AUSTRALIAN ARMOURED VEHICLE PROGRAMS to 2030

M1 ABRAMS MBT | COMBAT RECONNAISSANCE VEHICLE
INFANTRY FIGHTING VEHICLE | MANOEUVRE SUPPORT VEHICLE
LAND 8160 PH 1 | HAWKEI PMV-L | BUSHMASTER PMV-M
Foreword

The Australian Army is undergoing an unprecedented modernisation of its armoured vehicle fleets that will peak in the early 2020s and continue out to 2030. It will prove a time of step changes in capability.

The M1 Abrams main battle tank will remain the hardened core of the Army, with the Land 400 Combat Reconnaissance Vehicles and Infantry Fighting Vehicles breaking new ground in protection, lethality and networked capabilities. Armoured engineering vehicles will keep the fighting vehicles moving, while the world-class duo of Bushmaster and Hawkei protected mobility vehicles will provide the necessary combat and logistics support.

The modernisation is central to the Army’s Plan Beersheba restructure and will provide Government with a wider and more capable range of deployable land force options than ever before.

Main Battle Tank

Project: Land 907 Phase 2
Capability: M1 Abrams Main Battle Tank

59 vehicles

status: Activity is currently centred around Land 907 Phase 2 which seeks to maintain the capability edge of the Army’s M1 Abrams main battle tank (MBT) fleet through enhancements in knowledge, lethality, mobility, survivability and sustainability to its planned life-of-type of 2035.

Phase 1 of Land 907 procured a total of 59 M1A1 Abrams Integrated Management (AIM) Situational Awareness (SA) MBTs via the US Foreign Military Sales (FMS) program, with first deliveries in 2007. Seven M88A2 Heavy Equipment Recovery Combat Utility Lifting Extraction System (HERCULES) armoured recovery vehicles (ARV) were also acquired under this phase.

Several years ago the Army also purchased a small number of Tank Urban Survivability Kits (TUSK) for the M1A1 Abrams fleet to improve survivability in complex terrain. In early 2015, an Australian Government request for up to six additional M88A2
HERCULES ARVs was approved by the US State Department. Phase 2 will provide a series of upgrades to achieve integration of developing network enabled capability interface control systems; operator, supervisor, instructor and support training, training and simulation equipment, technical support, vehicle health and usage monitoring systems; capability enhancements such as a commander’s independent thermal viewer and training technology reviews.

With the M1A1 AIM SA tanks the last of the analogue Abrams variants and the US refresh production line for the M1A1 Abrams closed since 2010, the need to update to a more readily supportable and digital MBT capability is pressing.

In the almost 10 years that have passed since the M1A1 Abrams was accepted into service, the operational context within which the Army uses its MBTs has also evolved. The threat level against armour has changed and a definable shift back toward conventional combined arms ground combat is underway.

DTR understands that the likely way forward for Phase 2 is that Australia will follow the US Army’s tank modernisation/refresh lead and adopt the digital M1A2 SEP V2 (System Enhancement Package, Version 2) Abrams, which is currently the most advanced M1 Abrams variant in US service. Consideration will also be given to jumping straight to the latest M1A2 SEP V3, with the first initial production tanks due to be delivered to the US Army in 2017, whereupon acceptance testing will continue.

The option to run the legacy M1A1 Abrams fleet through a US upgrade to bring them to the M1A2 SEP V3 standard will be investigated but would be dependent on the level of work required and commercial viability considerations. The most simple solution may involve handing back the legacy tanks and purchase newly upgraded M1A2 SEP V3 Abrams as they come off the US lines. Should this prove to be the case, a Phase 2 acquisition will almost certainly take place via FMS, as would a buy of additional tanks to flesh out the numbers required under Plan Beersheba.

KEY FACTORS: Whilst the threat level a decade ago was able to justify a conventional armour pack for the then new Australian M1A1 Abrams fleet, developments in recent years may require a reassessment of protection for the upgraded MBT capability delivered under Phase 2. Even regionally, Indonesia and Singapore make use of advanced, highly lethal 120mm ammunition natures for their respective Leopard 2 MBT fleets. Defining the prevailing threat in Australia’s region of interest, therefore, will be key to the type and level of protection and what mix of capabilities the upgraded MBT capability will require.

Active protection systems (APS) are also likely to figure prominently as part of the MBT’s protection capability over the next 5 years as technology continues to mature. The US Army’s recent moves to install an APS on its armoured fighting vehicle triad of M1 Abrams, M2 Bradley and Stryker sooner rather than later has not gone unnoticed by Army.

Phase 2 Upgraded Tanks Entry into Service: Around 2025

The tender evaluation phase of Land 400 Phase 2 is now complete, with BAE Systems Australia and Rheinmetall Landsysteme selected on 28 July to proceed through to the Risk Mitigation Activity (RMA) phase. Second Pass Approval is scheduled for the second-quarter of 2018.

The two candidate Combat Reconnaissance Vehicle (CRV) designs are the AMV35 from BAE Systems and Rheinmetall’s Boxer CRV.

The Commonwealth signed RMA contracts with each tenderer on 19 August, with the first vehicle-related activities (lethality trials) to commence in September 2016; an AMV35 will undertake lethality trials in Sweden, whilst a Boxer CRV will undertake same in Germany.

Two AMV35s are now in Australia being worked up prior to Australian-based RMA trials commencing in November. The first Boxer CRV arrived in Australia in early August. This vehicle was equipped with a 35mm cannon, demonstrating the feasibility of integrating a weapon of that calibre into the Lance two-man turret.

Acquisition of a CRV is currently the highest priority for Land 400 due to obsolescence issues with the ASLAV 8x8 cavalry vehicle that constrain tactical employment and increase the cost of ownership. No upgrades are planned for the ASLAV fleet in the interim to ensure maintenance of a deployable combat reconnaissance capability prior to introduction into service of the CRV.
In contrast to the AMV35, the Boxer CRV is proposed with a two-round launcher for the Rafael Spike-LR ATGM mounted on the portside of the turret. The Boxer CRV is understood to meet the Phase 2 requirement for Level 6 KE protection and has a commensurately higher combat weight than AMV35: around 36 tonnes.

Images of the Boxer CRV which surfaced in July showed the vehicle fitted with Rheinmetall’s own version of an APS along the hull flanks, this being known as the Active Defence System.

Even without an integrated ATGM and APS, the Boxer CRV is understood to have a higher unit cost than the AMV35.

STATUS: With the selection of short-listed Phase 2 tenderers to proceed through to the Risk Mitigation Activity (RMA) achieved, industry responses to the Phase 3 Request for Information (RFI) are currently being analysed. Prior to this the RFI responses were quarantined so that there would be no suggestion of the Phase 3 RFI content having an influence on the outcome of Phase 2 tender evaluations.

The RFI responses will assist in the development of a realistic requirement and specification sets and options in preparation for presenting the Phase 3 business case for First Pass Approval in early 2018.

The acquisition strategy for Phase 3 is the same as for Phase 2, with six months to prepare tenders, another six months for tender evaluation followed by a 12-month trial. This would indicate Second Pass Approval around 2021 and first deliveries of vehicles to the School of Armour (initial materiel release) in 2024-2025 to commence train-the-trainer training.

The Phase 3 Infantry Fighting Vehicle (IFV) will begin replacing the M113AS4 armoured personnel carrier family of vehicles around 2025, continuing through to perhaps 2030. This process will allow for gradual retirement of the flat-bottomed M113AS4 as its ‘fit-for-purpose’ suitability continues to decay in the face of current and emerging threats that are becoming increasingly lethal and sophisticated. As such, the M113AS4 is not expected to be deployable for anything other than low intensity/low risk missions beyond 2025, according to Army.

Unlike Phase 2, Phase 3 of Land 400 will not pursue a military-off-the-shelf approach to acquisition, adopting instead a theme of robust technology with a growth path. The IFV will operate alongside the M1 Abrams main battle tank and therefore require equal mobility over difficult terrain. STANAG 4569 Level 6 KE protection will be a requirement. The IFV will be expected to engage in heavy close combat, destroy enemy forces, provide convoy protection, and conduct patrolling and quick reaction force security tasks.

Like Phase 2, the Phase 3 requirements are demanding, with the key discriminator between competing vehicles the ability to carry eight dismounts (equivalent to an infantry section) plus a crew of three. To date, the only likely Phase 3 IFV candidate design known to meet this requirement would be the prototype-stage Lynx KF 41 from Rheinmetall.

Unlike the Phase 2 Combat Reconnaissance Vehicle (CRV), an integrated ATGM is not a requirement for the IFV, although it remains an option. The lethality requirements for the projected 312 turreted IFVs are the same as that for the CRV.
The 85 non-turreted Specialist Support variants will be armed with a remote weapon system able to fire a M2QCB 12.7mm heavy machine gun, Mk 47 40mm automatic grenade launcher or MAG-58 7.62mm general support machine gun.

As an indication of which IFV manufacturers may lodge a tender, known respondents to the RFI early this year included the PSM joint venture between Krauss Maffei-Wegmann and Rheinmetall describing the Puma IFV now entering service with the German Army; General Dynamics Land Systems proposing the British Army’s Ajax tracked combat reconnaissance vehicle and a modified Ajax (ASCOD 2) fitted with the Kongsberg MCT-30 unmanned turret, Rheinmetall with the Lynx IFV family; and BAESystems putting forward the combat-proven CV9035.

KEY FACTORS: An 8-dismount IFV solution would enable a reduction in the total buy to perhaps around 350–375 vehicles. The option of a turret common to both the CRV and IFV and the significant savings that will bring in training alone is known to be attractive to the Commonwealth. It’s hard therefore not to see the Phase 3 outcome wedded to that for Phase 2, and a formal re-link of the two phases in due course would seem logical. As in Phase 2, proposed Australian industry capability will play a major part in selection.

**Manoeuvre Support Vehicle**

**Project: Land 400 Phase 3**  
**Capability: Manoeuvre Support Vehicle**

**STATUS:** The Manoeuvre Support Vehicle (MSV) is also to be acquired via Phase 3, with bidders required to offer an Infantry Fighting Vehicle (IFV) and an MSV in their tender responses. First Pass Approval is expected in early 2018.

Although small in number, the MSV is a new capability for Army and will provide a mounted and dismounted engineering effect in the indirect fire zone where the primary threat is from small arms only and artillery fragments. The requirement calls for vehicles with a range of capabilities including dozer, digger, crane, obstacle destruction, route marking, clearance of surface laid explosives and a fascine. Due to the requirement to doze and dig earth, the MSV will almost certainly be a tracked vehicle.

Prior to the standing up of Land 8160 Phase 1 (see next entry), the MSV was initially envisaged as being based on an armoured engineering vehicle (AEV) such as the Rheinmetall Kodiak. However, it is more likely the MSV will now be a specialised Phase 3 IFV hull with implements attached. This type of vehicle is represented by the BAESystems CV90 combat engineering vehicle, the most recent example of which is being introduced by Norway as part of its CV9030N upgrade.

As no manufacturer is currently building an MSV, Army is cognisant of not adopting an orphan fleet. The BAESystems Terrier combat engineering vehicle comes close to meeting the MSV specification but production has now ceased following fulfilment of the British Army’s 60-unit order.

Whilst a MSV based on the modified hull of the Phase 3 IFV may not meet the requirement in every area compared to a bespoke platform, it would have significant through-life support benefits and cost savings.

**KEY FACTORS:** An 80 per cent IFV-based MSV solution that is ‘good enough’ as opposed to a bespoke and highly specialised vehicle that meets 100 per cent of the requirement but that runs the risk of becoming unsupportable in 10 years may see endorsement of the former approach.

**Initial Operational Capability:** 2024-2025  
**Final Operational Capability:** late 2020s
Armoured Engineering Vehicles

**Project: Land 8160 Phase 1**
**Capability: Under Armour Breaching, Engineering & Bridging**

---

**STATUS:** The newest of the Army’s armoured vehicle procurement programs, Land 8160 Phase 1 is currently in the requirements definition stage. First Pass Approval is expected in early 2018.

Land 8160 Phase 1 seeks to acquire a mounted armoured engineering capability for use in the direct fire zone where combat mobility vehicles would operate alongside main battle tank (MBT) and the Land 400 combat vehicles at the forward edge of battle. As such, the vehicle variants comprising the armoured engineering capability will require high levels of protection against kinetic energy and blast threats that are close to that for the vehicles alongside which they will operate.

Land 8160 Phase 1 is a key enabler for the future M1 Abrams MBT capability and Land 400 fleets and will address current capability deficiencies in gap crossing, breaching of obstacle belts, mines, wire, roadblocks both in open terrain and in built-up areas.

The new armoured engineering capability will acquire three different support vehicles that deliver three effects:

**UNDER ARMOUR BREACHING:** the ability to breach, plough, doze, mechanically and explosively breach minefields and clear obstacles. This type of vehicle is represented in the new Assault Breacher Vehicle (ABV) being procured for the US Army and US Marine Corps (USMC). Based on the M1 Abrams M1A1 hull/chassis and combat proven in Afghanistan, the 63 tonne ABV provides in-strike breaching capabilities to armoured and manoeuvre forces. The ABV’s M1A1-equivalent protection levels allow it to rapidly go forward to the head of a column to clear the breach or obstacle and do so under fire.

**UNDER ARMOUR BRIDGING:** an armoured vehicle launched bridge (AVLB) to cross wet or dry gaps and ensure forward mobility when crossing the battlefield; gap crossing span has not yet been determined, with the range of gaps that might require bridging in the region currently being examined. A late-generation AVLB capability is the Joint Assault Bridge (JAB) to be built for the US Army and USMC. The JAB combines a Government-furnished M1A1 hull with M1A2 suspension, a launch mechanism and an MLC-85 rated, vertically-launched, scissors-type AVLB. The JAB can support vehicles of MBT weight and span gaps up to 18.3m wide.

In May 2016, DRaS (now DRs) awarded a US$31.8 million (AUD$42.2 million) initial production contract to deliver the first of up to 365 JABS for the US Army and USMC.

**UNDER ARMOUR ENGINEERING:** featuring a full-width blade for earth moving, excavator arm for digging and to pick up and move obstacles like car bodies out of the way. The US Army’s attempt to develop an M1 Abrams-based armoured engineering vehicle (AEV), known as Grizzly, was cancelled in 2001. Consequently at the time of Land 907 Phase 1 there was no tank-based AEV available for Australia to include in the package deal, although five tanks received detachable mine plough kits in September 2014.

Land 8160 Phase 1 seeks to procure a new fleet of vehicles that provide these effects and meet these capabilities. Around 20 of each vehicle type is understood to be required, with nine vehicles of each type allocated to each Multi Role Brigade, plus additional vehicles for training and attrition.

Land 8160 Phase 1 offers an opportunity for Australia to stay with the M1 Abrams family and procure combat support vehicles based on the M1 Abrams hull/chassis to fulfil project requirements. Therefore, the ABV and JAB and perhaps a modified ABV to create a heavy M1 Abrams-based AEV are early candidate solutions. This would enable the Army to have a common fleet of heavy chassis, some with gun turrets, others with specialisation breaching, engineering and bridging configurations, which would be logistically easier and cheaper to sustain than a smaller, bespoke fleet of heavy AEVs like the Leopard 2-based Kangaroo. Procurement would very likely be via FMS.

**KEY FACTORS:**

Adding the 60 Land 8160 Phase 1 vehicles to the additional tanks to be acquired to right-size the MBT fleet to account for the tank capability now being in three disparate locations under Plan Beersheba, the total number of common M1 Abrams hull/chassis in Australian service could be as many as 120-140 by 2025. In addition to widespread commonality benefits, this number of chassis should make an Australian-based long-term through-life sustainment plan more attractive for the original equipment manufacturer General Dynamics Land Systems.

---

**Bushmaster PMV-M**

**Project: Land 116 Phase 3 and other Capability:** Protected Mobility Vehicle - Medium

---

**STATUS:** The Bushmaster protected mobility vehicle - medium (PMV-M) is viewed as one of two vehicles in a protected mobility vehicle ‘system’ that will ensure Army can generate protected deployable options for Government if called upon.

In the land mobility domain, the Army is about to embark on a transformational change which will encompass all of the non-armoured fighting vehicle fleets in addition to Army’s watercraft and planned riverine capability. Modernisation of the Army’s medium and heavy truck fleets has already commenced via Land 121 Phase 3B, with the new trucks from Rheinmetall to continue to arrive into the mid-2020s, and the Land 121 Phase 4 Protected Mobility Vehicle – Light, the Thales Hawkei, which will enter into initial production trials in the second half of 2017.

Despite these two programs alone earmarked to deliver around 3,500 new high-mobility vehicles, the Bushmaster PMV-M will continue as the backbone of a digitally networked capability providing ground mobility, protection, communications and limited direct fire support to infantry, artillery engineers, signallers and logistics units to support Army’s mission profiles. Through Land 116 Phase 3 and various rapid acquisitions the Army has successfully introduced a number of significant modifications and mission kits to the vehicle over the last decade, such as a protected weapons station, Sparks mine roller and survivability enhancements. The latter have increased protection levels to create a vehicle that was designed initially for protected infantry lift into a platform that fulfils a range of bespoke roles on the battlefield. The current focus is on bringing these mission specific kits into service in the raise, train, sustain and operational environment.

Other areas of activity for Bushmaster PMV-M relate to ‘baselining’ the fleet to a common standard to assist with its management and through-life support and to gain efficiencies in areas such as the training of soldiers on like platforms and equipment. The second relates to fully realising the potential of this vehicle by assessing the complete range of variants that Army may be required to call upon to field on operations.

Army will commence scoping the replacement Bushmaster program in the early 2020s.

**KEY FACTORS:** The home-grown Bushmaster PMV-M has been attributed to saving 300 lives on operations and will continue as one of Army’s most deployable assets. Considered as one of the best vehicles in its class, the Bushmaster PMV-M will likely continue in service for at least another 15 years after which it will be upgraded or replaced based upon an assessment of the available technologies, threats and likely future mission profiles at the time.

---

**Life-of-type: to 2030**
**Replacement Program: early 2020s**

---

**Initial Operational Capability: 2024-2025**
**Final Operational Capability: 2026-2027**
Hawkei PMV-L

Project: Land 121 Phase 4
Capability: Protected Mobility Vehicle - Light
1,100 vehicles

STATUS: Land 121 Phase 4 has just entered the testing phase, with five pilot vehicles delivered to date for testing at the Moneggetta Proving Ground. All eight pilot vehicles are expected to be delivered by the end of September 2016.

Thales Australia was awarded a AUD$1.3 billion contract in early October 2015 for 1,100 Hawkei 4x4 Protected Mobility Vehicles – Light (PMV-L). The Hawkei PMV-L will replace around a third of the 1980's era Land Rover 110 Series 4x4 fleet, with pilot production of initial vehicle quantities having commenced in the first half of 2016 to coincide with the wind down in production of Bushmaster vehicles at Thales Australia’s Bendigo facility. The contract also involves delivery of 1,058 companion trailers.

The Hawkei PMV-L will be delivered in two principle variants to undertake command, liaison, utility and reconnaissance roles: a two-door single extended cab and four-door dual cab, each sharing the same base mobility platform. The four-door variant can accommodate up to four occupants, or up to two in the two-door version.

The testing of Hawkei PMV-L pilot vehicles currently underway by the Commonwealth and Thales Australia covers two key aspects. The first is reliability testing, which involves testing of the mission system – the vehicle and trailer as a whole – to ascertain overall reliability: This includes a reliability growth trial which accumulates mileage on the vehicles under different conditions. Secondly, developmental testing and evaluation which assesses all the individual functional performance aspects of the vehicle against the Land 121 Phase 4 requirements. These are individually tested in formal testing procedures to ensure that all the essential requirements are able to be met. Testing under Stage 1 of the contract will continue into 2017.

A user trial will also be conducted in the first quarter of 2017. This will involve Army being given a small number of vehicles to improve end user understanding of the platform. The outcomes of that trial have a technical focus and potentially identify what improvements or modifications may need to be incorporated into the low rate initial production (LRIP) vehicles. It will also go some way to informing introduction into service and use of the vehicle as Army develops its concept of employment for the Hawkei PMV-L.

A second user trial will be conducted towards the back end of LRIP. That will be a larger scale user trial and further inform how Army is to use the vehicle as a mission system in the tactical sense. User trials will likely be conducted in northern Australia at locations such as the Shoalwater Bay Training Area.

LRIP is due to commence in the second half of 2017, running through to mid-2018, with first LRIP vehicles delivered in late 2017. A brief transition period will then follow before full rate production begins. A total of 1,100 vehicles will be produced for Army, with these including the LRIP vehicles. The Army’s first battlegroup’s worth of Hawkei PMV-L will largely come from the LRIP build. There will be several build states for Hawkei PMV-L as Land 121 Phase 4 progresses.

Integration onto the vehicle of a manned weapon station that can accept the in-service M2QCB 12.7mm heavy machine gun, MAG-58 7.62 machine gun and the new Mk 47 40mm lightweight automatic grenade launcher is underway. A remote weapon system will also be amongst the suite of weapon systems to be integrated on the vehicle, although the manned weapon station will be more numerous.

KEY FACTORS: Given its onboard technology, increased protection and high operational and tactical mobility, the Hawkei PMV-L is a good deal more than a simple Land Rover replacement. As such, it is likely to figure prominently in the majority of Australian land force deployments across the mission and threat spectrum post-2020.

Initial Operational Capability: 2019
Final Operational Capability: 2023

KONGSBERG creates and delivers high technology solutions for people that operate under very challenging conditions – on the oceans, in the deep subsea, in defence, in space.