

Spiralling away from the warfighter: the trials & tribulations of maritime surveillance

■ Trevor J Thomas/CANBERRA

When the Minister for Defence, Dr Brendan Nelson, announced 28 July that Australia was “one step closer” to acquiring a new Multi-mission Unmanned Aerial System (MUAS) capability – following the Government’s Air 7000/1B ‘first pass’ decision – those with longer memories must have felt a sense of déjà vu, and swearing they had heard it all before.

For it was none other than Dr Nelson who, as newly minted Parliamentary Secretary for Defence in 2001, presided over the high profile arrival into Australia for trials of the “Southern Cross II” – Northrop Grumman’s original prototype RQ-4A ‘Global Hawk’ unmanned aerial vehicle – said at the time to be the culmination of phase 1 of Joint Project 2062 as it was structured to facilitate Australia’s participation in the USAF’s ‘Tier II+’ Advanced Concept Technology Demonstrator (ACTD) program (as ‘Global Hawk’ was then known).

The objective of JP2062/1 was to demonstrate the ‘Global Hawk’ air vehicle and sensor systems’ capability to provide maritime surveillance (which it did with aplomb), and to provide data to inform a Phase 2 acquisition. Incorporating scientific input from the Defence Science and Technology Organisation (DSTO) – subsequently taken up by the United States – that the clarity of images obtained by the UAV of US Navy (USN) warships was subsequently credited with driving the accelerated purchase of two RQ-4s for further USN evaluation.

However, and despite the acknowledged value of the JP 2062/1 datasets, the Phase 2 procurement did not go ahead as the Defence Capability Plan (DCP) was subsequently restructured by former Defence Minister Hill, producing project Air 7000 and the proposition of a new series of UAS trials under its first phase, all



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Key Points

- **Work is to commence shortly in the United States** to help inform the third iteration of a Department of Defence quest to equip future network centric warfighters with an enhanced unmanned aerial surveillance (UAS) capability.
- **Phase 2 of Joint Project 2062 was envisaged** in the inaugural (June 2001) DCP as spending \$150m to acquire, by 2007, a mature ‘Global Hawk’ UAS for ‘all-weather, long endurance maritime and land surveillance & reconnaissance’.
- **By February 2004, a new DCP consolidated** such aspirations into phase 1 of project Air 7000, involving the “study and purchase” (for \$750m to \$1b), of a UAS for ‘maritime patrol and other surveillance’, to enter ADF service over 2009 to 2011.
- **In June 2006, a third DCP budgeted \$1-1.5b** under phase 1B of project Air 7000 to acquire a high altitude long endurance UAS just for maritime patrol, to enter service over the same timeframe (2009-2011) as envisaged in February 2004.

subsequently and conveniently packaged into “Securing Australia”, a key element of the Government’s 2004 re-election platform.

Similar to its forebears, the currently underway North West Shelf (NWS) UAS Trial (*see ADBR, Vol.25, No.8, 19 September 2006, p7*) is intended to provide quality data to assist the Government in making an Air 7000 UAS procurement decision.

However, delays in the timetable for the trials – affected by both American MUAS providers not having aircraft available – put the Government into a position of having to make its Phase 1B decision without the benefit of any substantive comparative Australian UAS trial data.

So perhaps unsurprisingly, Dr Nelson’s “one step closer” an-

nouncement – that Australia would now look to joining the US Navy’s Broad Area Maritime Surveillance (BAMS) project (*see Insert box page 30*), has in fact had the opposite impact in effectively delaying the prospect of any immediate acquisition by the ADF of unmanned aerial vehicle-based surveillance capability for many years.

Options put before Cabinet for ‘first pass’ decision reportedly included: the Australian industry-friendly selection of two local systems integrators to separately further research UAS options; joining BAMS and leaving it to the US Navy to produce a result; or progress a rapid off-the-shelf acquisition of a small number of unmanned aerial systems to provide an experimentation basis for the DSTO and respective serv-

ices. In hindsight, and in the absence of NWS UAS trial data, the Government chose the safest (and lowest cost) route in flick-passing the project to the US Navy.

As detailed by Air 7000 capability staff to ADBR at the NWS UAS Trial VIP Day in Adelaide 1 September, the Government is now proposing to revisit phase 1B of the project in late-2007 for an “interim pass”, and after the US Navy has made its BAMS selection decision. At this time, the Australian Government – armed also with practical and comparative NWS UAS trial data – will either confirm the ADF will follow the US Navy’s lead, or make a decision to abandon the BAMS approach for something else.

In short, the practical effect of the Government’s MUAS acquisition strategy to date has been to place Australian UAS acquisition in a holding pattern while US application (and development) of unmanned aerial vehicle-based surveillance systems has spiralled considerably away from the prototype ‘Global Hawk’ that first visited Australia in 2001.

Analysis of the development history of the two BAMS (and now Air 7000/1) contenders – Northrop Grumman’s RQ-4B Block 20 ‘Global Hawk’ (RQ-4As are no longer made), and General Atomics Aeronautical Systems’ MQ-9B ‘Predator B’ – shows that from their original USAF mission-customised forms, both products have been subjected to substantive progressive (or spiral) development.

Clearly, the USAF (helped along by the ‘War on Terror’) has been able to take advantage of this process to acquire substantial UAS capability from scratch through the application of earlier forms of such vehicles, the RQ-1 ‘Predator A’ and RQ-4A ‘Global Hawk’, for immediate operational benefit.

By contrast, Australia – despite considerable up-front DSTO and Royal Australian Air Force (RAAF) investment in MUAS concepts – in particular, the four-

year RAAF/USAF/DSTO 'Project Arrangement 13' - is a long way from even starting to develop an 'in the flesh' UAS capability that can more immediately be applied to the Defence of Australia and its interests. The US Navy's timetable to achieve Initial Operating Capability (IOC) for the BAMS outcome is 2011, with Full Operating Capability (FOC) in 2018.

On the basis that BAMS (and therefore, Air 7000/1) progresses as is now scheduled, it seems unlikely the RAAF will be in a position to take delivery of its first UAS until early next decade. After that, the RAAF will have to march down the long road of learning how to operate, maintain and efficiently deploy such a system, which has associated orders of magnitude that multiply depending on the level of autonomy in the subject air vehicle's control system.

In short, it is unlikely a fully effective UAS - capable of not

only Australian operations, but also regional deployments and niche contributions to Coalition operations - will be available to ADF commanders before 2015.

The thrust of JP 2062/1 and the current NWS UAS trial rightly focused on sensor systems and their integration, however, the impact of UAS introduction on the RAAF's workforce remains a black spot. Arguably, introducing other new capabilities - like the project Air 5077 Boeing 737 'Wedgetail' Airborne Early Warning & Control (AEW&C) aircraft - is much simpler. According to RAAF users at No. 42 Wing, AEW&C simply takes extant RAAF capability - the ground based Fighter Controllers and their radars - and places them in an aircraft.

Conversely, shepherding the effective entry into service of a MUAS is far more demanding than simply taking the mission crew of an AP-3C 'Orion' long range Maritime Patrol Aircraft

(MPA) out of their aircraft, and placing them in a ground control station at an air base. USAF experience in UAS operations - as explained to ADBR during an 'Edwards' AFB briefing - is said to be "fundamentally different to current operations", with a significant separation of air vehicle launch, recovery and mission systems skills, all complicated by human resourcing issues required to staff very long endurance missions of between 32-48 hours.

Unfortunately for those looking to an early introduction of UAS capability into the ADF, the original JP 2062s year of decision (2004/05) fell too close to a Federal election, and thus with the issues of the day focusing on border protection and illegal immigration, the project ended up being consumed in the Government's successful "Securing Australia" campaign package.

The 'sole source' specification of 'Global Hawk' in the 2001

DCP also lay uncomfortably with the Government's 18 September 2003 decision to take up 'Kinaird' Report defence materiel acquisition reforms. Hence the opportunity was taken in the February 2004 DCP to fold the project back into a competitive acquisition (Air 7000), albeit with the product of such actions being to effectively delay the entry into ADF service of at least a minimal UAS capability by up to five years.

The enthusiasm surrounding the promulgation of "Securing Australia" and its associated 'Global Hawk' versus 'Predator' UAV 'fly-off', pitched to the Australian public in 2005 that UAS trials would "use this exciting technology to provide additional surveillance capability ... (and) provide data to support the acquisition of a [MUAS] under Project Air 7000 Phase 1".

However, even successfully re-elected Governments don't al-

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BAMS reference base to guide Air 7000 UAVs

■ Canberra Bureau Report

The US Navy's Broad Area Maritime Surveillance (BAMS) project seeks to acquire a high altitude long endurance (or HALE) multi-mission unmanned aerial system (MUAS), with 40 air vehicles based at five sites (Hawaii, Diego Garcia, Florida, Japan and Italy), to assure global continuous maritime surveillance coverage.

The BAMS fleet will prospectively be able to detect targets as small as submarine periscopes, and will cue complementary manned assets, in the form of Boeing's new P-8A Multi-mission Maritime Aircraft (MMA) - for more targeted surveillance/response, and Northrop Grumman's MQ-8B 'Fire Scout' vertical takeoff & landing tactical unmanned aerial vehicle (VTUAV), to specifically identify targets.

BAMS assets are required to operate at altitudes over 40,000

feet, above the weather and most civilian air traffic, and be able to provide a continuous (using multiple aircraft) on-station presence at ranges of 1,800-5,400km (1,000-3,000nm) from the launch point.

While focused on maritime surveillance, BAMS will also be able to support other Intelligence Surveillance and Reconnaissance (ISR) missions, including: pre- and post-strike intelligence; signals intelligence (SIGINT); and communications relay.

Competing for the BAMS requirement is the latest spiral development Northrop Grumman 'Global Hawk' UAS, and General Atomics (teamed with Lockheed Martin), offering the high altitude version of the 'Predator' (renamed as 'Mariner'), and using the more flexible 'Altair' wings. Raytheon is said to be offering a yet to be flown unmanned version of the Gulfstream G550 militarised business jet.

Unlike Australia, the US Navy has complemented its BAMS

project with a separate acquisition of two 'Global Hawk' Maritime Demonstrators (GHMD), to help develop MUAS concepts of operations, sensor technology experimentation and fleet orientation. The GHMDs sensor suite is complemented by the LR-100 for multi-function electronic support, with WRW, ESM & ELINT.

The US Navy has also ordered a 'Predator B' for an April 2007 delivery, thus providing a further means of bringing to bear a third line of assessment in relation to the respective capabilities of the competing BAMS platforms, as well as developing a 'roadmap' for introducing into service unmanned systems emerging as victors from the current series of platform and sensor evaluations.

SPIRALLING AWAY FROM AUSTRALIA: By selecting BAMS as the potential solution for Air 7000/1, the Government has delayed the entry into service of the first MUAS until at least 2011. The original JP 2062/2 timetable envisaged 2-3 'Global Hawk' systems entering ADF service in 2007. The possession of even some basic UAV capability from this time would have enabled Defence to work up a UAS workforce capable of adding value to procurement deliberations

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Battlespace...

years to further research into Defence nutritional requirements, and to upgrade research equipment and general infrastructure at the facility. Rogers also recommended the Defence Science and Technology Organisation explore opportunities for collaboration in food and nutrition research with the CSIRO, universities, other government departments, as well as overseas defence research organizations (including the US and New Zealand). DSTO management says it has begun implementing Rogers' recommendations alongside a number of its own initiatives, such as: appointing a new Head of Defence Nutrition; developing a five-year Defence Nutrition Capability Plan; and a 50% increase in scientific staff over five years.

Australia driving land mine action

Australia's assumption, in Geneva, 18 September of the Presidency of the international Mine Ban Convention has seen at the 7th annual Meeting of States Parties the launching of an action plan to promote the universal adoption of the Convention. Several significant producers of land mines (including the United States) have not yet joined the treaty. In reality, said the Parliamentary Secretary to the Minister for Foreign Affairs, Teresa Gambaro, "the commitment of all countries to the Treaty is ultimately the only way to eliminate the threat from anti-personnel mines." In a related development, Adelaide-based Minelab secured 4 September an important technology contribution role via a new \$390m contract to supply the US Army with next generation AN/PSS-14 hand-held standoff mine detection systems (HSTAMIDS). The 10-year contract centres on



US-based Cubic Defense Applications was contracted 13 September to integrate the laser-based instrumented training system for infantry and armour forces delivered (through Cubic New Zealand) for project Land 134, into the development of the new Joint Project 2098 Joint Combined Training Centre (JCTC), and including Cubic's Air Combat Maneuvering Instrumentation (ACMI) system.

Being advanced by the ADF in league with the US Pacific Command and US Joint Forces Command, the JCTC effort aims at increasing operational capability, combat readiness and interoperability between the US and Australia through leveraging the integration of live, virtual and constructive (LVC) training technologies.

The US and Australia's roadmap for JCTC includes an initial concept validation event, at Exercise 'Talisman Sabre' in June 2007. Project Land 134, the transportable ground

combat training system, was said by Defence to be in the final stages of integration and test at Townsville (Qld) - albeit some years behind the initial schedule.

Under Cubic's new ADF contract, Cubic's expertise in Test and Training Enabling Architecture (TENA) software interfaces - the computer framework proposed to underpin the JCTC effort - will be developed between the ACMI and project Land 134, and potentially other tracking and instrumentation systems such as Cubic's Initial-Homestation Instrumentation Training System (I-HITS) used by the US, as well as the Urban Operations Training Facility also planned for Australia.

The subject software interfaces will allow air and ground live combat training systems to exchange data in real-time, and will provide warfighters from different services with the ability to train together as they fight together, with real-time feedback. **ADBR**

the supply of up to 17,000 mine detectors which, for the first time, will combine metal detection with ground-penetrating radar - meaning one piece of equipment can now detect all metallic and non-metallic, anti-personnel and

anti-tank mines in all types of soil. Minelab is to manufacture metal detection components for shipment to US-based L3-CyTerra, who will then assemble them into operational HSTAMIDS units. >>>39

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ways get everything their own way, and as the realities of the global war against terror came to pass, the UAV 'fly-off' had to be subsequently delayed to September/October 2006, due to the unavailability of air vehicles. Northrop Grumman could not serve up a 'Global Hawk' as they are all owned by either the USAF or the US Navy, who were busy with their own trials or servicing heavy operational commitments.

In substitution, Northrop Grumman offered the Government as an alternative, access to their Cyber Warfare Integration Network (CWIN) to conduct a 'virtual' trial of the 'Global Hawk' operating over the NWS, using simulated data matching

known 'Global Hawk' attributes to simulated Australian environment data supplied by the DSTO, Tenix and Saab.

A 'Predator B' platform (albeit configured to 'Mariner' attributes) was similarly not available until September reportedly due to delays necessary to integrate the Elta

M2022 'Seawatch' Maritime Search Radar (MSR) into the air vehicle, in order to participate the US Navy's 'Trident Warrior 2006' ForceNet BAMS trials. The 'Seawatch' MSR was substituted for the Raytheon's 'SeaVue' MSR.



RAAF's AP-3Cs have the 'Seawatch' radar while Coastwatch Dash-8s have the 'SeaVue'.

Whilst the DSTO was appreciative of the extra time such delays gave it to develop more appropriate test concepts for the NWS trials, including developing

a meaningful trial methodology (rather than just flying the UAS' over and around the Shelf), the Government

still ploughed ahead with a 'first pass' decision in the absence of any substantive data, other than that what may have been provided by the two UAS suppliers from other trials conducted in Canada and the United States.

How reflective such a decision is in view of the 'best practice' reflected in the 2003 'Kinnaird' report - which initially proposed the dual 'pass' approvals system - is questionable, especially given the delays to Australia's early acquisition of a UAS capability now inherent in the decision to go down the BAMS path.

Delaying 'first pass' consideration to March 2007 - when enhanced data would have been available from both the 'physical' (NWS-Predator) and 'virtual' (CWIN-Global Hawk) activities - would of course have denied the Minister a public relations opportunity to pitch that at least one ADF project was "one step closer", at a time when so many of its other endeavours appear to be moving several steps backward. **ADBR**