

Land 17 morphs from MOTS to developmental

■ Abraham S Gubler/CANBERRA

Speaking at the 29 May formal launch of the company's bid for project Land 17 - acquisition of a new artillery system for the Army - the Managing Director of Raytheon Australia, Ron Fisher, outlined how the project has become the "most significant systems project undertaken by the Army". The basis of the company's bid will be the Raytheon Advanced Field Artillery Tactical Data System (AFATDS) integrated with the Samsung Techwin K-9 'Thunder' Self Propelled (SP) artillery system, to be called AS-9 (given 'AS' is the NATO code for Australia).

With the Army's clear desire for AFATDS as the most requirement compliant Battle Management System - Fires (BMS-F) - see ADBR, 'Slip, slop and swap: barter deals twist Land 17 evaluation', Vol.25, No.10, 30/11/06, p7 - Defence and industry now have to respond to the fact that since the former US Secretary of Defense Donald Rumsfeld cancelled the then United Defence (now part of BAE Systems) XM2001 'Crusader' program, there is no 155mm L52 barrel SP artillery system in existence, or even in development, that is integrated with AFATDS.

Successful positioning for project Land 17, therefore, is no longer simply a matter of acting as a vendor of compliant Military Off The Shelf (MOTS) systems for the respective packages, but instead has become an exercise in significant systems integration.

With a Request for Tender (RFT) now due in the fourth quarter 2007 - according to advice received by ADBR from the Defence Materiel Organisation's (DMO) Director General Land Combat Systems (see *Letters to the Editor*, page 38) - and still likely to include a single contract methodology for the Package A/B requirement (BMS-F and SP



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Key Points

- **With 2007/08 Defence Budget papers showing** increasing provisions for accumulating delays in new military capability acquisition plans, the commercial sector has begun putting to Government opportunities to short-cut long-winded and bureaucratic military equipment acquisition processes.
- **Using their superior knowledge of international defence** market needs, Defence corporates have begun to look across stove-piped military specifications to develop omnibus solutions that address a range of contemporary warfighter needs.
- **Two projects - Air 5428 and Land 17** - have recently seen the promulgation of 'killer' strategies which offer government an opportunity - similar to the 'Abrams' tank, C-17 and 'Super Hornet' purchases - to compress 'first' and 'second' pass decision cycles and fast-track new capability to the warfighter.
- **Competitive observers of this 'new wave'** in the Australian defence-industry contracting landscape are now wondering whether they should move to lobby against the new 'omnibus' trend, or simply revise their own approaches and join it.

artillery system) - those in industry wishing to offer a baseline bid for Land 17 will have to undertake developmental activity in order to integrate their SP artillery system solution with the AFATDS BMS-F, at considerable up-front expense, just to meet tendering requirements.

As detailed previously (see *'Kinnaird up in flames from likely artillery down-select'* - Vol.26, No.3, 21/03/07, p1) the AFATDS down-select - while progressing an off-the-shelf-like tendering model - is having negative effects on Land 17 competition options. While the DMO's Brigadier Bill Horrocks contends that the Land 17 Inte-

grated Product Team (IPT) has not endorsed an uncompetitive tendering model, industry has alternatively confirmed to ADBR their concern at the considerable expense involved in developing a bid for Land 17.

Such expense is not limited to non-Raytheon corporates wishing to access AFATDS technical knowledge from the company's Network Centric Solutions enterprise in Fort Wayne, Indiana. In accordance with Raytheon's own internal open business model principles, Raytheon Australia has also had to make a considerable investment, in the realm of millions, in developing their Austral-

ian Land 17 solution and response.

Normal competitive developmental project acquisition would see Requests for Proposals (RFPs) first offered to Defence, and leading to the nomination of a shortlist for subsequent Government-funded developmental work. One could look for inspiration to the competitive trial and evaluation of protected vehicles used to effect the down-select for project Land 116 ('Bushranger'), which led to a production contract award to ADI (now Thales Australia) for the 'Bushranger' Infantry Mobility Vehicle (IMV).

Accordingly, while Raytheon Australia has opted for a second time to adopted a bid strategy involving considerable up-front investment (see *'Act of faith, or killer strategy?'* - Vol.26, No.2, 19/03/07, p21), other local industry players are balking at the prospect of stumping up front-end investment on what is viewed as a risky probability of success. Admirers of the approach from within industry have suggested to ADBR writers that prospect for competition still exists within Raytheon Australia's filtering of potential partners for the supply of project solution sub-systems and components.

But with an unprecedented 10 years of Defence equipment to be acquired under the Defence Capability Plan (DCP) 2006-16, the burdens on industry associated with Defence moving to a significant private sector up-front investment model are acting to significantly increase the risk of doing Defence business if successive bids are unsuccessful - thus denuding equity and making defence business much less attractive compared to other commercial pursuits.

Given there can be only one winner, Raytheon Australia no doubt considers the high costs associated with its 'killer strategy' approach (given the potential benefits) has also factored into its commercial equation the prospect of significant export earnings, both in their project Air 5428 and Land 17 development investments, as both proposals have been moulded to meet emerging

needs in the international defence market.

With project Land 17 thus crossing the divide from a MOTS to a developmental acquisition to meet the specification endorsed by Government at 'first pass', perhaps it is time the acquisition methodology is also redefined. While the DMO promotes to industry that it supports a 'profit is good' mantra, the Agency perhaps also needs to appreciate that 'waste is bad', and shareholders have little tolerance for investments that do not yield a return.

Accordingly, if the Department of Defence and the Minister are now happy to see companies such as Raytheon Australia and like competitors take on higher investment risk to deliver to government more holistic and integrated new military capability acquisition solutions, then such solutions deserve serious consideration, otherwise both the Department and Minister risk being seen as failing to sustain innovative Australian Industry Capability (AIC) initiatives, and by default, consenting to a state in which lead suppliers act principally as vendors for overseas MOTS equipment.

RAYTHEON & SAMSUNG: Raytheon Australia formally launched its integrated solution to Packages A/B and Package D of project Land 17, along with new partners Samsung Techwin, at Parliament House on 29 May. The Republic of Korea (RoK) Ambassador was also on-hand to add gravity to the not insubstantial importance the corporate teaming offers to develop Australian-RoK defence ties, given a Government-to-Government Defence cooperation MoU is currently un-

der negotiation, with a resolution due this year.

The offer team also combines Raytheon Australia's systems integration expertise with Raytheon Company expertise in the US (in terms of its suite of fire control systems), and Samsung's leading edge SP artillery system, substantial engineering expertise, and huge industrial production capacity.

The importance of the RoK connection for Australia from the Land 17 offering should not be understated. Korea has a significant Defence industry leveraging both the high tech national commercial heavy and light industries, and the sustained threat of military conflict with North Korea to promote high expenditures on research and development (R&D) into new weapons and their subsequent volume production.

The RoK also has considerable access to US military technology, with systems like the K-9 having been evolved from long domestic production runs of previous generations of US equipment.

Korea currently runs a \$6 billion trade deficit with Australia, something President He Roh Moo-Hyun of the RoK was quick to point out during his 6 December 2006 visit to Canberra. Korea also offers Australia considerable opportunities for Defence industry cooperation with current links established in the Medium Artillery Replacement Project (MARAP), and Boeing 737-based Airborne Early Warning & Control (AEW&C) aircraft program, for which Boeing would like to integrate the first RoK unit in Australia.

The RoK also launched 17 May a US\$2.7b project to develop technology for their third generation of domestic submarine

production, due to enter service from 2018. Of interest for Australia, is the RoK vision this submarine would approach 3,000 tonnes and be fitted as an ocean-going conventional submarine; a position uniquely held in the world by the Australian submarine industry via its construction and support of the six-boat 'Collins'-class.

The Package A/B offering will develop AFATDS and the AS-9 along with a full suite of supporting equipment. As part of the Package A requirement, Raytheon Australia will offer the Turkish 'Aselsan' Weapon Management System (WMS) for all new artillery systems to be acquired under Land 17. The Aselsan WMS is being fitted to the entire K-9 fleet, courtesy of their first successful export to Turkey, where the SP artillery system is produced under license as the T-155 'Firtina' ('Storm').

The Aselsan WMS will be integrated with AFATDS and provide all fire control functions to the artillery system including INS/GPS locating and pointing. The same WMS will also be available for fitting to the 155mm L39 lightweight gun to be acquired under Package C, as well as the modernisation of the legacy M198 155mm guns under Package D.

Providing targeting information and management will be forward observer equipment for the Joint Offensive Support Team (JOST) based on hardware and software in-service with the US Marine Corps. Completing the fire control package will be Raytheon digital bearers (radios) from the EPLRS (vehicle borne) and 'Microlight' (soldier carried) family, also offered for the Land 75/125 Battle Group and below

Command, Control and Communications (BGC3) system.

The 18-24 AS-9s required under Land 17 (as part of the K-9 family) would be sourced from an overall production order of 1,700 units (including Korean and Turkish options). In short, Australian stake in production and sustainment of the total volume of artillery systems would be (a very low risk) 1.4% of the global support system.

This compares to 7% for the Krauss Maffei-Wegmann (KMW) PzH2000 production (336 ordered), 50% of the BAES Bofors FH 77 BW L52 'Archer' production (24 ordered), and 100% of the Denel G6-52 (none ordered). Further, Australian accessibility to Korean production facilities would be improved due to their regional location, and high volume transportation links.

Boosting the operational capability (and survivability) of the AS-9 package is Raytheon Australia's proposal that the K-10 Protected Ammunition Resupply Vehicle (PARV) - based on the K-9 vehicle - will be offered as the AS-10. The K-10, for which the RoK Army has ordered one for every three K-9s, carries 104 complete rounds of 155mm ammunition and can automatically and under armour pass these rounds into the magazine of the K-9.

This unique capability was planned for the XM2002 'Crusader' Field Artillery Ammunition Supply Vehicle (FAASV), and differs from other resupply vehicles which load ammunition by hand, and thus are vulnerable to enemy fires. Operational experience in Afghanistan is said to have demonstrated the utility of a PARV, where small numbers of SP artillery systems (operating as single



L52 & AFATDS SOLUTION NOW UP TO AIC PITCH: Since the US cancelled the XM2001 'Crusader' system after spending over US\$1.3b in development (far L), no artillery system with 155mm L52 ordnance has been integrated with the AFATDS Joint Fires management system until Raytheon Australia came along with its plan to do so with the Samsung Techwin K-9 'Thunder' (L) and the Aselsan Weapon Management System (R). It remains to be seen whether other Land 17 industry teams are willing to make the upfront investment required to match AFATDS with other artillery systems, such as the KMW PzH2000 (far R).

US ARMY, VENDOR AND DUTCH ARMY IMAGES AND PHOTOS

gun firing units), are required to provide supporting fires over areas much larger than the range of their gunfire, with little or no support from other artillery systems. This requires constant readiness for movement into less dangerous areas.

Dutch Army briefers at the 2007 LanDef Exhibition (Avalon) told Defence officials and industry how PzH2000s operating in Afghanistan were required to source and expend ammunition from adjacent ground piles at their main operating base (MOB), in order to keep their 60 round onboard storage unit untouched to service rapid calls to relocate to new firing positions.

In such cases, gun units were limited to firing 60 rounds at the new location before they either had to return to the MOB to restock ammunition, or seek vulnerable resupply from Field Truck borne ammunition carriers.

Operating under similar operating conditions, Raytheon's AS-

9/AS-10 combination would see the AS-9 firing from its 48 round magazine, kept topped up by an AS-10 at the MOB - and when called upon to displace to a new location - would be similarly accompanied by the AS-10 or plot a rendezvous with an AS-10 at the new firing location.

At that time, the AS-10 could resupply the AS-9 with up to 104 rounds, and then act as a shuttle keeping the new firing location stocked without the AS-9 having to cease firing in order to return to base, or call for more vulnerable Field Trucks to carry ammunition forward to the firing line.

As a measure of typical high-tempo daily ammunition expenditure, Dutch briefers indicated this could be as high as 200-400 rounds per gun. In an Afghan province like Oruzgan (where Dutch and Australian personnel are located), the area of operations is supported by only three PzH2000s able to cover with gunfire, as single gun firing units,

only 15% of the entire provincial Area Of Responsibility (AOR).

155MM ON THE CHEAP: Unlike Land 17's requirement for the supply of SP artillery systems (which must be combined with a fire control system offering), the Package C new lightweight 155mm guns and Package D upgrade to the legacy M198s, can be separately tendered (or combined with a Package A/B) offering.

Declared contenders for both packages remain BAE Systems (BAES) with the M777 155mm lightweight gun, and Raytheon Australia with an M198 upgrade based on the RoK KH179. Another potential contender is Singapore Technologies with its Kinetics (STK) 'Pegasus' 155mm lightweight gun, the only other 'Chinook' air-portable gun system in the 155mm calibre under production.

BAE Systems (BAES) Australia announced at LanDef they had partnered with KMW to es-

tablish a KMW-certified facility in Adelaide (SA) to support the PzH 2000, if selected for Package B, that will also be able to support other 155m towed guns. BAES were awarded a US\$834 million contract on 24 March 2005 for a four-year production run of 495 M777s for the US Marine Corps, and US Army 'Stryker' Brigade Combat Teams.

If acquired under US Government Foreign Military Sales (FMS) arrangement, 35 M777s would only cost around US\$60m or 12% of the overall Land 17 budget forward estimate. The M777s would require a WMS sourced from Package A, but this would be a cheap and accessible acquisition. The M777s are also the only gun system currently integrated with the Raytheon/BAES Bofors XM982 'Excalibur' Precision Unitary Munition (PUM).

Alternatively, the STK 'Pegasus' could also be acquired directly, courtesy of Australia's close Defence cooperation rela-

Saviour in the wind for Mulwala and Benalla

The final component of project Land 17, Package E - and relating to Course Correcting Fuses (CCF) - will complement other munitions to be acquired under MARAP (conventional projectiles) and the Joint Project 2085 acquisition of Precision Unitary Munitions and Sensor Fused Munitions (SFM).

■ Canberra Bureau Report

At a range of 30km, conventional shells fired by a 155mm L39 gun will disperse in a Circular Error Probability (CEP) of around 340m, meaning only half the fired shells will land within 340m of the target. This subsequently requires high volumes of fire to achieve target destruction at long range, and increases the risk of collateral damage.

Unlike the XM982 'Excalibur' PUM, the CCF will not significantly increase range and lethality through near vertical terminal flight paths, nor offer the opportunity for in-flight retargeting. However, CCFs replace the screw-in nose fuse of conventional artillery munitions providing a low-cost opportunity for accuracy improvement by working to

reduce the dispersion, or CEP of conventional shells.

The 31 May down-select for an initial 18-month, US\$18m contract to Alliant Techsystems (ATK) for System Design and Development (SDD) of the US Army's new 155mm Precision Guidance Kit (PGK), is destined to provide a significant enhancement to CCF capability. Legacy CCFs have used muzzle velocity radars to order changes to the shell's drag profile to reduce dispersion in range, but the ATK PGK incorporates GPS guidance and canards to provide in-flight diverts.

During the PGK competition with the BAES solution, the ATK fuse demonstrated twice the required first increment accuracy level - a 50m CEP. While this is twice that realised by 'Excalibur', it still is far superior to that achieved by conventional 155mm L39 artillery at

ranges beyond only 3km or 10% of maximum range. Follow-on production options, scheduled for first deliveries in 2009, are expected to be worth up to US\$125m over a three-year period. Given these developments, Package E is thus considered a follow-on acquisition for Land 17, and is unlikely to be tendered until the US Army project progresses further.

Outside of project Land 17, the acquisition of PUMs and SFMs is being progressed via Joint Project 2085. 'Excalibur' is clearly likely to be pre-selected for the PUM role, as compatibility with the munition has been mandated for the SP, towed and modernised M198 systems.

Accordingly, the Department of Defence and relevant industry players are currently investigating ways to involve AIC in the production of 'Excalibur' units. Adelaide-based BAES Australia is nevertheless expected to be involved in electronics production, whilst Benalla (Victoria)-based Thales Australia is expected to be involved in the production of warheads and 'Excalibur' bodies.

The 'Excalibur' Block Ia-2 PUM was successfully tested 10-17 April during a firing campaign at White Sands Missile Range, in New Mexico. The tests are said to have proven firings with live base bleed to increase range and maximum charge firing.

Two of the test projectiles were fired to a target range of 40.8km, and impacting approximately 6.7m and 2.2m from the target. Three shots were fired from an L39 barrel on an M109 system, and indicating a L52 barrel could achieve a range of roughly 50km.

Upcoming Block Ia-2 tests include full system performance testing, to include maximum range shots from the FH 77 BW L52 and safety testing to validate projectile design margins under gun pressures exceeding normal operating conditions.

Currently shorter range Block 1a-1 rounds are now in active service with the US Army in Iraq, with the Block Ia-2 having planned initial operational capability in 2009/10.

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tionship with the Singapore government. The 'Pegasus' is heavier than the M777 (5.4 tonnes versus 3.2 tonnes), because it is fitted with a 21kW Auxiliary Power Unit (APU) providing hydraulic pressure to drive the wheels (at up to 12kph), operate a powered Ammunition Loading System (ALS), and power the deployment of the system.

Similar in concept to the motive system that powers the 'Mobicon' container handler system, the 'Pegasus' Auxiliary Power Unit needs to be engineered to survive the shock and vibration of gun firing.

The M777 achieves many of the Pegasus' capabilities without the cost and weight of the APU due to its designed-in 'centre of balance' and recuperator system.

The M777 is balanced on its wheels in travelling configuration so it can be easily controlled and moved. BAES have experimented with using a simple 'quad bike' All Terrain Vehicle (ATV) to tow the M777 at low speeds, thus

enabling reasonable mobility after rapid deployment by helicopter.

The advantage of using an All Terrain Vehicle compared to the 'Pegasus' APU is borne out in much lower acquisition and sustainment costs, as the ATV can be subsequently freed up for other operational uses, such as towing ammunition, after the M777 is positioned.

Post-firing recoil energy stored in the recuperators is applied to presenting the next projectile to the breech without human effort (the flick rammer can be 'pumped' for first round loading).

As a contender for the British Army's requirement for 45 Lightweight Mobile Artillery Weapon System - Gun [LIMAWS(G)], the M777 has seen funded the development of the Supacat HMT 8x6 'portee' gun carrying system.

This unique application uses the same truck chassis as that selected for the ADF's 'Nary' Special Operations Vehicle (SOV), which can lift on and off its rear tray an M777 gun.

The Supacat HMT will also carry ammunition and crew in a protected cabin for a total weight of 12.3 tonnes with gun. The advantage of the portee design is a much lower space signature for air and sea transport, and ease of manoeuvring a single unit. It is also configurable as a gun tractor towing the M777 freeing space for a total of 70 complete 155mm rounds to be carried.

NEW LIFE FOR M198: Providing a low cost alternative - or as a supplement to acquiring a new M777 or 'Pegasus' 155mm artillery system - is a Package D modernisation of the M198. Raytheon Australia's omnibus offering promises to reduce the gun's current weight from 7.1 tonnes to 6.9 tonnes, thus improving air portability whilst increasing warfighting capability by adding the Aselsan weapon management system.

Raytheon says that modifying and replacing the bottom carriage, wheel suspension, trails and firing

base with new components will achieve the required weight reduction. The existing recoil mechanism, top carriage, elevating mechanism, traversing mechanism and equilibrators will be retained. This same modification is proven, given it was applied to more than 100 guns in the RoK Army, and called the KH179.

Following original M198 conversions, 900 KH179s were produced as new builds to the same design, with approximately 1000 units currently in-service in the South Korean Army.

While it is proposed the first modification would be undertaken by KH179 producer, WIA Corporation in Korea, the remaining 34 ADF M198s are to be modernised by Raytheon Australia sub-contractors using kits. The Aselsan WMS will include a battery pack, motion sensor, Inertial Navigation System, optional GPS, gun display unit and muzzle velocity radar for all up additional weight of less than 50kg.

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