more systems later on.

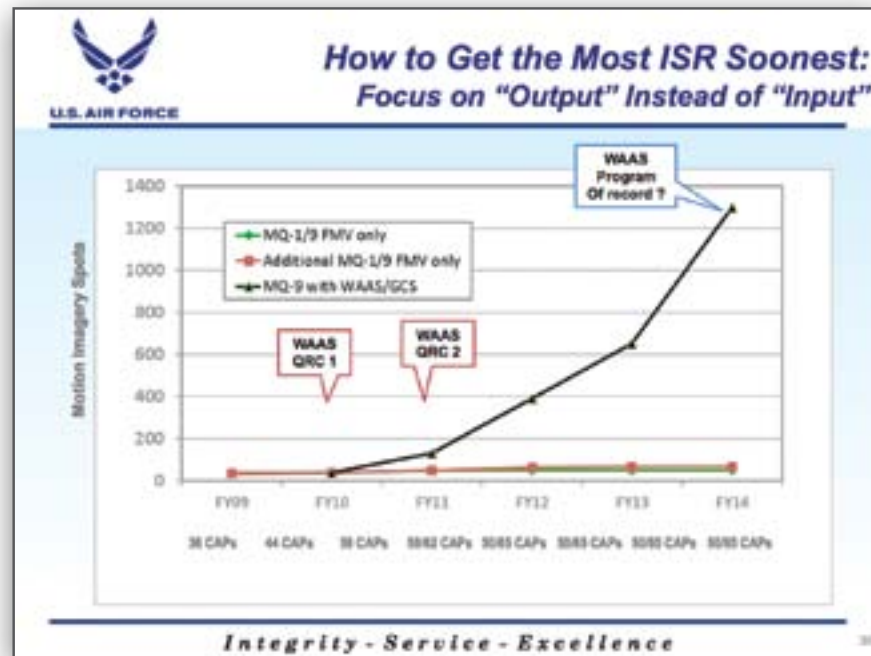


Figure 36: How to Get the Most ISR Soonest: Focus on 'Output' Instead of 'Input'

All that said, let me offer a cautionary note that we need to consider in our visions for and approaches to airborne ISR and, in particular, RPA. At present, we define our military challenges through the environments of regular, irregular, catastrophic and disruptive challenges (Figure 37). These may be useful constructs but, while they are of strategic environments, these characterisations of conflict are really intellectual bins that say more about us than our potential opponents and they may lead us down the wrong road with respect to defence planning. Rebecca Grant talked a little bit about that in her Q&A session.

Figure 38 also addresses this cautionary note. Consider the environment above Iraq and Afghanistan in which we are operating. It is permissive. It is one where we own the air and space, and no-one is attempting to wrest control of it from us. In parallel with the rapid expansion of technologies that will yield advances in ISR, however, there are technologies that will present us with contested or denied operating environments. It is in these environments where our greatest challenge lies. In these environments, survivability emerges as a critical factor and one that we have yet to apply the full weight of our industry, thought and technology.



Figure 37: Domains and Environments: A Cautionary Note (1)

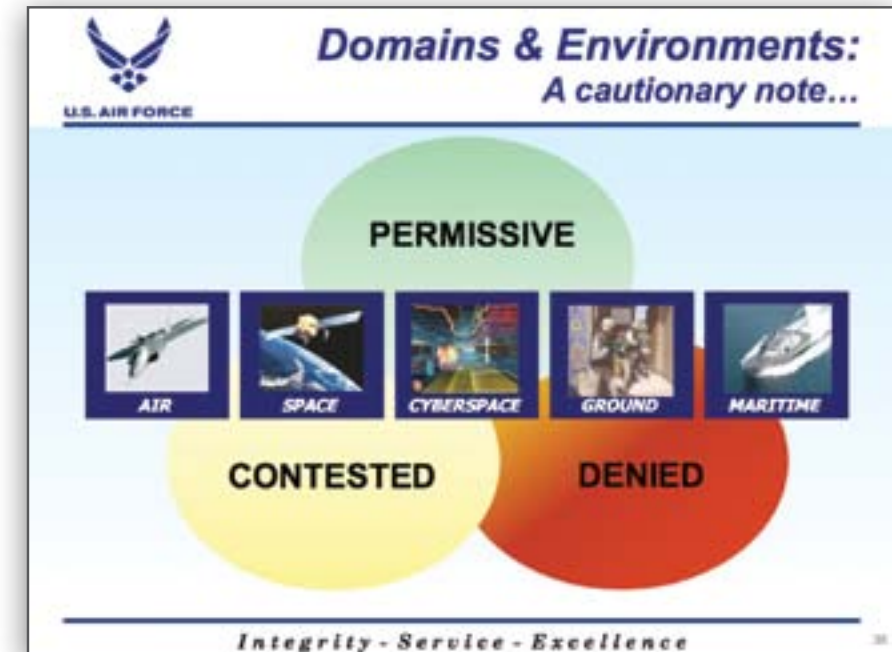


Figure 38: Domains and Environments: A Cautionary Note (2)

All right, let me wrap this up. We often hear—we have heard it through the presentations today—and we read about it in the press of the asymmetric challenges that our adversaries present us. Let me remind you, however, that we have asymmetric advantages as well and one of those is our ability to operate in the third dimension to a degree that our adversaries simply cannot affect (Figure 39). Now we know this not because of what I am telling you, but from what our adversaries tell us. The top quote in Figure 39 is from dialogue between two Taliban commanders—it did not come from the Air Force public affairs shop or the Air Force Association. The bottom quote is from a recent interview with a top Taliban commander. I think that these quotes are both testimony to the asymmetric advantage that we possess, and that is air power, and we would be well advised to consider strategies that allow us to better exploit this advantage. That is why it was so thrilling to hear Dr Stephen's presentation yesterday and I hope you will all take a copy of that and send it far and wide to expand the dialogue.



Figure 39: Our Asymmetric Advantage – Operations from the Third Dimension

With that, again thank you for the opportunity to be here and I will be happy to take your questions.

2

DISCUSSION

Air Commodore Mike Bennett (RAAF – Air Force Headquarters): You've talked about merging your intelligence feeds—the IMINT, MASINT [Measurement and Signature Intelligence], SIGINT—at 480th and you've got a separate organisation that has merged cyber and space. Is there any consideration about a single merge of all of that information so you've got single point of contact?

Lieutenant General Deptula: Absolutely, and that is one of the areas of organisational interest that the senior leadership in the Air Force has been wrestling with. We had an ISR summit last September [2009], where organisational constructs were discussed. One of the things we addressed was how should we optimally organise to incorporate cyber, not just into the ISR piece but to what we do on a day-to-day basis. The determination at that time was that, since we've just stood up 24th Air Force underneath Air Force Space Command and not that far in the past stood up the ISR Agency as an organisation directly reporting to the Air Staff and moved the 480th over with 70th Wing underneath the ISR Agency, we should let things settle down for a bit before we take a look again at how this is going to operate. As you well know, the US Cyber Command, as a command underneath STRATCOM [Strategic Command], is in the process of standing up right now and each one of the Service components, of which for the Air Force this is 24th Air Force, has still to be matured. The decision of the leadership has been to let that play out and see where it's going to go before we make any other changes. But, clearly, operating in, through and from cyber space is integral to the conduct of all that we do nowadays. I don't know if that answered your question, but lots of organisational churn and change and, quite frankly, US Cyber Command, as a subordinate combatant command unit to STRATCOM, deals with the military piece of operations in cyber. There is a critical infrastructure in the civilian piece that we are wrestling with in our nation as I'm sure everyone else is too. How is that organisational piece going to fit? Then there are the legal complications that overlie all of this in the context of, in our Constitution, First Amendment rights. Some of you in here may understand Title 50 but for the rest of you, if you don't understand it, take a year because that's how long it's going to take to figure it out. It gets very complex. These are all significant issues that we have to deal with in all our nations. How do you meld the military piece with the concern of the protection of the cyber domain that we operate in, as well as how do you orchestrate information to be used in a beneficial fashion across the board? It's a huge area.

Wing Commander Richard Trotman-Dickenson (RAAF – Commanding Officer No 87 Squadron): Sir, you referenced the joint CONOPS [Concept of Operations]. The USAF has the luxury of being a large organisation. I'm interested in your views on where you see Air Force's role in sort of the joint domain and where it would lie in the future, particularly since you're predominantly supporting the ground environment and those other Services also have ISR programs and would also see themselves as key stakeholders in their own sort

of destiny for ISR. I'm just interested in where you see the US Air Force going in the future in that regard.

Lieutenant General Deptula: You're making my point. Every one of the Service components has remotely piloted aircraft, of different types. So we ought to be mature enough to be able to sit down at a table and address where we can capitalise on the different sizes and capabilities of systems to optimally distribute them and ensure that each one of the Service components is getting the output or desired effect from not just their systems—and this gets into the joint piece of your question—but enjoys the capability that is produced when you treat the integration of all these systems as a cohesive whole. One of the things that you said there was in the context of support. One of the beauties of the joint system as we apply it in the United States is that we just don't have one particular concept for the employment of forces. A joint force commander has the advantage of picking different degrees of capability provided by separate Service components to meet the needs of a particular contingency, and those needs are going to change depending on the contingency. We have to guard against what we're doing predominantly today in thinking that that's the way we're going to operate in the future. That's the beauty of what our joint system does. So it's not about supporting one principal modality for the employment of force. It's about airmen, soldiers, sailors and marines working in conjunction with one another to meet the objectives of a joint force commander that's important because that way, if you think about the employment and integration of our Service components, you achieve a synergy that accrues because each one of those components is looking how to optimise what they uniquely bring to the fight, as opposed to being dominated by one particular construct of warfare. There are too many folks in our country that think that the Services fight, and what I like to remind folks is that the Army, Navy, Air Force and Marine Corps of the United States don't fight. They organise train and equip to provide capabilities to equip a joint force commander who then, he or she, selects the different component capabilities to fight. I don't know if that answered your question but I hope that gives you some insight to the way we're thinking. That's exactly what I meant on that chart, we've got to sit down and look at what's the best way to do this across the board. We don't have an answer yet, we're still working on it. The other point that I think many of you have heard used is that we are today, I believe, with the application of remotely piloted aircraft technology about where we were in 1918–1920 with manned aircraft. So we have a long way to go and there are no single source solutions but we do have to figure out a way, particularly in a resource constrained environment, to make sure that we're not duplicating capabilities but rather we're integrating capabilities.

Squadron Leader Chris McInnes (RAAF – Headquarters Joint Operations Command): I wonder if you could talk about how you are trying to improve the assessment of your ISR efforts. Traditionally, I've seen it expressed as, 'We had 40 hours of Predator time today, so it was a good day', which is a pretty simplistic approach.

Lieutenant General Deptula: What you're getting at is the whole issue that I alluded to and you just gave a good example where you talked about numbers of hours, which again is an input measure, not what was produced to meet the objectives of the individual unit commanders or the joint force command structure. Those measures of merit are up to the

actual appliers of the capability, the joint forces. So we have worked very hard with not just our own air components in the theatres but also in the joint force level to ask the users, 'What is it that you really want?' This is one of the challenges that we have in determining what is ISR sufficiency. It shouldn't just be the numbers of CAPs, that's what I was trying to get at. If what you really need is 'x' number of motion video spots in a particular area of operations for a particular amount of time, then let us know what that is. Don't tell us that you want 'x' number of MQ-1s or MQ-9s because, quite frankly, today we often times have MQ-9s that'll fly around for 18 hours and they won't be used. So what is it? I'm trying to describe the situation and it's fluid because it depends on what it is that you're using the asset for. In one case it might be video, in one case it might be strike and in one case it might be SIGINT. So the users are the ones that are going to have to determine what the best way is to describe the desired effects, and that would be my answer. It's an educational process to lay out, again, an effects-based description as opposed to an inputs-based measure.

Dr Jeremy Manton (Defence Science): Talking about numbers, you talked about 34 CAPs, each with the capacity of doing 50 full motion video streams. I wonder what your business process model was for that sort of full motion video dump and what sorts of technologies you are looking for to try and improve your ground segment analysis.

Lieutenant General Deptula: First, the one chart was hypothetical in nature to show what the potential would be if you equipped every MQ-1 CAP with a Gorgon Stare pod. That's not in our program plan right now because what we're trying to do is get people to understand that there is the potential to achieve greater output by using these pods instead of building more aircraft. So what we're hoping is, as we deploy the first systems and they become productive, that folks will begin to see this and then a determination will be made based on what the output measures are. There is a study being conducted chartered by the Vice Chairman of the Joint Chiefs of Staff, General Cartwright, to STRATCOM to attempt to determine just what the ISR requirement is from all the combatant commands. So that's to answer your first part of your question. For the second part of your question, clearly, we have this huge increase in output so how are we going to be able to deal with not drowning in the data? It's not going to be just by throwing more people at it. We are looking at and our Defence Advanced Research Projects Agency (DARPA) is working today very hard on automated tools for the conduct of the extraction of information. I won't say analysis, because analysis is going to be conducted by human beings with a brain. But instead of having someone sitting in front of a video screen watching a building, waiting for somebody to come out, which is what we do today for example, you can designate an area of interest on a screen and then walk away and the machine will be able to automatically pick up and track anyone who, through however you want to describe, you want to track and then set off a notification that someone has left. So it's those kinds of automated capabilities that will allow us to increase and handle the enormous increase in information that's coming out of these centres that we provide.

Major General Mohammed bin Swaidan Saeed Al Qamzi (United Arab Emirates Air Force): My question is on the use of ISR sensors. If you put an ISR sensor on another platform, like tankers and so on, do you have any ideas on how you are going to do it and how much

duplication will there be when you use that type of platform? The sensor on tankers could be a SIGINT or ELINT. Will you have it for your ISR organisation?

Lieutenant General Deptula: We've built the Gorgon Stare sensors specifically for the MQ-9 because we have so many of them in theatre, but it is a podded system. So, by virtue of the fact that it's a podded system, there will be potential opportunities to use it on something else. Now we have not done the research and development or the application yet because we're focusing in on MQ-9, but I'm sure that if there is a will there is a way to apply that podded capability to some other platform.

THE DEFENCE WHITE PAPER AND ITS IMPLICATIONS FOR AUSTRALIAN AIR POWER

DR ANDREW DAVIES

This presentation is going to be in three parts. The first will be a review of the 2009 Defence White Paper and what it has to say about air power. That will not actually take too long because the 2009 White Paper, in my reading, was mostly about Navy and, despite the fact that I suspect that a few of you here have been metaphorically running a tape measure over the deck of the Landing Helicopter Dock (LHD) amphibious ships, there is not a lot in there about air power that is new. The second part of the talk might seem a little odd at first because I want to go back to a very early example of operational analysis to demonstrate a fundamental aspect of the way that aircraft go to war. Along the way we will have a look at air wars as they are contemplated today and that will provide an insight into the strengths and weaknesses of the air forces that we and our Western allies are in the process of building. With that in mind, I will finally turn to the next Defence White Paper, and those beyond it, and see what sort of balances will be required to generate air power capable of meeting the Government's requirements into the future. After that you can all take turns having a shot at me.

Well, let us start off with the 2009 White Paper, *Force 2030*.¹ Since plans were already in place to replace a very large proportion of the RAAF's inventory, it was not especially surprising to see more continuity than revelation in that White Paper. In fact, given that the decision to proceed with the Super Hornet acquisition had been made well ahead of the White Paper publication date, there was not much in the way of decisions to be made. For the most part, the new government essentially confirmed that it would deliver the plans put in place by the previous one. Firstly, it endorsed the decision to procure the 24 Super Hornets, which gives me the opportunity to put an emphatic 'I was wrong' on the public record. Back in 2006 when that decision was first announced, I was very critical both of the aircraft and of the processes that led to the decision. While I think there is still a reason to wonder exactly what sort of planning process led up to it, the decision itself, especially with the benefit of hindsight, is actually hard to fault, and the aircraft and its systems are far better than I gave them credit for. I hope that I am now older and wiser—I am confident that one of those things is true.

The White Paper also reinforced the determination that the Joint Strike Fighter (JSF) and its fifth-generation capabilities are the way ahead for the Air Force. I do not think that anyone would argue sensibly that there is an available alternative that will, in the longer term, be better on a platform versus platform basis. I will have something to say in a few minutes about the logic that the best platform is the right platform that underpins that

¹ Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030: Defence White Paper 2009*, Department of Defence, Canberra, 2009.

decision, but for now we have to keep our fingers crossed that the latest revision of the JSF program will result in the outcomes that we are planning on. As I understand it, there is still some fat in the schedule and budget we are working to and, hopefully, that will be enough to see us through to a successful delivery of the aircraft.

Other White Paper platform announcements included the P-8 maritime patrol aircraft—actually, it does not say that explicitly, but we all know that that is what it meant—KC-30 tankers and the now four-year late Wedgetail AEW&C aircraft; all good stuff and all important components of the modern air power system. If I wanted to be critical of the White Paper's materiel solutions I would have to say that I think we are being too slow to explore the capabilities of UAVs, or remotely piloted aircraft, and that the focus on air combat and jointery is too heavily weighted towards the top end of the warfighting spectrum; that is fast jets and heavy surface combatants. At one level, it is fair enough to say that the near regions are the focus and the ADF can 'come as it is' further away, leaving the air-sea approaches to dictate the solutions, as they have for many White Papers, but surely we have to stop at some stage and give some thought to the needs of Army now in the ninth year of continuous land operations on the other side of the world.

I am getting a little bit off topic here but I think there is some value in thinking hard about long-endurance close support platforms that are suitable for operating where there is a threat to the guys on the ground but a pretty permissive air environment. Here, we are talking about the Predator, Reaper UAV-type solution or, heaven forbid, even a manned counterinsurgency platform—the sort of thing that was embodied in the OV-10 Bronco, that sort of platform, in the past. It seems to me that, at least for the next 10 to 15 years, we would be more likely to use those platforms in anger than we would to use Wedgetail and JSF. But let me get back to the White Paper.

In terms of strategic tasks, I think there is one element of the White Paper that has received insufficient attention and that is the stated aim to be able to establish sea control and air superiority in the air-sea approaches to Australia.² Now air superiority is not a new White Paper concept, but sea control is. The 2000 White Paper talks only of denying the air-sea approaches to an adversary,³ and that is a very big difference. At the risk of seeming like I am talking to the wrong conference, let me give you Navy's doctrinal definitions of those concepts. Sea control is when one has freedom of action to use an area of sea for one's own purposes for a period of time. Sea denial is when an adversary is denied the ability to use an area of sea for his own purposes for a period of time. So you can see from those definitions that sea denial is, by definition, an easier task than sea control. Sea denial can be done in a contested space—a sort of 'we can't control it but we can make sure that you can't either' kind of thing. But it is much more demanding to establish both sea denial and to have freedom of action for your own forces. Why am I telling you this? Because ships are to a very large extent the natural prey of aircraft and have been for 70 plus years since Billy

Mitchell showed the way. They have also been natural prey for submarines for longer than that, but that was a talk for the Sea Power Conference. The way the White Paper talks about sea control, it would be entirely reasonable for the casual reader to conclude that it was going to be achieved through the paper's proposed investment in naval assets. But I see the surface fleet as a beneficiary of sea control, as much as an agent for establishing it. Basically, if you do not rule the air you will not rule the sea, or at least not for very long, and here is where the concept of control and denial comes to the fore again. In some circumstances, you can hope to deny the air or, more accurately, a limited amount of the air from the surface of the ocean. The air warfare destroyers under construction will certainly give Navy a much needed boost in air defence capability. But no matter how good shipborne defences are, you will not establish control of the air that way, and the horizon-limited nature of shipborne systems means that you will always be susceptible to pop-up, drop-down attacks or, if sufficient third-party targeting is available, you will be susceptible to genuine over-the-horizon attacks. And if the attacks are persistent enough, the cumulative nature of probabilities will get you in the end, or in the stern as the case may be. I am sure that is the reason why the White Paper says the air warfare destroyers will be fitted with a Cooperative Engagement Capability, allowing them to share data with the AEW&C aircraft, thus allowing the ships to make use of their 200-nautical mile SM-6 missiles. No doubt, that is a very formidable combination, almost certainly enough to deal with the low-level air threat likely to be encountered from near regional forces. But in a high-level conflict against an adversary that itself has long-range anti-radiation missiles and/or the will to absorb losses, I do not think the AEW&C–air warfare destroyer combination really stands alone. I am sure I do not have to explain to you here what is missing from this picture. It is no coincidence at all that carrier battle groups have at their centre, a carrier. In that case, sea control and the air superiority necessary to retain it come as a package deal. I will come back to this point later, but I will note for now that the White Paper seems to me to be insufficiently thorough in its explanation of what is required to pursue the strategic and military ends that it seeks.

Let us move along and I want to revisit an old adage. A wise man once said that quantity has a quality all of its own. In the popular press and amongst enthusiasts, a large amount of effort goes into discussing the relative merits of platforms, sensors and weapons; I have been guilty of that myself. But there are some really good reasons to think that most of the arguments about aircraft systems are actually a waste of bandwidth. To a large extent, and this might surprise some of you here, for wars where there is a lot at stake, it mostly does not matter. To explain why, let me start with a specific example and then generalise.

Some of you will have read the late-2009 RAND Corporation report on a hypothetical conflict between China on one side and the United States and Taiwan on the other.⁴ The report contains a case study that should be required reading for anyone who cares about air power, and there is an interesting aside. Some commentators who have read that report have somehow managed to deduce the diametrically wrong conclusions, for reasons I will

² *ibid.*, pp. 41, 53 and 88.

³ Department of Defence, *Defence 2000: Our Future Defence Force*, Defence Publishing Service, Canberra, 2000, p. xii.

⁴ David A. Shlapak et al., *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, RAND Corporation, Santa Monica, CA, 2009, available at http://www.rand.org/pubs/monographs/2009/RAND_MG888.pdf, accessed 30 July 2010.

come back to later. The work concerns a scenario in which China launches a pre-emptive attack on Taiwanese and US bases, and ground-based air defence assets in order to blunt the ability of Taiwan and the US to thwart a Chinese invasion of Taiwan. The air war, which is described in Chapter Four of that report, is for supremacy over the Taiwan Strait. If China loses the air war, then invasion assets are too vulnerable to interdiction. In this scenario, RAND made some assumptions about the relative superiority of US aircraft versus their Chinese antagonists. In a one-on-one engagement they assumed that the exchange ratios will be weighted heavily in favour of the US. Now we could argue until the cows come home about the details of those exchange ratios, although to my inexpert eye they look OK. Calculating them in detail requires a really good knowledge of sensor and weapons effectiveness, including cross-sections of various wave lengths of the aircraft involved, missile single-shot kill probabilities, probable tactics etc. It is a very complex business. Good analysts would do the sensitivity analyses of the exchange ratios and would check the limiting cases, where parameters are taken to their maximum and minimum values. It is a very technical business and not something that can be done without detailed knowledge and sophisticated tools. But for our purposes, the point is not whether the exchange ratio for the F-15 against the Chinese Flanker is 4.5:1 or 5:1 (Figure 1), or for that matter even in the other direction as some commentators might have it. The bottom line is that the exchange ratios are remarkably unimportant in the big picture.

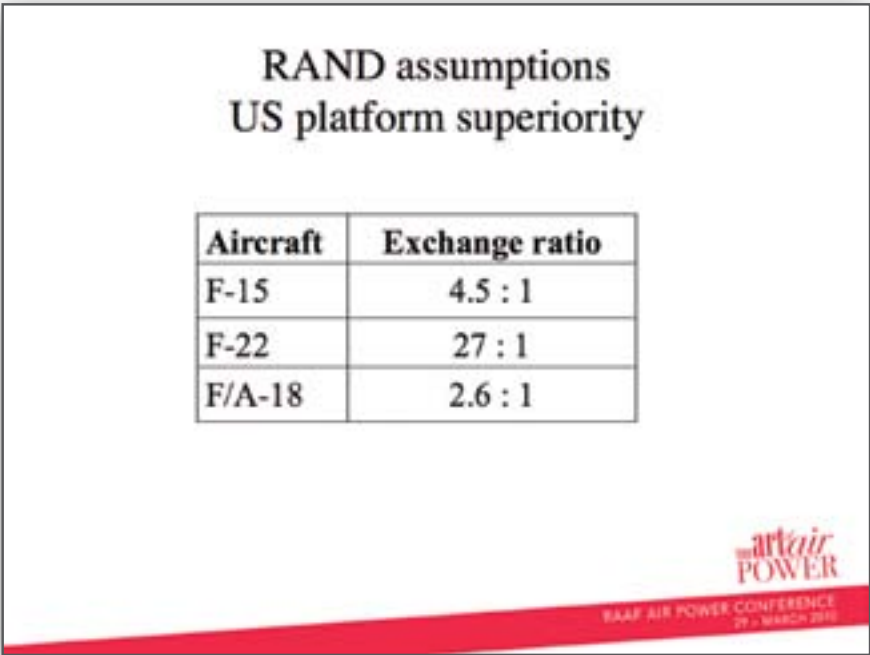


Figure 1: RAND Assumptions: US Platform Superiority⁵

⁵ ibid., Table 4.4: Sortie Rates and Exchange Ratios, p. 65.

Despite the huge advantage to the US aircraft in individual battles, under a large proportion of the cases that were studied the campaign outcome went to the Chinese side. Only when everything goes the way of the US-Taiwan do the defenders prevail. In hearkening back to the earlier point about the vulnerability of high-value assets like AEW&C, the RAND guys illustrate in a companion piece how attacking Chinese forces that are willing to take a bundle of losses can ride out the initial salvo of air-to-air missiles and get among the P-3s, Rivet Joint surveillance aircraft etc., and possibly threaten the surface vessels, when the defenders simply run out of missiles. It is not pretty from either side but it might be a reminder of what a war, as opposed to a limited operation, actually looks like. The outcomes in this work are far different from the 2000 RAND study into the same scenario,⁶ in which the Chinese were almost always defeated and there has been no ‘magic bullet’ technology in that intervening period. To be sure, there has been a steady improvement in Chinese air combat capability, but the key difference is not that they have improved so much but that there are, very simply, more of them at a sufficiently high standard that they offer at least a modest level of competitiveness with US types. The table in Figure 2, which shows the 2009 RAND study’s total projected sorties flown over the first day, tells the other and ultimately decisive side of the story.

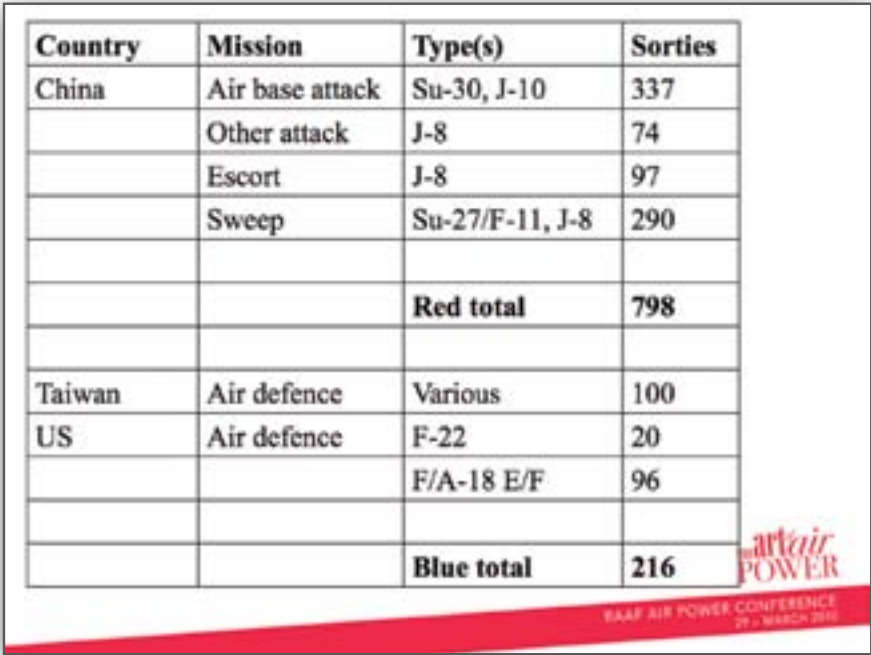


Figure 2: First-Day Sorties Flown: China versus US-Taiwan⁷

⁶ David A. Shlapak, David T. Orletsky and Barry A. Wilson, *Dire Strait? Military Aspects of the China-Taiwan Confrontation and Options for U.S. Policy*, RAND Corporation, Santa Monica, CA, 2000.

⁷ Numbers in table are taken from Shlapak et al., *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, Table 4.5: First-Day Sorties Flown, p. 66.

Basically it boils down to numbers. Modern air doctrine places a strong emphasis on presence and persistence, but I think that it is possible that something quite fundamental has been lost, or at least underappreciated, in the four decades or so (or arguably even seven decades) since Western forces came up against a quantitatively competitive adversary. Numbers matter and they matter a lot. To see why, we actually have to go right back to the dawn of air warfare over the Western front in 1915–1916. An English mathematician called F.W. Lanchester, a fascinating character in his own right incidentally who did a lot of important work on the theory of propellers and on the development of internal combustion engines, turned his attention to this new form of warfare. He quickly noticed that, to a good approximation, Blue force losses were proportional to Red force numbers (Figure 3).

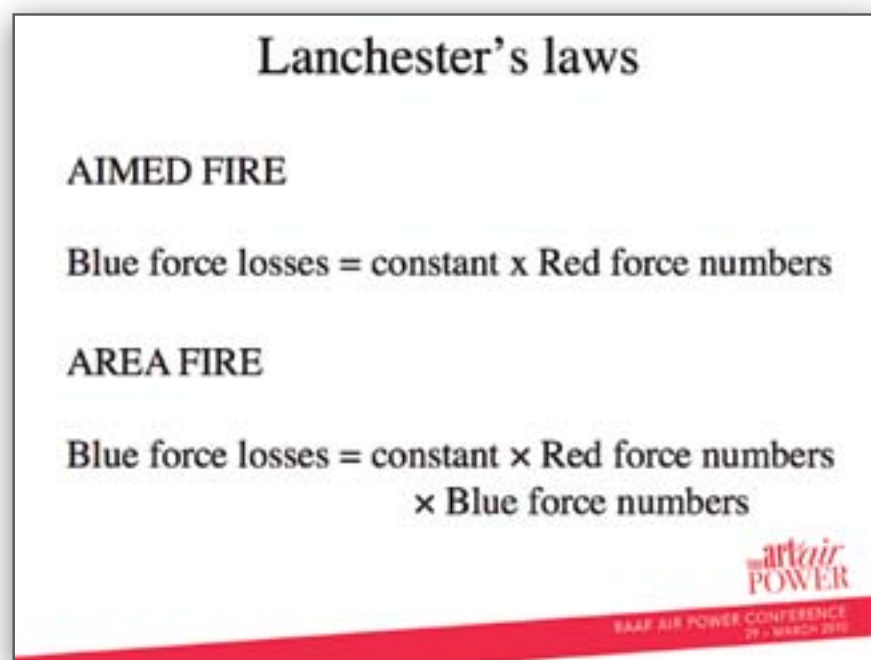


Figure 3: Lanchester's Laws

The constant in these equations is a measure of the relative effectiveness of Red aircraft against Blue aircraft. It is not the exchange ratio, but it is one input into calculating the exchange ratio. Lanchester's key insight was that the right-hand side of the first 'aimed fire' equation does not depend on Blue force numbers, provided there is enough of both for an actual battle to ensue. That is very important because for the previous forms of warfare, like the bloody land battles that were going in 1916, the equation looked like the second 'area fire' entry, where Blue force losses were proportional both to Red force numbers and to their own numbers. I will spare you the mathematics that follow from these equations, but the consequence of the later equation, the 'area fire' equation, is that the battle would go to the side that could bring enough numbers to bear to counter any technological advantage the other had. If Red's weapons were twice as effective as Blue's then Blue could

counter that by fielding a force twice as large, albeit having the expectation of taking more losses in the process. But the equation for air combat, the 'aimed fire' equation, has a very different consequence. It is the square of the number of aircraft that comes into the overall effectiveness. If Red's aircraft are twice as effective as Blue's the reinforcement required to even the battle is not 100 per cent but a much more modest 41 per cent or, alternatively, if Blue has twice as many aircraft as Red, then Red's would have to be four times as effective as Blue's.

Now we begin to see why RAND got the results that it did. The advantage of being able to use land bases to generate multiple sorties per day from relatively close range simply overwhelms the technically superior US forces, who are forced to operate either from land bases well removed from the battlespace, or from carrier decks. The People's Liberation Army (PLA) has 27 air bases within 500 nautical miles of the Taiwan Strait—the US has just one, at Kadina—which makes the PLA's airfield denial strategy much easier and the threat to the carriers of a few 'leakers' from the air battle means that they have to be kept at a safe distance, and for this argument we are ignoring the simultaneously submarine threat as well. Because of the distances involved and the relative numbers of aircraft available to the two sides, the phenomenal advantage in individual combat provided by the F-22 makes little difference to the outcome. The bulk of US sorties are flown by the Super Hornets flying off carriers. The weighted average of exchange ratios is still a whopping 6.8:1 in favour of the US but that cannot make up for the quantitative advantage of the Chinese sweep and escort sorties, which stands at 387:116. The square of that sortie ratio is a literal over 11. Eleven is bigger than 6.8, therefore they win. Let us be clear what we are talking about here. Obviously, exchange rates matter a lot to the air crew involved in a particular exchange—they are literally a matter of life and death—but when faced with an adversary that is prepared to push home an attack and accept losses because the strategic outcome really matters to them, there are factors that matter more than technical excellence and single sortie effectiveness of the aircraft.

Now we can argue about that RAND study and the assumptions that underpin it, but I would make a few observations. Firstly, nobody argued with them in 2000 when the results went the other way, and they used essentially the same methodology. But more importantly, whether the details are right this time around is largely irrelevant. Over a time the qualitative advantage held by US forces will erode as the very long development period and very high procurement costs of US and European aircraft progressively eat into the ability of Western forces to refresh themselves compared to the spiral development and relatively low cost of Russian and Chinese designs. The lower cost and the greater focus on limited goals, air power over the South China Sea as opposed to global projection, will mean that the quantitative edge is likely to move more strongly towards the home team. Numbers matter and geography matters as well. There is an important lesson in this study regarding basing, which I do not have time to go through today, but I will take time to make the observation that the lessons we take from Kosovo, Iraq and Afghanistan may be significantly skewed by the number of airfields available to allied forces in those areas. And please note that in order to push this viewpoint I do not have to buy into the argument that the new generation Russian PAK-FA will 'eat the JSF for breakfast' claim, popular in some

quarters. I am not saying that but I am saying that, in terms of this particular scenario, it does not much matter if the JSF is better or worse than the PAK-FA, or whatever, and I am not saying that building more F-22s is the answer. Simply put, they cost too much and are therefore likely to be available in too small a number to make much difference in a large-scale war in which the adversary is willing to take some losses but can field a large force. So they are the things I am not saying.

What am I saying? Well I think that a reasonable conclusion of all of this is that Western air forces have been seduced by an argument that places technology at the top of the totem pole. And I am saying that the 'silver bullet' approach is not the only answer to air power. In fact, by concentrating on ever more sophisticated and thus ever more expensive aircraft, there is the real possibility that air power in a high-end scenario may have gone down in the recent past.

Figure 4 shows a graph that compares Australian combat aircraft numbers against costs.

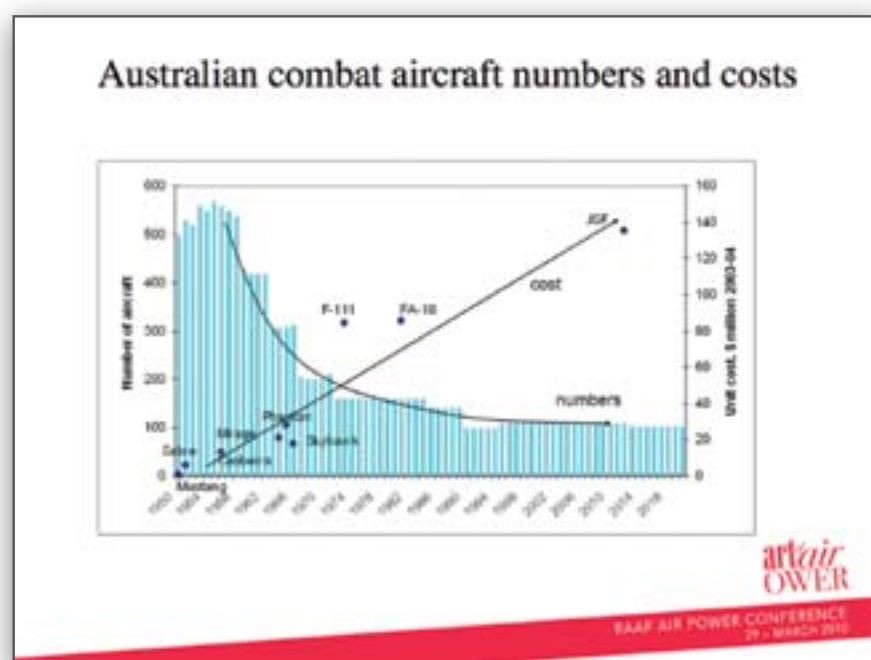


Figure 4: Australian Combat Aircraft Numbers and Costs

The numbers to the left are the number of tactical aircraft in the RAAF and Royal Australian Navy (RAN) from 1950 to current. The numbers on the right are the unit project costs of the tactical aircraft that we have acquired over that period. The numbers of aircraft are the ones that are steadily decreasing. The aircraft unit costs are the ones that are steadily increasing. Clearly, the newer platforms are better than the old ones and they had better be.

However, it is not just us. Figure 5 provides similar information on combat aircraft numbers for the US Air Force, from the 1950s through to the current day. And in case you think

things are going to get better in the near future, Figure 6 provides one last graph for you to look at; a comparison of US Air Force fleet size versus age. Look at the black line on this chart which reads to the right. It is the average of aircraft in the US Air Force inventory. Not only have the numbers have gone steadily down, but the average age of the fleet has gone up by a tremendous amount. In fact, it has gone from about five years to about 20 years in the space of 50 years. That tells you that, barring a remarkably turnaround in the US fiscal situation, the future US Air Force will be smaller still. Simply put, the money will not be there to recapitalise when the current aircraft reach life of type. The fifth-generation air force will, platform for platform, be far ahead of its predecessors but it will also be significantly smaller.



Figure 5: USAF Combat Aircraft Numbers

I think what we are seeing here is a clear trend towards air forces that are extraordinarily good at a range of tasks they have been called on to perform for post-Vietnam conflicts; that is, they are able to overwhelm the air defences and or opposing aircraft of lesser powers, such as Iraq, Yugoslavia, Iran and Libya, whenever required to do so, and they do it with such overwhelming superiority that few losses are incurred. High technology platforms, weapons and sensors will certainly do that for you. But that trend, which is driven I think in part by political pressure applied to air forces to operate with minimal casualties, has come at the expense of being able to field a large amount of combat mass. It is entirely possible that our high-tech forces are at their best when the stakes are least. If the RAND study does nothing else it should make us think about what a truly high-stakes war might actually look like.

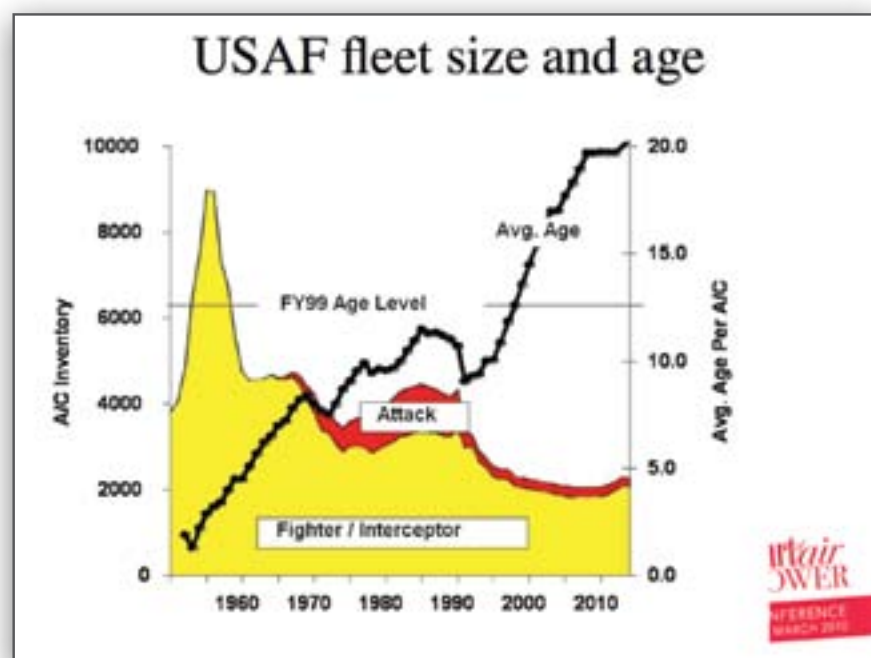


Figure 6: USAF Fleet Size and Age

Now let us pretend for the sake of argument that the worst-case scenario in last year's Australian Defence White Paper is a credible one. That is, that Australia faces a major power adversary staging through bases in the immediate neighbourhood and we are largely left to our own resources to deal with that situation. With that in mind, we can start to think about the future Australian air combat capability that best suits that scenario and what the future White Papers might look like. So let us see where we have got to. Modern Western air forces I have just argued have evolved into small collections of amazingly capable platforms. They have sensors, weapons and networking of a type that allows them to fight without loss, or with very few losses, in a great many circumstances. But it is entirely possible that we have blindsided ourselves by concluding that the future will look like the past few decades in which Western forces have faced smaller less competent versions of themselves. In that case, better is better and the cost of better is largely irrelevant, although we might be getting close to hitting the wall on that front and I suspect the US Air Force is very close to it indeed. I am not saying for a minute that World War III is around the corner, but I am saying that I am far from convinced that we are set up to fight it if it is. I think that a little more intellectual honesty is called for when looking at the strategic goals of our armed forces. The 2009 White Paper purports to set the ADF up to be able to operate without external assistance against a major power adversary operating in our approaches but, to my eye, it does not think through the consequences of that. There are two possibilities here: either the scenario is too far-fetched to really worry about and the next White paper should scale the ambition back a bit—and I actually have some sympathy for that view—or we need to think through the capability implications more thoroughly. I will have something

else to say in an Australian Strategic Policy Institute (ASPI) publication in the near future about the surface fleet in that context, but let me conclude with a few remarks about air power.

Firstly, the defence of the air-sea approaches, and remember that the White Paper says that the geographical focus of the ADF will be in the approaches to Australia. In the air-sea approaches we have a scenario very much like the RAND study but in which we get to play the defending side while the major hostile power gets to play the other side. In that case, the same calculus works. Getting to the fight with numbers and persistence is more important than getting there with the best platforms. Any power trying to operate against us in that space is going to be faced with the difficulty of keeping numbers in the fight while simultaneously manoeuvring high-value assets out of the way. In that case, what should we be procuring? The answer might be that we should be buying more of a bit less; that is, the largest number we can reliably operate of the cheapest platform that is good enough, and the sea control issue means that anti-shipping capabilities should be at a premium—a point which I think Hugh White is going to expand on in the next talk. In time, the right platform will probably be the JSF but, for now, it would be the Super Hornet. If we were serious about warfighting at the top end of the scale, we would have opted for more of them and deferred the JSF purchase to a time when it was mature and the unit costs have come down as far as they will go. Finally, before the next White Paper, we might also usefully spend some time thinking about cost-effective ways of fighting the wars that we actually fight. Counterinsurgency operations can be greatly facilitated by armed, low-cost, low and slow platforms, manned or otherwise. We have precisely none of them. When you run those two ideas together in successive paragraphs an interesting observation emerges. The 'silver bullet' approach to combat aircraft actually leaves you short of useful capability at the low end and short of useful capacity at the top end. On that note, I will sit down to present a smaller target and await questions.

2

DISCUSSION

Air Commodore Mike Bennett (RAAF – Moderator): Thank you, Dr Davies. I did say he was a theoretical particle physicist and you've just seen the product of that. Let me start by posing a question for you Andrew and we'll sneak up on some of the bigger questions that I'm sure that are going to come. You started off by talking about the planning process but getting beyond that, given your observation of the Defence processes over the past number of years, since 2006 in ASPI, there have been a number of Defence acquisitions, and I guess Super Hornet and C-17 would be two examples, that haven't actually gone through the standard process. Your comments earlier about the process indicate that maybe you've got some views on whether the process used for those particular acquisitions actually abided by any logic.

Dr Davies: It's a case where it's actually hard to question the outcomes because the Super Hornet and the C-17 I think are both very powerful platforms that will provide a real boost in capability for the RAAF. It's hard to argue with that. In terms of the processes within Defence, a lot of people here will have had a posting in Defence Headquarters at some stage. I might be just getting cynical in my old age but, as I see it, rather than a really rigorous process that turns the strategic guidance of the White Paper into a force structure, what tends to happen is the project that's a gleam in a Service Chief's eye lands on project officer's desk, who then goes through the White Paper and finds a sentence or a paragraph that supports that acquisition, and the process starts from there.

Mr David McIlroy (Defence Science and Technology Organisation): Thanks for the presentation, Andrew. On the premise of numbers versus quality, what's your comment on the ongoing problem of acquiring sufficient aircrew, particularly pilots?

Dr Davies: Well, essentially it's the same problem. Aircraft without pilots are not terribly useful. I think what we need to think about is a whole-of-combat capability approach. My understanding is that the Air Force has enough pilots, not that there's a lot of fat in the pilot numbers, but that there are enough to provide the air power that's 'contracted' with Government, if you like. There have been times in the past where those numbers have fallen and we have a situation at the moment where we have more submarines than crews. I think that's actually a failure of two things. Firstly, there's nobody in Defence who you can actually point to and say it's their job to make sure that there are enough pilots for aircraft or enough crews for submarines, and they have the resources to make that happen. I think the change in the support arrangements that's going to happen in July this year will give the Service Chiefs more resources and control of the resources is actually a very important factor in that respect. I think the other thing that the ADF was slow to do was to recognise that it was part of a labour market.

Squadron Leader Mat Barnett (RAAF – Air Force Headquarters): Extending from your argument about the numbers, I've had some interesting discussions with people over the last year or two about what would happen if the situation was taken even further into a

genuine 'slugfest' that extended over a long period of time and how you would replace the losses that you would accrue over that time. Clearly, you can't build F-22s, JSFs, or even F-18s for that matter, fast enough to replace the losses that you would have over a few months. One of the responses I got was from someone who was actually an American fighter combat instructor. He said, 'We'd go back to using Mustangs because that's all you could build at a rate that you'd need!' But presumably, somewhere between there and the F-22, there's a requirement for something like the original F-16 concept, which is a cheap, largely expendable, 'lawn dart' that you can throw at the enemy with a basic BVR [beyond visual range] capability but not much more than that. Do you have any comments on that?

Dr Davies: Thanks for your question Mat. Yes, I think you're absolutely right. I think the original F-16 concept was right on the money and one of the problems we have is we keep having these wonderful concepts that the next generation of platforms will be cheaper or somehow defy the laws of nature almost. If you have a look at the rising cost of combat aircraft or, in fact, any like military systems over the decades, you see a pretty steady increase, exponentially increasing. I think one of the things that we're going to have to do at some stage is stop being seduced by every new whiz-bang technology that comes along and have a think about what actually gives combat mass and put the cost-effective capabilities under the platforms and perhaps live without some of the real top-end ones. That's if we're serious about fighting a major war. Maybe we're not. Maybe we only want to work over Kosovo and Iraq in perpetuity, in which case we're probably on the right track.

Unidentified member of PLA delegation: Just now you were talking about the so-called Taiwan conflict. As we all know, Taiwan is the territory of China and once Taiwan declares independence we think that there will be a kind of Taiwan conflict. In that situation, you are making the Taiwan issue as an example, how deep do you think that US air power will be involved?

Dr Davies: Firstly, the Australian Government takes the view that Taiwan is a part of China. Let me say that the ability of an external power to project power across an ocean and successfully defeat somebody operating in close proximity to their own territory relies on a very big difference in economic power. If you look at history, in 1812 the United Kingdom couldn't defeat the United States, despite having a far stronger military. In 1905, Russia could not defeat Japan. In the 1940s, the United States defeated Japan but only because they had a gross domestic product about 20 times the size of the Japanese one. The rise of Chinese economic power and the military power that's come with that, in my view, makes a Taiwan conflict almost unthinkable and if it's not unthinkable now, it will be in 10 years or 15 years time. I would hope that wisdom would prevail on both sides of the [Taiwan] Strait and that everybody will be looking for a peaceful way ahead.

Dr Malcolm Davis (Strategic Policy Division): Andrew, can you comment on your thoughts on the PAK-FA and Chinese J-XX aircraft, where they're going? And if Russia and China can produce those sort of fifth-generation platforms in significant numbers, is it the case that no matter how many fourth-generation or 4.5-generation platforms we procure it's simply not enough? We can't beat them. Can you possibly comment on what implications this might have for US efforts on sixth-generation platforms in the future?

Dr Davies: I'd make the observation that all I know about PAK-FA is a YouTube video and I don't think that's much of a basis for solid technical assessment. The point of my talk was that 4.5-generation, generation-five, generation-six is missing the point. The point is that it is the total combat mass you can bring to bear. If you can build one generation-six aircraft for the cost of five generation-five ones, you've really got to be sure that you're actually getting a good deal out of that. I think cost-effectiveness in terms of combat capability per dollar should be the real arbiter.

Flight Lieutenant Alexander Cave (RAAF – Australian Defence Force Academy): My question is with regard to when you were talking about sea control as it relates to the White Paper. Would you care to elaborate on maritime patrol and response or anti-submarine warfare [ASW] as it's addressed by the White Paper as it relates to air power?

Dr Davies: I was very pleased to see in the White Paper that some real efforts are going to be made to improve the ASW capability. Any of you who know me will know that that's been a real interest of mine for over 15 years now. And I have to say that over 15 years I've seen many announcements that were going to take real steps to improve the ASW capability. So let's just hope it happens this time. But my observation would be that sitting on the surface of the ocean is actually a very precarious place to be—enemies above and enemies below, and you're slow, fixed to a plane and a relatively large target. I think sea control is actually a step too far. I think air-sea denial is a much more rational strategy for Australia to pursue. If you want to do sea control, you really need carrier battle groups and not just one or two of them, you need a dozen of them. The United States is the only navy in the world that can seriously think about sea control and even it can't do it globally.

Air Vice-Marshal John Harvey (RAAF – Program Manager New Air Combat Capability): Thanks Andrew, I always enjoy discussions with you. An observation I'd make is that aircraft don't kill aircraft, weapons kill aircraft. To what extent do you think it's possible in the future you could start looking at the option that it's the weapons you have against the other aircraft, rather than just your numbers. You can conceive of an F-22 with a lot of weapons against a mass of aircraft coming at it or better counter systems against other people's weapons. You've looked very much at platform versus platform in terms of numbers. To what extent do you think on the weapons side that you need to consider that as well?

Dr Davies: I think that's a really good observation and I think, again, that that's somewhere where the West has tended to go more towards a smaller number of very highly capable air-to-air weapons—eight on an F-22, four on a JSF—whereas the Flanker family has a load of anywhere between eight and twelve. One of the things I saw on a slide this morning that I liked was the idea of a UAV that was simply a missile truck carrying a large number of missiles into the battle. Provided you could get the command and control and the networking right, that's a very attractive model, a very persistent aircraft carrying a large number of missiles.

Squadron Leader Ross Chard (RAAF – Headquarters Joint Operations Command): With the White Paper, you talked about sea power, air power and land power. Being such a small Defence Force as such, should we be refining that and looking purely at a littoral power concept?

Dr Davies: Whose littoral, ours or someone else's?

Squadron Leader Chard: Ours, in defence of Australia.

Dr Davies: OK, I think the answer is yes. I think the air-sea denial picture that I pointed out is actually the right one. One of the force structure decisions I've been critical of is the LHDs [Landing Helicopter Docks]. Not because it's not useful to be able to take a bunch of people somewhere with helicopters and vehicles to support them, but I'm blown if I can work out what the military problem is for which the solution is 1000 guys on the beach at the end of a long supply chain. I think that's an example where our ambitions for force projection have actually got beyond our means, in terms of the size of the ADF that we have. So I think the sea and air denial, with a light infantry as the land force, is probably the right model. Sorry, light infantry plus Special Forces. I think that they have a role to play as well.

Air Commodore Mike Bennett (RAAF – Moderator): Andrew, you've posed a number of conundrums indeed for defence thinkers, so I thank you very much for that. I also thank you for bringing Lanchester's laws to the forefront and I wonder whether some other technologies might defeat them. You've shown two different examples of the two laws. Can you perceive a technology change, if we continue to progress down this technology bandwagon, that that would overcome that Lanchester law issue that you've highlighted?

Dr Davies: It's entirely possible. If you could have an exchange ratio of 50:1 or 60:1, then, yes, you would be in the ballpark of being able to defeat that, but to have those sorts of exchange ratios you have to have a very large technological gap between the two sides. As economic growth brings regional and global militaries up to a progressively higher level, establishing that level of technical dominance will be increasingly difficult.

Air Commodore Mike Bennett (RAAF – Moderator): Ladies and gentlemen, that will draw to the end this particular session. Thanks very much for all of your questions and thanks Dr Andrew Davies for your confronting presentation.

AIR POWER IN AUSTRALIA'S STRATEGY IN THE ASIAN CENTURY

PROFESSOR HUGH WHITE

HARD CHOICES

Australia faces big choices about the future of our air power, and we are not finding them easy to make.¹ They are the most important air power decisions—and arguably the most important *capability* decision—since the F/A-18s were ordered a generation ago. No-one can be very comfortable with the way that process has gone so far. There are many reasons for that, but I think the most significant one is that debate and decision-making have focused so much on the aircraft themselves—the Joint Strike Fighter (JSF) and its alternatives. Much has been said about the JSF's strengths and weaknesses, its cost blowouts and schedule slips, and much of it from people whose passion for the aircraft is all too evident from the tone and balance of their opinions.

What has been missing has been any serious discussion of what Australia's air power is supposed to do. That is a serious failure. We cannot responsibly decide what kind of aircraft, and how many, would best meet Australia's air power needs over coming decades until we have first answered the question, 'What do we need air power for?' I do not believe that the Government, or Defence, or the RAAF, have a clear answer to that question. We have avoided it by hiding behind the agreeable fiction of the 'Balanced Force'. The idea of the Balanced Force is simple. As long as we have a little bit of everything we can do a little bit of anything, so we do not have to decide what things we might really need to do. The flaw in this idea is simple too: a little bit of everything means you do not have enough of anything to achieve a real strategic effect. It works fine if you assume that all we will ever need to do is support a superpower ally or hold off a much weaker neighbour. It guarantees failure if we face more serious challenges that require the ADF to achieve substantial strategic results independently. But before we can move beyond the Balanced Force to build forces that can achieve substantive strategic results independently, we must first decide what those strategic results are.

The need to determine the ends before debating the means is hardly news to the defence community. The first principle of war, as they teach such things at any Defence College, is 'selection and maintenance of the aim', after all. We have got away with evading these questions in the past because we have enjoyed four decades of peace and stability. Now, Australia faces a period of strategic transformation in which the demands we will make on our armed forces in the next few decades might be much greater than they have been in the last few. Addressing that possibility is the core challenge in defence policy today. It is clear

¹ This paper, prepared for the 2010 RAAF Air Power Conference, was also scheduled to be published in *Security Challenges*.

from the 2009 Defence White Paper, and even from its predecessor in 2000, that political leaders on both sides of politics see this. They clearly discern the great strategic trends which are reshaping Australia's strategic environment, and they understand that there will be profound implications for Australia's military posture. But they have done little so far to work out what those implications are. I can understand why: the choices are stark and uncomfortable. Neither they nor their advisers have any wish to confront them. But until they do, it is hardly going to be possible to make a responsible decision about our future capability needs, including our future air power needs.

THE ASIAN CENTURY

In this paper I will explore those choices. It is a big subject and to get to the implications for air power I will need to cover the preliminary ground quickly.² We can start with three propositions.

First, the past 40 years have been among the most peaceful in our region's history, thanks to America's uncontested strategic primacy in the Western Pacific. This has placed clear and rather low limits on the kinds of military operations Australia has needed to be able to do, either independently or in support of America. Essentially, thanks to US primacy the scale of threat we might have to face unassisted has been low, and because US primacy has been uncontested, the support we have needed to provide the US has been low too.

Second, as China's power grows it is very likely that the regional order based on uncontested US primacy will become unsustainable, and will be replaced by another. It is possible, and highly desirable, that a new order will evolve which preserves the stability of recent decades. But it is at least equally probable that Asia will slide instead into a more contested future characterised by more intense strategic competition among Asia's major powers. This is not to say that China is the threat: avoiding bad outcomes is not just China's responsibility, but everyone's. Unless the major powers succeed together in building a new order, there is a clear and significant possibility either that the US and China will be drawn into systemic and intense strategic competition, or that the US will reduce its strategic engagement in Asia.

Third, if either of these happens, Australia's strategic circumstances would change profoundly. Australia would face a much wider range of credible strategic risks, and hence the possibility of needing to undertake much more ambitious military operations than those we have contemplated in recent decades, either in support of the US, or alone. In particular, it increases substantially the risk that we may find ourselves in conflict with a major Asian power without the support of the US. The risk remains low, but not nearly as low as it has been. It is of course these possibilities, rather than the demands for stabilisation or peace support operations, which will determine the demands that Australia will make of air power over coming decades.

² For more extensive analysis see Hugh White, 'Why War in Asia Remains Thinkable', in *Survival*, vol. 50, no. 6, December 2008–January 2009, pp. 85–104, available at <http://www.informaworld.com/smpp/content~content=a906263182~db=all~order=page>, accessed 1 October 2010.

These are not new insights. They were foreshadowed as long ago as the 1994 Defence White Paper, and were explicitly addressed in the 1997 Strategic Policy Review and the 2000 White Paper. They received less attention in the years after 9/11, but last year's new White Paper brought them right back to the centre of attention.³ *Force 2030* added a twist, however, that allowed it to evade the stark implications of its own analysis. It asserted that big strategic shifts would not occur for many decades, and therefore need not influence our force planning until the 2030s and beyond. This assertion was not supported by argument, and it sat uneasily with its prediction that China could overtake the US economically as soon as 2020. I believe it to be unsustainable: if China keeps growing, there is a clear possibility that Australia's strategic circumstances will change fundamentally, and Australia's strategic risks grow sharply, within the next few decades—in other words, in the period in which today's force-development decisions determine the forces Australia will have to rely on. The risk of strategic transformation in Asia must therefore inform the capability decisions we make today.

A MIDDLE POWER?

But first, Australia needs decide whether we want to be able to respond to these risks militarily or not. We have always claimed to be a middle power—a country that can look after itself militarily, and can negotiate with major powers, not simply obey them. But we have also doubted that we really are—doubted our ability to look after ourselves, or even to make much direct difference to who won or lost the great wars into which we have been drawn in support of others. So we have settled on an easy compromise: talk like a middle power and act like a small one, leaving the gap to be covered by great and powerful friends. But in the Asian Century, if our great allies are no longer in charge, we may have to finally decide which we are. For the purposes of this paper, I will assume that we aspire to be a middle power in the new order which will emerge in Asia in the Asian Century. In military terms that means something quite specific; that our forces should be able to protect our most important strategic interests independently against that proportion of the forces of a major Asian power which could credibly be brought to bear against them.⁴

How do we decide what kind of forces we need to give us the strategic weight of a middle power? This too is a big subject that I will cover briefly. We must start by defining those 'most important interests'. I have discussed how we do that in detail elsewhere,⁵ so let me simply suggest that the concentric hierarchy of regional strategic interests set out in the

³ Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030: Defence White Paper 2009*, Department of Defence, Canberra, 2009.

⁴ For a fuller version of this argument, see Hugh White, *Power Shift: Australia's Future between Washington and Beijing*, Quarterly Essay 39, Black Inc., Melbourne, 2010.

⁵ Hugh White, 'Strategic Interests in Australian Defence Policy: Some Historical and Methodological Reflections', in *Security Challenges*, vol. 4, no. 2, Winter 2008, pp. 63–79, available at <http://www.securitychallenges.org.au/ArticlePages/vol4no2White.html>, accessed 1 October 2010.

2000 White Paper and retained with minor modifications⁶ in the 2009 White Paper will serve as sufficient foundation for the argument I want to develop here. From these interests flow a series of strategic objectives—things we would want to be able to achieve or prevent with armed force in order to protect our interests. The strategic objectives that flow from our concentric hierarchy of interests can be summarised as: defend the continent, deny the inner arc of islands to potentially hostile forces, prevent major power strategic intrusion into maritime South-East Asia, and preserve a balance of power among Asia's major powers so none can establish regional hegemony. Of course, as a middle power we would not need to be able to do all these things by ourselves. We should be able to achieve the first two objectives by ourselves, play a leading role in the third, and make a significant contribution to the fourth.⁷

MARITIME DENIAL

Next, we need to decide which operational options would most cost-effectively achieve these objectives. This too is a big subject that I am going to cover very briefly, and offer a stark conclusion. For many years, most people have accepted that Australia itself is best defended by sea and air denial operations—the denial of our maritime approaches to hostile ships and aircraft. But we have also tended to assume that our wider strategic objectives—in the inner arc of islands, maritime South-East Asia and the wider region—are best achieved by power projection based on sea control. In fact, it is often assumed that they can only be achieved by, or by way of, sea control operations, either as an end in themselves or to allow the projection of land forces.

This assumption must be carefully tested, because sea control is going to be very hard to achieve against any major Asian power, or even against a growing number of middle-sized regional powers, over coming decades. Submarine, sea mine, and airborne anti-shipping capabilities in the region have grown steadily in recent decades, and are likely to grow further over the next few decades. Submarines will be especially critical. Unless a technological breakthrough neutralises the advantages of stealth now enjoyed by submarines, they are likely to remain extremely effective and cost-effective anti-shipping platforms for as far ahead as we can see. This has profound strategic implications. It is already unclear that the US can deploy surface ships in the Asian littoral against Chinese sea denial forces without unacceptable risk. That means the US itself is losing sea control in the waters in which Australia would need to operate to achieve its strategic objectives. Over coming decades, Australia has no chance of being able to achieve sea control in any area of the Western Pacific contested by any major or middle power with a substantial submarine capability to a degree that would enable us to deploy and sustain significant expeditionary forces by sea.

⁶ Minor but not insignificant: see Hugh White, 'A Wobbly Bridge: Strategic Interests and Objectives in Force 2030', in *Security Challenges*, vol. 5, no. 2, Winter 2009, pp. 21–29, available at <http://www.securitychallenges.org.au/ArticlePages/vol5no2White.html>, accessed 1 October 2010.

⁷ This summarises the view of Australia's strategic objectives as set out in the 2000 Defence White Paper, Department of Defence, *Defence 2000: Our Future Defence Force*, Defence Publishing Service, Canberra, 2000, Chapter Four, pp. 29–32.

So if a capacity for that kind of power projection, and the sea control necessary to achieve it, is essential to Australia's strategic objectives as a middle power, we had better forget about being a middle power.

But conversely, it would be relatively easy for Australia to achieve a substantial sea denial capacity of its own. The technological balances which make sea control so hard to achieve make sea denial relatively easy. Moreover, I would argue that sea denial can achieve our core strategic objectives—not just denial of our own direct maritime approaches, but also the approaches to the inner arc of islands and, with others, the waters of maritime South-East Asia and the more distant areas of the Asian littoral. This conclusion will surprise those who assume that only direct operations against an adversary's territory by land or air forces can achieve strategic results. Certainly, such operations can achieve results that sea denial cannot, but are those results really essential to our strategic objectives, and are they achievable for Australia acting alone, with the forces that can be sustained at any credibly sustainable level of defence spending? I think not. In reality, sea denial (or rather maritime denial—which I will explain in a minute) is the only conventional operational option we will have independently against major power adversaries in the Asian Century. Australia is fortunate that our strategic geography allows us to exploit the asymmetrical advantages of denial over control to support not just our own direct defence, but the defence of our wider strategic interests as well. Taking advantage of this is the key to Australia's chances of sustaining the strategic weight of a middle power.

You may have noticed that I slipped 'conventional' into the argument a few sentences back. There is a quite separate debate to be had about the place of nuclear weapons in an independent Australian middle power strategic posture, which I do not intend to pursue here. Let me just say in passing that the only nuclear strategic posture which could make sense for Australia would be one based on deterrence rather than denial, and that I neither predict nor advocate the development of such a posture.

AIR POWER AND MARITIME DENIAL

Now we can see how to answer the question I posed at the start. What does Australia need air power for? To help achieve maritime denial in Australia's direct approaches, in the maritime approaches to our closest neighbours, in the waters in maritime South-East Asia and in the wider Asian littoral. Our task then is to consider how air power can most cost-effectively contribute to Australia's maritime denial capacity. The remainder of this paper will explore this question. It will not consider platforms or systems, or even whether platforms are manned or unmanned. Its focus is on tasks and cost-effectiveness. It is important to understand that cost-effectiveness here is not just a fiscal imperative, but a strategic one. Australia's relative economic weight in Asia is in long-term decline. We will not be able to maintain middle power strategic weight over coming decades as our economic standing erodes unless we focus our efforts on achieving the maximum strategic effect for every dollar we spend. We will need to keep a very open mind on how that can best be done, and the more expensive a capability will be, the more care we should take in scrutinising whether or not it contributes cost-effectively to achieving our key operational

objectives. Anything that does not, should not be funded. Air power is extremely expensive, and we should buy no more of it than we need. Nothing is sacred.

Two other preliminary points. First, the core aim of maritime denial is to prevent hostile forces reaching Australia through our air and sea approaches. It therefore has two elements—sea denial and air denial. They are connected, though in complex ways. The role of air power in maritime denial involves both elements, as air power has the potential to contribute to both. Second, although maritime denial is *strategically* a defensive posture, operationally it can be highly aggressive, in ways which may be very important to the way we think about the role of air power. Denial is achieved not simply by interdicting adversary forces as they approach our shores, but by attacking the forces that could be sent against us wherever they can be cost-effectively targeted.

The following section will explore air power's role in maritime denial, primarily by looking at the specific case of direct defence of the continent and the inner arc of islands, partly because they are our highest-priority strategic objectives, and the ones most important to be able to achieve alone. But the same considerations apply to the use of maritime denial further afield in South-East Asia or the wider Asian littoral, subject to important considerations of basing and support, which I will address later.

At first glance, the role of air power in a maritime denial posture seems straightforward. We need to be able to establish and maintain air superiority over the maritime approaches we want to deny. In crude terms, we could say that maritime denial consists of a combination of sea denial and air superiority. Air superiority contributes to maritime denial in two ways. The first is air denial *per se*. We want to prevent attacks on the defended territory by denying passage through the maritime airspace by hostile aircraft. The second is supporting sea denial. Air superiority does this by enabling our aircraft to contribute to sea denial operations without interference, preventing adversary aircraft from operating against naval sea denial forces, and enabling strike operations against adversary forces and bases. To a first approximation then we could say that the core role of air power in Australia's strategic posture over coming decades will be independently to establish air superiority over the maritime approaches to the continent and the inner arc of surrounding islands against the forces that a major Asian power could bring to bear against them in those locations. We can also see from this analysis that an important secondary role for air power is to contribute to sea denial operations through anti-shipping surveillance and strike, and through land strikes against adversary forces and bases. By the same token, some roles which have been considered important for air power are not priorities after all, and can be excluded from our considerations. Most obviously, on the arguments presented here, direct support for land forces is not a priority for Australian air power. Neither is support for surface ships seeking to establish sea control.

DIGGING DEEPER

But is this all we can say, or can we dig a bit deeper here and provide a clear and more informative judgement about the roles of air power in a maritime denial posture? In the following paragraphs I will offer some preliminary ideas that might at least suggest some directions for further thought.

Air Denial

The most obvious role for air power in maritime denial is the direct denial of air approaches to the aircraft of an adversary. Instinctively, any government is going to give top priority to preventing any kinds of air attack on the homeland. But just how high a priority, and how much it would be willing to spend, does depend on a more sober analysis of costs and risks, and the comparison with other kinds of threat. Eventually, it will face the question: which is more important in a maritime denial posture—sea denial or air denial?

I would like to offer as a tentative hypothesis that sea denial is more important. My reason is simple enough—more force can be delivered against us by sea than air. Intruding aircraft can deliver two types of attack. One is the landing of air-deployed forces. So long as we can maintain effective sea denial to prevent reinforcement and supply by sea, the scale of land forces that could be deployed and sustained by air is not great, and it would not be hard for Australia to sustain land forces sufficient to deal with them. The more serious risk is air-delivered strike operations against Australian targets. Let us leave to one side the question of aircraft-delivered nuclear attack, because this risk is more sensibly managed by a posture of deterrence than by maritime denial. For the same reason, we might leave aside ballistic missiles, which at the ranges required to attack Australia would only be only cost-effective with nuclear warheads.

We focus then on conventional strike operations against Australia. How big a threat are they? That depends on the scale of forces an adversary could base within range of Australian targets. Geography helps us here. Although economically important targets abound in northern Australia, strategically important ones do not. (Yes, there is a connection between economics and strategy, but it operates at longer time frames than are relevant for most operational planning.) To achieve worthwhile strategic effects with conventional strike operations against targets in southern Australia from bases offshore, an adversary would need to mount a large and sustained strike campaign at extreme range. It is worth wondering whether it would be worthwhile, even for a major power adversary, to commit the forces required for such a campaign. The only targets that would promise a clear strategic return would be the Australian forces and support systems needed to achieve sea denial. They might be made hard to hit if we gave them extensive passive defences and plenty of surface-to-air missiles (SAMs).

These reflections suggest that so far as the protection of the continent itself from air attack is concerned, the most cost-effective defence might be mounted over the continent, and perhaps over the approaches to the south-east and south-west corners of the continent. This would give significant advantages, and allow us to achieve a credible defence at lower costs, with fewer aircraft at less exposed bases, than meeting adversary forces closer to their own bases. I can hear cries of the 'Brisbane Line' already. Of course, any Government is going to want to defend the whole country equally all the time and, as we shall see below, there might be other reasons to build forces capable of maintaining air superiority over our sea approaches. But the direct defence of the continent from air attack might not be among them. Relatively smaller forces based further back, perhaps combined with SAMs, might meet our highest-priority needs better.

Sea Denial

This analysis also implies that supporting sea denial may be a more important task for air power in a maritime denial posture than air denial. As we have seen, air power can support sea denial in several ways—enabling our aircraft to contribute to sea denial operations without interference, preventing adversary aircraft from operating against our naval sea denial forces, and enabling strike operations against adversary forces and bases. It helps to clarify things if we look at them separately.

First, there are clear advantages in being able to sustain air superiority over the waters one is trying to deny to an adversary because it allows our aircraft to contribute to sea denial operations. The question is, how important is this to achieving sea denial, and what priority should it have over other elements of the task? Aircraft contribute to sea denial both through surveillance and strike, and against both surface ships and submarines. Let us look at anti-submarine warfare (ASW) first because, rather surprisingly perhaps, it is not very important. ASW is very hard, and it is easy to spend a lot of money for small and uncertain returns. One of the advantages of forgoing sea control as an operational objective is that you do not have to worry much about ASW. A maritime denial posture means that we do not have to protect our ships from the adversary's sea denial forces, because we keep the sea clear of our ships. Of course, we still need to protect our submarines from adversary submarines. But a major investment in airborne ASW, and in the air superiority forces needed to protect them, would probably be less cost-effective than simply building more submarines to do their own ASW, and to increase our capacity to absorb submarine losses. Airborne ASW has little future in a maritime denial posture.

Anti-ship operations are a different matter. Aircraft are very effective anti-ship surveillance and strike platforms, and they complement the capabilities of submarines in important ways. They are more vulnerable than submarines, but they have offsetting advantages. Their wide area surveillance and targeting systems have big advantages over submarine-based systems, though of course they may be superseded by cost-effective space-based systems in time. As strike platforms, aircraft can attack ships when slow-moving submarines are not around, and a combination of subsurface and air threats complicates a ship's defensive task significantly. More broadly, the risk of air attack requires very expensive air defence systems in ships and drives up the costs and risks of maritime operations. Finally, while there is a strong imperative to maximise investment in the most cost-effective capabilities for any particular role, there is also there is a clear advantage in diversifying our means of achieving our most important tasks, to guard against surprise or disaster. Therefore, while I would tend to argue that submarines are our most critical sea denial capability, airborne anti-ship capabilities are important too. This means we should give significant priority to both anti-ship aircraft, and to the air superiority forces needed to allow them to operate.

Second, some would strengthen this conclusion by arguing that air superiority over contested waters is also important in preventing adversary aircraft from operating effectively against our naval forces. I do not think that is true in the kind of maritime denial posture we are talking about here. As long as we keep the sea free of our ships, adversary

air forces will find few targets. And for them, as for us, airborne ASW will remain a hit-and-miss, high-cost low-return business.

Third, strike operations against land targets may have an important role in sea denial operations (and air denial operations too). Strikes against adversary air and naval platforms at their bases, and against the bases themselves, potentially provide a cost-effective way to erode the adversary's capacity to penetrate maritime approaches, and the ability to do so can impose high defensive costs on an adversary. This has two implications for our view of the role of air power in maritime denial. First, to the extent that we can extend air superiority from the approaches we are trying to defend to the bases from which an adversary is trying to project force, we can enable strike operations against them. This provides an additional reason to invest in air superiority, but the cost-effectiveness of additional air superiority capacity required to enable strike operations would dwindle sharply as the distance from the maritime approaches being defended increased. Second, it could justify a significant investment in land strike capability. How much investment would be needed would depend, among other things, on the extent to which strike can be performed by the same aircraft as air superiority and anti-shipping roles, and how much would be justified would depend on how reliant adversary forces were on basing within easy range of relatively inexpensive air superiority and strike capabilities. My guess is that a careful analysis of these factors would show that strike is in fact a pretty good investment in a maritime denial posture. But the more important implication of this analysis is that the value of strike capabilities should be judged only on the basis of their cost-effective contribution to maritime denial, and not on the basis of some more generalised concept of deterrence.

BEYOND THE INNER ARC

So far we have focused on the role of air power in maritime denial in Australia's immediate neighbourhood—the air and sea approaches to the continent and the inner arc of islands. But we also need to consider how air power might contribute to maritime denial operations in cooperation with regional friends or allies in maritime South-East Asia and the wider Asian littoral. In essence, the operational issues are very similar whether close to home or far away, and at first glance the balance of costs and benefits between investment in air power and in other types of capability for maritime denial might seem the same. But in practice, two important and interconnected issues intrude into the analysis as we move further from the continent.

The first is access to basing. Even with massive investment in air-to-air refuelling (AAR), Australia cannot achieve significant strategic results beyond the inner arc with air power operating from bases within Australia. Other sea denial capabilities—submarines—can operate throughout the Asian littoral from bases in Australia, but air power cannot. Indeed, even air operations in the approaches to the inner arc—to the north of Papua New Guinea (PNG) for example—would be much less cost-effective if mounted from bases in Australia than from bases in PNG. So our judgements about the cost-effectiveness of air power in maritime denial beyond the inner arc, or even beyond the continent's own approaches, will depend among other things on our confidence that we could get access to adequate and

reasonably secure basing close to the areas where we want to operate. This is probable, but not to be taken for granted.

The second issue is secure lines of communication to those bases. This is much more problematic. The argument for adopting maritime denial as the primary operational concept for the ADF is based largely on the judgement that sea control in any contested waters is going to be unachievable for middle powers, or even for major powers, in the next few decades. Just as this makes the deployment of expeditionary land forces an impractical option for Australia in any conflict involving a maritime-capable middle or major power, it also makes expeditionary air deployments impractical if they depend on sea transport. It is hard to imagine a strategically significant deployment of air power being sustained purely by air, so this consideration might prove to be a decisive constraint on the use of expeditionary air power to prosecute maritime denial beyond the range of aircraft based in Australia. That suggests that the more priority we place on being able to project maritime denial capability beyond our own approaches, the more the emphasis in our investment should shift from air to submarines.

CONCLUSION

Where does this leave us? Today the future both of the submarine force and of the core combat capabilities of the Air Force are on the table, along with massive investments in new naval surface combatants. The first and most critical conclusion is that none of these decisions can be made responsibly until the Government has first decided what kind of operations the ADF is being built to conduct. That decision must in turn be based on a rigorous analysis of the operational options that would most cost-effectively protect Australia's strategic interests in a more contested Asia. If that analysis confirms that maritime denial should be the core task for the ADF in coming decades, then Australia's air power decisions, and the other big capability choices now before us, should seek the mix of capabilities that most cost-effectively achieves it. The ideas I have sketched here provide, at best, only preliminary guideposts for the detailed analysis that is required to determine the most cost-effective mix of capabilities for maritime denial, but they at least indicate the kinds of issues that need to be addressed and the kinds of answers we should be looking for.

Then of course there is a whole set of questions about what kind of fleet best delivers the capabilities we need. Andrew Davies' paper for this conference makes a fascinating and important contribution to this question. And, finally, we need to consider whether we as a country can sensibly expect to be able to sustain the kind of air power that our analysis suggests we need to be an independent middle power, and what kind of organisation our Air Force would need to become in order to do it. But that is for another time.



DISCUSSION

Air Commodore Mike Bennett (RAAF – Moderator): Thank you Professor White. You picked up again a very interesting theme that has been evident through the last couple of days. Before I take questions from the floor, I will take the opportunity to just tease out a little bit about ASW, given that the Chief of Navy is not here and I suspect he's got a stake in this as well. One of the conjectures is that we won't be at sea. But I suspect that the national economy will require whole civil-naval support and that any adversary would be tackling that economic line. Do you think the submarines will be in a position to be able to protect that line of communication?

Professor White: Thanks for asking that question, apart from anything else because I was very conscious that I had left the whole defence of trade argument to one side and I'm very glad to bring it back in again; it's a terribly important point. One of the best arguments often advanced in favour of a sea control strategy is that it appears to give you the opportunity to defend your trade, but I do not think it really does. We know how much ASW costs. We cannot defend Australia's seaborne trade from an effective submarine-capable adversary through doing ASW. It's just too hard to find the submarines. It's too easy to build the submarines and it's too easy to sink the ships with a submarine once it's there. So if sea control is required for us to defend our trade, we cannot defend our trade. It's just not going to be possible for us. That's the way the balance of technology is today and actually has been for quite a long time, but there is an alternative. What that means is that in an all-out conflict trade stops, and that's pretty scary and we don't like that conclusion. But it's also worth bearing in mind: where are we going to send this iron ore to, in this conflict we're speculating about? And don't get me wrong, I don't necessarily mean that I think China is the adversary, but I do think that a major conflict of the sort we're talking about stops the North-East Asian manufacturing juggernaut in its tracks. So, we've got a lot of problems other than the fact that we can't establish sea control sufficient to defend our trade, but I also turn the coin over. I think that we do have a modest capacity to defend trade against any adversary that itself has substantial seaborne trade by the good old-fashioned operational option of deterrence, which I know is much beloved of Air Force. They sink our ships, we sink their ships—submarines can do that for you. What you need to be able to do is to impose the same kind of costs on an adversary as they're seeking to impose on you. Now, it's not perfect, it's a second-best operational option but the first-best operational option—the option of sea control sufficiently broadly based to defend Australia's maritime trade—is simply not going to be achievable against capable adversaries, so it's a real waste of money to try. Sorry, I would like to think better of ASW, but that's the way I see it.

Dr Andrew Davies (Australian Strategic Policy Institute): Thank you Hugh, I want to pick up on ASW. ASW is too expensive to do if you choose to do it expensively. Now a \$300 million P-8 [maritime patrol aircraft] is a very expensive way to do ASW, but I can foresee doing ASW with a fleet of 'marinised' Reapers, if you like, with an ASW torpedo and sonobuoys, and you network them. You then have the persistence and, if you network the sonobuoys

across the fleet, you can actually do fairly wide area ASW at a relatively low cost if you do it that way.

Professor White: It's a very good point. The hypothesis I'm developing depends very much on the proposition that the balance of technology and cost between ASW and submarine operations remains roughly stable. If it shifts, that might not work. But it would have to shift, to me, a hell of a long way before it reached the point where maintaining sea control started looking like a good idea. Of course, you might be making a more modest point than that and that is that non-submarine based ASW is worth investing in. That could easily be right but it would be, to my mind, investment at the margins. I've got to say that my working hypothesis is that the best way of managing the threat that submarines pose to your own submarine forces is to build an awful lot of submarines, so that you can afford to lose some, and you can do a lot of submarine-based ASW itself and, of course, keep the sea clear of your own ships.

Squadron Leader Darin Lovett (RAAF – Defence Space Coordinating Office): On the topic of anti-shipping weaponry, as an ex-P-3 TACCO [Tactical Coordinator], I, like you and Andrew before you, have always thought of ships as floating targets. The 2009 White Paper said that we're going to get JSF and alluded to the P-8. You suggested that sea denial through strike should be our number one priority. But where are the weapons to do that? My understanding is that JSF isn't coming with an anti-shipping weapon for Australia and the P-8 is looking at an obsolete Harpoon—I believe in the early spirals it's not even going to integrate those weapons. So, do you think we've got the priority right for the weapons side of things, given that they're not in the DCP [Defence Capability Plan]?

Professor White: I'm trying to keep this above the level of capability but, of course, I'm no better at resisting that temptation than anybody else. I think the idea that Australia would acquire something intended to be a multi-role front-line combat aircraft like the Joint Strike Fighter that doesn't have a maritime strike capacity is unthinkable. I've got to say, I just don't see how that adds up. Even if you take a much more modest view of the role of sea denial in an Australian operational strategic posture than I do, it still does seem to me that it's absolutely fundamental that being able to do it from the largest number of aircraft as possible is a very high priority. Now, I can see the problem. [Air Commodore] Mike Bennett said I spent a bit of time in Defence and there are some very ugly records of us trying to integrate US or other weapons onto aircraft that hadn't been integrated by the USAF or the USN, and that's a very difficult and costly business. So I'm very sympathetic to people who fight shy of it, but I just don't think it makes any sense at all for this island continent to buy a front-line combat aircraft that doesn't have a very strong anti-shipping capability. I'm neutral on the question as to what kind of platform is actually best for that role. I'm very open to being persuaded that actually putting it on the fast jets, the air superiority platform, is a very cost-effective thing to do. I'm open to the argument that bigger slower longer range aircraft with bigger weapons loads and capacity for bigger sensors makes sense. I'm open to the argument you can do it very cost-effectively from UAVs. I've got a very open mind as to what the best technical solution is and I'd want us to look at that question as openly as possible. I just want to get the most cost-effective outcome. But to turn that coin over, if we're going to be buying a Joint Strike Fighter or, for that matter, anything else that doesn't

have a really good anti-ship strike capacity, then I don't think we're going to be hitting the right box.

Air Commodore Mike Bennett (RAAF – Moderator): Before our next question, I'll just invite Air Vice-Marshal Harvey to make a comment about the JSF.

Air Vice-Marshal John Harvey (RAAF – Program Manager New Air Combat Capability): I'll just hit a couple of points there, Hugh. I note your comment went from JSF not having a maritime strike *capacity* to later you said *capability*. To clarify, the aircraft will be capable for maritime strike. The issue at the moment is to choose which is the best long-term weapon to integrate into the aircraft. In terms of the DCP, it does have a dedicated maritime strike weapon program in there. I suggest, in the long term, JSF will arguably be one of the best maritime strike platforms out there, given its sensors, its stealth and the internal carriage of something like the Joint Strike Missile. It's just a matter of us wanting to sit back and make sure we do that in the most cost-effective way with regard to which is the preferred weapon and preferred time frame, and we'd like to do that in conjunction with the rest of the partnership to keep the price down for us. So, as I say, DCP has it covered and we're just choosing the optimum time and weapon to go for. Sorry, that's a statement rather than a question.

Professor White: It's a very good point and I'm very reassured to hear it. I guess I'd just suggest that we wouldn't want the gap to be too long, if you know what I mean. In the Defence capability business, that phrase, 'long term', has got a very sinister ring to it. But I'm reassured by what you've said. I do think for the reasons I've said, it's terribly critical that that be got right as soon as possible.

Dr Malcolm Davis (Strategic Policy Division): Hugh, you may be surprised but I'm not going to tackle you on submarines. What I am going to suggest to you is that your analysis might lead you to another possibility that you haven't really talked about and that is long-range bombers. The US Air Force is now looking at its next-generation bomber program. They've very much discovered the renaissance of the bomber and its utility in terms of being a multi-role platform. Now, I'm not suggesting that we buy B-2s. What I am suggesting is we get something like a next generation B-1 that is loaded with cruise missiles that can complement the submarines. If we're looking two, maybe three, Defence White Papers out in terms of force structure development, do you think this is a viable option to make the Air Force more of a credible player in terms of operating forward, rather than just being in the inner ring as you've got it?

Professor White: A very good question, Malcolm. I always start thinking about strike by asking about the target set. What is it we want to destroy? As a working hypothesis, I think for a country of Australia's size and assuming we're talking about conventional warheads, it's very hard to achieve strategic effect by striking anything other than targets which are directly related to the military capabilities that the adversary might bring to bear against you. To my mind, being able to strike those targets is a very high priority because my instinct is it is a very cost-effective way of doing sea denial or air denial, so I'm very attracted to that kind of capability. But I think the cost-effectiveness of that option drops off sharply as the range increases. If their aircraft aren't yet in range of your target set, then I'd rather

keep my resources for attacking the things that are within range of my target set, keep my resources for attacking the bases that are within range of land-based air power of Australia, or attacking the ships that are sailing in our direction. So, whilst I wouldn't rule out the idea that there might be an argument for a longer range bomber capability, it does seem to me that the cost of that capability and the cost of the extended air superiority capacity required to be able to get them to and from their targets safely is unlikely to be cost-effective when compared with the other ways you could spend the same dollars. Not to put too fine a point on it, I'd rather just have more air superiority over the maritime approaches, more maritime strike over the maritime approaches and more submarines, please—small cheap ones, mind you, not big expensive ones.

Wing Commander Nathan Christie (RAAF – Air Force Headquarters): I was interested to hear your thoughts on balance. Yesterday, the National Security Advisor to some degree admonished us for not being flexible enough. How do you reconcile the difference between a Balanced Force and then the range of tasks that the government of the day can ask?

Professor White: A very important question and, of course, from the job that Duncan [Lewis] does these days, flexibility is very important—he's the guy who sort of transmits the messages, I guess. But we've got to be brutally realistic about this and by that I mean governments have got to be brutally realistic about this. Flexibility across a wide range of roles *always* comes at the cost of capacity in any one of those roles, except in fairytales. So we can build a flexible Defence Force that can do all kinds of things but, at any given level of Defence spending, the more flexibility we have the less capacity we will have to do anything in particular. Now, if the strategic risks you think you face are a fairly diverse range of rather low-level risks—Are things going well in Oruzgan this week? Are we happy with the way in which the Solomon Islands is operating? Would we like to be able to contribute to Cambodia or whatever?—then flexibility can make quite a lot of sense, particularly if you work on the assumption that your contribution is going to be a small, shall we say, niche contribution to somebody else's strategic effort. But, if the strategic risks you're most interested in managing are ones that would require a substantial Australian independent military response, then we cannot afford flexibility. We have to make the choices about what's most important to us and invest enough to achieve them. Otherwise, what we end up with, I don't want to be impolite, but we end up with what we've got today, which is an ADF which has a very large number of very small capabilities and not enough capacity in any one of them to achieve real independent strategic effects in any really serious strategic situation. Now that is, in the end, a choice for Government to make. Does Government want to have a military toolkit which gives it small options in a wide range of small and relatively credible scenarios or does it want to have military options to allow it to achieve genuine independent strategic results in the most serious situations? All I can say is that, if you go for option one, you're not a middle power. If you go for option two, and you play your cards right, you might be. So I can understand why Duncan asks for flexibility, but governments have got to ask themselves whether they're really serious about that or alternatively, of course, you can spend 8 per cent of GDP on Defence and have flexibility *and* capability, and then we go the way the Soviet Union went. Flexibility is often an excuse of just not making choices.

Squadron Leader John Durden (RAAF – No 2 Airfield Defence Squadron): I think everyone in this room is well aware of the issues we have manning six submarines. I'm just wondering if it's a wise decision to base a large part of our defence on a platform that we're unlikely to be able to man.

Professor White: Another very important question. Two points: the first is that we need to ask ourselves why do we have trouble manning submarines or, to put the question the other way around, what is it that means that a country of 22 million people can't find, to be very generous, 2000 young Australians who are prepared to serve on submarines? I don't believe it's demographic. I don't believe you can't find enough people to crew the Collins because the country's not got a big enough population, so there's something else wrong. I reckon you could find a solution to that problem pretty simply and it goes to something that Andrew said. You find some bloke and you tell him that he is personally responsible for making sure that the Collins fleet is fully crewed by the end of next year. You give him a substantial budget and, considering how much we've spent on the boats, it would be worth spending quite a lot of money to actually realise some strategic benefits from that investment. At the moment we have a huge sunk cost that delivers us very little. So I'd give him quite a lot of money and I'd also say, 'Mate, if by the end of next year we have a fully crewed submarine fleet, you will get a one million dollar bonus'. It would be a bargain. But if he has the authority to do it and the resources to do it and a very clear direction that that's what people want, I think we have a very good chance of solving the problem. Why are the submarines not fully crewed? Because nobody in the end thinks it matters enough to make it happen—it's as simple as that. Or you can turn the issue around. Australia maybe can't find the people to crew six or twelve submarines—my number's 18 but I'm easily persuaded of 24; quantity has a quality all of its own in submarines, as in many other things. In that case, we'd better work out what that means. It means that, as a country, we find it too hard to persuade young people to serve in submarines, so we're going to be a small power not a middle power. That's a choice we can make as a country, but it does make you wonder whether, not just the sort of detailed DCP planning processes we have in place, but the whole way we think of the functioning of the Defence organisation is really the one that Australia needs if it's going to be a middle power and whether, to take the argument a step further, the approach that Australia's political leadership of both parties have taken to these issues over the last few decades is in any way connected with the genuine strategic challenges we face. In the end, if we don't make a decision, we'll be a small power; we'll go the New Zealand route. The only difference is that we'll be spending two per cent of GDP instead of one per cent of GDP, so we'll be spending more than we need to be a small power and not enough, and not smart enough, to be a middle power, which will be doubly dumb.

CONFERENCE SUMMARY

AIR VICE-MARSHAL GEOFF BROWN, AM

INTRODUCTION

Chief of Air Force, visiting Chiefs, distinguished guests, ladies and gentlemen, it is with some trepidation that I follow such an impressive and respected group of national and international speakers from whom we have heard over the last two days. Although we have not had an Air Power Conference for a long time, this one has been a particularly successful event. I think the calibre of the presenters, the level of analysis, the debate and the thought we have witnessed have made it, in my mind, a truly fascinating couple of days. The presentations have challenged our perspectives on air power; in particular, where it is now, what the future may be, and the implications for Australia and the Air Force.

CAF noted in his opening address that the conference would provide an opportunity to analyse, think, discuss, and even argue, some of the key aspects of air power in the 21st century. For me, and I hope for you, the conference has actually achieved this. Indeed, it has served as a valuable 'strategic pause', and it has provided us with the opportunity to reflect on some of the key issues:

- what is the role of air power in the current and emerging national security concepts,
- what Government actually requires and intends of an air force and the air power it generates, and
- what the Air Force can do in order to be prepared to meet these challenges as a first-rate provider of air power.

CONFERENCE SUMMARY

Over the last two days, we have discussed several key areas of air power in Australia's national security. These have included:

- The role of air power in national security.
- The challenges of air power in meeting its full potential in difficult political and geopolitical environments.
- The role of air power in irregular warfare.
- Key capability requirements, identified in the Defence White Paper. These have significant air power implications, such as space, uninhabited aerial systems, and intelligence, surveillance and reconnaissance (ISR).

The Minister for Defence, Senator John Faulkner, detailed the effect of the 2009 Defence White Paper and the Defence Capability Plan on Australia's air power capabilities. The Minister reiterated the importance of air power's place in Australia's defence capability and highlighted the important changes that the RAAF will undergo in the forthcoming decade.

In his opening address, the Chief of the Defence Force, Air Chief Marshal Angus Houston, discussed the requirement for our force to reach, know and exploit—important words and ones that I would like to revisit later in this presentation.

The National Security Adviser, Mr Duncan Lewis, clearly identified the challenges of a broader national security construct. I think that this was a presentation well worth taking in for all Air Force officers.

Dr Sanu Kainikara from the Air Power Development Centre highlighted how much a modern air power strategist and commander can learn from understanding Sun Tzu's *The Art of War*—in particular, for today's air commander, in directing a complex and integrated air campaign that delivers effects for the joint commander and the Government across the spectrum of conflict. As CAF noted in his launch of the book, *The Art of Air Power*, 'leading an Air Force, directing an air campaign and controlling and conducting air operations is an art—it is the art of air power'. I would like to offer my congratulations to Sanu on an impressive and innovative book.

Mr Joe Rouge of the US National Security Space Office highlighted the close nexus between air and space power and the need to better integrate space into national power. In particular, he highlighted to us a couple of key points in terms of what space is. Space is a very congested environment. It also is a potentially contested environment, and I believe that one of the things that we need to think about, even at the tactical level, is how we handle that particular challenge.

Dr Ben Lambeth of the RAND Corporation showed that air power has a truly unique ability to provide strategic effects in the battlespace, and that they are effects that no other capability can provide. However, there is still a debate on how to prepare and orchestrate one's own air force for the current fight. Ben also offered some very interesting and valuable insights into the US Air Force and the Pentagon area of operations.

Dr Alan Stephens of the Williams Foundation challenged us in many ways by questioning the West's preferred method of warfare—expeditionary operations. As usual, Alan's presentation was particularly eloquent, thought provoking and, in some cases, uncomfortably difficult to argue with. Alan, it was interesting that your comments on collateral damage reflect one of the Air Power Development Centre's latest *Pathfinder* articles and I also found the argument you put forward on the 'three block war' an interesting one. I must admit that I have always accepted that notion, but now I will have to ask some more questions of my Army compatriots as we go into the future.

Dr Chris Clark of the Air Power Development Centre clearly demonstrated how irregular warfare is not new for Australian air power. He highlighted that we have undertaken the full range of irregular warfare operations throughout our history, whether it be counterinsurgency, counter-terrorism and, indeed, insurgency support, and that has happened from the earliest times of Australian military aviation.

Dr Rebecca Grant of IRIS, in what I consider was another great presentation, showed what we still do not know and the challenges that we face in better applying air power in irregular warfare. To my mind, it also showed that doctrine and capabilities that we develop in the

crucible of irregular warfare have had a lasting impact on air power, and that is long after the irregular warfare campaign has ceased.

Lieutenant General Deptula offered a unique and valuable presentation into how the USAF has transformed its ISR capability—from a 'backroom' intelligence enabler role to a key air power role and mission set. There is indeed much for us to learn from the USAF experience as we embark on our own RAAF ISR transformation. I must also say that it is the first time that it has really made sense to me that change in term from 'uninhabited aerial vehicle' to 'remotely piloted vehicle'. I had wondered why the USAF had made that change but it really does more accurately reflect what is going on; there are significant ground-based C2 and processing, exploitation and dissemination capabilities resident in the system, and those remotely piloted vehicles actually take a lot of people to operate.

Our last two presenters, Dr Andrew Davies of the Australian Strategic Policy Institute and Professor Hugh White from the Australian National University, provided some very interesting analyses of the 2009 Defence White Paper and its impact on air power. I think that there is a lot that we can probably argue with, but it is certainly an area we will continue to discuss. Andrew focused on capability and what the RAAF will and might look like, while Hugh focused on the 'Asian Century' and what it will mean, in a strategic sense, for Australia, and whether we have got the right sort of defence capability plan for the future.

MY FIVE KEY TAKEAWAYS

Now, it is easy to simply summarise a conference like this, but I would like to identify my five key take-outs from this conference and then briefly talk about in terms of their application in applying the art of air power, both in terms of orchestrating what air power brings to the joint campaign and the transformation of our Air Force into the future force. So, for me, the five key takeaways from this conference are as follows:

- Firstly, we need to understand the past—even if it is a 2000-year-old past—and we need to understand the way conflict has evolved and the increasingly critical role of air power, and how that has evolved in the conflict space.
- Similarly, we need to understand the current and emerging characteristics of conflicts and the strategies required to prevail in them.
- Thirdly, we need to have a clear understanding at the strategic level of the Government's requirements of the military for Australian national security.
 - These first three takeaways are critical for us to be able to plan, prepare and adapt for the increasingly complex operations our Government requires us to conduct across a very broad spectrum of conflict and the effects they expect us to deliver for our national security.
- My next takeaway is the need to develop air power enabled ISR and space capabilities in an integrated manner to meet the Future Joint Operating Concept and Future Air and Space Operating Concept in accordance with the 2009 Defence White Paper.

- Lastly, we need to leverage the benefits of a balanced force and its inherent characteristics against irregular and non-state adversaries operating in a complex battlespace, while at the same time, retaining capability to meet conventional stated-based actors—or non-state actors that are starting to utilise higher end capabilities, such as UAVs or ballistic missiles.

APPLYING THE ART OF AIR POWER

Now, let me provide the ‘so what’ of this conference. I suggest that each of these takeaways is integral to the application of the art of air power, our Air Force and our mission in providing air and space power for Australia’s security. So, how do we apply the art of air power?

Air power has traditionally been the application of four key enduring air power roles: ensuring control of the air, affecting things or events on the ground, observing things from the air, or moving things through the air.

Traditionally, control of the air has been viewed as the most important of these roles. However, there is a growing thought that perhaps information superiority is becoming an equally dominant air power role. In particular, I note that the RAF Chief of Air the Staff, Air Chief Marshal Sir Steve Dalton, said at a recent presentation:

... it will be air power’s ability to maximise its comparative advantage in the third and fourth dimensions and to dominate the information space that will underwrite its future utility as a useful, credible, viable and essential tool in both the influence and hard elements of national power.

That is a fairly challenging statement for the fighter pilots amongst us, but I actually think it reinforces Lieutenant General Deptula’s statements today. It reflects the potential synergies in knowledge dominance that air power can provide in the battlespace to the commander. It also reflects the inherent strengths and characteristics of air power—a theatre-wide perspective, global reach, flexibility, penetration and responsiveness. It reflects the potential strategic effect that air power can provide.

It is these aspects that make ISR and air power so integral to what Air Chief Marshal Houston identified as the need to reach, know and exploit in the future operating environment. Air Chief Marshal Houston noted in his opening address that the enhancement to the Air Force’s ISR capability will be quite phenomenal. More important, was his acknowledgement that Air Force will take the lead in data sensor fusion. It is for this reason that we are transforming our ISR capabilities and we are taking a leading role in developing and promoting the ISR concept within Air Force and the joint community.

Overall, there is much alignment in Air Chief Marshal Dalton’s, Lieutenant General Deptula’s and Air Chief Marshal Houston’s understanding of the capacity of air power to be the primary provider of information superiority in the battlespace.

Of course, ISR is only part of the transformation that the Air Force, and thus Australian air power, will undergo in the next 10 years. As the Minister and Air Chief Marshal Houston

outlined, the Air Force is transforming the current force into a future force characterised by fifth-generation air combat aircraft, uninhabited aerial systems—remotely piloted vehicles—networked ISR and global reach.

This is a significant challenge for us and, I would suggest, a challenge where our capacity to overcome that challenge will require us not only to apply the art of air power to operations but also in the transformation of our Air Force from a modern tactical one to a future networked enabled, strategically influential force providing the Government with effective global air power in support of Australian national security.

For me, the critical need for us is not just the realisation of that future force through applying the art of air power but actually effectively applying that future force in support of Australian national security. This will require a precise understanding of air power and strategy. Further, it will require the ability to articulate that knowledge and understanding. I think that this is one of the key points that the Air Force officers in the room need to appreciate. Airmen are not particularly good at this and it is probably the reason that we battle with our force structure in talking about it in the national security environment.

I believe that there are two fundamental building blocks for this. They are professional mastery and strategy. Further, I would suggest that these two building blocks are critical to my five takeaways and our capacity to succeed in the art of air power. Of course, not surprisingly, both are reflected in CAF’s priorities in his *Commander’s Intent*.

We have instigated much in terms of enhancing professional mastery in the Air Force over the last several years, but there is a lot more to achieve. It will be in the next five to ten years where we will really see the benefits of such initiatives with a better prepared and better educated force, able to demonstrate and articulate a much better understanding of air power and its importance, and how it contributes to national security. I believe that possessing and articulating that understanding will represent the pinnacle of the art of air power in the Australian context; having air power strategists who can articulate the integration of air power and thus our future force in national security—in essence, what we need are ‘air power statesmen’. It is only then that we will have realised the future force that has been articulated in the Defence White Paper and was outlined by the Minister and Air Marshal Houston in their speeches yesterday:

- an Air Force conducting integrated operations to address the complex security challenges Australia is facing here and abroad, and providing the Government with key strategic responses and options in support of Australian national interests; and
- Australian air power effectively integrated into a national effects-based security strategy by statesmen of air power who are capable of successfully articulating and integrating air power at the national level.

And, of course, we will achieve this through our professional mastery of the art of air power.

I will now ask the Chief of Air Force, Air Marshal Mark Binskin, to close the conference.

CLOSING ADDRESS

AIR MARSHAL MARK BINSKIN, AM

Good afternoon distinguished guests, ladies and gentlemen.

I think that we would all agree that the last two days spent listening to some of the most impressive air and space power speakers in the world has been time well spent. The presentations were all first class and I am sure they will add significantly to the greater air and space power debate—remembering that right at the start, I said the aim of this conference was to encourage and inform the air power debate in this country and take it away from enthusiasts and put it back where it needs to be with the strategists. A key part of that, for all of you in blue suits out there, is professional mastery and the ability for us to develop that professional mastery and start to hone the debate.

I will not go through all the speakers again—the Deputy Chief did a great job summarising all the speakers and their presentations. However, I would like to thank them all personally for the time that they have taken. It is a long way to travel for many of them and I really do appreciate their efforts, and I think we have achieved the aim.

I was particularly interested to listen to Hugh White's discussion at the end. I think it was a great presentation on which to end because it really did set the scene that it is not a given in the air power domain. We do have to argue the strategy but we have to work it back and make it a logical argument, whichever way we go. So, thank you very much.

All of the speakers have added significantly to the air and space power debate and I am sure their presentations, once published by the Air Power Development Centre, will be utilised for some time to come as references for us all. The conference proceedings will be published in hard copy by the end of the year and all delegates here will be provided copies. Also, the Air Power Development Centre (APDC) is intending to post the presentations as podcasts on the APDC website so that you can listen to them on your MP3 players and the like—we are jumping into new technology here, so we would like some feedback on the usefulness of that.

I would also like to remind you that this conference has been made possible by the assistance provided by Defence Industry. Therefore, I would once again like to thank our principal sponsor, Boeing, and our two major sponsors, Rolls-Royce and L3, who have been represented here throughout the conference. Thank you again for your generous funding and support.

I would also like to thank:

- The International Engagement staff in Air Force Headquarters and, in particular, Tania Cox for her efforts in coordinating the program for all the foreign dignitaries. It is a hard ask, and she and the team have done a fantastic job.

- The Air Force Security Police contingent for providing security for the conference and, in particular, Squadron Leader John Nelson for his efforts in planning and leading the security effort.
- The men and women of No 28 Squadron—the Reserve Squadron here in Canberra—who provided support to the Conference. They are always available for these sorts of functions and, again, they do a great job.
- The Air Power Development Centre for planning, organising, managing and conducting this conference, and, in particular, Ms Sandra di Guglielmo for the exemplary way in which she has planned and managed the conduct of the conference administration and logistics. She has spent hours, days, in fact, probably a year preparing for this and we could not have done it without her.

I would also like to note that, this year, the Air Power Development Centre will be celebrating its 21st birthday. Twenty-one years ago, Air Marshal Ray Funnell, the then Chief of the Air Staff, and who has been here with us over the last two days, established the then Air Power Studies Centre to develop the RAAF's air power doctrine, strategy and concepts. The establishment of the Centre was an inspired and visionary decision, Ray, and the fact that we continue to have an air power centre of excellence is testimony to your vision. So, my deep appreciation and I am sure everyone here continues to support what you put in place 21 years ago. You can see by the attendance here today that it is important to Air Force.

Lastly, I'd like to thank all the conference attendees for taking the time to attend, what I consider to be, two of the most important days of the year. The attainment of professional mastery just doesn't happen. You cannot get it only from attending your PMET (Professional Military Education and Training) courses, although that is certainly an important pathway, nor can you get it from just reading a book or attending an exercise. You develop professional mastery by doing all of these things—by expanding your knowledge, by reading, by undertaking additional education and additional training, and by developing yourselves as officers, airmen and civilians. It takes willpower and attendances at conferences such as these are also an important aspect of all our development.

So, ladies and gentlemen, distinguished guests and visitors from around the world, I will now close the 2010 Air Power Conference, but I do want to say to you that I look forward to all your participation back here in 2012.

Thank you very much.