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THE RAAF AND FORCE MULTIPLIERS

By

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About the Author

Group Captain Doug Chipman joined the RAAF in 1964 and graduated from the RAAF Academy with a Bachelor of Science Degree in 1969. After completing his flying training he flew Caribou aircraft for several years prior to staff postings at RAAF Academy and No 1 Flying Training School. In 1978 he was posted to the USAF Institute of Technology in Ohio to study for a Master of Science Degree in Logistics Management.

Following that course, and tours in Air Force Materiel Division, Group Captain Chipman went back to transport flying as Commanding Officer of No 36 Tactical Transport Squadron, flying C130H Hercules aircraft. He returned to Canberra in mid-1985 to undertake JSSC Course where he subsequently remained on the Directing Staff and was promoted into the position of Director of Studies.

Recent appointments have included Commander of Tactical Transport Group, Commander of the Operational Support Group, and now Director of Air Warfare in Air Force Office.

INTRODUCTION[1]

> Force multipliers are essential to '*expand the effectiveness of man and machine without increasing the numbers of either; in that way lies economy*'.[2]

While the concept of force multiplication has been around for some time, it seems that only in the past decade or so has the term 'force multiplier' come into vogue. A cursory glance at recent official documents, academic literature and media items will reveal a rapidly increasing use of the term. There has even been a tendency for some staff officers within Defence to attempt to attract priority for a particular project by simply claiming that the project will result in a 'force multiplication', assuming that little or no other justification is required. Their general assumption seems to be that force multipliers are a panacea, capable of solving all force structure problems confronting a cash-strapped RAAF.

The term 'force multiplier' seems to be used to describe almost anything ranging from the tangible to the intangible. For example, good doctrine, leadership, training and maintenance have all been acclaimed widely as force multipliers, in the same way and sense as have Air-to-Air Refuelling (AAR) and Laser Guidance Bomb nits. 'Force multiplier' is not defined in recognised dictionaries or doctrine manuals and must be considered to be part of Defence jargon.

This paper will review modern usage of force multiplier terminology, analyse Australia's need for force multipliers, and discuss force multiplier applications affecting the RAAF.

Force Multiplier Terminology

Primitive man fought with his hands, feet and teeth, but because he was not as well equipped for fighting as many other animals, he did not begin to dominate his rivals until he learnt to use weapons. Initially he enhanced his fighting skills by using sticks and stones. Then crude arms fashioned from wood, bone and rock were developed, eventually sharpened for better effect. A stone blade mounted at the end of a wooden shaft became an effective lance or axe which could be used to strike at an enemy outside normal grappling range.

A glance back to the origins of weapons is useful for two reasons: first, to demonstrate that man has always been interested in gaining an advantage over his adversaries by making his weapons more effective and/or efficient; and second, to illustrate that the difference between a 'weapon' and a 'force multiplier' is often obscure. Is a knife on the end of a shaft simply a force multiplied knife or is it a lance – a weapon in its own right? We should not be concerned with the lack of distinction but simply understand it, because the same problem with terminology remains today. For example, a dumb bomb with a guidance unit attached can be a force-multiplied dumb bomb or it can be a Precision Guided Munition (PGM).

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[1] This paper was adapted from a lecture by the author to RAAF Staff College on 4 June 1992.

[2] Lord Trenchard, quoted in Forestier, Squadron Leader A.M., *Into the Fourth Dimension: An ADF Guide to Space*, Canberra, RAAF Air Power Studies Centre, 1991, p 1-5.

Conceptually, then, force multipliers by virtue of their name, if nothing else, describe those capabilities which allow a given input to produce a relatively greater output of effective combat power. In other words, any *system improvement* which increases the efficiency or effectiveness of a military force, that is, provides more 'bang for the buck', can be regarded as a force multiplier.

Some countries use the term 'force enhancer' rather than 'force multiplier'. For example, the USAF's recently released official doctrine[3] defines the force enhancement role as a means of *multiplying combat effectiveness* and includes a list of typical mission, five of which are specified as being uniquely important to the success of aerospace and surface forces. These 'force enhancement' missions include Airlift, Air Refuelling, Spacelift, Electronic Combat, Surveillance and Reconnaissance, and Special Operations. The Manual acknowledges that aerospace forces perform many other crucial force enhancement missions, such as Weather Services, Rescue and Recovery, Intelligence, Navigational Aids and Communications Services.

Occasionally the term 'force enabler' is used in lieu of 'force multiplier'. If part of a military capability weer called a force enabler then, by definition, without the capability the enabled mission would not be possible. Therefore, if a dumb bomb was considered to be the force, then a delivery platform such as a bomber is a force enabler, not a force multiplier. Clearly the two concepts are different and should not be confused.

The force multiplier concept may well act in the opposite sense – whereby it is possible to have force 'dividers' or force 'reducers'. While force multipliers enhance military capabilities, logically force dividers reduce or divide the effectiveness of capabilities. Examples include passive defence measures such as dispersion, camouflage and protective hardening of aircraft shelters and fuel storage facilities. This opposite sense of the force multiplier concept is important to understand and must be taken into account in both offensive and defensive situations.

AUSTRALIA'S NEED FOR FORCE MULTIPLIERS

Strategic Setting

Australia's strategic setting is shaped in a unique and enduring way by basic facts of geography and location, population size and distribution, and by national economic resources and infrastructure. The great majority of population and industrial centres are in the south-east and south of the continent, surrounded by ocean and he inhospitable tracts of country to the north and north-west. While Australia's manpower base is small, it has a relatively strong and sophisticated economic, scientific, technological and industrial base.

Although Australia is distant from areas of major instability, there are regional tensions such as conflict in Cambodia and competing claims over the Spratly Islands, which suggest that we need the insurance provided by a strong Defence Force.

[3] Department of the Air Force, Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force*, March 1992.

Cognisant of its geostrategic circumstances, the Australian Government has selected a defence policy of 'self reliance within a framework of alliances and regional associations'.[4] Because the policy of defence self reliance requires the ADF to be capable of defending a very large area, even though the Australian economy can only afford to provide limited resources, the Defence Force must ensure it makes the most effective and efficient use of its assets.

Force Development Imperatives

Although the RAAF has some limited ability to influence the design or modification of major weapons systems, by and large it is constrained to equipment produced by its allies for reasons of economies of scale and interoperability. Often, such equipment has been designed, operated and employed in combat in a context of different strategic, operational and environmental circumstances to those which influence Australia.

In particular, certain aircraft and weapons were intended for employment in different force structures and against quite different threats. For example, while the F-111 is one of the few aircraft that can penetrate enemy air space alone, undetected and unsupported, the USAF originally planned to use it as part of a strike package in European operations. This package might have included dedicated electronic warfare aircraft such as the Eff-111 and F-4G Wild Weasel for the suppression of enemy air defences, and escort fighters in addition to the strike aircraft. This number of specialist aircraft is clearly not a practical proposition for a force the size of the RAAF, even though all of the roles may need to be performed (the RAAF must expect that any target worth attacking will be defended).

The solution to this lack of specialist aircraft is to exploit the flexibility of air power and to realise the maximum combat power possible from limited resources through the development of various force multipliers, utilising *inter alia*, high technology on a small number of multi-role air platforms.

Technology

Technology is not *per se* a force multiplier but many force multipliers depend significantly on the application of modern technology. For example, the US DoD Final Report to Congress on the Conduct of the Persian Gulf War observed when summarising the Air Campaign that 'Technology gave the Coalition a decisive edge'.[5] The Report went on to list many of the force multipliers that were very effective but entirely dependent on high technology, such as stealth and sophisticated computers.

Technology has always been a significant factor in the evolution of air power and the practical influence of innovation and technology, often in response to a flaw revealed in the heat of battle, is obvious. Just some of the many examples from history include: the synchronised forward firing machine gun from World War I which fired through the propeller rather than over it; the improved bomb sight of World War II – the

[4] *The Defence of Australia 1987*, presented to Parliament by the Minister of Defence, March 1987, p vii.
[5] Department of Defense, *Conduct of the Persian Gulf War – Final Report to Congress*, April 1992, Volume 1, p 244.

Norden – which enabled relatively precise or selective bombing by allied aircraft; the development of radar; the jet engine in the latter stages of World War II and then in Korea; and the use of EW in Vietnam and the Arab-Israeli wars.

Innovation and technology are still major influences in air power's development, and unless modern aircraft continue to be equipped with force multipliers based on high technology, those aircraft will be vulnerable to ground threats and inefficient in their role. Fortunately for the RAAF the Government recognises the importance of technology and has supported its development. Within the Defence community DSTO continues to keep abreast of latest technological developments and is becoming more 'customer oriented' as funding remains tight. The RAAF must continue its efforts to maintain the technological edge within Australia's increasingly sophisticated Area of Direct Military Interest.[6]

FORCE MULTIPLIER APPLICATIONS AFFECTING THE RAAF

Strategic Force Multipliers

The concept of force multipliers can be applied strategically. For example, the inherent ability of a long-range strike force to attack an adversary's bases and support infrastructure, and to interdict his lines of communication can raise his costs of fighting, facilitate control of escalation, enable Australia to shift the focus of operations, and compel the adversary to undertake extensive defensive measures. In this context the acquisition and retention of appropriate military capabilities, which demand more effort to counter than they would cost Australia, can produce a disproportionate response.

In an examination of military disproportionate response some years ago, J.O. Langtry and Desmond Ball argued that Australia must invest in capabilities which ensure that aggression against us would be very costly – hopefully, so costly that military coercion would be impracticable.[7] In this sense, strategic force multipliers calculated to cause an enemy to react disproportionately in terms of money, time, materiel and/or manpower weer considered vital. Langtry and Ball argued that Australia should focus on strategic force multipliers when acquiring new weapons systems.

A specific example of a strategic force multiplier is an air strike capability which enables its owner to seize the tactical initiative by taking the fight to the enemy. The RAAF's F-111s are able to fly very close to the ground at very high speeds, following terrain so as to avoid radar detection, day and night and in all weather. Defence against appropriately armed F-111 aircraft would require a highly capable and integrated air defence system, demanding the allocation of considerable resources and expertise.

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[6] *The Defence of Australia 1987* presented to Parliament by the Minister for Defence, March 1987, defines the Area of Direct Military Interest as including 'Australia, its territories and proximate ocean areas, Indonesia, Papua New Guinea, New Zealand and other nearby countries of the South-West Pacific,' p 2.

[7] Langtry, J.O. and Ball, Desmond, *The Concept of Force Multipliers and the Development of the Australian Defence Force*, Canberra, Australia National University, Strategic and Defence Studies Centre Working Paper Number 66, January 1983.

Other examples of strategic force multipliers include mine laying capabilities which require mine counter measures, and Electronic Warfare (EW). The possession of a comprehensive EW capability might well force an enemy to look to counter-measure capabilities requiring new skills and techniques as well as equipment – a time consuming process and extremely costly when developed on a large scale. Of significance to air forces, a submarine force operated by an adversary drives a requirement to develop a large and very expensive aerial anti-submarine force.

The perceptions of politicians and defence analysts about strategic force multipliers have important consequences for how a country justifies the expenditure required for major items of military capability and how it manages conflict resolution. The strategic use of the force multiplier concept is one that air staffs in particular need to understand if the full potential of air power is to be realised.

Command, Control, Communications & Intelligence

Good command, control, communications and intelligence (C^3I) systems are also extremely powerful force multipliers. This point was made by Air Vice-Marshal E. A. Radford when, speaking as Air Commander Australia to a JSSC course in 1989, he explained that the dramatic improvement in the ability to use real time information for the central direction of air power has emerged as one of the great force multipliers.[8]

Air Vice-Marshal Radford went on to say that improved surveillance and aerospace reconnaissance systems and rapid all-sensor fusion capabilities can give essential early warning and do much to disperse the fog of war. Given the right communications and intelligence, command staffs will be better positioned to maintain an accurate real-time picture of the developing battle, make proper and timely command decisions about the need for immediate retargeting, the disposition of forces and the overall rate of effort. They can thereby obtain the maximum power from a limited number of weapons systems.

Perhaps the most dramatic example of the importance of C^3I was the Battle of Britain. In 1940, adequate and timely intelligence coupled with speedy communications and survivable command centres enabled RAF commanders on the defensive to place extremely limited fire power in the right place at the right time to defeat an otherwise superior force. This point is especially significant given that air forces on the defensive are intrinsically at a tactical disadvantage.[9]

The 1991 Gulf War provides another good example of the importance of effective C^3I systems. The Coalition air campaign was highly successful, even though planners and coordinators had to cope with an enormous variety of aircraft types, nationalities, onboard weapons systems and so on. Little could have been done without a modern, high speed C^3I system.

[8] Radford, Air Vice-Marshal E.A., Unpublished address on Air Command given to JSSC on 9 May 1989.

[9] For a lucid analysis of the disadvantages of being an air force on the defensive see Stephens, Alan and O'Loghlin, Brendan (eds.), *The Decisive Factor – Air Power Doctrine by Air Vice-Marshal H. N. Wrigley*, Canberra, Australian Government Publishing Service, 1990, Document 9, 'Future Policy in the Air' (issued originally by General Trenchard, GOC of the RFC, September 1916).

The importance of 'intelligence' in the C^3I equation was highlighted by General Schwarzkopf at the end of the war when he said: 'The great military victory we achieved in Desert Storm and the minimal losses sustained by US and Coalition forces can be directly attributed to the excellent intelligence picture we had of the Iraqis'.[10]

Early Warning

An important part of C^3I for aerial warfare is Early Warning of air attack, enhanced with capabilities such as Over the Horizon Radar (OTHR) and Airborne Early Warning and Control (AEW&C) aircraft. These two capabilities expand by several orders of magnitude the ability to monitor and predict the scale and direction of an enemy attack. Without an AEW&C capability, intercept before weapons release might not be possible. A recent example of this problem was the inability due to lack of radar contact of the Royal Navy task force during the Falklands War to successfully intercept any Argentinean shadowing aircraft, or any Exocet-firing Super Etendard aircraft, before or after missile launch.

While the RAAF has one semi-operational OTHR, and has projects in hand to develop the capability further, there are no funded plans for the introduction of AEW&C. For many years, AEW&C has been recognised as an important capability for the ADF, but to some extent funding of the Jindalee Over the Horizon Network at about A$1b has distracted the ADF from acquisition. While there are indications that the AEW&C project is beginning to gather momentum, the capability may not be in-service before the turn of the century.

Electronic Warfare

Although EW was mentioned briefly in the context of strategic force multipliers, it needs further analysis if the vital role it has played as a force multiplier at the tactical level of war is to be appreciated. The advantages of employing EW or the consequences of ignoring it or not using it correctly, are most dramatic in the air and maritime environments.[11]

An impressive example of the tactical advantage that the full and correct use of EW can bestow on a force is the Israeli's success against the Syrian forces in the Beka'a valley during 1982. Without EW the Israelis would not have been able to attack and destroy SAM sites and at least 87 Syrian aircraft for the loss of a few helicopters and two jets. On the other hand, the Royal Navy's loss of HMS Sheffield during the Falklands War to an air launched Exocet was a cruel reminder of the drastic consequences that can follow from a lack of EW protection.

A part of EW is Electronic Support Measures (ESM), which detect and identify targets. Any sensor which helps aircrew to detect targets, especially if outside the range of enemy terminal defences, can increase the effectiveness of searching aircraft and reduce the risk of overlooking attacking aircraft. Modern ESM equipment can accurately identify transmitters, and perhaps the target, well outside the range at

[10] Department of Defense, *Conduct of the Persian Gulf War – Final Report to Congress*, April 1992, Volume 2, p C-1.
[11] See Kopp, Carlo, *Command of the Electromagnetic Spectrum – An Electronic Combat Doctrine for the RAAF*, APSC Paper Number 8, Canberra, 1992.

which the ESM aircraft can be detected by the transmitting unit, thereby facilitating aircrew situational awareness and hence tactical surprise. With the aid of onboard computers, the position of the transmitting target can also be determined after a relatively short period of time.

In recognition of the importance of EW the RAAF has taken several initiatives. The first of these is the establishment of an EW training capability at Delamere Range near Tindal in the Northern Territory. The Delamere EW range has already achieved a limited capability which enables Australian and friendly aircrew to experience a modest range of EW threats and to practise appropriate responses. The RAAF has plans to develop further this capability as experience is gained, with a view eventually to running a significant tactical weapons and EW training range.

Investing in EW has proven to be an expensive and technologically difficult task. To try to minimise the cost and concentrate EW expertise, the RAAF has established the EW Operational Support Unit (EWOSU) near RAAF Edinburgh. EWOSU, now part of the Aeronautical Research and Development Unit (ARDU), is responsible for the software maintenance of all aircraft EW systems, the conduct of EW training, the provision of an EW data base, and the conduct and coordination of EW research and development. One recent task was the design of an EW suite for Caribou aircraft against the possibility of that aircraft being employed in Cambodia.

The RAAF would like to upgrade the EW equipment on all of its aircraft but budgetary constraints make this impossible in the near term. Priority is being given to providing all operational aircraft with some capability to counter IR missiles. This priority is derived from the world-wide threat of uncontrolled use of man-portable IR SAMs such as the SA-7 and Stinger. Significant numbers of these weapons are freely available on the black market and their availability increases considerably the risk to aircraft from terrorist groups.

Multi-Roling

For a small air force without a wide variety of specialist aircraft, significant force multiplication can also be achieved through the acquisition of multi-role aircraft. Multi-role aircraft have the ability to undertake more than one role by varying the types of weapons and sensors fitted to the platform. Done properly with modular and interoperable sub-systems, multi-roling can be achieved with minimum additional aircrew training. A true multi-role aircraft is able to exploit to the maximum the inherent flexibility that air power offers and provides a capacity for subsequent role adaptation during a long service life.

The Hornet is a magnificent multi-role aircraft as a quote from the US DoD Interim Report to the Congress on the Conduct of the Persian Gulf War illustrates:

> The F/A-18 is capable of performing several missions: offensive air-to-air, interdiction, battlefield air interdiction, close air support, and suppression of enemy air defences. This capability allowed the F/a-18 to execute interdiction strikes while providing its own air cover, thus eliminating the requirement for fighter escort aircraft. Not only did this multi-mission capability allow the

> services to generate/support greater numbers of strike missions, but fewer support aircraft were required to fly into hostile enemy territory.
>
> No single event of the war better demonstrated the value of multi-role capability than the events of the first day when two F/A-18s from VFA-81, a fighter attack squadron embarked on the USS Saratoga, shot down two Iraqi MIG-21s. The F/A-18s were on a scheduled bombing mission against an Iraqi airfield when they detected the two bogies seven miles away. The switched their weapons computer systems from the bombing mode to the air-to-air mode, confirmed the planes as hostile and downed both MIGs using Sparrow and Sidewinder missiles. They then successfully completed their assigned mission of bombing in support of a Coalition strike against an enemy airfield.[12]

A further development of the multi-role concept is that of multi-mission aircraft. Such aircraft can, when appropriately armed, conduct during the one flight more than one mission. While there can be some reduction in range when armed for more than one role, the additional versatility provided can in some circumstances substantially increase the effectiveness of a force. For example, the RAAF's Orion Maritime Patrol aircraft is equipped as a multi-mission aircraft. It can conduct a combination of mine laying, anti submarine warfare, surveillance, targeting and anti-shipping strikes during the one sortie.

The RAAF's F-111 is another example of a multi-mission aircraft. It is capable of some defensive counter air operations in addition to its reconnaissance and strike roles. To further that multi-role/multi-mission capability, the RAAF would like to fit an anti-radiation missile for the suppression of enemy defences to the F-111 and improve substantially the onboard Electronic Counter Measures (ECM) suite. The intention would be to load each aircraft with the appropriate type of PGM, say two GBU-15 electro-optical command guided glide bombs, together with an anti-radiation missile and perhaps short-range air-to-air missiles for self defence.

The employment concept would be one of mixed weapons loads rather than strike packaging, thereby obviating the need for additional specialist aircraft, such as the USAF's F-4 Wild Weasels. Similarly, while the RAAF's F-111s may be required to perform the whole gamut of offensive roles against land targets, they may also be fitted with the Harpoon AGM-84 anti-shipping missile and conduct offensive operations against maritime targets. The F-111C provides a unique aircraft/weapon combination. Its retention in the force structure is essential to ensure that the RAAF can perform a variety of tasks for which other larger air forces have dedicated aircraft Australia cannot afford.

Stand-Off and Precision Guided Munitions

The improvement in, and consequent force multiplier effect provided by stand-off and precision weapons on air power has been dramatic. The destruction of the Thanh Hoa bridge during the Vietnam war was an important example of the force multiplier effect of PGMs. Over 700 sorties using free-fall weapons were flown against this bridge between 1965 and 1972 without success. Eventually just two aircraft brought

[12] Department of Defense, *Conduct of the Persian Gulf War – Interim Report to Congress*, p 199.

down the bridge with a single, 3000lb laser guided bomb: one aircraft laser designated the target and the other dropped the weapon.

In a similar way, a stand-off capability such as that provided by the Harpoon anti-shipping missile can produce significant force multiplication. For example, a modern Harpoon equipped aircraft can fire simultaneously two missiles at a target and match the capability of a flight of conventionally armed aircraft, without exposing itself to the target's terminal defences.

The use of PGMs can reduce significantly the number of aircraft which must be armed and serviceable to meet a given over-the-target requirement. For example, the ratio of the number of sorties needed to achieve a particular weapons effect with the Mk 82 500 lb General Purpose Bomb compared with one laser guided equivalent, the GBU-12, could be as high as 50 to one. The 1991 war in the Persian Gulf provided the most recent and vivid testimony to the use of PGMs, especially when combined with stealth technology.

Stealth

The Gulf War saw the public unveiling of another great force multiplier in the form of stealth technology, As the US DoD Final Report to the Congress on the Conduct of the Persian Gulf War observed:

> The revolutionary combination of stealth aircraft and PGMs allowed nearly simultaneous attacks against scores of targets across the theater. They enabled a relatively small number of offensive assets to attack effectively many more targets than would have been possible without stealth (which requires little airborne support) and PGMs (which require few munitions to achieve the desired effect). Without these capabilities, the attacks would have required many more sorties, and would have been much more costly. Many attacks would have been impractical (because they would have caused too much collateral damage or would have required too many assets) or impossible (because the desired level of damage against pinpoint or hardened targets could not have been achieved with conventional munitions).[13]

Although stealth technology is currently associated with high cost capabilities, in time certain of its elements are likely to become basic design requirements across a wide range of equipment. As stealth technology becomes more widespread, more assets will become less observable to radar and other sensors, rather than being invisible. Given the important part stealth technology is likely to play in future warfare, and the possibility that its relative cost should decrease as it becomes more widely used, the RAAF will need to develop its knowledge of stealth technology and consider acquiring some applications.

Air-to-Air Refuelling

An AAR capability is regarded as an important force multiplier because aircraft refuelled in the air can cover more distance, stay aloft longer and carry increased

[13] Department of Defense, *Conduct of the Persian Gulf War – Final Report to Congress*, April 1992, Volume 1, p 244.

payloads on take-off. By increasing the payload, through reducing the amount of fuel carried during take-off and replacing it with additional ordnance, the number of aircraft required to deliver a specific amount of ordnance on a target can be reduced. Furthermore, AAR can enable aircraft to attack targets which might otherwise be beyond their range; and extend the combat radius of defensive fighter aircraft or increase dramatically their endurance in the Combat Air Patrol role.

The RAAF has acquired an initial AAR capability with the modification of four B707 aircraft with Sargent-Fletcher underwing refuelling pods. While no extra tanks were fitted to the aircraft, the fuselages were plumbed to accept a later retrofit of an AAR boom. This initial modification gave the B707 the capability of refuelling Hornet aircraft and the option of acquiring the capability to refuel F-111 aircraft at a relatively cheap cost and at short notice.

At least some of the RAAF's Hercules fleet will be replaced by 1997, possibly with a new 'J' model Hercules. The modern fuel system being designed for the 'J' should facilitate the aircraft being both a donor and a receiver in the AAR role. It is important to note that the B707 tanker is not suitable as a Hercules refueller, due to speed and drogue hose length differences. Any proposal to refuel Hercules aircraft will have to be based on a 'buddy' system.

The use of Hercules aircraft as tanks not only allows Hornet aircraft to be receivers but also permits the refuelling of helicopters. With the appropriate modification, Blackhawk helicopters could be given the capability to cross the northern air-sea gap, enhancing their operational flexibility.

Leadership, Morale and Training as Force Multipliers

Good leadership, morale and training are also considered to be powerful force multipliers. As Air Marshal R. G. Funnell explained in a presentation on the influence of junior officer training on the future development of the RAAF,[14] improved leadership can be as much of a force multiplier as any other factor because with improved leadership the output of air power is enhanced. He developed his theme by stating:

> The logistician who ensures that appropriate weapons are supplied when required, the engineer who ensures that the aircraft is serviceable for tasking, the intelligence officers and air defence officers who ensure that the aircraft is in the right place at the right time, the medical officer who ensures the aircrews are fit for duty – all of these officers play a vital role in air power in the same way as the pilot who safeguards his platform to place the weapons on target.

Air Marshal Funnell also pointed out that good leadership should not be focused solely on developing technical expertise. While all personnel must be properly trained to do their job, they must be happy with what they are doing. With good leadership, morale and training the RAAF will be well placed to achieve the best from its people

[14] Funnell, Air Marshal R. G., An unpublished presentation by the Chief of the Air Staff on *The Influence of Junior Officer Training on the Future Development of the RAAF*, RAAF Richmond, 29 November 1988.

in the same way as it strives to enhance the effectiveness of its platforms and weapons systems with other, more tangible force multipliers.

Other Force Multipliers

There are many other components of a military force which can meet the definition of 'force multiplier'. Because the term is loosely defined, anything which provides more effectiveness at a lower marginal cost falls within its ambit. Group Captains P. J. Criss and D. J. Schubert have argued that the notion can comprehend the distribution of manpower, good doctrine, civilian augmentation and simulation.[15] Factors such as those can be regarded as intangible force multipliers because they are not manifest in terms of weapons or equipment.

Intangible force multipliers depend entirely on high quality; if the quality is poor then the factor becomes a force divider rather than a force multiplier. For example, poor leadership, morale, doctrine or training would reduce the effectiveness of a military force, perhaps fatally. The RAAF must continue to ensure that the intangible force multipliers remain of the highest quality if it is to get the most effectiveness from its scarce resources.

CONCLUSION

The term 'force multiplier' has been analysed and its definition found to be imprecise, with the distinction between some 'force multiplied' weapons and new weapons often unclear. Force multipliers mean different things to different people, and can be confused with other terms such as 'force enhancer', 'force enabler', 'force reducer' or 'force divider'. The key factor which identifies a force multiplier is a commitment to improving weapon system efficiency or effectiveness.

The proportion of national resources allocated to the Australian Defence Forces will continue to be scarce. Accordingly, the ADF must constantly strive to improve its capabilities by developing force multipliers based on innovative concepts and high technology. The acquisition of force multipliers is particularly important for air forces where combat power is vested in a few platforms which are very expensive and difficult to replace.

The force multiplier concept can be applied at the strategic level of war when a capability on one side generates a disproportionate response from the other. Examples of strategic force multipliers are air strike, mine laying and EW capabilities.

Force multipliers can be tangible in that a combination of innovation and modern technology result in material improvements. Examples include good C^3I, Early Warning, EW, multi-role aircraft, stand-off and precision guided munitions, stealth, and AAR. Intangible force multipliers are often a result of intellectual endeavour alone and involve factors such as good tactics, training, leadership, and morale. Intangible force multipliers, correctly applied, will also improve significantly the

[15] Criss, P.J. and Schubert, D.J., *The Leading Edge: Air Power in Australia's Unique Environment*, Canberra, Australian National University, Strategic and Defence Studies Centre, 1990.

efficiency and effectiveness of military forces. However, if applied incorrectly these factors can be force dividers.

The bottom line is that while the force multiplier definition is quite imprecise and its use often degenerates into jargon, the principles and concepts comprehended by the term are of vital importance for a small air force which has to rely on maintaining its credibility through operational excellence, the technological edge, and maximising its ‘bang for the buck’.