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Military airpower 2004

Air Chief focuses RAAF assets fair and squarely on the ground

This Edition: Aerospace Plan Confused by Dual Air 9000 Helicopter Choice, Beazley Still Feeling His Way Back into Defence, Homeland Security Market Valued at $650m, **PLUS** ADBR's exclusive 'Future of Australian Airpower Strategy and Projects Report

This Edition

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Cover photo: RAAF F/A-18 fighters are said by Defence to have worked, for the first time, with ADF troops to prosecute the ground war in Iraq
DEFENCE PHOTO

Up-arming the 'Hornet' fleet: Having just completed the ASRAAM/AMRAAM upgrade, new stand-off missiles are now on the way for the F/A-18s p6

Mixed outcome for Air 9000: Australia is verging on sustaining two prime helicopter fleets to deal with divergent troop lift and counter-terrorism tasks p7

Armoured 'Hercules' set for the Gulf: The RAAF is switching its transport assets in Iraq to C-130Js after a major electronic warfare & armour upgrade p12

Beazley back in command at Defence: The ALP is staying quiet about its new plan to re-focus military assets on regional counter-terrorism capabilities p20

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BOEING GRAPHIC

Air chief focuses RAAF on the ground

Australia's Chief of Air Force, Air Marshal Angus Houston, says the nation's air combat capability is on the threshold of a new era, as the F-111 and F/A-18 approach the end of their service lives, and a range of complementary and supporting projects are brought into being leading up to the introduction into service of the Joint Strike Fighter in the years after 2012.

Trevor J Thomas/CANBERRA

Key Points

- **The Royal Australian Air Force is switching doctrine** to a first-up task of destroying an adversary's air combat capability on the ground, as a means of achieving a new twist to the definition of 'air superiority'.
- **Officials admit that as the acquisition of new platforms** alone is unlikely to deliver a 'qualitative edge' for Australia, all forces are now to be combined into a new 'system' to deliver network centric air combat capabilities.
- **In the absence of a new F-111 coming onto the market**, Defence planners have resolved Australia is going to have to adapt to 'a lesser range platform' supported by air-to-air refuelling and stand-off weapons.
- **Because the air force will only have to fight the F/A-22** 'Raptor' in training exercises with the US, officials are confident that in NCW 'system' engagements, the JSF will prevail against all 4th generation adversaries.

Writing under his own name in a recent Australian Strategic Policy Institute (ASPI) paper, Air Marshal Houston has lauded proposals to replace the current F-111 and F/A-18 combat aircraft fleets after 2010 with the Lockheed Martin-built Joint Strike Fighter (JSF), saying the JSF "will be a true fifth generation, stealthy, multi-role, single-seat, single-engine, fighter aircraft."

Houston's commitment to paper of a rebuttal to growing public criticism of the Government's decision to phase out the F-111 fleet early - as well as propose the JSF for its replacement - comes as the nation heads toward national elections, where a prospective change in Government would see a wholesale review of current defence policy by way of the preparation of a new Defence White Paper under Labor.

The development of advice, and successive policy decisions, on that White Paper are likely to exceed Houston's tenure as Chief of the Air Force (which expires in July 2005), although his enduring influence on the form and strength of Australia's future air combat forces would be sustained should he be confirmed as a replacement for the current Chief of the Defence Force, Gen Peter Cosgrove.

Houston's advice to the Howard Government has been both reflective of the changing strategic circumstances, as well as practical, in terms of what an ageing population can afford in terms of its national defence effort. He says in the paper, "our advice to government to move to a more modern fifth generation aircraft reflected our view that the fourth generation aircraft would not meet our country's needs, nor be good value for money."

AIR SUPERIORITY, NOT AIR COMBAT: Acknowledging 'air superiority' remains at the heart of Australia's military strategy, Houston's paper then seeks to begin the process of cultural change within the hearts and minds of the substantive air force and related stakeholder base, saying "the traditional image of dogfight battles in the air between opposing air forces is usually a most inefficient way of achieving air superiority. Precision targeting and weaponry (in the future will) allow us to take a new and more efficient approach."

The Air Chief cites the wars against Iraq in 1991, and 2003, which he says "featured, as their initial priority operation, a carefully orchestrated and methodical neutralization of communications systems, command and control nodes, surveillance and warning systems, defensive missile systems, and aircraft and their logistical support on the ground. The results were, in each case, a quick and comprehensive denial of an adversary's ability to mount most, if not all, air operations."

As a result, writes Houston, "there were few aircraft-on-aircraft engagements in the Gulf War, and none in the war of 2003. This is the way our future air force would want to operate to achieve air superiority, in preference to fighting air battles of attrition - glamorous and gladiatorial though air battles may be. An adversary's air capabilities are better destroyed on the ground, than in the air."

Houston's conclusions, therefore, indicate a fundamental shift in Australian air power doctrine, and in simple terms put the ability to dominate on the ground, above that of being able to dominate in the air. As he states in the ASPI paper, "the fundamental keys to air superiority in coming decades will be reach and precision, exercised by a determined leadership that is prepared to seize the initiative."

This, of course, does not mean wholesale neglect of the 'air-to-air' combat superiority objective, as any air campaign will still call on an ability to fight and win air-to-air engagements, as it cannot be assumed that initial strike operations would fully succeed in eliminating an adversary's own air capability. With eyes fixed on the JSF, however, Houston considers "there is an immense dividend to be gained by an air force that can, through the use of a single aircraft type, conduct decisive air-to-ground campaigns but then swing roles to fight air battles where necessary. That means precious resources are not tied up in a second specialized aircraft type dedicated to what should be, in doctrinal terms, a subsidiary (but still necessary) purpose."

MORE NEEDED THAN JUST THE JSF: Developing further the need for a substantive cultural shift in perceptions of how the air force will operate in the future, Houston then introduces developments in the information technology revolution, and how this is changing the way war is conducted in the air. Accordingly, and as the ability to move information increases, he says "we can start to think of all elements of our air capability functioning in real time as a single system."

The core of this approach, writes the Air Chief, is "we need to start thinking of our aircraft not as stand-alone platforms, but as elements in that system. In the future it will be the system, not just the pilot and his aircraft, that defeats the adversary. In Australia we need to meet this challenge in a dynamic regional capability environment (as) the trend towards more effective air combat, ground-based air defence and information capabilities seems likely to continue."

Houston acknowledges many nations in Australia's region have acquired, or plan to acquire, advanced air combat aircraft with advanced capabilities. These include 'Beyond Visual Range' (BVR) systems, that can detect and destroy adversary forces at long range, and 'Look-down Shoot-down' capabilities, which can find and destroy hostile aircraft from above, even against the clutter of the ground. Ground-based sensors and command and control capabilities are also being enhanced.

Accordingly, he writes, the "acquisition of new platforms, alone, is unlikely to provide us with the qualitative edge that we need in this emerging environment. A qualitative edge will only be achieved through enhancing individual platform capabilities by integrating them as a part of a system within which the platform will operate. We will maintain our capability edge by developing a network-centric air combat system that exploits information and communications systems to create the desired effects."

The Air Chief sees the performance of an effectively networked system as "exceeding the sum of its individual parts." In essence, and despite being out-gunned or out-numbered in certain platform areas, operational weaknesses across the broad range of capabilities of prospective adversaries will, theoretically, see them unable to prevail in combat against a more coherent and better networked force.

CHARTING TOMORROW'S RAAF: Houston sees this latter state as being achieved "by exploiting data link information technology to display a common picture of an engagement that is shared in real time between all participating sensors, shooters and the command nodes within the system." Like all assumptions, and in a constantly moving threat environment, proof of the assumption lies first, in the ability of the future RAAF to merge all these capabilities into a single seamless force, whilst second, regional adversaries are similarly unable to achieve the same sort of integration for a considerable time into the future.

Addressing directly the interests of Australia's next generation of pilots, aircrew and ground support personnel, Houston writes "everybody should be working from a common view of adversary and friendly activities. A capable and well designed networked system - operated by good people - should always prevail over an adversary that is not supported by a similar system, even though that adversary might possess highly capable platforms."

Houston's vision of the RAAF's future 'fully networked system' sees data being brought together (ie: fused) at many levels, starting with the aircraft itself, where sensor information is integrated within the avionics system, rather than by the pilot, freeing the pilot to concentrate more fully on the tactical situation. "Fighters in flight will also be able to fuse information over a high capacity data link, so they can share their picture of the engagement, whilst information will also be able to be fused between fighters themselves, and remote sensors such as AEW&C, Over-the-Horizon radar and other ground or sea based radars - and the command and control system," he says.

The Air Chief's picture will also be supported using intelligence information piped in from satellite links tied into systems in space capable

of providing real time tactical information as part of the network. It is this total network - including sensors and shooters - that defines, Houston says "the capability. Of course fighters remain the essential core of the network, and it is important to examine the capabilities of the individual platform options and their ability to contribute to the system."

WHAT'S SPECIAL ABOUT THE JSF: Compared to the difficulties of sustaining two ageing fleets, or the sheer cost of affording the 'most outstanding fighter ever built' (the F/A-22 'Raptor'), Air Marshal Houston says the JSF is "intended to set new benchmarks in affordability, availability and supportability, for a high-performance stealth aircraft." Apart from its stealth design, the Air Chief acknowledges the JSF "does not break a lot of new ground in its aerodynamic design, though it is clearly from the same stable as the F/A-22."

Irrespective of this, the JSF's designers are said to "have squeezed in an extraordinary amount of fuel for a single-engine fighter of this size." What is different in the JSF, says the Air Chief, "is its advanced sensors and communications systems, lead by its Active Electronically Scanned Array (AESA) radar - capable of both air-to-air and air-to-ground target detection, identification and weapon allocation."

These attributes, says Houston, "are key to its ability to integrate into a networked air combat capability. The radar also acts as a passive, highly precise long-range sensor for emissions from threat systems, and can actively jam other air and ground emitters. Importantly, it can conduct most of these activities simultaneously." Additional systems include a radar warning receiver (RWR), and advanced Electro-Optical Targeting System (EOTS) to provide long range infra-red search and track of air targets, a laser range finder and a laser target designator.

DEFENCE PHOTO

One element unique to the JSF, says Houston, is a Distributed Aperture System (DAS) "comprising of six infra-red sensors positioned around the aircraft to provide a spherical display in the pilot's helmet visor of the position of other flight members, targeting for air-to-air missiles, locating ground targets and detection of threat aircraft and missiles. It provides the ability to look through the aircraft structure, eliminating blind spots."

Completing the network-centric enabling package says the Air Chief, is the JSF's "extensive communications and data link suite. The high capacity inter/intra flight data link allows a flight of JSFs to act as a fully fused team. Link 16 allows the sharing of data with other air and surface players. Satellite communications provide for beyond line-of-sight communications (the JSF is the first fighter aircraft to have satellite transmit and receive capability). There is a software driven Joint Tactical Radio System, primarily for communications with ground forces, and there is a Prognostics and Health Management data link that provides for integration with the JSF's logistics system while still airborne."

So in total, the 'real leap' in capability, writes the Air Chief, comes from the "fusion of data. This includes: spherical RWR coverage to detect radar threats; passive electronic support from the radar array; long range detection of targets using - air, land, and maritime; close range warning of threats using the DAS; and connectivity to the rest of the formation and the wider network through data and communications links.

BEST VALUE-FOR-MONEY PACKAGE: Returning to the concept of 'required defensive capability' against clear economic restraints in Australia's ability to support its national defence, Houston adds one further feature of the JSF is its aim "to achieve affordability by containing costs throughout its life. This is being done by avoiding high-risk untried technology, and leveraging off earlier programs, such as the F-22," currently produced by US-based Lockheed Martin.

Air 5376

The Department of Defence is releasing a restricted tender request to three makers of target designation systems for ultimate fitting to the RAAF's fleet of F/A-18 'Hornet' fighters, as part of a fleet-wide program to up-scale the aircraft's strike capabilities in advance of the phase-out of F-111s from 2010.

Canberra Bureau Report

Issuance of the restricted Request for Tender follows the Howard Government's 14 July approval of the $100-150m phase 2.4 of project Air 5376, set to up-scale - from the current 'Nite Hawk' pods - the detection, identification, precision targeting and damage assessment capabilities of the F/A-18 'Hornet' across strike and offensive air support operations.

Defence is to assess three systems: the Advanced Targeting Forward Looking Infra-Red (ATFLIR) pod manufactured by Raytheon; the 'Pantera' pod (an export version of the 'Sniper XR' targeting pod) manufactured by Lockheed Martin; and the 'Litening AT' pod manufactured by Israeli-based Rafael and Northrop Grumman. A decision on the preferred tenderer is to be made in 2005, with the first squadron expected to be equipped with the new system by early 2007.

Raytheon reported at the end of August its ASQ-228 'ATFLIR' targeting pod had been deployed to two US Navy F/A-18C 'Hornet' fighter squadrons onboard the aircraft carrier, USS John F Kennedy (CVN 67). According to company officials, the pods had "successfully completed numerous missions' during July, with the ATFLIR's infrared and electro-optical (television format) sensors "detecting tactical threats at unprecedented ranges, delivering images with more clarity than those afforded by any other targeting pod now in production, (and) demonstrating effectiveness above 50,000 feet." The ATFLIR has been fully integrated on all F/A-18 models, and is approved for international sales.

Raytheon had earlier (19 July) confirmed delivery of 55 (of an expected 574) ASQ-228s to US Navy 'Hornet' operators, claiming the new pod gave 'a three-to-five-fold increase' in target-recognition range, as evidenced by examples of tactical threat detections 'at unprecedented ranges/effectiveness above 50,000 feet'. The single ATFLIR pod encompasses all current US Navy imaging and targeting functions (previously requiring three separate pods), thus liberating an air-to-air weapons station for other mission requirements.

Lockheed Martin (LM) reported 6 August its 'Sniper XR' advanced targeting pod was undertaking test flights on US Navy F/A-18 aircraft at the China Lake Naval Air Warfare centre in California. Flight tests were said to have been conducted in support of ongoing acquisition competitions in Australia, and Canada, as well as satisfying potential future requirements of the US Navy and Marine Corps. The Sniper XR's integration on subject F/A-18 A-D aircraft was achieved via legacy 'NITE Hawk' interfaces.

The Sniper XR's testing is further said to have extended across day and night operations, in both the air-to-ground and air-to-air scenarios. The USAF (following a 2001 competition) is purchasing 'Sniper XR' pods for Air Force and Air National Guard F-16 Block 30, 40 and 50 aircraft, as well as the F-15E, and

Houston writes there has been "a tight discipline placed over the operational requirements to control requirements creep. Senior decision-makers can over-ride demands for 'nice-to-have' capability enhancements that could drive up the cost. That is not to say that the project is without risk. The software development task is truly challenging. There have already been weight growth problems - typical of most fighter aircraft programs at this stage of development - but of sufficient gravity to cause some delays. There may even be crashes, there usually are with new fighter aircraft with relatively new engines."

Acknowledging regular media coverage of difficulties being faced by Lockheed Martin in progressing the JSF systems development (SDD) phase, Houston concedes, "doubtless there will be further problems as the development program progresses. While not denying these risks, and realising that some of them are likely to have cost and schedule impacts, the US has a great deal riding on making the JSF a success."

Further, says the Air Chief, "it's not just the US that needs (these) aircraft. All JSF partners and a number of potential future customers need to replace their ageing fleets. With that demand will come a large production base, probably well in excess of 3000 aircraft worldwide, which is particularly important to us in terms of growth potential. The ability to share the cost and risk of growth developments across such a large customer and production base greatly lowers the potential cost to us of keeping our fleet up to contemporary standards of capability throughout its service life."

JSF CONSTRUCTION UPDATE: Assembly of the wing for the first JSF was started 24 August at Lockheed Martin's facility in Fort Worth (Texas), less than two months after the plant was said to have begun the aircraft's forward-fuselage assembly. UK-based BAE Systems, was similarly reported as set to begin production of the aircraft's aft-fuselage (in Samlesbury) by the end of this month, whilst Northrop Grumman's Palmdale (California) facility is said to have started centre-fuselage assembly in May.

According to Bob Elrod, Lockheed Martin's new executive vice president and JSF program general manager, "with wing assembly under way, and with aft-fuselage assembly expected to begin this week, all of the F-35's four major sub-assemblies will be in production. The F-35's advanced, modular assembly process is designed to increase production speed dramatically, while improving quality and reducing costs."

Addressing the National Press Club 18 August, the Chief Defence Scientist, Dr Roger Lough confirmed that that in response to a call for submissions from the US Joint Strike Fighter (JSF) Science & Technology Board - looking at technology insertion opportunities for the 'generation after next' of the F-35 - (and gathered from all nine JSF SDD partners) had seen 288 proposals whittled down to 21.

Of the 21 submissions to receive funding over the next few years, support was given to 13 submissions from US-based laboratories and industries, with a total of eight going to the non-US SDD partners. Of these eight, one is said to have gone to the Netherlands Government Laboratories, with the other seven were awarded to Australia. Dr Lough said the Defence Science & Technology Organisation (DSTO) played "a lead supporting role in each one of the seven research proposals."

The first GE Rolls-Royce F136 development engine for the Joint Strike Fighter (JSF) program successfully began ground-testing 20 July at GE's facility in Evendale (Ohio). The F136 engine, in the Conventional Take-off/Landing (CTOL) configuration, was fired up for the first time to perform an idle leak check, and began its initial mechanical and controls evaluation.

The ground-testing program will run through to December 2004, and will be conducted at both sea-level static and simulated high-altitude, high-Mach tests. In early 2005, the same engine is planned to run endurance testing. A second development engine in the Short Take-off Vertical Landing (STOVL) configuration is to be assembled later this year, with testing on that installation to begin in early 2005.

Project Air 5376 - Ctd from page 17

AIR 5376 OPTIONS: From top left - Raytheon ATFLIR pod on US Navy 'Hornet'; Lockheed Martin 'Pantera'/Sniper XR-derivative pod and Northrop Grumman's 'Litening' advanced targeting pod (bottom left)
VENDOR PHOTOS

potentially the A-10 fleets. Evaluations are also being undertaken in regard to the pod fulfilling B-1 and B-52 targeting requirements.

Norway reported 14 July its air force had become the first international customer to deploy LM's 'Pantera' targeting pod. The deployment came when a flight of Royal Norwegian Air Force planes participated in Exercise 'Maple Flag', held in May. The export version 'Pantera' pod incorporates a high-resolution mid-wave third generation forward looking infrared (FLIR), infrared pointer, dual-mode laser, day television, laser spot tracker and advanced algorithms in a lightweight, aerodynamic pod. The pod's long range FLIR and TV imagery is said to allow pilots to avoid enemy air defences and preserve national assets.

The US Marine Corps reported 30 August it had successfully integrated and tested Northrop Grumman's 'Litening' advanced targeting system on its F/A-18D 'Hornet' aircraft, the eighth US platform to achieve such an outcome. The initial capability was achieved using 'Litening' ATs borrowed from Marine AV-8Bs. Experience from 'Litening'-equipped AV-8Bs during Operation 'Iraqi Freedom' is said to have convinced the Corps of the need to quickly enhance the precision attack capabilities of its Hornets, with 60 pods now intended to be procured to support its fleet of 72 F/A-18Ds.

Installation of the new pods is intended to support day/night target location and identification, laser spot search/track, laser marker and data links for coordinated operations with ground forces, and precision target coordinate generation. US-based FLIR Systems said 16 July it had received a series of orders totalling US$7.4m for delivery of infrared imaging cameras for use in Northrop Grumman's 'Litening AT' targeting pod. A new version of the 'Litening' infrared imaging camera was developed in 2001, enabling Northrop Grumman to deploy the first targeting pod with an advanced third-generation infrared detector. The new cameras will be applied to USAF B-52 and F-16 aircraft. ADBR

The first F136 engine into test marks the most significant milestone in the Phase III pre-System Development and Demonstration (SDD) for the GE Rolls-Royce Fighter Engine Team, which comprises: GE Transportation - Aircraft Engines (Evendale); Rolls-Royce plc (Bristol, UK) and Indianapolis (Indiana). This development work is being funded by the four-year Phase III pre-SDD contract, which runs through 2005. Proposal work by the Fighter Engine Team is underway in anticipation of a new multi-year SDD contract award in 2005 from the JSF program office. Based on the current schedule, the Fighter Engine team expects to run the first full SDD engine in 2007, with delivery of the first production F136 engine in 2011.

The F136 engine will be fully interchangeable and affordable to meet the requirements of all JSF aircraft variants. Engines will be tested for all F-35 variants during Phase III: STOVL for the USMC and the Royal Navy, CTOL for USAF, and the Carrier Variant for the US Navy. ADBR