

JOINT PROJECT 129/2&3

Canvassing the market: sole source or open tender?

■ Nick Merrett/CANBERRA

Having now had five months since its September 2008 termination of the original Joint Project 129 acquisition & support contract to consider the latest available tactical unmanned aerial vehicle (TUAV) alternatives, the Government is set to re-issue a tender that spans urgent operational needs in Afghanistan through to longer-term capability development requirements, shortly to be specified in the new Defence White Paper.

The broad requirement is expected to moderate expectations within Defence that it can add multiple sensors to the aerial platform (albeit affecting payload/weight tolerances), and apply unique Australian attributes to the TUAV ground station, without increasing integration risks and frustrating off-the-shelf purchases.

Such developmental adventurism was slated to have led to the IAI/Boeing 'I-View' 250 in-service date slipping from the latter half of 2008 to beyond early-2010. With the tempo (and danger) of operations in Afghanistan set to rapidly increase as the influx of US troops enables combat operations to extend out of the provinces and into the regions, the ADF is now without a sorely needed capability to seal the march over Taliban forces in field operations.

Unlike in 2004, Defence now fortunately has a much larger range of potential suppliers to choose from for its TUAV requirements, and thanks to rapid technological advances courtesy of 'war on terror' investments by key allies, such systems are much more mature, integrated and possessing wide capabilities.

The original JP 129 competition short-listed the BAES Australia/AAI Corporation RQ-7B 'Shadow' 200 offering, the Thales/

Elbit 'Hermes' 450 and Boeing/IAI-Malat 'I-View' 250 TUAV.

Visits by Defence officials to the factories of various TUAV manufacturers were progressed over late-2008 and early-2009, along with a study tour in Afghanistan to observe similar systems in operational use. With all this to hand in a new UAV 'Roadmap' to be prepared after the White Paper, the ADF will have a much clearer idea of what will best match its requirements.

The JP 129 scope was initially stated to include two TUAV systems, each comprising four aircraft, two ground control stations, four remote video terminals, and an associated tactical support system. Each vehicle was to have electro-optic and infrared cameras, and a laser target designator. System outputs were to be in the form of real-time video footage to ground operators via secure wideband line-of-sight datalinks.

Defence says the initial operating capability, including completion of operational test and

evaluation and military airworthiness certification for its next attempt at acquiring a TUAV system "are now being finalised for Government consideration in the near future."

It adds the capability to be delivered under the 'revised' phase 2 of the project "remains that of the original project: the introduction of TUAVs to support land forces." This means, in essence: monitor the battlefield, detect, identify and designate targets for artillery and armed reconnaissance helicopters, as well as carry out reconnaissance missions. In these respects, the 20 Surveillance & Target Acquisition Regiment, based at Brisbane's Gallipoli Barracks, was raised in November 2007 to operate the new capability.

Acquiring armed UAVs was not specified in the original JP 129 tender, however relevant technology has sufficiently matured in the past few years to make this option a likely element (or option) of the ADF's new requirement, particu-

larly given the heightened threat to ground force operations from the prevalence of roadside bombs and improvised explosive devices (IEDs) in Afghanistan.

The Defence Materiel Organisation (DMO) and then Boeing Australia (the 'I-View' 250 solution prime contractor) announced 4 September 2008 their agreement to terminate the December 2006 JP 129 acquisition contract, following Defence's issuing a formal notice of default against Boeing in August.

Defence Minister Fitzgibbon said that with "a range of technical issues making it increasingly difficult to deliver the full scope of the contract within a timeframe acceptable to Defence ... (and) with a Defence imperative to field a TUAV capability as soon as possible (the two parties had) agreed to terminate the contract on mutually acceptable terms."

Boeing also agreed to refund to Defence the \$6m they had been paid to date under the contract, albeit with about 70% of the contract having been subcontracted to IAI to progress development and production work.

In a written response to questions regarding the JP 129 contract termination lodged by ADBR, Defence explained it had found the tactical 'I-View' 250A system "was not as mature as tendered. While the contracted requirements remained stable, Boeing and its principal subcontractor continued to evolve the system."

Consequently, "the expected 'modest adaptation' of off-the-shelf systems became a major integration activity as the contracted requirements became understood. Boeing attempted a number of replans, but these contributed to delays, which were ultimately unacceptable to Defence."

With time lost and frustration within the Government at having to declare JP 129 a 'project of concern', Defence's immediate

Key Points

- **Defence capability managers are in a quandary.** With the first attempt to resource JP 129 cancelled by the Rudd Government, but facing a pressing need to field a new TUAV in Afghanistan, should solicitations be restricted to previous tender respondents, or opened up to the world?
- **Since the IAI/Boeing 'I-View' 250 was selected** above the 'Shadow' 200 and 'Hermes' 450 in December 2005 (with the contract signed in December 2006), military forces have witnessed burgeoning growth in the number of off-the-shelf TUAV solutions available to Defence, with at least four contenders recently visited by Defence officials.
- **Reported as having frustrated the delivery of JP 129** as a result of additional capability requests, Defence says it is still seeking 'a similar level' of capability to that originally sought via the 2004 request for tender, although the new solicitation is likely to include an option for armed UAVs.
- **With the Prime Minister declaring 4 December 2008** Australia required 'a new concept of national security', much wider criteria (including the need for Australia to develop self-reliance across a range of relevant national security capabilities), are in the process of being incorporated into a new UAV 'Roadmap' absorbing parameters beyond those initially envisaged by Defence.

reaction has been to shift focus to an off-the-shelf UAV capable of being delivered in minimum time, aka, three months from contract.

Defence similarly confirmed to ADBR it was looking for “a similar level of capability” to that sought in 2004, adding more immediate TUAV requirements were “currently being reviewed in light of the potential availability of lower risk alternative systems, and operational lessons learnt ... Once this review is complete and compared against alternative capabilities, a revised acquisition plan will be developed (with) a new unmanned systems ‘Roadmap’ to be produced during 2009.”

On 22 October 2008, the Chief of the Capability Development Group, Vice Admiral Matt Tripovich, told the Senate Standing Committee on Foreign Affairs, Defence & Trade (during Estimates hearings), “we are doing a quick review of the requirements to make sure they are still valid, and there are no requirements that are impossible to meet, if you like, with the technology that is around ... so we can return to government with advice about the options available for government to quickly fill the gap left by the cancellation of JP 129.”

Tripovich added, “I think the important thing is to make sure our requirements match what is on the market, within reason, to try to shorten the (acquisition) time frame. There will be a delay, obviously, as we have to go back to the market in some form, but we will do that as quickly as we can.”

In the absence of the original-scoped JP 129 capability, but having no doubt had some say in

the form of contemporary TUAV now required to meet combat operations challenges, ADF units – especially those deployed in the Middle East – have been using the Elbit Systems-sourced ‘Sky-lark I’ mini/man-pack UAV, and the larger Boeing Australia/Insitu contractor-provided (ie: leased, with civilian operators in the field) ‘ScanEagle’ UAV to JP 129-like requirements.

The ‘ScanEagle’ UAS carries inertially stabilised electro-optical and infrared cameras that allow the operator to track both stationary and moving targets. It is capable of flying above 16,000 feet and loitering over the battlefield for more than 24 hours. To some extent, Defence officials consider the operation requires an overlap of civil/military staff, and hence, there is some concern about the costs of the ‘Scan-Eagle’, albeit whilst operators are impressed by its functionality.

Higher order airborne intelligence, surveillance and targeting (ISTAR) capability has also been provided to ground forces by specially upgraded RAAF AP-3C ‘Orions’, as well as coalition partners utilising US-sourced General Atomics ‘Predator’/‘Reaper’ UAVs. Boeing is also developing a larger UAV from the ‘ScanEagle’ known as the ‘Integrator’, and has secured full intellectual property access to this vehicle having acquired its original developer, Insitu, on 22 July 2008.

Rapid technological developments in regard to TUAV capabilities and solutions – including endeavours such as those within the US Army’s Future Combat System and related US Marine Corps and US Navy program –

have occurred over the past five years.

Defence Minister Fitzgibbon acknowledged this saying there is “potential for a number of lower risk alternative systems ... (so) this decisive action (ie: terminating the original JP 129 acquisition) will enable Defence to focus on the earliest acquisition of an alternative TUAV to meet the JP 129 requirements.”

The US Navy is also brokering a Small Tactical UAS (STUAS) program, with the US Marine Corps’ similarly sponsoring a tiered UAS program. Lead options for the revised Australian TUAV tender accordingly include (alpha order):

AAI CORPORATION: Textron Systems-owned AAI Corporation has long been a lead supplier of its ‘Shadow’ TUAV to the US Army and Marine Corps. The company reported 14 October 2008 it had won a US\$242.1m contract to supply 17 additional TUAV systems – 13 for the US Army and four to the US Marine Corps – from December 2009 through to November 2010. To date, AAI has been contracted for a total of 113 ‘Shadow’ TUAS units, and has delivered a total of 71.

The company revealed several air vehicles under the new contract would be supplied with new RQ-7B ‘Shadow 200B’ capabilities – a laser designator, and a tactical common data link (TCDL). Accordingly, there is a prospect Australia’s JP 129 requirement could be met via the same configuration that the US Army and Marine Corps have fielded, with the acquisition potentially managed via a Foreign Military Sale (FMS) arrangement.

An interim acquisition (or lease) for new capability to be more rapidly provided to deployed forces in Afghanistan, is also believed to have been offered. The ‘Shadow’ TUAV system is said to have achieved 350,000 total collective flight hours as at 15 October 2008, principally in support of Operations ‘Iraqi Freedom’ & ‘Enduring Freedom’ in Afghanistan.

AAI Corporation has also developed a new Ground Control Station (GCS) – based on the US Army’s ‘One System’ GCS – which the Army & Marine Corps use to operate the ‘Shadow 200’ TUAV.

The new GCS was said in September 2008 to be compliant with NATO standardisation agreement (STANAG) 4586 requirements for translating information from UAVs into standardised message formats that can be shared with other systems. Information can also be transferred back into vehicle-specific messaging formats for seamless interoperability.

BAE SYSTEMS: BAE Systems unveiled at the 2008 Farnborough (UK) air show a production standard variant of its High Endurance Rapid Technology Insertion (HERTI) unmanned autonomous system (UAS) – a new generation UAS suitable for both military and civil operations. HERTI has an endurance of up to 20 hours. The production standard airframe is manufactured by UK-based Slingsby Aviation, based on an original design by J&AS Aero Design of Poland. The UAS platform features a new, robust mission system with enhanced sensor flexibility provided through a multi-



MATCHING THE MARKET SUPPLY: Australia’s fleet of AP-3C ‘Orion’ long-range maritime patrol aircraft (far-L) have done a sterling job in adapting to land-based surveillance missions for which other nations use unmanned aerial vehicles. Familiar names such as the ‘Predator’ (L) are not strangers to Australia’s shores, whilst new UAV derivatives, such as the Boeing ‘Integrator’ (R) and BAE Systems ‘Herti’ (far R) continue to be developed for traditional ISR roles. In looking for a new TUAV for the Army in lieu of the failure of the first attempt at Joint Project 129, the Chief of the Defence Capability Group, Admiral Matt Tripovich says, in considering the ADF’s new requirements for tactical air vehicles “I think the important thing is to make sure our requirements match what is on the market, within reason, to try to shorten the (acquisition) time frame. There will be a delay, obviously, as we have to go back to the market in some form, but we will do that as quickly as we can.”

DEFENCE, ADBR & VENDOR PHOTOS

payload turret manufactured by Polytech (Sweden) equipped with state of the art electro-optic sensors for day and night operations.

Officials indicated that – when coupled with the company's Imagery Collection & Exploitation (ICE) system – the aircraft offers real potential in military surveillance and insurgent detection. An armed version was announced in 2008.

A team from BAE Systems (BAES) announced 17 November it had developed a compact mortar-based launcher for small Unmanned Air Vehicles (UAVs). The new device – developed under a program code-named 'Project Artful' – allows UAVs of up to 25kg in weight to be paired with a mortar-based launch mechanism, which currently has European and worldwide patents pending.

The new development makes it possible for individual frontline units to rapidly deploy such systems, thus significantly enhancing their operational effectiveness. 'Project Artful' was initially developed by BAES' Military Air Solutions business, based in North West England, but quickly grew into a partnership involving a number of small and medium enterprises, including IBEX Ropes; Cranfield Aerospace; Blue Bear Systems Research; and BAES' Land Systems business.

BOEING/INSITU: Boeing reported 9 September it had completed its acquisition of Washington-based Insitu. Officials indicated the acquisition, first announced 22 July was part of a larger plan to increase Boeing's presence in the UAS market. Insitu has been structured as a separate subsidiary under Boeing's Integrated Defense Systems Military Aircraft unit, retaining an independent operating model while benefiting from Boeing's vast resources. Boeing is expected to offer Insitu's newly developed 'Integrator' UAS to satisfy any evolution of Australia's tactical unmanned aerial vehicle requirement.

In the baseline configuration, Integrator carries inertially stabilised electro-optical (EO), long wave infrared (LWIR), and mid-

wave infrared (MWIR) cameras with optional IR marker and laser rangefinder on a single 24+ hour endurance vehicle. Integrator has line of sight communications range of over 55 nautical miles (nm) with extended beyond line of sight mission radius of up to 550nm.

Its ceiling at MGTW is 20,000 feet. It is launched by pneumatic catapult and recovered by use of the SkyHook, where its wingtip is snagged.

DENEL DYNAMICS: South African-based Denel Dynamics has expanded its UAV offerings with another iteration of its 'Seeker' UAV family – the 'Seeker 400'. The new UAV, launched in mid-September 2008, is some 30% larger than the existing 'Seeker II'. The twin boom, pusher prop 'Seeker 400' tactical UAV is said to have an endurance of 16 hours, and already has an undisclosed launch customer.

The new UAV has dual-band datalinks, can operate at distances up to 250km, is capable of carrying up to 100kg of payload plus fuel, and has an operating ceiling of 18,000 feet. As well as electro-optical systems, Denel is also offering synthetic aperture radar and signals intelligence payloads. A typical 'Seeker 400' system is expected to consist of between four and six air vehicles, a mission control unit, modular payloads and a tracking & communications unit.

GENERAL ATOMICS: Airmen of the 432nd Air Expeditionary Wing ('Creech' AFB in Nevada) flew 18 February a General Atomics Aeronautical Systems Incorporated (GA-ASI) MQ-1B 'Predator' UAV in a combat mission in the US Central Command area of responsibility in Iraq, which over the course of the mission surpassed the 500,000 flight-hour mark for the aircraft.

The 'Predator' can be armed with two laser-guided AGM-114 'Hellfire' missiles and carries the Multispectral Targeting System, which integrates electro-optical, infrared, laser designator and laser illuminator into a single sensor package. More than 30 'Predator' combat air patrols currently sup-

port warfighters over Iraq and Afghanistan.

The US Navy announced 6 February it is preparing to forward-deploy the MQ-9 'Reaper' unmanned aerial system (UAS). Rear Admiral Mark Kenny, Director, Navy Irregular Warfare (N3/N5) advised during a briefing to the AUVSI Program Review 2009 the US Navy was going to fly 'Reaper' aircraft 'forward,' rather than out of its 'Nellis' AFB.

The forward operating capability means the USN would be able to control such aircraft (and their sensors) from the sea. Kenny acknowledged the new approach was "a huge change in the paradigm of how UAVs are operated. But unless we can have access to the information and control of the bird, in the places that we go, we aren't interested in having to worry about operators back in [Continental United States] – both in driving the birds or processing the intelligence."

Kenny confirmed the 'Reapers' would be Navy-owned, characterising the activity as a 'Navy / Special Operations Command' project. 'Reaper' UAS operations commenced in Afghanistan in September 2007. Like the smaller MQ-1 'Predator', the 'Reaper' is primarily flown via satellite from the US. Italy (acquiring two) and Germany (acquiring five) submitted FMS requests for 'Reapers' in August 2008, becoming the third owners of the aircraft after the US and UK.

ISRAEL AEROSPACE: IAI's 'Heron' multi-role MALE UAS is known (although the performance report submitted to the Government in June was classified), to have achieved highly respected results from its Customs/Border Protection Command (BPC) trials flown during 2008, and thus has potential application to meet an expanded JP 129 requirement if offered with the company's POP family of advanced EO/IR payloads, said by officials to have application across air, land and naval missions.

Flying over the Gulf of Carpentaria, the Torres Strait and the Great Barrier Reef, the UAV was reported by Customs to have

provided live radar, vessel information, video and photographs, which were then transmitted to a temporary ground station in Weipa, and relayed to the BPC National Surveillance Centre in Canberra.

The Malat Division of IAI confirmed 10 September 2008 that its turbo-prop powered 'Heron TP' UAV had flown for three hours at a record altitude of 40,000ft, reaching such heights in less than an hour. The 'Heron TP' (or 'Heron 2') UAV is powered by a 1,200hp turbo-prop engine, has a maximum take-off weight of 4.6 tonnes, a wing span of 26 metres, and can loiter for 36 hours. It has a range of more than 1,800km.

RAFAEL: Rafael Advanced Defence Systems – together with (Israel-based) Bluebird Aero Systems – announced 22 October the 'SkyLite B' mini-UAV had reached a flight ceiling of 36,000ft during demonstrations to prove tactical reconnaissance capabilities in mountainous areas.

The demonstration proved the 'SkyLite B' could be launched from high altitudes of 14,500ft (where the air density is less than 60% of the sea level atmosphere, and wind gusts are strong). It also demonstrated the SkyLite B could climb and perform its ISR missions at altitudes of up to 36,000ft – a capability said to be important for intelligence gathering and tactical units that need to operate independently in mountainous regions.

The electric powered UAV was also reported as having broken flight endurance records of over 3.5 hours, while executing an operational target tracking mission with an operational flight range of 42km. Rafael on 25 September had also demonstrated the new capabilities of its 'Spike' multi-purpose missile system from the mini-UAV.

The 'SkyLite B' is said to have executed two 'Spike' missile launches: a long-range ('Spike'-LR) launch out to 3.5km (one with 'Line of Sight', and the other to a 'Non Line of Sight' target), and one with an extended range ('Spike'-ER) missile out to 7.5km,

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with the 'SkyLite B' then relaying battle damage assessment data.

SELEX/GALILEO: The Selex Galileo 'Falco' TUAV system is said by its Italian manufacturers to be able to fly in day or night, in all weather conditions, while its persistent surveillance capability allows it to perform missions ranging from border patrol, coastal watch, immigration prevention, law enforcement to power and pipeline surveillance, illegal fishery prevention, and environmental monitoring.

The UAV's redundant and fault-tolerant architecture meets EASA (European Aviation Safety Agency) Airworthiness guidelines for both civil and military oriented products. Incorporating an inherent automatic short-take-off ability from semi-prepared airstrips, the 'Falco' can also be launched from a pneumatic catapult in a tactical environment. Recovery is accomplished by automatic conventional wheeled landing, tactical short landing, or by parachute.

Its landing gear on the air vehicle is designed to prevent payloads and aircraft structure damages due to heavy landings (decks landings or parachute recovery) and for semi-prepared landing strips operations.

The 'Falco' houses a wide suite of payloads including electro-optical/infrared, SAR, maritime; surveillance radar, ESM, self-protection equipment, hyperspectral and NBC sensors. Selex Galileo also designed the mission pre-planning, re-tasking, mission simulation, rehearsal and play back; and autonomous navigation and control system.

The 'Falco' UAS configuration is made up of a Ground Control Station (GCS), Ground Data Terminal (GDT), Ground Support Equipment (GSE) and four air vehicles. From the GCS, the operator is said to be able to either control payloads and sensors and handle the collected data in real time or pre-program their tasks during the mission planning phase, enhancing UAV autonomous operation features. The aircraft can be flown in manual and in fully automatic mode, including automatic take off and landing operations.

The GCS is said to be capable of off-line target data evaluation and processing, for further diffusion through the C4I net. The Ground Data Terminal provides a higher-than-200km redundant link range between the Ground Control Station and the 'Falco' air vehicle, via a jam-resistant option data transmission in real time.

The Ground Support Equipment supports maintenance, pre and post flight aircraft tests and reconditioning of the entire system. Endurance is 14-18 hours, a 70kg maximum payload weight, a 7.2 metre wingspan, a MTOW of 420 kg, a flight ceiling of 5,000 metres and a maximum air speed of 60 metres per second (ie: just over 200kms/hour).

THALES AUSTRALIA: Thales Australia originally offers a version of the Israeli Elbit 'Hermes' 450 for JP 129, however, since the original project down-select, has been involved in an intensive technology development program in France and the United Kingdom. Thales UK confirmed 24

November 2008 its first system flight trials of the 'Watchkeeper' UAV – based on the 'Hermes' 450 platform – had been successfully achieved, with autonomous flight taking place under the system guidance of program-specific ground control software fully integrated within a ground control station. Thales UK produced the control software at its Crawley facility.

The GCS has been designed and manufactured in the UK by UAV Tactical Systems (U-TacS), the Thales UK/Elbit Systems joint company site in Leicester. Officials indicated that during the first successful flight trials at Elbit's facilities in Israel, the UAV performed an Automatic Take-Off and Landing (ATOL).

Full systems trials are being undertaken in the UK this year. Since signing an acquisition contract in 2005, the 'Watchkeeper' UAV achieved first successful flight trials in April 2008, followed by a demonstration of the ATOL capability in August 2008.

The 'Hermes' 450 has an operating ceiling of 18,000ft and an endurance of approximately 20 hours. It has a cruising speed of 95kt and a maximum payload of 150kg. The upgraded LE version with external fuel tanks provides for a 50% increase in endurance to 30 hours.

To comply with revised JP 129 requirements, Thales Australia & Elbit will need to bid a more mature, off-the-shelf configuration of the 'Hermes' 450, as the 'Watchkeeper' is not expected to be fully proved prior to Australian TUAV requirements needing to be filled.



DEFENCE PHOTO

'Pilatus' PC-9/A fleet makes it to 21

Pilatus Australia marked at the close of 2008 the 21st birthday of its delivery of the first PC-9/A trainer aircraft to RAAF. Aircraft A23-001 & A23-002 were delivered to RAAF Base 'East Sale' on 24 November 1987, after having flown from Switzerland.

These aircraft were the only two (of 64) fully assembled by Pilatus, with the remainder (which have flown a total of over 375,000 hours) built under licence by Hawker de Havilland in Australia.

The original planned withdrawal date for the Pilatus PC-9/A fleet was 2008, however, company officials indicated to ADBR the design, robustness and support of both the airframe and the systems "has permitted the ADF to extend the life out to 2016, or beyond if required."

Defence is looking to replace the PC-9/A under project Air 5428 by a complete Training System. Pilatus intends to offer its PC-21 training suite into project Air 5428. The PC-21 training suite is already in operation with the Singaporean and Swiss Air Forces.

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REVOLUTION IN SENSORS & CONTROL: One of the unsung heroes in the rapid increase in the utility of unmanned aerial vehicles, has been technological growth in the variation and sophistication of sensors, which can now track enemy targets on the ground as well as peer through clouds & smoke to provide critical assistance to the development of tactics to fight bush fires. A second revolution is now emerging in the control of UAVs, with single ground stations being able to control multiple air vehicles, along with the slaving of UAVs to combat helicopters.

WESCAM SURVEILLANCE TURRET ON 'PREDATOR' UAV (far L); SELEX-GALILEO 'FALCO' TUAV (L); 'HERON' UAS (R); & 'SHADOW' 200 TUAV (far R) – ADBR & VENDOR PHOTOS