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Synopsis L121-4 Hawkei was envisaged as an ‘armoured Land Rover’ replacement. As the vehicle was developed it retained its ‘armoured support vehicle’ features, but grew ‘light armoured fighting vehicle’ features. While using the Hawkei as an ‘armoured support vehicle’ is reasonably understood, using it as a ‘light armoured fighting vehicle’ is breaking new ground. Breaking new ground has an impact on our intellectual capacity, operational plans, collective and individual training and Fundamental Inputs to Capability (FIC).

Hawkei is Coming, What can we do with it?

The Hawkei, a *protected mobility vehicle - light*, is being introduced into service. The vehicle is named after a highly venomous snake, the Barkly Death Adder – Acanthophis Hawkei – which is found in the Barkly Tablelands on the Northern Territory-Queensland border.

1100 vehicles and 1058 trailers will be procured and issued to units or elements of FORCOMD, 1st Division, SOCOMD and RAAF from 2020-2023. Hawkei comes in Two-Door (2DV) and Four-Door (4DV) variants. Each variant is able to tow purpose built trailers. The 2DV can seat two personnel, while the 4DV carries four. There are plans to build 465 2DVs and 635 4DVs.

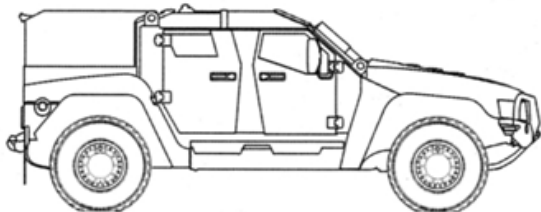


Figure 2: Four Door Variant (4DV)

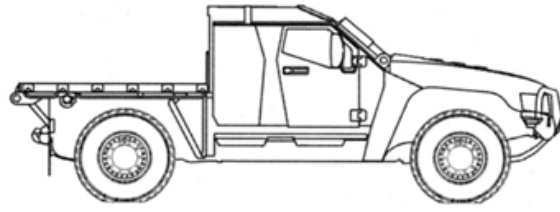


Figure 3: Two Door Variant (2DV)

Thales Australia designed, developed and will build the vehicles at their factory in Bendigo, Victoria. A trailer has been designed by Schutt Industries, but built by Thales at Eagle Farm, Queensland. Other trailers are also being developed to carry specialist equipment such as: satellite terminals, and radar or missile modules. The vehicles and trailers will be delivered to Damascus Barracks, Meeandah, Queensland for the Commonwealth to fit government-furnished equipment, before being issued to units. Once in the units, the vehicles will need to be ‘role configured’ from their ‘basic’ delivery configuration into ‘mission ready’ vehicles.

Hawkei can be maintained by military or civilian tradesmen, assisted by the vehicle Health and Usage Monitoring System (HUMS). Maintenance will be guided by the Interactive Electronic Technical Publications (IETP) held on board the integral computer system (ICS). With time, and in accordance with Army policy, maintenance is expected to become *conditions-based* rather than *schedule-based*. Initially, Hawkei will be maintained using a combination of civilian (contractor field support representative) and military personnel. Support and test equipment will be provided as part of the initial delivery of vehicles with parts sourced from either the supply chain or deployable ‘Fly Away Kits’ (FAK)¹. The FAK are only required until the supply system is finalised, which will occur towards the end of the first year of service. Once fully introduced, the Hawkei will be integrated into the

¹ FAKs are packages designed to hold critical spares and consumables to support either an operational viability periods or introduction into service where the logistic system is not yet finalised.

Bushmaster/Hawkei family of vehicles' servicing, maintenance and support system; managed by the Protected Mobility Vehicle fleet manager².

Hawkei was originally envisaged, as an *armoured Land Rover*³, to replace about a third of the Land Rover fleet. As with the Land Rover, Hawkei comes with an accompanying trailer. The vehicle was expected to fill four roles: *command*, *reconnaissance*, *liaison* and *utility* (logistics).⁴ The design priorities for Hawkei were, in order of criticality: protection, mobility, situational awareness, lethality and logistics. The original design priorities led to a Hawkei that has a well-protected 'crew citadel' with a layered armour system, while the remainder of the vehicle is left unprotected. The armour was heavily influenced by a desire to lift⁵ the Hawkei under a CH-47 Chinook. The vehicle has been 'weaponised' and can carry small calibre machine guns and automatic grenade launchers in a manned weapon mount (MWM), but lethality⁶ is, strangely, a sub-set of 'useability'. Changes in the direction of the design now require the introduction of a remote weapon station (RWS) on some⁷ vehicles which brings the possibility of carrying light automatic cannons or guided missiles or both⁸. To support situational awareness, an ICS is fitted. The ICS provides for the integration of battle management, fire control and RWS sensor images into the common displays. A key innovation has been the development of a power system that can provide power to 'attachments' or support 'silent watch'. The power system substantially exceeds the 2 hours at 2kW power drain requirement. The vehicle with Li-Ion batteries can 'silent watch' for 9-15⁹ hours at the heaviest loads.

Through the design and development process, Hawkei has emerged as a world-class multi-purpose, *weaponised*, role-configurable and digitised vehicle.¹⁰ A *weaponised*, Hawkei could be classified as an *armoured Land Rover* or generically as an *armoured support vehicle* capable of only self-defence¹¹. However, if the capability manager (Chief of Army) exploits the protection and mobility of Hawkei, coupled with the offensive use of the weapons on a RWS; we can create a *light armoured fighting vehicle*.¹² Employing the full technical, procedural and human dimensions¹³ of Hawkei as a *light armoured fighting vehicle* is

² The Fleet is managed by the Capability Acquisition and Sustainment Group (CASG).

³ Armour became important due to studies indicating that logistic and support vehicles were vulnerable to 'off-route' mines, mines, bombs and rifle or rocket fire while employed in disaggregated battlespaces. The term - protected mobility vehicle – light (PMV-L) was selected as a part of the mandatory 'non-solutionness' way of describing an '*armoured Land Rover*'.

⁴ In these roles Hawkei aligns with current operational concept document (OCD), troop views and doctrine. The OCD is 10 years old and in need of an update if we are to harness the potential built into Hawkei.

⁵ To date, Hawkei is not yet certified for CH47 lift, due to weight, and flight characteristics. Work continues to try to meet the objective.

⁶ 'Lethality' or 'weapons systems' requirements are contained within 'useability' section of the functional performance specification.

⁷ The number is driven by how many we can afford, not the number we need. We don't know how many we need.

⁸ EOS R400 variants can simultaneously carry a 30mm autocannon, 7.62mm machine gun and a guide missile.

⁹ Briefed to the AUS-USA Li-Ion Battery working group by the DAAR, S. Long on 21 Jul 20.

¹⁰ There is resistance to calling Hawkei an 'armoured car', even though Hawkei has the characteristics of, and could be used similarly to the traditional role of an 'Armoured Car'. In Australia, the *Staghound* was an armoured car which serviced from 1943 well into the 1970s. A military armoured car is a lightweight wheeled armoured fighting vehicle, historically employed for reconnaissance, liaison, internal security, rear area security, escort, peacekeeping and other tasks. Armoured cars are popular due to their speed; stealth, due to their size; comparatively simple maintenance and low production cost. They were also favoured by armies as a cheap system for use in under developed regions against lightly armed insurgents.

¹¹ Land 121-4 (Hawkei) Operational Concept Document (OCD) of 23 Aug 2011.

¹² As this article progresses it should be noted that some of the additional weapons and other capability enhancements discussed are not planned/approved/funded; but are ideas for consideration.

¹³ Standardised use of Interoperability Lexicon – Plan AURORA.

important. Fully utilising the lethality of Hawkei is important since it increases the range of options available to planners, increases the probability of achieving a *relative advantage*¹⁴ to defeating a targeted adversary and helps to bring the troops home safely.



Figure 1: Hawkei as an Armoured Support Vehicle and Light Armoured Fighting Vehicle from its ancestor the Land Rover

With initial material release in March 2020, Hawkei joins Bushmaster and the Rheinmetall-MAN protected trucks to create a *protected mobility combat system*¹⁵. This *5th generation system*¹⁶ will for the first time, provide protection from blast, fragments and projectiles to all our *ready now* and operational deployed troops, while offering significant striking ability. As a result, Hawkei now straddles two vehicle domains: one, as an *armoured support vehicle* and the other, as a *light armoured fighting vehicle*.

The conflicting requirements between *support* and *fighting* vehicles became apparent when the roles of each seat were considered. To support Hawkei's employment as a *support vehicle* it was expected that a driver and co-driver would operate the vehicle as a team. The initial 4DV crewing concept believed only the two rear passengers would make use of the computer system. And developers expected the rear passengers to be a commander or an operations officer and an assistant. The pair would conduct task group command, control, and coordination or prepare for a liaison visit.

Unfortunately, during the extended design and development phases, dispersed and disaggregated operating environments became the norm. The shifting norm requires one of the rear passengers to become the gunner. The initial view underestimated the criticality of the gunner and crew commander functions¹⁷, especially in a contested or non-permissive environment. So, as a minimum, a Hawkei will be manned by two personnel; but when weaponised a third person, acting as the gunner is required, leaving just one seat that isn't

¹⁴ The concept of *relative advantage* was developed by CAPT W.H. McRaven (a SEAL) (ret'd as ADM McRaven) in the early 1990s.

¹⁵ The preferred term would be 'light armoured combat system', but 'correctness gets in the way. So too the following from Sovereign Industry Capability Priority Implementation Plan - combat vehicles – vehicles operated in sustained close combat and designed to generate warfighting advantage through lethality and protection systems. And protected vehicles – vehicles designed to enable the safe movement of personnel and/or equipment through a conflict environment, however, not designed for sustained close combat.

¹⁶ RAN and RAAF have both used the term 5th Generation to describe the systems Plan JERICHO and MECATOR are providing. Hawkei, Bushmaster and the armoured truck represent the 1st modern connected, protected, lethal and enabled deployable land force that will operate with 5G RAN & RAAF.

¹⁷ The under estimation also saw the crew requirement drop from five to four around 30 May 2014.

needed to control or fight the vehicle. The 4DV crew seating configuration in dispersed and disaggregated environments begins to look as follows:

<p>Left front seat Vehicle commander Note: The vehicle is commanded from the left front seat when on task or the co-driver occupies this position.</p>	<p>Right front seat Driver Note: The driver will be the junior member of the crew. With ‘classified’ drives fitted, at least one person will always need to be with the vehicle.</p>
<p>Left rear seat Spare Note: The spare seat is used by a specialist mission systems operator, passenger, or task group commander.</p>	<p>Right rear seat Gunner Note: The gunner operates the weapon in the MWM or becomes the RWS operator when the RWS is fitted.</p>
<p>Note: Depending on the method of controlling the RWS, the gunner’s seat may need to be on the left.</p>	

Figure 4: Four-Door seating plan

For the 2DV the crew assume the following roles:

<p>Left front seat Vehicle commander Note: The vehicle is commanded from the left front when on task or the co-driver sits in this position.</p>	<p>Right front seat Driver</p>
<p>Note: For the 2DV, the main issues seems to be, how much or often will the battle management system be used.</p>	

Figure 5: Two-Door seating plan

The Army and Project Office have yet to determine the full *operational envelope* of Hawkei, nor has a *statement of operating intent* been developed; since there is a fixation on achieving delivery targets. The multi-purpose design created the potential for under exploitation, due to a common belief that - ‘the operators would figure it out’. However, leaving the design and operational choices to the operator, when the project is nearly complete and development budgets nearly spent – secedes responsibility and will cost more in terms of time, blood and treasure. Or ignoring the potential of Hawkei as *light armoured fighting vehicle* increases the probability of casualties and wastes the investment already made. There is an opportunity now to develop increased capability for the same cost. The challenge is to capitalise on the Hawkei’s full potential across the fundamental inputs to capability (FIC) in all operational scenarios before full operational capability is achieved in 2023.

As an *armoured support vehicle* Hawkei meets general Army capability objectives. But, Hawkei can meet more than general objectives of creating connected, protected, lethal and enabled systems suitable for dispersed and disaggregated operating environments. The identification of the new (or emergent) *light armoured fighting vehicle* characteristics of the system, leads to both opportunities and challenges. The sections below will briefly discuss Hawkei as an *armoured support vehicle*, then discuss in more detail the emergent combat power opportunities inherent when Hawkei is configured as a *light armoured fighting vehicle*.

USE OF THE HAWKEI

Current role - Armoured Support Vehicle. In its *armoured Land Rover* or *armoured support vehicle* configuration, Hawkei can be used for command, control, coordination, liaison and logistics; while its reconnaissance capacity has reduced by some of the design decisions. Due to emergent properties, specialist team and transporter functions have been added to this category. The range of *armoured support vehicle* functions are:

- **Command, Control, Coordination and Liaison.** Headquarters elements can use the Hawkei to command subordinate elements, enable liaison or visits to military elements or civilian leaders, control supporting systems and apply targeted effects. The compact size

of Hawkei makes it suitable for convoy command and control, advance party or step-up tasks. While it is possible for Hawkei to transport small headquarters cells, this should generally be done in a Bushmaster.

- **Reconnaissance.** The Hawkei system is suitable for engineer, artillery, headquarters, logistics and other specialist reconnaissance tasks. But, the Hawkei is not well suited to act as a carrier for combat reconnaissance elements due to its loud aural signature, limited vision from the cab and lack of sensors. Additionally, without adequate sensors¹⁸, warners, and automatic screening systems, Hawkei secedes *relative advantage* and becomes vulnerable to a surprise strike by weapons, such as laser guided munitions or systems using laser range finders. Once sensor and targeting pods are fitted, to armed and jammer protected Hawkei, it would be a significant combat multiplier. Or if combined with Boxer¹⁹ it would provide a compact reconnaissance, surveillance and watch system, able to go where Boxer might not.
- **Logistic.** Logistics elements can use the 2DV to deliver small quantities of stores and equipment where larger vehicles are considered unsuitable. The stores can be in the form of palletised, loose general cargo or in specialist modules with a payload of approximately 1 500 kg. The 2DV flatbed tray has integrated twist-locks to secure a TRICON container. These logistics vehicles could also be configured as ammunition transporters to support weapon carrier vehicles.
- **Specialist Team.** Hawkei can be utilised by specialist teams able to make use of the vehicle or its subsystems, such as: radio re-transmission, unmanned system, forward repair teams, ‘street view’/radio-electronic sniffer²⁰ or military dog detachments. At the time of writing, specialist modules or modifications for these roles have not been designed.
- **Air and missile defence transporter.** As the L19-7B National/Norwegian Advanced Surface to Air Missile System (NASAMS) is introduced into service, Hawkei will be employed in the battlespace with elements of the integrated air and missile defence system fitted to the rear of the 2DV or towed by the 4DV. However, an apportionment review will need to ensure all personnel are protected when the systems are ready to fire.²¹
- **Satellite terminal transporter.** JP2072 is delivering Mobile Satellite Terminals (MST) as a purpose designed trailer, which is only towable by either a 4DV or 2DV. Selected Army and RAAF communications elements will be issued Hawkei and MSTs.

Proposed New Role – ‘Light Armoured Fighting Vehicle’. Developing the proposed new role as a *light armoured fighting vehicle* requires further evolution of the RWS to carry a combination of cannon, missiles, machine guns, automatic grenade launchers and sensors in order to *weapon and sensorise* Hawkei. In effect, Hawkei becomes a modern *light armoured fighting vehicle* that can be used offensively or defensively. As a *fighting vehicle*, Hawkei can provide armed reconnaissance, fires, and protection to headquarters, infantry, artillery, engineer, signals and logistic units. Furthermore, Hawkei provides operational and strategic

¹⁸ An example is the lack of Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) sensors making Hawkei unsuitable for CBRNE reconnaissance.

¹⁹ In Australian service the 211 Rheinmetall Boxers are classified as a Combat Reconnaissance Vehicles.

²⁰ This would be akin to Googles ‘street view’ system of imagery and wi-fi signal collection system, but for military purposes.

²¹ Personnel cannot remain in close proximity to the vehicle when firing occurs.

strike potential when air transported or parachuted²². In effect, the early design decisions drove Hawkei to straddle two previously separate roles; that subsequently leads to interoperability in the ‘close fight’ with the future L400 armoured fighting system.

A key issue will certainly be where are the vehicles coming from to dedicate to the *light armoured fighting vehicle* role? And where will those vehicles be held? At final material release in December 2021 we will have 635 4DV, which equates to 42 Keogh Combat Teams (KCT) or 14 Keogh Battle Groups (KBG)²³ worth of Hawkei. Given we only need to generate three *ready now* KBGs, means that we have a large number of 4DV which could be dedicated as *light armoured fighting vehicle* and they would be available for assignment to a KBG either formally or on request. As for their place in unit establishments – initial views indicate that armoured/cavalry units, Reserves earmarked for security duties²⁴ or the support companies of the infantry would be best placed to accept *fighting Hawkei*, and that logistics battalions may benefit from *escort companies*, but the answer needs further analysis.



Figure 6: Hawkei as a ‘Light Armoured Fighting System’

Accepting the emergent *light armoured fighting vehicle* characteristics of Hawkei leads to the following general configurations:

- **Weapons carrier.** When Hawkei is fitted with 7.62mm or 12.7mm machine guns or a 40mm automatic grenade launcher in a MWM or RWS, it functions as a weapons carrier to provide attack-by-fire (ABF) or support-by-fire (SBF) to other elements²⁵. If fitted with the EOS R400S²⁶ or equivalent, a future weapons growth path could include a 30mm auto-cannon, anti-tank guided missile and a light machine gun. These would provide utility against armoured vehicles, ‘technicals’²⁷ defenders in improvised fortification and

²² Hawkei is not currently certified for paratroop, however, initial investigation indicate that with modernised equipment it will be possible.

²³ The OCD only required vehicles for 10 BG. The KCT and KBG acts as an ‘indicative task group’ for planning purposes. Traditionally, we have a propensity for ad hoc task organisation for each mission, which in this case means we have sufficient Hawkei to dedicate to a new role. A review is planned to refine the final basis of issue by the end of 2020.

²⁴ Each Reserve battle group aligned with a regular brigade could be equipped with Hawkei as a dedicated rear area security force.

²⁵ The key to ABF/SBF is the number of stowed ranging and killing burst available in the ready ammunition containers or carried on the vehicle. Calibre selection and engagement area development will require an understanding of the number of threats that can simultaneously present themselves and how fast they can be detected and destroyed (engaged).

²⁶ Procurement of additional RWS (variants to be selected) by Defence is occurring as part of an industry stimulus package.

²⁷ ‘Technical’ refers to a civilian vehicle which has been fitted with mounted weapons and possibly light armour. It is a light improvised fighting vehicle or a non-standard tactical vehicle (NSTV). Typically they are an open-backed civilian pickup truck or four-wheel drive vehicle mounting a machine gun, anti-aircraft gun, rotary

personnel in the open. The 4DV, if used as a *weapons carrier* would need to be supported by 2DV *ammunition carriers* and would greatly benefit from close cooperation with sensor packed drones. Stand-off and defilade firing positions are important, since Hawkei's engine is not well protected. The transfer of ammunition will need to be conducted away from direct fire threats and with the necessary consideration of any indirect fire. Elements of conventional support²⁸ companies could potentially be replaced with Hawkei mounted systems.

- **Escort.** When fitted with manned or remote controlled weapons and jammers the 4DV Hawkei provides a compact system that can act as an *escort* or *gun vehicle*²⁹ for convoys, liaison visits, delivery of supplies and specialist reconnaissance activities. The advent of a non-linear, dispersed and disaggregated battlespace has meant that even the shortest movement outside defended localities require armour, jammers and weapons; which can't always be fitted to a single vehicle. As a result, the development of agile and powerful *escorts* based on vehicles such as Hawkei is becoming the norm³⁰. The advent of *specialist escorts* has organisational and training implications.
- **Fire control vehicle.** A 4DV fitted with digital terminal control system (DTCS) supports Joint Fire Teams (JFT) and potentially Battery Tactical Parties³¹. Present configurations of Hawkei are not engineered to support JFTs fighting whilst under armour. The vehicle provides protected mobility for a JFT and a platform for the ad hoc rigging of their systems on the roof or manned weapon mount, while using the DCTS from their seat. DTCS is available on the platform ICS, which allows the JFT to maintain situational awareness and receive updates, while moving, through the vehicle's radios. The manpack DTCS is synchronised with the vehicle ICS via a 'sync-cable' when connected on occupying the vehicle and is updated via the ICS when the JFT is preparing to leave. The 4DV allows for a driver and three-man JFT, which means a JFT will usually need to be equipped with two vehicles. Future versions of AFATDS will be available on the ICS, enabling the vehicles to be used by fires command elements to provide command, planning, control and coordination of fire-missions and fire units from inside a Hawkei.

Realising the value of Hawkei as a *light armoured fighting vehicle* has a significant operational impact. Hawkei can easily be envisaged as critical to shaping, entry, decisive and transition actions. Operationally, Hawkei is suitable for amphibious, airborne and land operations. With a shift to targeting³² over manoeuvre, as a key strategic driver to change threat behaviour, the Hawkei supports compression of 'kill chains'³³ by bringing protected small calibre, but powerful, weapons closer to a fight; increasing speed and quality of decisions through the networked battle and fires management systems and improving organic logistics velocity to the smallest tactical teams.

cannon, anti-tank weapon, anti-tank gun, ATGM, mortar, multiple rocket launcher, recoilless rifle or other support weapon, somewhat like a light military gun truck or potentially even a self-propelled gun if the needed weapon is placed.

²⁸ It is possible to procure automatic mortar, small diameter rocket as well as laser or radio weapons pods for either the 4DV or 2DV. Vehicle mounted systems would dramatically reduce the team sizes; eg a mortar crew could be three men.

²⁹ Based on Army convoy doctrine at DN2-2013 B Vehicle Tactical Mobility Considerations and Procedures.

³⁰ Globally, almost every army is equipped with 'armoured cars' with a range of weapons, jammers and armour.

³¹ At this stage, AFTADS will not be loaded and so battery tactical parties will not initially be supported.

³² 'Targeting' is now the guiding concept for fires, air, special forces, information and cyber actions. Manoeuvre is the one system out of step with modern trends. 'Changing behaviour' is a modernisation of the Clausewitzian 'compel to comply with our will'. In this military epoch – targeting is economic, ethical, effective and efficient.

³³ *Kill Chains* and targeting rely on: understanding the threat, determining an intent, selecting a tactic and issuing treatment tasks.



Figure 7: Hawkei, Bushmaster and Armoured Trucks.
'Light Armoured Fighting System'

Air and sea projected Hawkei, Bushmasters and protected Heavy/Medium Rheinmetall-MAN trucks combined with sea or air stand-off weapons provides a significant *relative advantage*, and a dilemma to adversaries, across our primary operating area; which will be even more concerning to any adversary once L400 systems arrive. However, until CH-47F or CH-53K³⁴ helicopter lift of Hawkei is certified, operationally significant air mobile operations to deliver, displace or recover Hawkei will not be possible.³⁵

Deployments will generally follow a simple mission profile of: concentration, preparation, projection, insertion, infiltration, actions in a target area, exfiltration, extraction and reconstitution. While each activity is important this article will focus on 'actions in a target area'. The following vignettes help to understand the role of Hawkei as it is used in 'actions in a target area'.

Combined Arms team - Close combat. While the L400 vehicles will comprise our primary *close combat force*, a force that contains a combination of Hawkei, Bushmaster and armoured trucks also offers close combat advantages – especially due to their air portability. Integrating with towed artillery and unmanned aerial systems, they provide the most deployable and employable ground force that the ADF can currently generate. This force can be relatively easily projected within Australia or into the near region, using service/national air and sea transports. In addition to a *projection advantage*, the lighter force has a *manoeuvre advantage* in a broad range of climatic zones and terrain types. The force can also operate effectively against the expected Tier 1-2³⁶ threats using its mobility, protection, digital and fires advantage³⁷. Force application using the projected *light armoured force* requires an emphasis on quick decisions, quick movement, effective use of micro-terrain and concentrated surprise strikes at the longest possible stand-off ranges. Should operations require an emphasis on infantry in close combat, then they will be able to be brought near to the *close fight* in protected vehicles and supported during break-ins by intimate protected fires. The combination is a particularly useful operational tool when overwatch, counter-attacks, blocking or security actions are required for non-combatant evacuation operations (NEO), security assistance or stability operations (SASO) or joint land combat (JLC) operations. For the greatest effect the force needs to emphasise attack-by-fire, support-by-fire, ambush and mobile defence over positional techniques, in imitation of the German technique of being operationally offensive and tactically defensive.

Vital asset protection/defence. Airfields, operating bases, ports and other important infrastructure or some natural features are important key points to modern forces; consequently they require close protection/defence. Success is reliant on the close teaming between intelligence and combat systems. On the ground, *fighting* and *support* variants of

³⁴ Operationally, a CH-53K can transport a JLTV plus two tonnes of other supplies over a distance of 110 nautical miles (204 km), which the CH-47D Chinook is unable to achieve.

³⁵ Work continues in order to meet this objective.

³⁶ Defined in Defence Planning Guidance.

³⁷ They can serve as mobile fire support platforms that not only attack-by-fire, but also maneuver to deliver suppression in support of dismounted troops and cut off lines of retreat.

Hawkei combine with personnel carrying and command Bushmasters to form the core of the ground combat elements tasked to protect assets, infrastructure and personnel against attack, observation, sabotage or espionage. Small 4–6 man teams with unmanned sensors and or drones shaped by intelligence analysis, attempt to find and fix threats in the zone immediately beyond a perimeter fence. Other Hawkei and Bushmaster elements stationed on high-alert are combined into *strike forces* to counter any identified threats through the application of fire rather than assault, using the overmatch of their direct and indirect fire weapons. Beyond the *close-defence zone*, integrated search and destroy Hawkei, Bushmasters and manned/unmanned aircraft operate together to conduct sweeps, patrols, ambushes and check points to cover the most likely avenues of approach, while adding defensive depth to further restrict an adversary's access to the key points.

Rear area security³⁸. In the rear area, an adversary is expected to carry out observation, sabotage, infiltration, assaults, indirect strikes, mining, and psychological actions. A rear area security force will need to be created. That force will be confronted with a combination of large and small forces threatening disaggregated concentrations or movements. While Australian armoured combat doctrine does not distinguish between operations in the spaces between key nodes and operations in a *combat-contact zone*, the distinction is useful in highlighting the difference and value of both light and heavy armoured forces. Doctrinally, preventing disruption is accomplished through observation and patrolling with heavy reliance on a strong reserve³⁹. Against a large enemy force, delay and disruption are emphasised while against a small enemy force identification, interception and destruction by fire are expected. Where possible, destruction by fire should be based on movement of weapons to permit *defensive application of fire* in developed engagement areas. Much like in vital asset protection/defence, Hawkei and Bushmaster provide the core of task organised teams for both roving and high-alert strike or reserve forces to find, fix or finish identified threats before resetting⁴⁰.

Convoy protection. The road movement of troops, stores, supplies and equipment during disaggregated operations will usually be done as a convoy, which will require a degree of protection. Protecting convoys will shift from a solely logistics problem to a combined intelligence, combat and logistic problem. Hawkei offers the *convoy protection group* a vehicle that can be used in advance, flank and rear guards, and close protection. A vehicle acting in the *close protection* role is traditionally referred to as an *escort vehicle*. Hawkei could become an excellent '*escort vehicle*', able to provide direct and indirect fires, mobile jamming, and reconnaissance functions all in one system. Combined with Bushmaster to provide lift to convoy command, troop, engineer and medical elements, convoys can now be provided with a *balanced protection group*. Ideally the group should not be drawn from the combat elements, but should be a dedicated task-organised team⁴¹. The combination of Hawkei and Bushmaster allows the armoured trucks to be closed down and able to concentrate on moving the convoy's cargo. As an escort to *convoys* and *packets*, Hawkei should be fitted with overmatching weapons and jammers and fought as a *light armoured fighting vehicle*, engaging at the longest practical range, with maximum surprise. With Hawkei offering a vehicle combining both weapons and jammers, the need for separate fire

³⁸ LWD 3-0 Operations. While we talk of dispersed and disaggregated mission space, lesser important or priority areas will still exist.

³⁹ A perfect role for a Hawkei in its light armoured fight vehicle guise.

⁴⁰ Cavalry doctrine uses the mnemonic FFAR (Find, Fix, Attack and Reset): F = Find the threat needs to be actively sought out; F = Fix the threat needs to be contained for sufficient time to enable action to be taken against it. This might require an adjustment to the force deployment; A = Attack the threat needs to be attacked and destroyed, or rendered incapable of any further action; and R = Reset or re-orientate the force in order to detect subsequent or additional threats.

⁴¹ Potentially embedded in a logistics unit's establishment or new dedicated escort/protection units.

support and electronic countermeasures vehicles is removed, reducing establishments. Additionally, Hawkei also provides utility for small groups conducting route reconnaissance, and for Military Police teams conducting traffic control and checkpoints.

Since little work has been conducted to understand the operating envelope of Hawkei or the *protected mobility combat system* the above is but an initial estimate of the potential of the system. Consideration is already occurring to increase the impact of our *ready forces* through the *protected mobility integration and capability assurance program (PMICA)*, which will baseline and then deliver an optimised system, initially by combat team and eventually in task group lots. The development process will also need to consider inclusion of long-range guided weapons, light air defence weapons, anti-UAS systems, rockets or semi-automatic small calibre mortars to take advantage of the unique capacity of digitisation and the highly sophisticated adversary we may soon face. Digitisation allows these forces to quickly find and fix targets, provide strike guidance and exploit success. Additionally, protecting the vulnerable elements and fitting a sophisticated sensor package is also being considered. All of this work will require both formal and informal, theoretical and practical test and evaluation.

In conclusion, our troops will find that the Hawkei is a versatile vehicle designed for operations in the 21st century. While Hawkei was originally envisaged as an *armoured Land Rover*, it now straddles two vehicle domains: one as an *armoured support vehicle* and the other as a *light armoured fighting vehicle* with sufficient vehicles to accommodate a new role. Critically, Hawkei is joining Bushmaster and the protected trucks in a family of *protected mobility combat vehicles* to provide troop protection while offering significant striking ability.

The emergent challenges faced in the mission space and the effects of new technology emphasise the need to be able to operate in a non-linear, distributed and disaggregated battlespace. The incorporation of an integrated computer system, threat optimised armour and countermeasures, and a range of manned or remote weapon systems supports the ability to compress kill chains, improve the speed and quality of commander's decisions and increase logistics velocity to support more decisive engagement, significantly increases operational options.

The 4DV can be used for command, control, liaison, fighting and or escort roles. The 2DV can be used for logistics roles or as the basis for air/missile defence, communications or weapons modules. Some indicative tasks are: leader transport; military/civilian liaison; direct/indirect fires; air/missile defence; specialist reconnaissance; rear area security; and convoy control and escort.

Hawkei, Bushmaster and armoured trucks provide the core air/sea projectable land control system which will be augmented when L400 arrives. For the foreseeable future, Hawkei equipped forces will have a *relative advantage* which we should grasp as we prepare plans to conduct operations to shape, deter and respond to threats to Australia.



Figure 8: PMICA modified Hawkei, Bushmaster and Armoured Trucks.

Bibliography

Land OCD of 2019
PMICA UR v1.4 of 14 Sep 18
Land 121-4 OCD of 23 Aug 2011
Land 121-4 FPS of 8 May 2014
Land 121-4 TCD of 16 Nov 2011
Land 121-4 TEMP v5.0 of Jan 18
Land 121-4 MAA v4.2 of 12 Mar 20

Doctrine

ADDP-D Foundation of Australian Military Doctrine
ADDP 06.4 Laws of Armed Conflict
ADDP 3.0 Campaigning and Operations (AL1) 2013
ADDP 3.1 Joint Fires 2018
ADDP 3.14 Targeting 2018
ADP 3.13 Information Activities 2013
Australian Contingency Context Scenarios (ACCS)
LWD 1 Fundamentals of Land Power
LWD 3-0 Operations
LWD 3-0-1 Counterinsurgency
LWD 3-0-3 Formation Tactics: Interim
LWD 3-0-4 Stability Actions
LWD 3-3-4 Employment of Armour
LWD 3-3-7 Employment of Infantry
LWD 3-4-1 Employment of Artillery
LWD 4-3 Transport Support
DN-1-2014 Concept for Employment a Army's Combat Brigade
DN2-2013 B Vehicle Tactical Mobility Considerations and Procedures
DN 1-2019 Improvised Explosive Devices
SOVEREIGN INDUSTRIAL CAPABILITY PRIORITY IMPLEMENTATION PLAN Land combat and protected vehicles and technology upgrades – August 2020
<https://www.defence.gov.au/SPI/Industry/CapabilityPlan/Docs/Land-Combat-and-Protected-Vehicles-Implementation-Plan.pdf>

USA

FMFRP12-11 German Tactical Doctrine of 13 Apr 1989

German

Heeresdruckvorschrift 300 'Truppenführung': Part 1, (1933), and Part 2 (1934).

Books

Hannah Beech, "China's Sea Control Is a Done Deal, 'Short of War With the U.S.,'" *New York Times*, September 20, 2018, <https://www.nytimes.com/2018/09/20/world/asia/south-china-sea-navy.html>

Georg Bruchmuller, 2nd Ed, *The German Artillery in the Break Through Battles of the World War*, E.S. Mittler und Sohn, Berlin, 1922

James Corum, *Roots of Blitzkrieg: Hans von Seeckt and German Military Reform*; University Press of Kansas 1992

William S. Lind, *Maneuver Warfare Handbook*, Westview Press 1985

Michael Mazarr, *Mastering the Gray Zone: Understanding a Changing Era of Conflict* (Carlisle, PA: United States Army War College Press, 2015), <https://ssi.armywarcollege.edu/pubs/display.cfm?pubID=1303>

William, H., McRaven, (1993) *The Theory Of Special Operations*. <https://calhoun.nps.edu/handle/10945/14838>

Linda Robinson et al., *Modern Political Warfare: Current Practices and Possible Responses* (Santa Monica, CA RAND, 2018), https://www.rand.org/content/dam/rand/pubs/research_reports/RR1700/RR1772/RAND_RR1772.pdf

Timothy L. Thomas, *Russia, Military Strategy, Impacting 21st Century reform and Geopolitics*, (FMSO Fort Leavenworth, KS 2015

Articles

“Sharp Power: Rising Authoritarian Influence,” National Endowment for Democracy, December 5, 2017, <https://www.ned.org/sharp-power-rising-authoritarian-influence-forum-report/>

[https://en.wikipedia.org/wiki/Toyota_War#:~:text=Toyota%20War%201%20Background.%20During%20the%20period%20between,the%20encouraged%20Chadians%20carried%20their%20offensive%20into%20https://en.wikipedia.org/wiki/Armored_car_\(military\)](https://en.wikipedia.org/wiki/Toyota_War#:~:text=Toyota%20War%201%20Background.%20During%20the%20period%20between,the%20encouraged%20Chadians%20carried%20their%20offensive%20into%20https://en.wikipedia.org/wiki/Armored_car_(military))

[https://en.wikipedia.org/wiki/Technical_\(vehicle\)](https://en.wikipedia.org/wiki/Technical_(vehicle))

Basan, T., 2019, *A New Approach to Collective Training - Lessons Drawn from Sport and Music* <https://cove.army.gov.au/article/new-approach-collective-training-lessons-drawn-sport-and-music>

Basan, T., 2019, *Time for a new approach to war? A case for adopting the Kill Chain concept* <https://cove.army.gov.au/article/time-new-approach-war-case-adopting-the-kill-chain-concept>

Basan, T., 1998, Airborne forces: the twenty-first century’s rapid dominance solution, pg 35-40, FADFJ Issue 133 Nov/Dec 1998

<https://www.thefreelibrary.com/Tactics+and+operations+in+the+mexican+drug+war.-a0278773923>

https://en.wikipedia.org/wiki/Google_Street_View

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