

'Globemaster III' sets about redefining ADF airlift vision

Shockwaves from the Government's \$2 billion rapid acquisition of four C-17A 'Globemaster III' aircraft from the Boeing Company - to form a new Responsive Global Airlift (RGA) capability - were still reverberating throughout the Department of Defence as the first unit arrived outside Canberra's VIP (No.34) Squadron hangar on 5 December, and after a direct flight from the United States.

■ Trevor J Thomas/CANBERRA

Debate over the manner and means of the debut of the C-17 in Australia have ranged from complaints of its detrimental effect on the fledgling 'Kinnaird' acquisition reform process (ie: by undermining the integrity of the daily-intensifying 'two pass' evaluation process), through to the impact of the aircraft's 78-tonne payload capacity, and how that is to be absorbed by the balance of the ADF's airlift system.

Principally at issue is how supporting RAAF logistics systems and considerably under-sized aircraft types (ie: compared with the C-17s dimensions), will be able to accommodate the sheer volume of materiel that each new 'Globemaster' is capable of disgorging every time it lands.

Yet before the C-17As were even a glint in Prime Minister Howard's eye, recapitalisation plans for the ADF's airlift fleet had been finely re-crafted in the 2004-2014 Defence Capability Plan (DCP) under two phases (1/2) of project Air 8000.

The 2004 DCP focused on replacing (via the former project Air 5190/2) or upgrading (via Air 5190/1A) the veteran De Havilland Canada DHC-4 'Caribou' battlefield airlifters (4 tonne), whilst similarly upgrading (via the former project Air 5414/1) the rapidly life-of-type expiring 19-tonne Lockheed Martin C-130H 'Hercules' tactical airlifters.

The tide then turned, however, with the pre-Brendan Nelson legacy ideology of upgrading platforms and systems being fatally wounded in light of continuing difficulties with a series



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of current platform upgrade programs (ie: Sea 1411; Land 106; Sea 1390; Air 5376; etc).

Accordingly, issuance of the 2006-2016 DCP in June (see *ADBR, Vol.25, Nos.5/6 - 30 June 2006, p14*), saw ADF capability planners leaping at the opportunity to modernise its Airlift fleet on the basis of promises by Government that full asset replacement funding would be provided, if needed. When fully implemented, such investment will effectively achieve by the middle of the next decade, an average airframe life across the RAAF's airlift fleet of well under 10 years.

ADBR understands the C-17A's formal acquisition process found its momentum in November 2005 (at a meeting of the Cabinet's National Security Committee), with Government calling on the Department of Defence to prepare two fully-costed RGA options, for consideration and decision in March 2006.

The Government subsequently down-selected to the C-17A after rejecting an offer by EADS to temporarily lease commercial cargo aircraft through to 2010, when such airframes would be replaced by Airbus Military A400M

transporters fresh off the European production line.

Despite the attraction of significant Australian industrial advantages in picking up A400Ms cut from the German Air Force's budget (as well as joining the glo-

bal A400M production program) - along with significant airlift force structure rationalisation benefits by consolidation around the A400M (and replacing the C-130s) - the offer of early C-17A deliveries ended up being too strong when combined with the allure of amassing further 'political capital' in Washington.

As is now history, from the point of Government's decision to delivery of the first C-17A took only nine months and two weeks, an admirable performance by Boeing. Achievement of Initial Operational Capability for the C-17As is now planned for August 2007, with the entire fleet expected to be delivered to the RAAF by mid-2008.

Full Operational Capability is unlikely to be achieved before 2011, however, given training systems (including the aircrew simulator) and required support facilities still need to be built and established at RAAF Base 'Amberley', in Queensland.

As originally reported by ADBR (see *Vol.25, Nos.1/2 - 31 January 2006, p11*), the demise of the 'legacy' airlift plan has itself been the source of much debate within the Department of Defence and

external commentary circles. The most obvious effect of the C17A acquisition has been a need to substantially recalculate many of Defence's former airlift cargo load assumptions, with the Defence Science and Technology Organisation (DSTO) at the fore in raising concerns about cargo 'transference' issues in operational theatres (ie: between the C-17As and smaller extended fuselage C-130Js).

In such debate, the wisdom of the A400M route (which features similar cargo dimensions to the C-17) has refused to be quashed, with one recent airlift study paper forcefully advocating acquisition of the Airbus Military-sourced aircraft to eventually replace the RAAF's C-130Js, and tasked in direct support of the C-17As.

Facing multiple new aircraft type introductions across the next decade (ie: C-17A, 'Wedgetail', A330 MRTT, F/A-18F, F-35A - plus project Air 7000 UAV outcomes), the RAAF now appears to have firmed its resolve to limit the introduction of new aircraft types, preferring instead for an approach that leverages commonalities with those types of aircraft already in-service.

Examples of stresses within the RAAF were confirmed in its efforts to secure a ready workforce to operate the new C-17As. The eventual solution involved liquidation of the previous C-130H operator (No. 36 Squadron), and the turning of its primary focus onto the new heavy lifters, whilst transferring the balance of personnel and airframes to the existing C-130J operator, No. 37 Squadron.

This group will in future fly a mixed fleet of 12 x C130Js, and up to eight of the 'least used' C-130Hs - noting the whole 12 have been committed to an Electronic Warfare Self Protection (EWSP) upgrade under project 'Echidna' (Air 5416/2B) - to improve safety for Middle East operations.

Similar to the United States (as well as the UK and Canada), the implications of the intensive use of military assets in the Middle East is only now just coming to be appreciated within Australian Defence circles. The heavy

utilisation of C-130Hs in combat zones (due in some part to delays in C-130J certifications), means the 'H'-model's present life-of-type will expire not long after 2010. In short, and to sustain current operations, the ADF has argued it still requires 20 fully functioning airframes in the C-130-class.

Changing operational demands placed on the RAAF from a more expeditionary ADF have also caused a major rethink on the role of 38SQN, the operator of the 14 DHC-4 'Caribou' fleet. An aircraft now set well apart from others in the RAAF fleet, the DHC-4s are equipped with pre-World War II radial piston engines and minimal mission systems. In short, the current 'Caribou' fleet remains effectively unchanged in terms of its configuration from the time it was acquired in the 1960s, and when it was already a mature aircraft.

The niche carved out by this Short Take Off and Landing (STOL) aircraft in the hills of Papua New Guinea has also been evaporating as new national air transport infrastructure has been built in the South Pacific nation, while the locus of disaster relief missions has increasingly moved to naval platforms parked offshore of afflicted areas.

The Caribou's STOL performance - maximum gross takeoff weight of 13 tonnes from a 221m grass strip, with a high gradient climb (15%) to carry an up to 4 tonnes payload over 371km (or 2.5 tonnes up to 1,760km) - is not that much different to modern military helicopters (albeit achieved with more logistical efficiency).

Further, and while previously the 'Caribou' was able to 'live off the land' by consuming civil aviation stocks of AVGAS for its ra-

'Chooks' raising their place in the ADF's airlift pecking order

■ Canberra Bureau Report

After being prematurely de-commissioned in the late-1980s, some fancy argument in the mid-1990s about the need to supply fuel forward to extend the range of the Army's 'Black Hawk' helicopters saw wiser heads recognising the aircraft's value and versatility, resulting in approval for a 12 x 'C' to 4 x 'D'-model upgrade, followed on by a further two airframe supplementation under project Air 130.

Since that time, the 'D'-models have become one of the most heavily committed ADF units, with ADF and Special Forces deployments to both Iraq and Afghanistan, as well as regional involvement in supporting disaster relief missions.

ADF modernisation and expansion plans for the CH-47 fleet under project Air 9000 therefore focus on leveraging

dial piston engines, this fuel is now increasingly rare in outlying areas (let alone cities), as more and more commercial operators convert to jet fuel powered turbines.

More importantly in terms of the step-up of ADF operational 'tempo' in recent times, the 'Caribou' lacks any battlefield armour or self-protection capability, meaning it could not be deployed to Middle East operations with a high certainty of survival.

The 'joint' element of the ADF's airlift system is sourced from the Army's C Squadron, 5th Aviation Regiment, and its now heavily committed six Boeing CH-

Boeing's new CH-47F model, which has benefited from a substantial airframe upgrade.

This work has seen the addition of a new Rockwell Collins integrated avionics suite (with all glass cockpit), more efficient and powerful Textron Lycoming T55-GA-714A engines, plus a range of other structural and system improvements that improves operational deployability, along with reduced life-of-type/operational cost reductions.

CH-47Fs can currently be acquired as either new builds benefiting from Boeing's application of

LEAN manufacturing techniques and costing roughly US\$30m each, or as a remanufactured CH-47D costing around \$9m.

According to a recent US Army Operational Requirements Document (ORD), approval has now been given for a total CH-47F development program that encompasses 397 rebuilds, 55 new builds, and a rebuild/conversion of 61 CH-47Ds into Special Operations-standard MH-47Gs.

Boeing advised 19 December it had signed a production contract with the US Army for 16+22 new builds, and 9+19 remanufactured CH-47Fs, thus launching the production line with deliveries from early-2008. [ADBR]



47D 'Chinooks', two of which have served through 2006 in Afghanistan (see *Insert Box above*).

Given the above aircraft supply environment, one pervading thought apparently on RAAF minds has been: Why not move to a three-tier airlift fleet of C-17As, C-130Js and CH-47Fs, and effected via the acquisition of additional C-130Js and CH-47Fs to replace outright the C-130Hs, as well as the increasingly redundant 'Caribou' in the short-to medium term? Such a scheme would also yield substantial savings through all battlefield airlift being provided by the C-130Js and the CH-47Fs.

Established ADF concepts of operations, however, appear even harder to defeat than Service pejoratives, and it appears that the Australian Army's 'etched-in-stone' requirement for a separate battlefield airlifter to support the deployment of reconnaissance and surveillance forces (including the SAS Regiment), continues to find support in terms of its demand for the retention of some distinctive battlefield airlift capability in the under 10-tonne cargo class.

The acquisition of such an aircraft was the subject of phase 2 of project Air 5190, a tender-based contest which reached its peak in 2000 for 10-12 aircraft, with two bids being short-listed: the then Lockheed Martin Alenia Tactical Transport Systems (LMATTS) C-27J 'Spartan'; and the CASA C-295M.

The other bidder was the IPTN CN-235 promoted by the then Aerospace Technical Services (since acquired by Raytheon Australia). Project Air 5190, however, failed to receive funding

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FOUR-WAY CONTEST FOR LOWER AIRLIFT TIERS: Lockheed Martin appears undeterred by its exclusion from the Joint Cargo Aircraft (JCA) program in the United States, and is expected to go head to head with its short-fuselage C-130J in Australia's project Air 8000 battlefield airlifter competition against JCA finalists: Alenia Aeronautica/L-3 Communications with the C-27J 'Spartan', and EADS-CASA NORTH AMERICA/Raytheon with the C-295M.

LOCKHEED MARTIN, ADBR & EADS PHOTOS

Proliferation Beyond Rogues' - that the most worrisome motivation associated with potential proliferation "is countering the pervasive extent of US influence. This motivator is likely to spark further efforts to proliferate in the Middle East and Latin America, and it is certainly a motivation for several countries within our region."

The signing of the NPT in 1968 by Australia, along with the enforcement activities of the IAEA, has no doubt served the national interest effectively over the past 40-odd years by keeping a lid on widespread proliferation. Only India, Pakistan and Israel have not ratified the NPT, while North Korea (as demonstrated by its recent actions), has obviously withdrawn.

While Australia faces no imminent need itself to withdraw from the NPT, even in the face of unsanctioned nuclear activity (including its own complicity in the potential supply of uranium to India), the NPT at the end of the day only provides a framework for consensual non-proliferation.

In a rapidly changing world seeking energy security, the NPT and other regional Nuclear Free Zone treaties Australia is a party to, only provide safeguards to nuclear proliferation while signatories remain in a nuclear free balance. Hence, a phase-shift brought about by further proliferation could invalidate the entire NPT principle overnight, perhaps underscoring the Government's elevation of ballistic missile defence (BMD) capabilities in the 2007-2017 Defence Capability Plan (DCP).

Still, the most alarming scenario for Australia would be a limited-warning acquisition by another country in the wider region of nuclear weapons, thus setting off a chain of uncontrolled counter proliferation responses. Israel's widely acknowledged (but only recently declared) acquisition of nuclear weapons in the 1960s was a major driver of proliferation attempts within the wider Middle Eastern region, in particular: Iraq; Egypt; Libya; and latterly Iran.

So whilst geo-strategic realities to date have limited the impact of WMD proliferation, such as the

Indian-Pakistan stalemate, the entry of such weapons to other regions (ie: South East Asia) close to Australia, could foster fractal-like growth in counter-nuclear efforts.

A regional neighbour's sudden acquisition of nuclear weapon capability would immediately quash most, if not all, of the strategic defence elements that have contributed to Australian government structuring for defence of the continent. Such weapons are comparatively very small (in terms of their destructive power), but easily deployed over long distances - thus negating the protective insulation traditionally offered by Australia's remoteness.

As outlined in our cover story, such weapons can be deployed by systems that are extremely difficult to counter via ground-based missiles, air- or space-based systems (ie: just look at the billions being invested in US national missile defence), or other asymmetric means - including pre-emptive missile strikes or Special Forces operations, the latter of which the ADF has invested substantial resources in over the last thirty years.

Further, rudimentary nuclear weapons are relative easy to use and target (even if inaccurately), and can be used by military forces without high standards of force employment, thus countering the ADF's quest for the 'capability edge' via high levels of investment in professionalism as a strategic defence tool. In short, the only effective military counter to nuclear weapons is deterrence through the promise of nuclear response - a strategy aptly named in the 1960s as 'Mutually Assured Destruction' (MAD).

In order to undertake the rapid production of nuclear weapons in response to changed strategic circumstances, Australia would need to have in place a much larger nuclear industry than it presently has. Such critical mass would be needed in order to be able to readily acquire sufficient quantities of fissile materials, unless these were supplied by either the UK or the US - which has its own political implications.

Provided with sufficient fissile material, it is not unlikely that Australian science and industry

could foster the required knowledge and facilities to produce effective nuclear weapons in a relatively short time, though this would come at a considerably high cost without the provision of external assistance.

Reflecting back on Switkowski's recommendations, and by establishing a larger Australian nuclear industry in the near future, it is likely the nation could be provided with a less than 6-12 months nuclear weapons 'in wait-

ing' capability option within the next decade, principally as a check to a possible regional breakdown of the NPT.

Conversely, and without a robust nuclear power industry (or an indigenous enrichment or re-processing capability) in a nuclear weapons proliferation-intense world, Australia's citizens would be at a significant disadvantage if there emerged a rapid increase in regional spread of nuclear-based or other WMDs. [ADBR]

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approval from the Government, and was given a ten-year 'cooling off' period by way of the 2004-2014 DCP.

With an undoubted requirement for at least some battlefield airlifter capability given the current threat outlook (as fuelled by the 'War on Terror'), the ADF's future force structure mix began to coalesce by the start of 2006 around: 4 x C-17As (on the top Tier); 10 x CH-47Fs and 4-8 battlefield airlifters (at the bottom Tier); and the balance of 12-24 C-130Js in the middle. All that was missing was a convincing Airlift study supporting the shift to such an outcome.

Any diminished buy of 4-8 battlefield airlifters raises the obvious question as to the supportability economics of such a small fleet across the wider RAAF. This realisation has since driven a focus on an airframe that already has a large degree of commonality with existing RAAF assets.

Re-entering this fray in 2006 was the reinvigorated C-27J 'Spartan', as offered by Alenia Aeronautica (with support from L-3 Communications) and teamed as Global Military Aircraft Solutions (GMAS) into the potentially huge, but divisive, US Joint Cargo Aircraft (JCA) program.

In short, the C-27J offers a common cockpit and engines with the already in-RAAF service extended fuselage C-130Js, supplemented by its many commonalities in the cargo handling system and overall familiarity with the larger 'Hercules'. Much of this was gained from Lockheed Martin's association

with the original Italian Air Force project to upgrade its near 30-year old G.222 design to the C-27J standard.

Lockheed Martin executives told ADRB in Canberra 22 January they would similarly argue the majority of the above-mentioned benefits would also be brought to the table via the RAAF selecting its short-fuselage C-130J, which was eliminated very early and with some controversy from the JCA competition in 2006.

While any dominant preference by the RAAF to opt for commonality benefits and cost savings in project Air 8000 would spell bad news for EADS CASA and their C-295M (the other JCA contender), the faces of a high level Alenia Aeronautica team seen leaving Russell Hill in late-November were no doubt pleased a further change of view within airlift circles might also support both additional extended fuselage C-130J acquisitions, as well as smaller numbers of a separate battlefield airlifter.

A US Air Force decision in early-January to push back JCA program conclusion from February 2007, to the middle of the year (*refer story page 25*), also raises the probability of some increased connection between the final JCA outcome and Air 8000 aircraft selection, particularly in shared global maintenance support (as with the C-17s) for the micro-fleet of battlefield airlifters now expected to be acquired by Australia.

While Boeing was first off the mark in lodging unsolicited offers for 3-4 CH-47F 'Chinook' new

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THAAD is said to provide much better detection and tracking of threat missiles over the legacy 'Aegis' SPY-1 radars, including discrimination of the actual missile warhead if decoys are deployed.

According to Ed Miyashiru, the Vice President of Raytheon Missile Systems, the Block II (or 'full-width' 21 inch diameter missile) will significantly increase missile thrust given they will have 1.5 times the velocity at burnout of Block I missiles - thus implying an intercept altitude as high as 300-400km. He told ADBR that "additional capabilities would potentially enable mid-course intercept of longer-ranged ballistic missiles," however, they currently remain to be fully funded.

Accordingly, one reasonable alternative to the 'Aegis' BMD system solution flagged by Dr Nelson after AUSMIN talks in Washington is the THAAD, which is on its way into military service after securing 4 January a US\$619m production order from the MDA. The contract, for the first two fire units, includes 48 interceptors, six launchers and two fire control and communications units, and is scheduled for fielding in Fiscal Year 2009 - four years before the RAN's first AWD is to be launched.

So, for roughly the same cost (as estimated to Japan) to fit out three 'Aegis' BMD systems on the RAN's new air warfare destroyers, Australia could acquire four THAAD systems on the back of the MDA order, and at much lower risk, and without the required integration with the AWD, and with three times as many interceptors. This means the ADF could provide ready BMD protection to multiple prime Australian cities, at all times providing at least twice the coverage of an AWD-based solution, and without compromising the initial concept of operations that has so far driven project Sea 4000.

Using the MDA's figures, eight THAAD batteries would cost upwards of \$3.5b, but after covering mainland capitals, would still leave one system for forward deployment with ADF expeditionary forces. Further, THAAD has been designed from the ground up for rapid relo-



cation, and is also capable of deployment by the RAAF's new C-17A heavy lift transports - requiring four flights to establish a minimal capability (ie: at least eight interceptors).

One of the most impressive elements of the THAAD system is its X-Band phased array radar, which is said to be populated with 25,344 transmit/receive modules across its 9.2m² aperture. As such, the radar is capable of detecting ballistic missile threats (without external queuing) launched up to 2,500km away, whilst also providing constant tracking and discrimination against decoys and missile kill assessment.

The THAAD 'hit-to-kill' missile construct provides two intercept opportunities from as high as 150km, and over a range of 200km against intermediate range threats (under 5,500km range or less than 6km per second re-entry), and when supported by a PAC-3 missile, can provide a third intercept opportunity.

Intercept opportunities against higher speed missiles will be limited, however, but are nevertheless claimed to be superior to the SM-3 Block IA as the THAAD system can engage both endo- and exo-atmosphere targets (ie: 'in' and 'out' of the atmosphere), while the SM-3 Block IA is more focused on exo-atmospheric engagements.

In short, and what should hopefully be in Defence's report when it goes to the government mid-year, is that the land-based THAAD offers much improved capability against short-range missiles, and additional intercept opportunities against longer-range missiles.

Further, and considered to be of increasing importance in the burgeoning cost of the project Sea 4000 air warfare destroyers if BMD is to be added to all three ships, is that the ADF's consideration of options for the acquisition of BMD capabilities might be much better tuned to budgetary limitations if the subsequent acquisition was limited to only one class of intercept system.

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Project Air 8000 - Ctd from page 15

builds - followed by a pitch to rebuild the six existing CH-47Ds (to yield an eventual fleet of 9-10 helicopters) - Lockheed Martin has similarly not been slow in preparing itself for project Air 8000.

The company appears well positioned to supply additional C-130Js (of either the extended- or short-fuselage type) on the back of a trade-in deal for RAAF EWSP'ed C-130Hs, with the Royal New Zealand Air Force (RNZAF) one likely resale target.

The RNZAF currently operates five 'H'-models, and is subjecting them to an extensive L-3 Communications SPAR Aerospace-led Life Extension Program, after deciding to forfeit a new-generation 'Hercules' acquisition opportunity secured on the back of the RAAF's earlier 'J'-model purchase.

Acknowledging the economics of small numbers on battlefield airlifter support costs, and assum-

ing the JCA ends up favouring the C-27J, the consideration of issues related to commonality with legacy systems might just force the ADF down this path. Armed with 'Kinnaird'-process tender quality information, a more complete picture of the RAAF's future airlift force might just be ready for a government decision within the 2007 election year.

In terms of aircraft delivery precedents, the Italian Air Force gave permission in December 2006 to Alenia to divert a C-27J originally destined for delivery to its 'Pisa' Air Base to satisfy early delivery to Lithuania, which had previously ordered three aircraft on the basis the first was delivered by the end of 2006. Accordingly, it remains to be seen whether the speed of military acquisition processes displayed for the C-17As, has any hope of filtering down to the wider Australian military airlift fleet.

ADBR

2006 DCP Enhancements - Ctd from page 22

ready fielded significant numbers of NLW systems into complex warfighting theatres such as Iraq.

The Royal Australian Navy (RAN) was an early adopter of NLWs via the American Technology Corporation's Long Range Acoustic Device (LRAD), which directs an acoustic beam effect onto selected targets to generate a 'mission-withdrawal' response.

Further, a recent spate of Australian Security Detachment (SECDET) lethal shootings in Baghdad, including the politically sensitive 22 June 2006 killing of bodyguards to the Iraqi Minister of Trade (Abdel Falah al-Sudany), might potentially have been avoided if the ADF had possessed an NLW capability.

The US Army and Marines in Iraq already make extensive use of non-lethal weapons to ascertain the intent of vehicle drivers and civilians approaching convoys and hardened positions.

In operational circumstances, the NLW is the weapon first fired, as a means of making it clear to drivers and non-combatants that further approaches to coalition forces is highly likely to generate a lethal response.

SECDET members in Baghdad again fired lethally 14 January on the occupant of a vehicle, said to have penetrated the first of a number of coalition check points in the vicinity of the Australian Embassy. According to officials, the incident occurred "when a vehicle failed to adhere to access control measures, and refused to stop despite specific signals to do so."

Preliminary assessments indicate the driver of the vehicle was a civilian contractor employed in the International Zone. A detailed investigation into the incident has since been instigated by Australian forces in conjunction with coalition authorities.

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