

PREMIUM EDITION

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JSF timeline and cost debate continues

Australian concerns about when the Joint Strike Fighter (JSF) will attain Initial Operating Capability (IOC) in US service were apparent at a meeting of the JSF Executive Steering Board (JESB) in Sydney on March 15.

The JESB is the top-level decision-making forum grouping the US and its eight international partners in the JSF program; the UK, Canada, Australia, Turkey, Italy, Norway, the Netherlands and Denmark. It meets every six months.

The Sydney meeting took place amid general concern on the part of the international partners at delays, cost increases and the effect of the Pentagon's plan to postpone orders for 179 JSFs over the next five years.

USAF Major-General John Thompson, deputy JSF program executive officer, described the Sydney discussions as lively.

"It's very clear that the RAAF has a very strong desire to know exactly where the US services are relative to their declaration of IOC later in the decade," Maj-Gen Thompson said, referring to what he described as "the capability gap here in Australia"

"Our services have very solid definitions of what they consider to be IOC – a final block build of software, certain weapon capabilities, completion of initial test and evaluation reports and things like that. But, currently our services have a desire to wait and see for a little while in terms of the execution of the program."

The USAF, USN and US Marine Corps had expressed "a strong desire not to put a date (for IOC) down on paper so we're not doing that," he added.

As currently scheduled, the first 14-strong tranche of the RAAF's CTOL (conventional takeoff and landing) JSFs will all be at RAAF Williamtown by late 2017 and IOC is expected to be declared in 2018.

However, Lt. General Herbert Carlisle, the USAF's deputy chief of staff for operations, plans and requirements, told a US conference on 13 March that USAF JSFs would achieve IOC later than the previous target of 2016, without saying when.

Carlisle said the USAF would carry out service life extensions and add capabilities to existing F-16 fighters to bridge the gap – a statement which, given the limited life expectancy of the RAAF's 71 "classic" F/A-18A/B fighters, could strengthen the case for the purchase of additional F/A-18F Super Hornets.

While Maj-Gen Thompson was confident that last year's rebaselining of the JSF program and the injection of additional funding had ensured the time and money necessary for the programme's success, flight testing was only 20 per cent complete.

The emergence of major unforeseen problems could see a tradeoff between price and capability.

"If by chance we do run into development issues that are particularly difficult to solve and might require more resources, I think we'll start to adjust the dial to speak in terms of the capability that the weapons system will provide," he said.

Such a decision would not be made in a vacuum but in consultation with the international partners, he stressed.

Lockheed Martin's Tom Burbage, executive vice president and JSF program general manager, has also been in Australia over the last week speaking to a Senate committee on the JSF program and the role Australia plays in it. Burbage confirmed on March 22 that the program is ahead of tests flights for 2012 already and the program has 1,001 flights planned for the year. There are engineering solutions in place for the tail hook (not a problem for Australia given we're not buying the carrier variant), fuel dumping, Heads Up Display (HUD) on the helmet and heating of the horizontal tails, Burbage said.

Given that the JSF program tends to talk in base year dollars from 2001, Burbage is also keen to talk in current year dollars where he estimates that the average cost of the Australians planes over 75 craft are running at about \$70 million. This price also includes spares and training but not infrastructure associated with the aircraft.

However, this price will always be affected by the volume of production that the program as a whole faces. For example, the Fort Worth facility is building four planes a month in 2012 but will drop back to three a month next year given the ordering profile of the international and US governments. What this means for long lead items and the wider global supply chain that the program utilises is yet to be seen. It's also worth keeping in mind that during 2014 to 2017, Lockheed will be building more planes for international partners than the US Air Force.

Frazer Nash completes CBRN project

Frazer-Nash has completed a contract for the Australian Government's Department of Defence to provide requirements engineering support for Joint Project 2110, which seeks to increase protection of personnel from toxic, chemical, biological, radiological or nuclear (CBRN) threats.

Working directly for Capability Development Group, Frazer-Nash was responsible for producing a Functional Performance Specification which sets out the necessary performance needed by all military capabilities related to CBRN defence. Liaising with the programme's stakeholders, the company captured the requirements for specific military equipment and the training needs of Australian Defence Force personnel when there is a potential toxic or CBRN risk.

The Joint Project comprises two phases. JP2110 Phase 1A achieved Second Pass in 2009 and is focused on delivery of chemical and radiological point detectors for all three services. The second phase, on which Frazer-Nash was contracted, is wider in scope and will address the five doctrinal elements of CBRN defence including detection, identification and monitoring to complement phase 1A capabilities; warning and reporting; physical protection; hazard management; and medical support.

The Functional Performance Specification as part of Joint Project 2110 is expected to be sent to the Australian Government for First Pass Approval during the 2012/2013 financial year. Frazer-Nash has since won two follow on pieces of work – to extend the Functional Performance Specification to cover mobile manned vehicles, and to conduct a study into how the future military capabilities designed to protect against CBRN threats are expected to be used by defence personnel.

For more on JP2110, see the current March edition of ADM.

Cyber lab opened in Canberra

Lockheed Martin's \$10 million NexGen Cyber Innovation and Technology Centre (NCITE) was officially opened in Canberra this week by vice president of Lockheed Martin Information Systems and Global Services, Linda Gooden.

Government departments and businesses will use the facility which is fully equipped for live cyber technology exercises and demonstrations to help customers integrate solutions and test them in environments that are representative of their missions.

Key features include seven collaboration areas, reconfigurable spaces, global cyber range, cloud computing platforms, green IT data centre, telepresence and high definition video teleconferencing and global site connectivity.

Lockheed Martin has built only two other similar facilities, one in the US and the other in the UK.

ADF Shadow 200 TUAV capabilities

Under JP129 Phase 2, the Army is currently fielding the RQ-7B Shadow 200 Tactical UAV (TUAV) at Tarin Kot in Afghanistan as a replacement for the very successful Insitu ScanEagle system, due to be phased out midyear.

The Shadow 200 carries a suite of sensors, including high resolution forward-looking optical and Infrared and camera, laser target designator, laser rangefinder and according to its mission it is also likely to carry the AUTRY radio relay system.

The aircraft can see targets up to 125 kms away from the brigade tactical operations centre, and recognise tactical vehicles up to 8,000 feet above the ground at more than 3.5kms slant range, day or night.

The Ground Control System (GCS) transmits imagery and telemetry data directly to the Joint Surveillance and Target Attack Radar System, All Sources Analysis System, and Advanced Field Artillery Tactical Data System in near real time and also provides targeting data for precision weapons.

It is not known whether the aircraft will carry an IED jammer however the laser target designator should allow the aircraft to take over a missile fired from an aircraft at standoff range and guide it to IED targets.

An important feature within the GCS is the Sentient automated target detection solution – Kestrel Land MTI – which assists Australian forces in analysing intelligence, surveillance and reconnaissance (ISR) imagery from the Shadow 200. For more on the Kestrel system which started life as a CTD program, see ADM's Dec 2011/Jan 2012 edition.

The software processes the imagery in real time, automatically detecting small, moving targets such as dismounts and vehicles within the TUAV sensors' field of view. The Army TUAV Capability Implementation Team, which is bringing the Shadow 200 into service, sees in Kestrel Land MTI a significant ISR capability enhancement.

AUTRY on Shadow 200 TUAV?

AUTRY is a tactical radio repeater, designed in collaboration with the DSTO, to extend tactical communications beyond the limitations of LOS (Line Of Sight), allowing operations in mountainous terrain and canyon areas.

Effectively a frequency translating repeater for 25kHz tactical radios, the AUTRY was specifically designed for deployment in unmanned aerial vehicles (UAV) initially for covert surveillance applications.

One way to overcome the line-of-sight problem is by use of satellite communications. However, demand for Australia's military communications satellite bandwidth has always been high and constantly increasing as new technologies come into use.

Over a decade ago, DSTO's Dr Weimin Zhang began to investigate surrogate satellite options to ameliorate this pressure.

In 2003, the airborne transponder system, used initially in balloons was reconfigured

for mounting on a small UAV, with the system now going by the name AUTRY.

After a number of tests and integration efforts, an improved version was flight tested over Shoalwater Bay in 2006, with a successful outcome attained.

An incidental bonus was that Army personnel participating in the trials expressed great enthusiasm for the capability offered by AUTRY.

Interest in AUTRY was also growing elsewhere in Defence circles within Australia as well as the US.

A Memorandum of Understanding was drawn up between the Australian and US governments to carry out field trials, and some of the Australian-made AUTRY-equipped UAVs were sold to the US for further tests.

A variation of AUTRY was integrated on ScanEagle and the integration work was undertaken at Brisbane for deployment on operations.

In early 2010, DSTO received an urgent request from RAAF Headquarters to assist with provision of a communications relay capability for deployment. A particular requirement was that cryptographic equipment not be carried on the UAV platform.

The platform used here was the Heron UAV. Delivering this capability involved working with RAAF personnel, the Heron designers and the Defence Materiel Organisation on integration and flight tests.

"The trials were very successful," says Dr Zhang. "They impressively demonstrated to all participants that AUTRY's large coverage footprint can dramatically enhance the radio communications capabilities of deployed forces."

To date, over 30 AUTRY units have been produced by RF Industries in Adelaide. A DSTO Capability and Technology Demonstrator project is currently underway with the company to develop an enhanced UHF repeater that will extend radio range capabilities for ground forces.

DSTO assesses missile launch detection system

The Cassidian AN/AAR-60 missile launch detection system (MILDS) fitted on ADF aircraft, including AP-3C, MRH-90 and CH-47, warns of attack by detecting ultraviolet light given off by a missile's rocket motor.

The apparatus consists of four to six ultraviolet sensors mounted around the body of the aircraft, giving 360 degree coverage. The system's master sensor analyses and classifies all detections and determines if they are a threat to the aircraft.

Upon detection of a threat missile countermeasures are activated. It is particularly useful for detecting infrared guided missiles including shoulder-launched heat-seeking missiles.

Because the AN/AAR-60 is considered crucial for aircraft protection against surface-to-air missiles, DSTO was recently tasked to assess its performance against specific threats.

The outcomes of this work were to deliver increased detection performance against all types of missiles, and to simultaneously lower false alarm rates. Another major advance has been to establish ways of adapting the AN/AAR-60 system to provide warning of incoming small arms fire and RPGs.

The value of doing so can be found in the many anecdotal reports of aircrew serving in conflict zones. These reports tell of aircraft having come under attack from small arms fire, which the crew only learned about after seeing bullet hole damage in their aircraft back at base.

The addition of a hostile fire indicator (HFI) warning capability to detect this less lethal but more common threat was thus seen to be highly desirable.

The kinds of signals to be detected now included muzzle flash and tracer illumination from weapon firings and RPG emissions.

The proposed solution will only require upgrade of sensors with a new hardware version and uploading of some new algorithms into the AN/AAR-60 signal processing system. This will enable the system to detect and track tracer fire, and locate the origin of small arms fire. This work is now on track. — *Defence Science*

Improved radar absorbing coat for Collins subs

DSTO is replacing internationally sourced radar absorbers on the Collins submarines that DSTO maritime platforms researcher Dr Andrew Amiet says proved to be less optimal.

The new radar absorbing material was designed, formulated and tested by electromagnetic signature management specialists and its fitment is being undertaken in collaboration with Mackay Consolidated Industries, a Melbourne-based rubber manufacturer.

“The old material showed evidence of deterioration and rust, where it is affixed to the Collins. The underlying metal also needed to be treated with hydrofluoric acid, to help affix the absorber,” Dr Amiet says.

DSTO has previously worked with Mackay Consolidated Industries on other projects and consulted them again to develop a durable material that meets the Royal Australian Navy’s unique signature management requirements.

The new material is tested for peel and tear, to help ensure it adheres effectively to the masts.

It is designed to reduce the range at which other sea or airborne platforms could detect a Collins class submarine. The effectiveness of the absorber has been validated through measurements performed by electronic warfare and radar experts at DSTO.

Dr Amiet says that Mackay uses the best, locally derived materials to develop the new Radar Absorbing Material.

“Working with local manufacturers means that the Australian Defence Force and DSTO have the sovereign ability to modify the material, as required, if circumstances or demand change.”

Aussie participation in F-105 launch

The first sea trials of Navantia’s F-105 frigate Cristóbal Colón are now underway off the northwest coast of Spain close to the Ferrol estuary.

The sea trials will last five days with the shipyard testing the performance of the ship’s platform, including such systems as manoeuvrability, propulsion and navigation, anchorage and mooring, emergency crafts, turbines, main engines, generators, radars and communications equipment. Meeting the speed, manoeuvrability and fuel consumption requirements are also being verified.

These first sea trials, that will be followed by a second batch of sea trials in June, are also verifying, while sailing, the performance of the AEGIS Combat System and the integration of all the Spanish CDS (Combat Direction System): radars, communications, guns, fire control system and command & control.

More than 200 people are participating in the sea trials, including Navantia staff, Spanish Navy, subcontractors and other technicians. The Australian personnel are participating in the sea trials as part of the Air Warfare Destroyer’s training program that Navantia is providing to the AWD Alliance in charge of building these ships in Australia.

Navantia has a contract for the design, transfer of technology and technical assistance for the construction of three AWD destroyers in Australia.

Apart from that, Navantia is building several complex blocks for these ships, that will be shipped to Australia for its final assembling.

Increased mobility from new body armour

BAE Systems (US) has been awarded a four-year US Defense Logistics Agency (DLA) contract to produce tactical vests equipped with soft body armour for men and women of the armed services who serve in harm's way.

The vests hold hard-armour plates and soft-armour ballistic inserts, which provide Soldiers with advanced protection.

The Improved Outer Tactical Vests offer Soldiers lighter-weight equipment with advanced features and increased mobility in the field.

The four-year contract, awarded by DLA Troop Support, covers the production of Outer Tactical Vests and Improved Outer Tactical Vests, plus associated components.

UKMOD contract extension for Saab's C-IED training

Saab has signed a two year extension, worth £11 million, for the Collective Counter-Improvised Explosive Device Trainer (CCT) managed service from the UK Ministry of Defence.

This extension will ensure that UK military personnel continue to receive C-IED live training in the UK and abroad. By closely simulating IED events in training, individuals and groups can better react and detect the IED.

Since November 2010 Saab has supported C-IED training for all UK personnel deploying on operations in Afghanistan. In addition Saab provides instrumented live simulation for UK MoD training exercises in Kenya, Canada and the UK mainland.