

HOLLOW FORCE, FILLED OUT FOR NOW: Given the above, principal initiatives in the 2007/08 Defence Budget relate to funding extensive packages to address shortfalls in uniform personnel recruitment and retention (\$2.1 billion), and the provision of extra monies (an additional \$1.8b over 10 years) to boost logistical sustainment of the ADF to underpin short-notice deployment preparedness.

The logistics funding boost has been greeted by ADF leadership as being particularly important in sustaining the force, as it enables a high level of operational readiness to be maintained through providing sufficient funds to guarantee adequate training can be undertaken.

Such philosophy counter-points inherited views from the 1991 Force Structure Review and subsequent efficiency measures, which saw Defence managers repeatedly cutting-back on personnel and training expenditure in order to raise additional funds for new capital acquisitions.

The cost of sustaining ADF operational capability (operational control and the three Services outcomes, not including personnel costs) is put at \$10b in 2007/08, of which the overall logistics boost (including previous budget allocations for a total of \$4b over the next 10 years), equates to roughly 4% of annual non-personnel operating costs. The additional funding will go to boosting inventory/stock holdings of consumables like fuel and ammunition, and improvements in inventory management and accounting practices (such as more efficient bulk orders), thus leading to a more functional and efficient inventory management system.

As this money is being targeted towards readiness in key combat capabilities – including the ‘Anzac’-class frigates, ‘Collins’-class submarines, Naval aviation, Army mobility and surveillance, Air Force airlift, the Boeing F/A-18A/B ‘Hornet’ and BAE Systems ‘Hawk’ 127 Lead-In Fighter (LIF) aircraft – the overall 4% boost will most definitely provide a higher increment to these frontline capabilities.

Yet with increments in ADF operational tempo now seen as being likely but ‘unforeseeable’ in the near and long term future (see *JO21C article, page 27*), the question remains as to why Defence goes on sustaining high levels of operational readiness being sought by the Government in response to contemporary threat changes, by resort to annual supplementation initiatives?

Surely the Department – after close to 20 years of experience since East Timor – is in a position to readjust the baselines underpinning annual military expenditure requirements in a fashion as to properly serve the currently required level of readiness, rather than resorting to annual top-ups of funding from artificially reduced baselines that remain built ‘into the books’ from an earlier period of national governance that saw lesser need for the ADF as an instrument of national power, and thus deserving of reduced funding.

TIME TO REFORM FUNDING BASELINES: By retaining a sustainment norm based on the legacy period of the early 1990s, Defence repeatedly instils under-funding into its budget estimates, thus compounding the infamous ‘hollow’ force as the de facto budgeting standard.

While current Governments reap the public relations benefit of announcing substantive logistics funding increases in each subsequent budget, they nevertheless also run the long term risk of reverting to a ‘hollow force’ in future circumstances where tighter financial pressures might require leaner allocations to be effected in a manner that does not raise public perceptions of a ‘cut’ in defence funding.

The fact that the Budget Statements indicate logistics funding remains a movable feast – with resource levels “under review by Government” – sustains the deception that ADF readiness is actually being built up to meet changes to the contemporary threat environment, as well as sustaining a baseline structure for logistics funding that remains below that prevailing during the 1999 East Timor crisis, which was subsequently shown to be inadequate.

Structural logistics funding deficiencies also magnify the challenges upon the ADF in budgeting for the support of new additions to military

‘Long & winding road’ to MUAS via BAMS

Two key deadlines were met during May for progression of the ADF’s long-running quest to acquire a Multi-mission Unmanned Aerial System: the 15 May closure of responses for the restricted Request for Tender for a local Industry Capability Partner under phase 1 of project Air 7000; and the 3 May closure in the United States of the Request for Proposals for industry solutions relating to the US Navy’s Broad Area Maritime Surveillance (BAMS) system.

■ Abraham S Gubler/AVALON & CANBERRA

The outcomes of the assessments of both competitions – involving the Defence Materiel Organisation (DMO) and the US Naval Air Systems Command (NAVAIR) – will feed an Australian Government ‘intermediate pass’ decision relating to a go-ahead on Australian industrial involvement in the development, and eventual production, of a customised BAMS system for the Multi-mission Unmanned Aerial System (MUAS).

This outcome falls a long way short of the original June 2001 Defence Capability Plan (DCP) to acquire a few Northrop Grumman RQ-4A Block 10 ‘Global Hawk’ air vehicles and supporting systems by 2007, in order to secure some early capability into service to give the Australian Defence Force (ADF) some ‘feel’ for the burgeoning capabilities of unmanned aerial systems (see ADBR - ‘Spirally away from the warfighter’, Vol.25, No.9, Sept-Oct 06, p29).

Competing for the Australian Industry Capability Partner (ICP) – see ADBR, ‘Aussie BAMS players gearing up for MUAS beauty contest’, Vol. 25, Nos 11/12, 31/01/07, p6 – are four industry teamings: BAE Systems (BAES) Australia partnered with L-3 Communications; Raytheon Australia with ISS, SAS and Boeing Australia; Tenix Aerospace & Defence partnered with Saab Systems Australia and Northrop Grumman (a repeat of the team that developed an Australian Ground Environment for the original ‘Global Hawk’ trial); and Australian Aero-

space, leveraging project Air 87/Air 9000 capability and expertise from parent group, EADS.

EADS is the Lead Systems Integrator (LSI) on the German ‘Euro Hawk’ program, which aims to raise an Electronic Intelligence (ELINT) variant of the Block 20 ‘Global Hawk’ UAV. The competing BAMS proposals include: Northrop Grumman with a production standard Block 20 ‘Global Hawk’ flying customised maritime sensors (and known as the RQ-4N); Lockheed Martin with an evolved General Atomics ‘Predator B’ featuring a new wing and sensors, and known as the RQ-9 ‘Mariner’; and Boeing partnered with Raytheon to offer an optionally manned UAS version of the Gulfstream G550 Special Mission aircraft, potentially to be called the RQ-37 under US naming protocols.

Outside of local ICP aspirants and US BAMS contenders, a third element in the mix seeking to influence Government MUAS solution considerations, is the Defence Science and Technology Organisation (DSTO) and its knowledge of Australian MUAS applications arising from its North West Shelf (NWS) UAS Trial. The publicly released version of the Trial summary document is notoriously vague, and provides little more than a sketched outline of events and assurances that the trial met its objectives and yielded some rather obvious outcomes.

The classified Defence version of the Trial documentation is understood to detail a range of specific system performance and command control issues highlighted during the trial activities. One element comments on the

capabilities already in the pipeline - such as the Air 5402 MRTT refuelling aircraft, Air 87 'Tiger' ARH helicopters and Air 5077 AEW&C aircraft - let alone upcoming decisions on multi-mission UAVs (see story page 21), air warfare destroyers, amphibious ships and battlefield airlifters.

57,000 IN UNIFORM AT ANY COST: Subsequent to previous government decisions, the ADF's objective strength has now been set at 57,000 uniform personnel by 2016 to man and support a huge log of new equipment coming from full implementation of the 2006-16 DCP. Current strength is 51,000.

The \$2.1b of new recruitment and retention measures in the Budget come on top of \$1b announced in December 2006, with new measures including: home loan assistance, flexible pay structures, marketing, career advice, expanded cadets and Navy 'SeaChange', new apprenticeships and professional development of medical officers.

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intensity of human operator support required to sustain the system. So how these issues will flow down to inform the down-select of BAMS solutions, when compared to Australian requirements and differing flight performance, will be of particular interest.

NAVAIR has now begun formal assessment of BAMS proposals with the 3 May passing of the deadline for receipt of proposals from industry. Final source selection of a preferred solution is due to be announced by end-November 2007, with Australian Government inputs (from the 'intermediate pass') set to drive a contract award soon after. Officials have indicated the exact contract award will not be announced until the contract is actually signed.

The BAMS program will then enter the development and demonstration phase at 'Milestone B', and subsequent to competitive system integrator selection process, the System Development & Demonstration (SDD)

phase will begin in Fiscal Year 2008 (FY08) with Low Rate Initial Production (LRIP) planned for FY11, and deliveries supporting an Initial Operational Capability (IOC) in FY14. Development of BAMS is expected to cost approximately US\$2 billion.

BAMS missions are envisaged as including: maritime surveillance; collection of enemy order of battle information; battle damage assessment; port surveillance; communications relay; support for maritime interdiction and surface warfare (including targeting); battlespace management and targeting of carrier launched maritime and strike missions.

The rough US Navy plan is to acquire around 40 UAVs to be based at five sites: Hawaii; Diego Garcia; NAS 'Jacksonville' (Florida); NAS 'Kadena' (Japan); and Sigonella (Italy), to provide coverage of ocean and littoral areas of interest.

BAMS will only be one element of the US Navy's planned Maritime Patrol and Reconnaissance Force (MPRF), which seeks the

The 2005 Defence Attitudes Survey (DAS) found that conditions of service which generated the most negative responses were associated with ADF postings policy, a strongly perceived (70%) decline in military values, and - in the Navy and Army - a strong belief that the workplace did not promote a healthy balance between work, home and family. Continuing similar perceptions amongst the ADF's workforce is thus liable to sustain high levels of turnover that are above sustainable norms.

It remains to be seen, in the longer term, if retention bonuses and other incentives can counter these negative conditions of service. The cost of addressing the negative elements of Defence postings (remote locations and high relocation frequency), restoring military values and allowing more flexibility in intensive service periods remains to be quantified, but apart from Defence management pushing for a significant basing realignment, is unlikely to be substantial.

The buoyant economy is often seen in a purely financial sense, as stiff competition for the ADF workforce. But the psychological attrac-

provision of persistent maritime Intelligence, Surveillance, and Reconnaissance (ISR) data collection and dissemination as an adjunct to the manned Maritime Patrol Aircraft (MPA) capability of the legacy Lockheed Martin P-3C 'Orion' and new Boeing P-8A 'Poseidon' Multi-mission Maritime Aircraft (MMA). Australia will consider the MMA under phase 2 of project Air 7000.

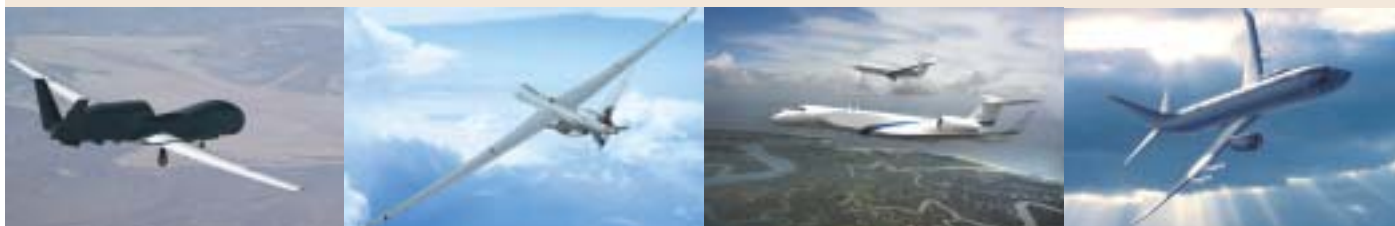
CHALLENGE TO LEGACY MUAS CONCEPTS: The emergence of a third BAMS contender via Boeing/Raytheon and Gulfstream (a General Dynamics subsidiary) with the offer of an 'optionally unmanned' 'Gulfstream RQ-37' has upset the hitherto comfortable High Altitude Long Endurance (HALE) versus Medium Altitude Long Endurance (MALE) UAV debate previously dominating the MUAS choice. Boeing's offering thus adds a third dimension - an Intermediate Altitude High Speed (IAHS) UAV customised towards the sea surveillance role.

With the IAHS air vehicle offering three times the gross takeoff weight of the RQ-4N, and nine

times that of the RQ-9, the RQ-37 offers plenty of space and weight to carry sensors and fuel combined with its higher speed deployment performance. Final endurance performance in the unmanned configuration remains to be determined, depending on operating weight with sensors and how much additional fuel can be carried by the aircraft utilising space in the fuselage.

However the RQ-37's increased cruising speed at altitude, up to Mach 0.87, will clearly allow it to cover more ocean per unit in a set time period than the competing systems. In a 12-hour mission, an RQ-37 can cover 36% more surface area than a Block 20 'Global Hawk', and 3.6 times more than a 'Predator B' - with the performance advantage being sustained even in the face of strong headwinds at operating altitudes.

Being primarily a naval surveillance platform, BAMS mandates surface area coverage as the priority, not the long loiter times over fixed locations initially canvassed in the original 'Global



FOUR KEY PLATFORMS HUNTING DOWN BAMS: Northrop Grumman's RQ-4N will utilise the Block 20 UAV platform (far L) that is a significant improvement over legacy 'Global Hawk' air vehicles in terms of reliability. Lockheed Martin's enhanced GA-ATS 'Predator B', or new 'Mariner' (L), offers much lower acquisition costs than competitors, whilst Boeing's 'optionally-manned' Gulfstream 550 UAV will leverage its huge commercial success and growing military take up, like these G550s in Airborne Early Warning and ELINT configurations (R). The preferred BAMS solution will be partnered with Boeing's P-8A 'Poseidon' multi-mission maritime aircraft (far R), which is a lead contender to replace the RAAF's AP-3C 'Orion'

VENDOR PHOTOS & IMAGES

tion of military service (ie: its 'esprit de corps'), provides a significant edge to ADF recruitment and retention. It is only when personnel lose confidence in the military system, or family pressures become too high that the civilian world beckons.

The buoyant economy simply means that those who would stay in uniform despite dissatisfaction, for fear of being unemployed, are now readily departing the service for civilian work. So without addressing key concerns - as expressed in the DAS - Departmental managers might expend a lot of taxpayers money and still fail to achieve personnel numbers, or resort to meeting requirements countering turnover via filling positions with personnel with skills below the experience level required.

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Hawk' and 'Predator' requirements. The term 'optionally unmanned' also needs some explaining, as the intuitive response is to assume that G550 UAVs could or would fly long endurance missions with a pilot onboard.

While the RQ-37 would retain a cockpit configuration, this would presumably be used in only two circumstances: flight in controlled airspace requiring a pilot to meet civil air traffic control dictates (particularly for short-notice deployments); and in post-maintenance test/checkout flights. Unmanned flight through congested continental USA and European airspace faces demanding civil certification requirements.

The very high altitude 'Global Hawk' solves this dilemma by flying above all other air traffic, but other lower flying aircraft like the RQ-37 and the 'Predator' need special US Federal Aviation Administration (FAA) certification to fly above 18,000 feet in 'positive control' airspace.

Further, restrictions are imposed on small planes operating below 18,000 feet (due to the danger of collisions) within the basing areas of these aircraft. By providing optional manning, the G550 UAV could avoid the need to secure special certifications and satisfy flying restrictions in congested airspace.

The option for a pilot onboard is also significant for post-maintenance test/check flights, which are an area of considerable management difficulty for UAVs (ie: if faults persist through maintenance cycles). Further, and unlike the small-scale production military-specific UAVs,

the G550 is not a derivative of an Advanced Capability Technology Demonstrator (ACTD) program, but rather, a commercial business aircraft in-service in comparatively large numbers with high levels of parts support, reliance and a global sustainment system.

Accordingly, the G550 is said to maintain a 98% dispatch rate for commercial operations, and Gulfstream provides a within 24 hour guaranteed global spare parts supply chain. The large airframe also provides plenty of space for growth in sensor payload, and the swept wings are resistant to take-off and landing turbulence effects that can ground the very high aspect ratio (length to width) and loaded wings of the other BAMS competitors.

The downside is cost, with commercial G550s retailing at around US\$40m in the business jet version (without any mission systems), and the much higher consumption of fuel to achieve the impressive range/speed performance.

'HEAD START' VIA RQ-4N: Northrop Grumman has chosen a testing and risk reduction approach for BAMS (called 'Head Start'), and involving development of the RQ-4N in a 'lowest program risk' manner with the eventual solution optimised for low developmental and life cycle costs. The 'Head Start' pitch is said to create a significant schedule margin in favour of the RQ-4N to provide BAMS IOC well ahead of the 2014 deadline.

To aid this outcome, Northrop Grumman has proposed the utilisation of a Gulfstream business jet - in the form of a flying test-bed - to perform end-to-end communi-

Some elements of Defence are already seeing this, with ADBR having come to understand that the average time in uniform for Sergeants is now as low as four years (down from around ten), and for Corporals, as little as one to two years. Certain junior Lieutenants are observed to have been moved upwards so quickly they spend as little as six months commanding their first appointment (a platoon or troop), far below historic norms, and the amount of time considered as prudently needed to adequately develop as a junior commander.

SWINGS & ROUNDABOUTS OF EQUIPMENT SPEND: Defence Budget materials indicate that \$622m has been reprogrammed

for cation functionality testing equipped with the RQ-4N's radar sensor, the Advanced Mission Management System for network, bandwidth and sensor control linked to a prototype of the BAMS specific Mission Control System (MCS).

The prototype MCS contains off-the-shelf commercial software and hardware components to yield a modern control station that can be upgraded as technology evolves. This will be used to demonstrate the effectiveness of the proposed services oriented architecture, and can receive sensor data from either simulated sources (or from the Gulfstream testbed), and will display and exploit that data in the same way as BAMS sensor data will be used.

The MCS communications system is to be equipped with an unmanned aircraft pilot workstation that can fly a virtual 'Global Hawk' being simulated within Northrop Grumman's Cyber Warfare Integration Network (CIWN) - a virtual, real-time combat environment used to customise, implement and analyse operational scenarios - and used for the Australian NWS UAS Trial in October 2006.

The RQ-4N air vehicle is based on the RQ-4B Block 20 'Global Hawk' that conducted successful first flight on 1 March. Unlike previous 'Global Hawk' airframes, the Block 20 is designed and built to production standards with enhanced performance, payload capacity for variable sensor loads and significantly improved maintainability.

Northrop Grumman claim the RQ-4N will meet all of the threshold and more than 90% of the BAMS objective requirements, including providing 80% Effective Time On Station (ETOS) at a ra-

dius of 3,600km (2,000 NM). The RQ-4N will also meet the BAMS requirement with the fewest air vehicles, Main Operating Bases (MOBs) and Forward Operating Bases (FOBs), thus providing the lowest total ownership cost.

While Northrop Grumman has not revealed the nature of the maritime surveillance sensors offered with the RQ-4N, Raytheon Space and Airborne Systems confirmed at the Avalon air show their development of a new 360° field of view Enhanced Integrated Sensor Suite (EISS) preliminary design for Block 20 'Global Hawks'.

The 360° EISS combines a spinning, dual array (back to back) MSA radar and the MTS-B rotating sensor ball turret. The MTS-B is a repackaged legacy 'Global Hawk' optical sensor subsequently used by US Air Force General Atomics MQ-9A 'Reapers' ('Predator B').

Raytheon says it will also offer their Distributed Common Ground System (DCGS) and DCGS Integrated Backbone (DIB) as Intelligence Surveillance & Reconnaissance (ISR) product management tools to the successful ICP, for integration as part of the ADF's new MUAS. DCGS/DIB is a software, secure net-based product that utilises commercial search engines and customised applications to allow exploitation of huge amounts of ISR data.

The system will be tested in July 2007 by the Defence intelligence agencies of the American, British, Canadian and Australia (ABCA) nations in the international Exercise 'Empire Challenge', designed to provide a single ISR picture across all four countries.

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has been immediately tasked with transporting the Special Force's newly-acquired (Joint Project 2088) Airdrop-able Rigid Hulled Inflatable Boats (SF ADRHIB) and their support equipment to Australia. RAAF C-17s will also be involved in proving the product of a Joint Rapid Airfield Construction (JRAC) exercise to be carried out later in 2007, and involving the construction of a C-17-capable airfield in Northern Australia by Army and RAAF engineers. The Defence Materiel Organisation (DMO) awarded 1 March a \$10.6m Foreign Military Sales (FMS) contract to the US Department of Defense to supply 10 United States Marine Inc (USMI) 11-metre RHIBs and aerial delivery systems to the ADF, previously announced as set to be matched to specially modified RAAF C-130H 'Hercules' air transports.

Grand avenue funded to the peak of Defence

One notable item in the 2007/08 Federal Budget brought down 8 May was a Department of Transport proposal to spend \$58.8m over the next four years replacing the Russell Hill roundabout in Canberra's Department of Defence precinct, with an overpass in order to provide a relatively unrestricted drive down Constitution Avenue from Defence to Parliament House. Transport officials described the project as establishing "the great boulevard that Walter Burley Griffin envisaged for the national triangle." Work on the duplication will begin next year for completion in 2010, provided the ACT Government agrees to transfer current roads and infrastructure to the Commonwealth at no cost.

MRTTs closer to flight tests

EADS reported 8 May it had successfully completed ground vibration testing of the RAAF's first project Air 5402 KC-30B Multi-role Tanker Transport (MRTT), and has now advanced the program closer to commencement of the flight test phase. Designed to validate the KC-30B MRTT's airframe

structural response, the ground-based tests were conducted with both the stand-alone centerline fly-by-wire Aerial Refuelling Boom System (ARBS), as well as with the two underwing hose-and-drogue pods installed. Completion of EADS' ground-based evaluations - said to have also been monitored by international airworthiness authorities - clears the way for the start of flight tests with the first KC-30B MRTT, including a series of in-flight refuelling contacts with various receiver aircraft. In a related project Air 5402 development, Defence signed 23 February a contract with Qantas for the ongoing engineering, maintenance, supply and training support of the new MRTTs, set to replace the existing B707 fleet by 2009. Defence confirmed in the 2007/08 Budget papers the KC-30Bs will be capable of refuelling the F/A-18s, F-111s, C-17s, AEW&C and Joint Strike Fighter (JSF) aircraft. Qantas' initial contract is for five years after the arrival of the aircraft in Australia, with provision to be extended up to 20 years, or the life of type of the aircraft. The MRTTs will be located at RAAF Base 'Amberley', in Queensland.

Trooplift helicopter assembly operation

The Minister for Defence, Dr Brendan Nelson, visited Brisbane 2 May to oversee initiation at Australian Aerospace's (AAE) facility of the ADF's new trooplift (and 'Black Hawk' replacement) helicopter programs, with commencement of final assembly of the first Australian-assembled MRH 90 helicopter (MRH005). The ADF's first four MRH 90s are currently undergoing manufacture in France, with the remaining 42 helicopters being acquired under phases 2 and 4 of project Air 9000 to be assembled in Brisbane from imported components. The completed MRH005 is expected to be ready for crew training in Townsville, in December 2008. Dr Nelson added that closely linking AAe's MRH 90 program with the Air 87 ('Tiger' ARH) program, would not only create 150 new jobs, but also ensure

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'MARINER' EVOLUTION: Lockheed Martin has similarly unveiled its BAMS solution, the RQ-9 'Mariner', as a further growth element of the General Atomics Aeronautical Systems 'Predator B' UAV family, with a larger wing providing increased endurance.

The new 'Mariner' has the same fuselage, avionics, flight controls and turboprop engine as the 'Predator B', but a bigger wing and tail to support an increased take-off weight and additional fuel tankage. The new 'Mariner' will also have enhanced icing and lightning protection, along with automatic take-off and landing capability.

Wingspan is increased to 26.8m from 19.5m, with the wingtip fairings housing radars for a 'detect, see and avoid' system to allow the 'Mariner' to operate inside congested civil airspace. Take-off gross weight is increased to 5,900kg from 4,080kg, with an

additional 910kg of fuel housed in wing tanks. Internal payload is 610kg, with 360kg of growth capacity, and capacity for up to 1,810kg to be carried externally on six hardpoints. Performance includes a maximum speed of 230kt (425kph), maximum altitude of 50,000ft and endurance of 48 hours.

The sensors and their mix have been changed from the 'Predator B' that was earlier demonstrated in Australia as part of the NWS UAS Trail, and includes a retractable (to reduce drag) FLIR Systems electro-optical/infrared (EO/IR) sensor and an EDO 360° scan maritime multi-mode radar. Electronic Support Measures (ESM) sensors for detecting target emissions and both wideband and narrowband line-of-sight (LOS) and satellite data-links are also fitted.

ADBR

"the continuation of more than 250 jobs commenced under the 'Tiger' project." The NHIndustries-developed MRH 90 is capable of carrying two pilots, two load-masters and 18 fully-equipped combat troops, and has a range of up to 900km at speeds in excess of 300km/hour. A naval version of the aircraft is also currently under development. The Royal New Zealand Air Force has also eight NH90s to replace its 14 UH-1 'Iroquois' helicopter fleet, a detachment of which recently took up service with the Combined Joint Task Force in East Timor. Studies are currently underway examining the longer-term future of Australia's naval 'Sea Hawk' helicopter fleet (currently being upgraded under project Sea 1405), and its potential replacement with navalised NH90s.

Anzac alliance re-contracted

The Defence Materiel Organisation (DMO) confirmed 27 April that, from 1 May, it would be entering a

new phase of its long-term strategic relationship with Tenix Defence and Saab Systems to support the 'Anzac'-class of ships and related shore facilities - under a new nine-year (plus a six-year extension option) contract known as the ANZAC Ship Integrated Material Support Program Alliance - replacing the original Anzac Ship Alliance (used for generation of the capability), and the In-Service Support contract (which handled sustainment capability). In a separate statement, Saab Systems said the initial value of the new contract was estimated to be \$104m, with expectations the Alliance would be further funded to enable additional capability enhancements to be undertaken. The alliance operates from Rockingham, in Western Australia.

F-35 program makes it into LRIP

Defence Minister Nelson noted 19 April the decision of the US Under Secretary of Defense (Acquisition, Technology, and Logistics) >>38