

Joint Fires

Combat Support Program's Information Circular



**Platforms and
Effectors**

**LAND 19 7B
(SR-GBAD)
gains Gate 2
approval in
February 19.**

**Bold Quest 19
Mode 5 IFF and
JF integration
success!**



Bold Quest 19

In May two contingents of RAA deployed to Finland to participate in Bold Quest 19-1. Bold Quest is a series of activities which provides the framework to test digital interoperability between ABCANZ and NATO mission systems. The ADF participated in the Joint Fires System Joint Mission Thread Lab with a contingent of RAA JFOs, RAINF mortar operators, and a GAMB Radar detachment from 16 Regt. Bold Quest also comprises labs for Joint ISR, Joint Situational Awareness, cont.. Pg6

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SO1 Joint Fires—Army LTCOL Jonathan Abundo

The Joint Fires – Army cell has started the year with quite a number of ongoing tasks, of note were the commitments to the ECP2 development to underpin a digital naval fires standard, ABCANZ representation to support the Divisional Targeting standards, the JTAC accreditation of the newly-built simulation domes across the country, the adoption of the responsibilities of JTAC training on behalf of the CA, support to the creation of the JTAC database, the start of the cradle-crack remediation program, commencement of physical integration trials for LAND 17 1C.2 *Future Artillery Ammunition* at P&EE PW, finalisation of LAND 136 *Light-weight Mortar* rollout plan including disposal actions for the F2 mortar, drafting the Joint Fires Study, review and distribution of the LAND 8113 *Long Range Fires* CONEMP and hosting the Joint Fires – Army FIC Working Group.

Given the cell's manning of four, it's been quite a busy start to the year, notwithstanding our most important task thus far, the support to the ADF's Force Structure Plan (FSP). The FSP is a whole of Defence activity that seeks to understand the force structure requirements of the future to meet the challenging contested regional environment. Joint Fire – Army support to this activity has been critical to ensuring that the offensive support needs of the Army are based on sound logic, well-articulated, and represent the most lethal and sustainable land fires for the coming decade. The end result of the FSP is an updated Integrated Investment Plan, which sets out the milestones for the ADF's future projects. Updates on how Army's Joint Fires capability is progressing in the FSP will be provided in subsequent issues of the JF Circular, as Defence determines its priorities over the next ten to fifteen years.

I am pleased with how the cell has commenced the year, and more is to come, with the Joint Fires – Army cell commencing the work-up for two projects, LAND 8110 *Future Artillery Ammunition Replacement* which will seek a refreshed Artillery Precision Guided Munition (APGM) fleet that capitalises on the latest 155 mm technologies, and LAND 8115 *Future Mortar Ammunition* which will support the development of a US-AS 81 mm Improved HE projectile and local 81 mm Practice load-assemble-packaging capability.



SO1 Air and Missile Defence—Army LTCOL Charles Slinger

2019 started very successfully with LAND 19-7B receiving Gate 2 approval in February. On the 20th June, the Project signed the acquisition contract with Raytheon who will now commence major system production and introduction into service (IIS) activities. This is a significant milestone for Defence and now creates real opportunities for Army to collectively develop how the system will be sustained and fought. Engagement with GBAD SMEs will continue; now with specific focus on the progression of individual and collective training requirements. This is a large body of work which will commence with a draft Concept of Employment and Training Implementation Plan. To support the development of LAND 19-7B IIS activities, Army will establish a Capability Implementation Team; prioritising postings within CATC, SoArty, AKC, 16 Regt and AHQ from January 2020. A full update of LAND 19-7B is on p.5.

LAND 19-6/7A remains committed to ensuring capability relevance. 16 Regt participated in BOLD QUEST (BQ) 19.1 in Finland (cover story). BQ presented an excellent opportunity to continue Mode 5 IFF certification of the GBAD system and also allowed Army to progress its understanding of Joint and allied GBAD interoperability requirements. Additionally, a series of approved User Requirements (UR) allowed testing of FAAD C2 to DIE integration on EX TS 19; certification of the GAMB Trolley; and integration of LSTAR software into TaCCS (AHQ decision pending). The majority of activities to support certification and IIS of these URs will commence from completion of the Mode 5 IFF work package, likely Q3 2019.

Finally, this will be my last entry. I have shifted across to the Program Management Office within AHQ, Land Capability. While a new role, it is a great opportunity and I will definitely be keeping my ear close the ground on the progress of LAND 19-7B. MAJ Jared Boyd replaces me as SO1 AMD-A until year's end. Thank you to the whole GBAD community for your continued commitment over the last 3.5 years.

SO2 Joint Fires Army - Developmental

MAJ Hugh Smith

I would like to start by acknowledging the achievements of my predecessor, MAJ Nick Ullin. His conceptual thinking and application of intellect to better define two very important future Joint Fires Army capabilities will prove invaluable over the coming years. I will continue to progress those two key capabilities, being LAND 8113 *Long Range Fires* and LAND 8112 *Protected Mobile Fires*. Long Range Fires will deliver a sensor system, C3 system and effector system that will provide Army with persistent, lethal and all weather strike capabilities at ranges beyond 400km. I am sincerely looking forward to working with all serving members of The Regiment over the next two years.



SO2 Joint Fires Army - C3 and STA

MAJ Dan Fussell

I would like to thank MAJ Andy McDonnell for setting the conditions across both L17 Ph-2—DTCS NextGen and my other areas of responsibility including Dome Simulators which you are all starting to realise the training benefit of but also the potential going forward. My 13 years in the RAA has included 6 years at 1 Regt RAA, 2008 - 2014, during the introduction of digital systems. Being able to understand the challenges of the past and look to advance capabilities through next generation systems is an excellent opportunity. I will be the desk officer for all things C3 and STA,. In my spare time, I'm enjoying the surrounds of Canberra, continuing to enjoy hobbies of rock climbing, kayaking, skiing and beach fishing.



SO2 Joint Fires Army - Platforms and Effectors

MAJ Robert O'Donnell

Along with the rest of the team, I posted in at the start of the year, and have been able to draw upon my recent battery command and New Equipment Training Team experience to provide context to the future needs of our force, as well as management of the in-service capability.

In my spare time I like watching sunsets and taking long walks on the beach. Seeing as I can't do either of those in Canberra, I've replaced them with evenings on DREAMS, long weekends in the office, and watching re-runs of *The Bachelor*.



SO2 Joint Fires Army - Air & Missile Defence

MAJ Jared Boyd

With 15 years of service, I have served primarily within the 8th/12th Regiment, RAA, with limited previous experience in Capability Management when posted to HQ 6th Bde in 2012/2013.

I have now served within Land Capability Division as the SO2 Air and Missile Defence – Army since Jan 18 and now have the lead for LAND 19-7B, LAND 19-7A and LAND 19-6 through to Dec 19.



SO2 Air & Missile Defence - Training

MAJ Rory Pratt

With several years at both 16 Regt and 20 Regt, as bookends to a long career as a military trainer. He brings a wealth of experience in GBAD, STA, Simulation and Training. MAJ Pratt will be with us for the next two years on CFTS and is primarily working on the Land 19-7B training system; and test and evaluation program. He enjoys offshore sailing, long walks in green fields and a cheeky red.



Land 19-7B Short Range GBAD

Major Jared Boyd

With Gate 2 approval CASG has been busy conducting contract negotiations with Raytheon Australia as the prime systems integrator. The contract with Raytheon was signed on 20 Jun 19. With this milestone achieved CASG are now progressing with contract negotiations with CEA Technologies. The aim is to have this signed by Q4 2019.

For those unfamiliar with the Project, the Government was provided two options for consideration at Gate 2. Option 1—MOTS NASAMS or Option 2—enhanced NASAMS. Government selected Option 2; which replaces the Sentinel radars of a standard NASAM system with CEA Technologies' AESA radars and control architecture. Land 19-7B will equip 16 Regt, RAA with six troops of SR-



GBAD organised into two Batteries. A troop of SR-GBAD will be capable of defending a 15 x15 km area. Each Enhanced NASAMS troop will comprise:

- a Raytheon/Kongsberg Fire Direction Centre (FDC) that integrates fire control, CEA radar and Air C2 software into a world class AMD warfighting system.
- Either Canister or High Mobility launchers capable of launching AIM-120 and AIM-9X missiles.
- CEA Tactical (CEA Tac) radars capable of air surveillance and CRAM roles.
- An EO/IR sensor to support passive engagement and BDA.
- SW&L software and warning systems.

The future of Army GBAD looks very bright. By 2026 the Australian Army will operate one of the worlds most capable SR-GBAD systems. To meet this milestone Army will need to adapt. The true effectiveness of this capability will be realised through changes in Army training and development of personnel to operate the system.



Platforms and Effectors

MAJ Robert O'Donnell

When people think 'Joint Fires', they imagine things that go bang. Within the JF-A cell, everything that goes bang has been grouped into 'Platforms and Effectors' (as have several things that don't go bang).

Let's start with ammunition. LAND 8110 Future Artillery Ammunition Replacement seeks to remediate Army's Artillery Precision Guided Munitions (APGM) capability. Whilst very early days for the project (it does not get ADF approval to commence work (known as 'Gate 0') until December this year), the project will likely seek to purchase Excalibur Block III and PGK, as well as investigate anti-armour options. This is likely to be either continuing with SMARt 155, or purchasing an alternative. LAND 8110 will also seek to conduct two studies: one to investigate what 155 mm emerging capabilities are available internationally; and the other to ascertain the domestic industrial capability to contribute to the 155 mm supply chain. The latter is a contribution to a greater strategic push to understand and enhance sovereign industrial capability.

Another ammunition project, LAND 8115 Mortar Ammunition Replacement, will be purchasing new 60 mm and 81 mm stock. However, as with LAND 8110, it will achieve much more. The project has contributed funds toward the US-led co-development of a high-lethality insensitive 81 mm round, which is designed to have the lethality of a 120 mm round with increased safety to users. LAND 8115 is also contributing to the broader sovereign capability narrative through funding a 'load, assemble, package' activity for 81 mm practice rounds. This is not only an important first step in domestic production, but will also mean that we can have more munitions delivered (more components can be transported on supply ships compared to complete rounds). Further, it means we can start realising a 'just in time' munition supply paradigm, which means that complete rounds are not sitting on shelves for long periods degrading and ultimately expiring and needing to be disposed. Whilst we are discussing ammunition, a non-project aspect that JF-A deals with is explosive ordnance (EO) issue management. In conjunction with Army's Principal Ammunition Technical Officer (PATO), Land Explosive Ordnance Systems Program Office (LEOSPO), and Land Engineering Agency (LEA), the cell makes decisions regarding investigation of malfunctions and incidents, mitigations, restrictions and suspensions, and provides guidance on the issuing of alternate items to enable training and operations to continue.

Unfortunately, it can at times be a slow process: munitions engineers are an essential element of the investigations but there aren't enough of them, not to mention the investigations (and subsequent reports) are by necessity very thorough.

The other main point for ammunition is the IIS for the current APGM: SMARt 155; Precision Guidance Kit (PGK) Course Correcting Fuze (CCF); and Excalibur. These rounds have been in the inventory for some time, but for a number of reasons were not fully introduced. To address this, AHQ



and 4 Regt (with support from LEA) conducted Ex CHIMERA at Shoalwater Bay Training Area in March this year, firing SMARt and CCF. Unfortunately, Excalibur could not be fired due to the identification of cracks in the HE fill of some rounds (subsequently, our holdings are being cycled back to the US for further surveillance and replacement as required). Another CCF practice is planned with SOArty later this year, and second SMARt practice is planned for next year—both with the intent of allowing the munitions to be brought into service and available for regular training. Excalibur will go through this process once more fidelity on remediation timelines are provided by the US.

Then there is the project that the Royal Regiment is most intimately familiar with: LAND 17 Phase 1C.2. This project is securing an alternate line of supply for 155 mm ammunition through the Introduction Into Service (IIS) of the Assegai family of munitions. These rounds provide significant increases in range, effects and lethality. No ballistic data exists for them however, which is why soldiers have been supporting the 'Verification 1' trial at P&EE Port Wakefield throughout the year. The project will produce the ballistic data that will be included into the NATO Armament Ballistic Kernel. This is the first time the US have allowed Australia to conduct such a complex activity and is testament to the trust that our allies have in our abilities and capabilities. 'Verification 1 (Extended Range)' (V1ER) will be conducted at Woomera Test Area in the first half of next year to test the rocket-assisted projectiles, and unit support will again be essential. Whilst Woomera lacks the seaside charm of Port Wakefield, V1ER is only expected to go for three months, so the burden on units will be substantially less.

Finally (for ammunition), the cell is taking responsibility for 155 mm authorised configurations, and investigating op-

Platforms and Effectors continued ...

tions for reducing or mitigating many current ammunition and range planning restrictions, to enable greater realism and fewer restrictions in training. JF-A has conducted a working group with subject-matter experts from SOArty, CSSPO and LEA to identify ways to modernise and simplify ammunition and range safety, and has developed a clear way forward. It's only early days yet though, so watch this space!

That's ammunition... Now onto platforms! LAND 136 Land Force Mortar Replacement project is replacing the F2 Mortar and M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) with the M252A1 Mortar and M32A1 LHMBC. The new mortar provides a significant reduction in weight, whilst the M32A1 allows mortar lines to connect to AFATDS and thus integrate into the broader fires network.

The project is in the process of issuing out M32A1s across FORCOMD, SOCOMD and 1 Div, with the first of two tranches of mortars being issued in August. We will conduct two Operational Test and Evaluation (OT&E) activities: the first later this year with an Inf Bn, Cdo Regt and SOArty to declare Interim Operational Capability (OIC); and a second next year to declare Full Operational Capability (FOC). Whilst this sounds simple, the project is not without its challenges, including: known bipod issues; arranging for a US team to repair the bipods retrospectively; and working with various cells in AHQ and SPOs in CASG to modify the brackets in the mortar variants of the Bushmaster and M113. Unless the vehicle fleets are modified before FOC, Army will need to retain a small number of F2 Mortars (and the associated CES, Learning Management Package etc) for operational preparedness purposes.

The cell is also involved with the IIS of the M224A1 60 mm Mortar. This system is in use with SOCOMD as an individually operated direct fire weapon and was purchased as an Operational User Requirement. JF-A is working with Soldier Combat Systems Program and Combat Support SPO (CSSPO) to identify the work packages required to enable

IIS as a system capable of both direct and indirect fire. Complicating this is the need to IIS the 60 mm ammunition fleet, which will require substantial engineering effort by LEOSPO and LEA. Discussions with SOArty suggest that the M242A1 will be included in extant mortar qualification courses. The 60 mm will be employed within SOCOMD and 2 RAR, with the potential to be rolled out to FORCOMD units in the future.

LAND 17 Phase 1C.1 Artillery Capability Assurance Plan is continuing to progress. Three of five Material Releases have now been completed, with the most deliverable being the new Manitou forklifts recently received by the units. The project is set to deliver additional 'dome simulators' as well as a Proof Gun System; however, the US have advised of delays to delivery of the latter and subsequently, FOC for the project is now in 2022.

Sustainment of the M777 fleet has been one of the major undertakings for the cell this year. In conjunction with CSSPO, JF-A have facilitated the conduct of the fleet-wide cradle crack repair activity conducted by the US in unit locations across the country. To date, approximately 10% of the fleet were not able to be repaired locally, due to the extent of cracking. This will likely require them to be returned to the US for repair, although CSSPO is investigating the feasibility of establishing and maintaining an appropriate repair facility in Australia.

The other major M777 activity is the Digital Fire Control System (DFCS) and Communications/Location Equipment (CLE) retrofit activity. This will be similar in scale and duration to the cradle crack repair activity, and again will involve a US team travelling to unit locations to conduct the upgrades. This is now scheduled to occur in the first half of next year.

Finally (for M777 at least), JF-A is coordinating various potential future upgrades, including radios, power management, tyres and numerous others. The cell participated in



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the US/Canadian/Australian M777 Memorandum of Understanding (MOU) working group in March (where these upgrades were discussed) and will be attending the next one in Arizona in August. More information will be provided on future upgrades as it comes to light.

The MOU will also provide an opportunity to observe a test-firing of the M777 Long Range Cannon. This is a US developmental program to produce an upgrade kit that will allow a M777 to be fitted with a 55-calibre barrel and larger breech, which enables the use of larger charge systems and can achieve ranges in excess of 60 km. The cell has contributed funds to the program and will receive one of the three kits produced, with delivery expected early next year. Mobility and live-fire trials are planned for next year, to determine the suitability of the enhanced platform in Australian conditions and to inform whether to purchase more kits.

JF-A has also been addressing issues surrounding the M2A2 ceremonial guns. 9 Regt identified difficulty in getting the large LAND 121 vehicles into some of their saluting platforms. Additionally, concerns have been raised by other organisations regarding the towing of an aging platform with no ready supply of spare parts. The cell is investigating options to address 9 Regt's vehicle provisioning as well as alternate methods of transporting the M2A2 fleet.

The future of Army GBAD looks very bright. By 2026 the Australian Army will operate one of the worlds most capable SR-GBAD systems. To meet this milestone Army will need to adapt. The true effectiveness of this capability will be realised through changes in Army training and development of personnel to operate the system.

We've discussed the things that shoot and the things that are shot... now for things that get shot at! As SMARt had not been fired outside of initial trials, there was little knowledge of what was required to successfully employ it in training - especially when it came to targetry. JF-A investigated this problem and paired with an Australian company (Redarc) to create a world-first targetry solution to mimic the heat and radar signatures of armoured vehicles (in a field environment without mains power), that succeeded in being recognised as a legitimate target by the SMARt's on-board sensors. The targetry enabled Army to directly observing the penetrating power of the sub-munitions (easily punching through turret, roof and floor of the Leopard hulls, and several metres into the earth below), and allowed for the development of doctrine and TTPs. Following on from the success of the targets, the project team is about to sign a contract with Redarc for targetry provision and support for future SMARt practices. The cell has also been looking into indirect fire targetry requirements for all natures, and conducted a working group with unit representatives to capture their ideas and preferences. This will form the basis of a submission to the Integrated Land Targetry System project team in order to ensure that artillery and mortar training needs are included in their procurement and that units are provisioned with appropriate targetry.



Previously, the cell took on the responsibility of investigating ammunition carriage on behalf of the LAND 121 project team. This resulted in 'Task 59', which investigated and developed requirements for a system to replace the Unit Load Ammunition Carrier (ULAC). The Operational Concept Document and Functional Performance Specifications have now been completed and handed to LAND 121, with expected delivery in 2022/23. JF-A continues to work with LAND 121 to develop the requirements for the new gun line stores module.

An important aspect of getting new stuff is to get rid of old stuff! The cell has been heavily involved in disposal of a number of obsolete weapon systems and CES, such as 105 mm Hamel guns and the pending disposal of (the majority of) the F2 Mortars. This ensures that the inventory is kept as small and efficient as possible (as well as ensuring warehouse space is not wasted) and whilst led by CASG, Army as the Capability Manager provides essential context and generally, the executive authority for disposal to occur.

Finally, JF-A has conducted a significant amount of external liaison. This has been with both industry and the media. The cell has briefed or received briefs from industry relating to current projects and proposals for procurement, and has provided a number of responses to media enquiries. The latter have directly informed articles by a number of media organisations across both print and digital media.

As you can see, there is a lot happening in the Platform and Effectors space! None of this would be possible without the dedicated support of a number of areas: CSSPO, LEOSPO, LEA, PATO and of course the units and formation/command headquarters—so thank you for your willingness to support (and your accommodation of) multiple, demanding (and at times short-notice) tasks. We will continue to work hard to ensure that Army has the best joint fires system possible, both today and into the future.

BOLD QUEST 19 continued from cover...

Cyber Security and C2 although the ADF is yet to be involved in these.

The event consisted of three phases. A lab phase, which tested the systems interoperability and ensured that critical message sets could be accurately sent and received by each nations digital fires system, a concept demonstration phase where NATO nations tested their operational structure, and a live fire phase where the mission threads were tested using real fires provided by multiple nations.

The lab phase presented an excellent opportunity for the contingent to both test ADF interoperability with other nations systems and view foreign procedures and digital systems. The team developed strong personal and professional relationships which aided in establishing experimental tests to further the RAAs understanding of the limits of joint fires in both digital systems and procedural differences. The live fire phase saw RAA observers from both 4 REGT and 16 ALR call fires from Finnish mortars and rockets, Belgian 120mm mortars and Swedish 155mm Archer artillery.

The event was a resounding success providing confidence to the ADF, NATO and the US that when required Joint Fires support can be provided between coalition nations. Joint Fires – Army intends to continue our participation at upcoming Bold Quest events in Scandinavia with an eye to increase our commitment in order to provide experience and exposure to more members of the RAA.



Project Snapshots

Land 17 Ph 1C1— Artillery Capability Assurance Program

Post Gate 2. Material releases 4 and 5 will deliver DTCS/Dome Simulators and Proof Gun System respectively.

Land 17 Ph 1C2—Future Artillery Ammunition

Post Gate 2 with IOC scheduled for FY20/21. Establishes a strategic second line of ammunition supply by introducing the Assegai family of ammunition. Assegai comes with increased range and capabilities. AFATDS will be modified to include Assegai data within the NABK. The data is generated through Australian proofing activities, which would be unachievable without the continued support of the RAA Regiments.

Land 17 Ph 2 - Next Generation DTCS

Going to Gate 2 IC in Nov 21. Diggerworks FITEX complete. User Evaluation (UE) 1A (ATAK) - complete. UE 1B & 1C across Q4 19 & Q1 20 will expand evaluation of ATAK with input from the complete user community in a simulated and FTX environment. UE for A-PASS are scheduled for 25-29 Nov 19 and 24-28 Feb 20.

Land 8110 - Future Artillery Ammunition Replacement

Going to Gate 0 IC in Dec 19. Four broad lines of effort have been determined:

- Precision strike
- Anti-armour
- Increased accuracy
- Emerging technology

Land 8113 - Long Range Fires

Going to Gate 0 IC in Mar 21. JF-A and US Precision Fires Rocket and Missile Systems (PFRMS) Project Office have developed a draft Project Arrangement which will enable Defence to assist in the co-development of a Precision Strike Missile (PrSM) baseline and Spiral 1. PrSM will replace the ageing Army Tactical Missile System. The draft Project Arrangement now sits with the Missiles and Space Program Executive Office for review, with an intention to formally sign the document early 2020. Im-

portantly, buying into the co-development of PrSM provides an option to acquire the missile in the future as part of L8113.

Separately, JF-A have remained closely engaged with DSTG and the US Aviation and Missiles Command (AvMC, part of Combat Capabilities Development Command). DSTG and AvMC will work collaboratively to progress the research and development of PrSM Spiral 2 and Spiral 3.

Land 136— Land Force Mortar Replacement

Post Gate 2 with IOC scheduled for Q2 FY19/20. Introduces a new 81mm Mortar and M321A1 Lightweight Handheld Mortar Ballistic Computer (LHMBC).

Land 8115—Mortar Ammunition

Going to Gate 2 IC in Aug 20. Four broad lines of effort have been determined:

- 60mm ammunition IIS
- 81mm ammunition fleet remediation
- Program arrangement for higher lethality 81mm round
- Domestic load assembled packaging for 81mm Prac and HE rounds

Land 19 7B - Short Range—GBAD

Post Gate 2 with IOC scheduled for Q4 FY22/23. PSI Contract signed with Raytheon Australia in Jun 19. Sub-system contract with CEA Technologies remains in negotiation. C-RAM Effector studies remain ongoing with a decision due back to Government NLT than 2022. CEA OPS radar scheduled for DT&E at Beecroft, NSW in Mar 20.

