

## PROJECT AIR 7000 – PART II

# The great debate: MMA or ‘Orion’ life extension?



Trevor J Thomas/WASHINGTON DC

Supported by the findings of a Defence Materiel Organisation (DMO)-commissioned study into the risks of extending the service life of the AP-3C ‘Orion’ fleet beyond 2018, the Rudd Government’s new Defence White Paper will need to contemplate a difficult trade off.

The challenge involves choosing between declining yet another exclusive US high technology development program (ie: in terms of P-8A MMA ‘Spiral 1’ participation), or re-crafting the nation’s aspirations for a medium to high-altitude long-range (MALE/HALE) surveillance capability that is again thrown open to global contenders.

This time around, however, potential airframe and systems suppliers will be asked to bid against requirements needing to satisfy both national maritime and land surveillance missions, along with target tracking and weapons-effected close-in air support for both combat and counter insurgency missions.

**S**purred on by Australian Government enthusiasm for an ‘all options’ review of current and future Defence capability acquisition programs, Lockheed Martin is one company that has thrown its towel into the ring in appraising the Department of Defence of opportunities to

apply life extension technologies to the RAAF’s AP-3C ‘Orion’ fleet (including a potential aircraft re-winging), in combination with the greater use of satellites as an alternative to MALE/HALE vehicles.

As established in the February 2009 Updated Economic and Fiscal Outlook (UEFO), the

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### Key Points

- **The Rudd Government’s decision to decline** an invitation to join the US Navy’s Broad Area Maritime Surveillance program, has opened up a new opportunity to review the future of the AP-3C ‘Orion’ long-range maritime patrol force.
- **The 19 AP-3Cs currently in-service were scheduled** in the 2006-2016 Defence Capability Plan (via phase 2B of project Air 7000) for a \$3.5-4.5b replacement with between 8-12 Boeing P-8A ‘Poseidon’/Spiral 1 multi-mission maritime aircraft.
- **Boeing has now commenced a US\$3.9 billion** US Navy contract to begin a systems development and demonstration effort that will ultimately yield 108 P-8As in an initial baseline ‘0’ configuration, offering capability not less than extant United States Navy P-3s.
- **Former Howard Government Defence Minister**, Dr Brendan Nelson, confirmed 20 July 2007 that ‘first pass’ approval had been given for phase 2B of project Air 7000, involving a \$4b acquisition of an Australian version of the P-8A MMA.

Rudd Government (courtesy of the global financial crisis) now faces the national Budget moving into deficit over 2008/09 – and after several years of financial stimuli resourced through government borrowings – anticipates the accumulation of a national debt upwards of \$200 billion.

Add to this rising acquisition costs for fully imported defence materiel courtesy of the sharp fall in the value of the Australian dollar, and the decimation of the non-farm GDP deflator used to adjust defence funding – which delivered a 7% gain worth \$1b this year) – and a picture arises whereby the government will be well motivated to bring forward defence outlays that are expended closer to home.

Added to this outlook is the Government's likely move to increase the quantity of savings expected from Defence as part of the wide-ranging Pappas review of the defence function (ie: over and above the \$10 billion already proposed over the next decade), and the emergent picture gels to become one of very tight resourcing for new defence capability acquisitions, even though Kevin Rudd has reaffirmed a commitment to honour his election pledge to increase annual defence spending by 3% in real terms, to 2017/18.

In terms of current plans to replace the AP-3C 'Orion' long-range maritime patrol fleet, the achievement of 'first pass' approval for phase 2B of project Air 7000 in July 2007 provided the authority for US Navy and Australian Government officials to begin negotiating from August that year a memorandum of understanding (MoU) on cooperation regarding systems development (and the ultimate procurement) of 8-12 P-8A 'Poseidon' multi-mission aircraft (MMA) over the 2015-2017 timeframe, and costing between A\$3.5-4.5 billion (2006 DCP).

Given Australian views the baseline '0' MMA anticipated to be first delivered to the US Navy from 2013 falls somewhat short of the sophistication of RAAF AP-3C 'Orion' aircraft – in respect of its former project 'Sentinel' upgrade, and an accumulation

of further upgrades under the project Air 5276 Capability Assurance Program 1 (CAP1) – it is envisaged Australia would not buy into the MMA program until it had achieved its next technological iteration, more widely known as 'Spiral 1'.

An ADF procurement decision on this element was initially slated for 2011/12. But with the intervention of the 2007 Federal Election, delays in release of the Defence White Paper, the onset of economic recession – and latterly, the decision to decline US Navy's BAMS program participation – it will not be until the 2009 Defence White Paper is tabled that further insight will be given as to whether the Rudd Government will elect to further extend the life of the AP-3Cs (as part of deferring a P-8A purchase into its 'Spiral 2' development phase), or the extant 'Orion' replacement schedule will be adhered to.

Defence Minister Joel Fitzgibbon visited RAAF 'Edinburgh' mid-August 2008 to announce a series of upgrades to the AP-3C 'Orion' fleet under the auspices of the project Air 5276 Capability Assurance Program 1 (CAP 1), and worth \$68 million. The upgrades will see the FLIR Systems AAQ-21 Star SAFIRE III electro-optical/infrared sensor turret (as proposed for the P-8A), an enhanced high-rate tactical common datalink (TCDL) system, and a new video recorder system installed across the whole AP-3C fleet. The 'Star SAFIRE III' and TC DL are understood to be already in limited use on specially fitted AP-3Cs deployed to the Middle East.

CAP 1 represents the first of three elements of the Air 5276 upgrade program for the 'Orion' fleet, and will be followed early next decade by CAP 2 enhancements to the aircraft's data management system (DMS), and CAP 3 radar, mission simulator, acoustic system, datalinks & ESM system upgrades. Work remains to equip all aircraft with Crash Data Recorders and integration of the JP 2070/2 MU90 Lightweight torpedo, which remains under review. Also under consideration are options to upgrade the Systems

Engineering Laboratory (SEL). Upgrade work is to be performed through the Edinburgh based P-3 Accord, now comprising the DMO, BAE Systems Australia (formerly Tenix Defence) and Australian Aerospace.

With all this new investment, a legitimate efficiency case can be mounted as to why such enhanced capability would be hurriedly retired in favour of the introduction of the P-8A, when cost-effective platform life extension options are prevalent in the global defence marketplace. EADS-owned Australian Aerospace, with funding from the DMO is understood to be mid-way through a study commenced in August 2008, relating to proving out the costs and risks of undertaking a ten-year life extension program for the RAAF's fleet of 18 mission-capable AP-3Cs, that will take them well past the current retirement date of 2018.

Lockheed Martin opened in March a new outer wing production line at its Marietta (Georgia) facility to support P-3 service life extension programs around the world. The kit includes the outer wing plus a centre wing lower surface, horizontal stabiliser, wing and horizontal stabiliser leading edges, and filet fairings. It also incorporates design enhancements and new materials with increased corrosion resistance that are expected to provide P-3 operators an additional 15,000 hours of service life, at significantly reduced maintenance costs and down time.

The Royal Norwegian Air Force (RNoAF) became the first customer for the new production service life extension kits, for its six P-3 'Orions'. The work, being undertaken by the Canadian firm IMP Group, is expected to add up to 25 years of additional service to the RNoAF fleet. Lockheed Martin Program Manager – P-3 Recovery Plan, Ray Burick, says that as part of its P-3 Recovery Plan, the US Navy is considering purchasing 50 modification kits, having already awarded two contracts in August 2008 to Lockheed Martin Aeronautics for 13 outer wing assembly kits (worth US\$129.3m to the company), with another \$60.6m contract to L-3

Communications Integrated Systems for four kits.

Burick says this action could signal the reversal of earlier plans to rely only on a combination of targeted maintenance (inspections have already been accelerated from every 36 months to every 18 months), modification and slow drawdown of USN airframes to keep the 161-strong 'Orion' force operational until the new P-8A 'Poseidon' MMAs and BAMS 'Global Hawk' UAVs can begin replacing them.

The US Coast Guard has also issued a Registration of Interest for re-winging its P-3s, while Canada is contemplating a schedule for their CP-140 'Aurora' aircraft wing replacement. In this regard, Australia's AP-3C 'Orion' fleet has also recently transitioned on a deeper level servicing (R3) 'safe-life' approach undertaken on a calendar basis and conducted every five years, to 'safety-by-inspection' routine performed on a flying-hour basis (R2) every year.

Should the new Defence White Paper affirm an AP-3C life extension program in parallel with an 'arms length' extension away from the risk profile associated with spiral-based MMA technology developments, the upgrade work would most likely be carried out at RAAF Base 'Richmond', where Australian Aerospace previously re-winged the RNZAF's P-3K fleet.

Under Project 'Kestrel', six aircraft were re-winged over three years (or one every six months) through to 2001, extending their useful life by approximately 20 years. Modifications required to the RAAF's 'Orion' fleet are viewed as including refurbishing the aircraft's nacelles, and replacement of the outer wings, the centre wing lower surface, horizontal stabiliser and filet fairings. Apparently, not all of the leading edges would need to be replaced.

The cost of one modification kit for each AP-3C is estimated at falling between \$15-20 million. New wings would use the aluminium 7000 series alloy (7075 T6), which is less corrosion sensitive. Corrosion (caused by persistent low altitude, high speed flying over the ocean), not fatigue, is consid-

ered the aircraft's main longevity risk. Specially upgraded RAAF AP-3Cs undertaking extended operations in the Middle East are acknowledged as having operated in a more benign environment in terms of corrosion.

Designed initially as a long-range maritime patrol aircraft, the four turbo-prop Rolls-Royce Allison T-56 powered P-3 has embraced significant mission growth over the past 15 years, taking it into multi-mission maritime & land-based applications such as fulfilling escort and counter insurgency tasks in the Middle East.

From April 2003 to April 2008, up to 70 members of the RAAF's 10 Squadron were deployed at any one time to undertake intelligence, surveillance and reconnaissance missions in the Middle East Area of Operations (MEAO), some 60% of which are said to have involved 'overland' flights escorting friendly road convoys, searching for militants launching rockets and detecting IEDs.

In such events, RAAF 'Orion' crews provided direct support to coalition ground forces by using the AP-3Cs FLIR Systems Star Safire III EO/IR system to search for suspicious activity, and relay (via datalink) video footage back to troops on the ground in real time – a role now increasingly being filled in US and UK forces by (frequently armed) unmanned aerial vehicles able to effect responses inside an adversary's decision cycle.

Since mid-August 2007 in the MEAO, 'Orions' are said by Defence officials to have collectively flown (Nos 10 & 11 Squadrons) more than 10,500 hours. The 19-aircraft 'Orion' fleet is expected to fly 7,900 hours in 2008/09.

In respect to phase 2B of project Air 7000, the US Navy's new P-8A 'Poseidon' will have anti-submarine warfare (ASW), anti-surface warfare (ASuW) and overland surveillance capabilities built into its baseline design, albeit with the initial 'Spiral 0' B737-800 mandated by the US Navy to be no less capable than its legacy P-3s.

Any decision to progress an AP-3C life extension would en-

able the RAAF to defer to 'Spiral 2' P-8A versions in terms of a replacement platform, which – coming on the back of a 100+ aircraft manufacturing program – could be expected to be cheaper, as well as exposing the DMO to having to manage less associated development risks. T-1, Boeing's first MMA test aircraft (ie: five developmental prototypes are now in various stages of assembly), began final assembly in March 2008 and is expected to make its first flight in the fourth quarter of 2009.

Initial Operating Capability (IOC) for the baseline P-8A is expected in 2013, with added capability from 'Spiral 1' cutting in from 2015, and still more incremental capability to emerge in 2017 from 'Spiral 2'. Full Operational Capability (FOC) is scheduled for 2018. Boeing officials estimate the 'Spiral 1' add-on budget at around US\$150 million a copy, although uncertainty remains on how much of the additional desired capabilities of the ADF this covers.

Integration with the P-8A's eventual unmanned complement, the Northrop Grumman BAMS RQ-4N 'Global Hawk' UAS, is not expected to begin until the 'Spiral 2' initiative. The BAMS concept envisages the P-8 fleet operating in conjunction with a constellation of 'Global Hawk' UAVs, and occasionally needing to take over control of their sensors to direct them to high interest targets.

The evolution of BAMS and the related Common Undersea Picture (CUP) initiative will drive spiral development of the P-8 mission system, sensors and weapons systems. 'Spiral 1' is expected to include extended echo ranging sonobuoys, acoustic rapid-commercial-off-the-shelf insertion and mobile acoustic support systems, as well as an automatic identification system (AIS) to provide real time tracking of merchant vessels, as well as a basic level of control for UAVs.

The US Naval Air Systems Command (NAVAIR) announced 5 August 2008 an intention to order 36 P-8As during the first three years of production (2010 to 2012), which could prospec-

tively bring forward the in-service date by one year.

The initiative was likely motivated by an airframe metal fatigue crisis facing the USN P-3 fleet, which saw 39 planes (or one-quarter of its fleet) grounded in December 2007 due to concerns about possible structural failings in the wings.

NAVAIR accordingly expects to order 10 aircraft in fiscal year 2010 (now under consideration by President Obama), followed by 12 in FY2011 and 14 in FY2012. Nearly US\$6.3 billion has been set aside in long-range budget plans for the LRIP phase to buy all 36 aircraft, averaging about \$175 million for each P-8A.

The US Navy plans to evolve the P-8 into a far more capable weapon system than the current P-3, which from the outset has been designed to be part of an interlinked series of maritime intelligence, surveillance, targeting and reconnaissance (ISTAR) networks. The P-8 will also serve as a critical node in two key future USN ISTAR systems.

The first is BAMS, which aims to create a picture of maritime surface activity on an oceanic scale, and is able to monitor in real-time all civil and military surface ship activity around the globe. In parallel, the USN is aiming to build an equivalent system for sub-surface activity, known as the Common Undersea Picture.

These two systems will be routed into the US Navy's 'ForceNet' communications network, which seeks to link every ship, aircraft, and weapon system to allow them to exploit in real time the data made available by BAMS and the CUP.

The P-8 will also have satellite broadcast communication links to up-link in real-time EO imagery and other sensor data into these networks. Data flow will be conducted over Internet protocol (IP)-based technology, along with Link 16 and common data links flowing data into traditional situational awareness networks.

The other part of Lockheed's alternate project Air 7000 concept of operations pitch to the ADF involves the greater use of space-based ISR systems. The company

submitted a series of new proposals to the US Department of Defense's (DoD) Joint Operationally Responsive Space (ORS) Office in March 2008.

The proposal advanced state-of-the-art technologies in support of fielding rapid and responsive space systems for the military, and including: responsive spacecraft bus and payload technologies; a multi-mission low earth orbit modular space vehicle; and responsive launch, range and system architecture & modelling technologies.

A 'full range of space effects' delivered to meet the war fighters' requirements 'when and where' they are needed is expected to begin in approximately 2015 according to a GAO report published in July 2008. The DoD's existing ISR process activities already face significant integration challenges and adding new ORS systems will further increase the complexity of the ISR environment.

Work on Australia's new Defence White Paper is again expected to review the schedule for military surveillance & communications satellites, including an Ultra High Frequency (UHF) satellite capability acquired via Joint Project 2008 (*see story page 41*). Australia and the United States agreed at the annual AUSMIN talks, held in February 2009, to establish a combined team to pursue options for enhancing collaboration in the field of ISR.

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