



BRIEFING PAPER

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Modernising the Army's armoured fighting vehicles

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Summary

The Army's armoured vehicles fleet is to be refreshed. The Ministry of Defence has all but decided on a new mechanised infantry vehicle (MIV) while the first of nearly 600 Ajax armoured vehicles will be delivered into service in the early 2020s. Both will equip the Army's new Strike Brigades. The order for Ajax in 2014 was the "biggest single order for a UK armoured vehicle in 30 years."¹ Updates to the Army's Challenger 2 main battle tank and Warrior infantry fighting vehicles are also underway. Altogether £20.1bn will be spent on Land Equipment over the next decade.²

For some the refresh can't come fast enough. Defence analyst Nicholas Drummond says over half of the combat vehicles in the Army's inventory are more than 40 years old and "many vehicles and key weapon systems are approaching a cliff edge of block obsolescence."³

£20.1bn to be spent
on Land Equipment
over next decade

The Army does not have a good track record when it comes to acquiring armoured vehicles from the core budget. The last thirty years is awash with cancelled, suspended or modified programmes with programme names like FFLAV, Tracer, FRES and Scout falling by the wayside. The Defence Committee has warned any repeat of past failures will "seriously impair, if not fatally undermine" the Army's ability to deploy the warfighting division as envisaged in the 2015 Strategic Defence and Security Review and the Army's new Strike Brigades.⁴

The next major procurement programme is for Mechanised Infantry Vehicles. The UK was involved in a multi-national programme to develop the Boxer vehicle at the turn of the century but withdrew in 2003. In March 2018 the MOD announced it is re-joining the Boxer programme. The first of an estimated 500 vehicles will enter service in 2023. MPs have questioned the MOD's acquisition strategy for the MIV and the lack of an open competition.

Box 1: What are armoured vehicles?

"Armoured vehicles comprise a range of military platforms including tanks, reconnaissance, engineer and personnel carrying vehicles. They permit military forces to manoeuvre while offering protection from a wide range of threats, and additionally provide platforms for mounting weapons and other military systems. Armoured vehicles are therefore a critical asset when undertaking a wide range of military tasks, from delivering humanitarian aid through to high intensity war-fighting operations."⁵

¹ "[Ministers announce Ajax delivery milestones in Wales](#)", Ministry of Defence, 18 September 2017

² Ministry of Defence, "[Defence Equipment Plan 2017](#)", 31 January 2018

³ Nicholas Drummond "[Critical UK Land Power Issues](#)", UK Land Power blog, 29 November 2017

⁴ Defence Committee, "[SDSR 2015 and the Army](#)", HC 108 2016-17, 29 April 2017

⁵ National Audit Office, "[The cost-effective delivery of an armoured vehicle capability](#)", HC 1029 2010-12, 20 May 2011

1. Background

A painful history...

Attempts to acquire new armoured vehicles have hit various buffers over the last three decades.⁶ The National Audit Office, which examined this history in a 2011 report, found the MOD had spent £321million on projects cancelled or indefinitely suspended, and warned of a capability gap until the middle of the 2020s:

The suspension and cancellation of a number of key armoured vehicle projects since the 1998 defence review has resulted in the Armed Forces facing a significant shortage in the principal armoured vehicles they require, until at least 2024-2025.⁷

Indecisiveness, over-ambitious and an overly complicated procurement process were some of the reasons given by the Ministry of Defence to the Public Accounts Committee for previous programme failures. The Committee also found armoured vehicle projects suffered more severe budget cuts than other equipment projects, largely because they involved lower levels of contractual commitment and were therefore easier to cut. Writing in 2011 the PAC warned the Department to “stop raiding the armoured vehicles chest every time it needs to make savings across the defence budget”.⁸ More recently, in a 2017 report, the Defence Committee called on the Government, the Army and industry to ensure current programmes are delivered on time and within budget.⁹

Previous programmes include FLAV, FLAV, Tracer, MRAV, FRES and Scout.

...with vehicles brought outside of the core defence budget

This is not to say the Army did not acquire new vehicles during this time. The Ministry of Defence procured a number of vehicles specifically for use in the wars in Iraq and Afghanistan. However these were made via Urgent Operational Requirements rather than funded from the core equipment budget (a list of vehicles procured by the Army since 2006 using the UOR is available [online](#)).¹⁰ These UORs also reflected the demand for wheeled protected patrol vehicles with additional armour to protect against improvised explosive devices. These vehicles are not the subject of this briefing paper.

What does the Army need?

The types of vehicles an army needs depends on a variety of complex factors, examples of which are given below.

⁶ Details of these can be found in National Audit Office, “[The cost-effective delivery of an armoured vehicle capability](#)”, HC 1029 2010-12, 20 May 2011. These include the cancelled TRACER and MRAV programmes and the ill-fated Future Rapid Effect System (FRES). In addition, “[British Army Medium Weight Capability](#)”, Think Defence website, 25 September 2017 provides a detailed analysis and chronology of medium weight vehicles.

⁷ National Audit Office, “[The cost-effective delivery of an armoured vehicle capability](#)”, HC 1029 2010-12, 20 May 2011

⁸ Public Accounts Committee, [The cost-effective delivery of an armoured vehicle capability](#), HC 1444 2010-12, 9 December 2011

⁹ Defence Committee, [SDSR 2015 and the Army](#), HC 108 2016-17, 29 April 2017

¹⁰ [HC Deb 12 February 2014 c697W](#)

Who will the Army be fighting against (insurgents or near peer adversaries?); what type of weapons will it likely face (more armour provides greater protection for operating personnel but adds weight and bulk); the level of firepower needed; where is it likely to operate (urban, littoral, heavily/sparsely populated); terrain (good/bad roads/bridges, deserts, open plains, forests); how easily can it be transported (by sea, land or air?); how will it communicate with other units (what communications system does it need?); logistical and mechanical support; numbers required versus total cost.¹¹

Nicholas Drummond argues that when thinking about armoured fighting vehicles, the traditional “iron triangle” of Firepower, Mobility and Protection must now include Connectively, Autonomy and Adaptability.¹² Adaptability, for example, can be provided via a common base unit that has different modules plugged on top depending on need.¹³

The British Army is not alone in refocusing on its armoured fighting vehicles. Fears of a resurgent Russia have prompted European armies to bolster the lethality and survivability of their armoured fighting vehicles. James Bingham, writing in Jane’s Defence Weekly, tracks this shift:

An important element of the renewed emphasis on ground operations has been the relearning of skills acquired during the Cold War, the first and second Iraq wars, and operations in the Balkans. However, an equally important component is the equipping of European armies to face force-on-force contests. While recent operations such as those in Afghanistan have prioritised survivability over lethality, the revival of potential peer-level adversary engagements now means that lethality is vital to maintain the effectiveness of European ground forces.¹⁴

Further discussion about the different types of vehicles and the roles they perform can be found in appendix 2.

¹¹ Nicholas Drummond “[Critical UK Land Power Issues](#)”, UK Land Power blog, 29 November 2017; William F. Owen “[Explaining the British Army’s Strike concept](#)”, RUSI Newsbrief, 12 September 2017; “[Land operations](#)”, Army Doctrine Publication, Ministry of Defence, 31 March 2017 (the first chapter explores the nature and character of conflict in detail)

¹² Nicholas Drummond “[Critical UK Land Power Issues](#)”, UK Land Power blog, 29 November 2017

¹³ The Boxer family of vehicles for example has different modules (e.g. armoured personnel carrier, ambulance or command post) which sit on top of a common drive platform/module.

¹⁴ “Gearing up: European armies bolster the lethality and survivability of their AFV fleets”, Jane’s Defence Weekly, 7 November 2017

2. Current and future vehicles

2.1 What does the Army operate now?

There are over 4,000 Key Land Platforms in the UK armed forces. The majority are Protected Mobility Vehicles (47% of the total) and Armoured Personnel Carriers (43%) with Armoured Fighting Vehicles making up the other 10%:¹⁵

- Over 1,900 Protected Mobility Vehicles which include the Coyote, Foxhound, Husky, Jackal, Mastiff, Ridgeback and Wolfhound
- 1,763 armoured personnel carriers: 895 x Bulldog¹⁶; 769 x Warrior; 99 x Viking vehicles¹⁷
- 428 armoured fighting vehicles: 227 x Challenger 2 Main Battle Tank; 201 x CVR(T) Scimitar

The terminology used to describe the different vehicles can be confusing. As well as the breakdown given above, taken from the defence statistics, the [Army](#) website helpfully breaks armoured fighting vehicles into three main categories: Combat, Protected Patrol Vehicles and Reconnaissance. In this breakdown, Combat includes Challenger 2, Warrior and Bulldog, the Protected Patrol Vehicles is the same as the Protected Mobility Vehicles given in the above list, while Reconnaissance includes Scimitar and CVR(T) series.¹⁸ Another way of thinking is that, for the UK army at least, current combat and reconnaissance vehicles tend to be tracked while protected patrol vehicles tend to be wheeled.¹⁹

Tracked vehicles provide greater stability for mounting large weapons and can operate in the most challenging environments.

Wheeled vehicles provide better on road performance and require less maintenance.

2.2 What will the £20.1bn be spent on?

The [Defence Equipment Plan 2017](#) allocated £20.1bn spending on Land Equipment over the decade to 2025/26.²⁰ This includes upgrades to Warrior and Challenger 2 tanks, the new Ajax family of vehicles and the yet to be procured mechanised infantry vehicles and multirole vehicle protected vehicles. Peak spending is in Financial year 2021/22.

¹⁵ [UK armed forces equipment and formations 2017](#), Ministry of Defence, 6 July 2017.

Definitions in this section are taken from the publication. Figures are as at 1 April 2017

¹⁶ Bulldog, part of the FV430 series of vehicles first introduced in the 1960s, is a tracked personnel carrier to provide protected mobility to infantry. Nearly 900 FV432 vehicles were upgraded to Bulldog standard in a programme that finished in early 2011.

¹⁷ Viking are all terrain amphibious vehicles primarily used by the Royal Marines. A £37 million [revamp](#) was completed in 2016 and included new mine blast protected hulls and a protected weapon mount.

¹⁸ [Armoured fighting vehicles](#), army website, accessed 13 December 2017. Be aware this information is dated and not all of these vehicles remain in service.

¹⁹ This is a very broad generalisation and is deliberately simplistic. There are a wide variety of armoured vehicles in use worldwide whose exact specifications depend on national requirements. Wheeled vehicles may come in variants of 4x4, 6x6 or 8x8 and have various levels of protection. William F. Owen provides some analysis of wheeled versus tracked in "[Explaining the British Army's Strike concept](#)", RUSI Newsbrief, 12 September 2017

²⁰ Land Equipment includes not just vehicles but also artillery systems, operational infrastructure, soldier fighting systems and training solutions. It also includes new and equipment already in service. Ministry of Defence, "[Defence Equipment Plan 2017](#)", 31 January 2018

Upgrading tanks and Warrior infantry fighting vehicles...

The Warrior Capability Sustainment Project (WCSP)

The tracked Warrior Infantry Fighting Vehicle provides protection and support to infantry on foot. It is a family of seven variants that first entered service in the late 1980s. The upgrade will extend the out of service date from 2025 to 2040. The project is currently in the demonstration phase (a development contract was placed with Lockheed Martin in 2011) with trials involving 11 demonstration vehicles expected to last until 2020. The MOD has refused to be drawn on how many of the 769 fleet will be upgraded, saying manufacturing timing and numbers are subject to commercial negotiations and dependent on proving the design through the trial period.²¹ The most recent Major Projects Portfolio data places the programme on amber/red, warns of a 12 month delay in delivery because of problems with the demonstrator vehicle, and puts the total cost at £1.6bn.²²

The Challenger 2 Life Extension Programme

The Army has 227 Challenger 2 Main Battle Tanks. The tanks, which first entered service in the late 1990s, are used by Armoured Infantry Brigades. The 2010 Strategic Defence and Security Review cut the number of tanks by 40% - removing 98 from service. The Life Extension Programme will keep the tanks in service until 2035, although the Defence Committee notes that it is as yet unclear how many tanks are to be upgraded and said any reduction in the number of tanks would be "fraught with risk."²³ The most recent Major Projects Portfolio data places the programme on amber and puts the total cost to be £744 million.²⁴

Challenger 2 tanks and Warrior Infantry Fighting Vehicles were deployed to [Estonia](#) in 2017 as part of the UK's contribution to NATO's Enhanced Forward Presence battlegroup.

Box 2: The 40mm Cased Telescoped Armament System

The main gun of Ajax and the upgraded Warrior infantry fighting vehicles will be the 40mm Cased Telescoped Armament System (CTAS – sometimes 'Armament' is replaced with 'Weapon' giving it the acronym CTWS). The MOD announced the £150 million contract for 515 cannon in July 2015. The weapon will be able to defend the vehicle and destroy a range of battlefield targets including buildings and armoured vehicles. The contractor is CTA International (CTAI), a joint venture between the UK's BAE Systems and French company Nexter.²⁵ France is also procuring the system for its EBRC programme. Jane's Defence Weekly says with the new CTWS on Ajax and Warrior "the British Army will be well equipped with a new medium-calibre firepower capability in coming years."²⁶

²¹ PQ 111962, 17 November 2017; [PQ2038](#), 4 July 2017 and HL862, 24 July 2017. [Lockheed Martin](#) says for up to 380 Warrior vehicles, across five variants, are included in the WCSP.

²² [MOD Government Major Projects Portfolio Data 2017](#), 18 July 2017, listed as 'Armoured Infantry 2026'

²³ Defence Committee, [SDSR 2015 and the Army](#), HC 108 2016-17, 29 April 2017

²⁴ [MOD Government Major Projects Portfolio Data 2017](#), 18 July 2017

²⁵ "£150 million cannon contract signed for UK armoured vehicles", Ministry of Defence, 1 July 2015. A detailed history of the CTAS/CTWS can be found in "[British Army Medium Weight Capability: Appendix B](#)", Think Defence Blog, 27 September 2017

²⁶ "Gearing up: European armies bolster the lethality and survivability of their AFV fleets", Jane's Defence Weekly, 7 November 2017

...and new capabilities – Ajax and multi-role vehicles

Three major vehicle platforms are planned, all of which have a long procurement history. The order for Ajax has been placed and the MOD has clearly signalled it intends to buy Boxer, while the remainder of the Multirole Vehicle (Protected) (MRV(P)) programme has yet to be decided.

Ajax

Ajax will be one of the best-protected and heaviest armoured reconnaissance vehicles in the world.²⁷

Ajax is £4.5bn programme for a family of 589 tracked armoured vehicles based on a common base platform which are expected to enter service from 2020 to 2025. The programme's overall name is Ajax but there are six variants: reconnaissance (Ajax), reconnaissance support (Ares), command and control (Athena), equipment repair (Apollo), equipment recovery (Atlas) and engineering reconnaissance (Argus).²⁸

Ajax will replace the CVR(T) family of vehicles including Scimitar²⁹ and will equip the new Strike Brigades announced in the 2015 Strategic Defence and Security Review (see appendix 1 for more information on the Strike Brigades). Each Strike Brigade will have two Ajax regiments and each regiment is expected to have between 50 and 60 vehicles.³⁰ The Army expects to have an Initial Operating Capability in 2021 and full operating capability from 2025. The latter should involve a readiness to move at 30 days-notice, depending on where the equipment is positioned.³¹ The Chief of the Defence Staff described Ajax as a “completely different capability” to the CVR(T) vehicles.³²

Attempts to replace the CVR(T) date back to the 1980s via a number of programmes.³³ The initial contract with manufacturer General Dynamics was placed in 2010 for what was then the reconnaissance variant of Scout.³⁴ A manufacturing contract was signed in September 2014³⁵ and in 2015 the programme was renamed Ajax. The Government has described the contract as “the biggest single order for a UK armoured vehicle in 30

“The biggest single order for a UK armoured vehicle in 30 years”
Ministry of Defence

²⁷ The Military Balance 2017, IISS, p85

²⁸ 245 x Ajax; 93 x Ares; 112 x Athena; 51 x Argus; 50 x Apollo; 38 x Atlas “[Ajax vehicle brings Merthyr Tydfil factory back to life](#)”, Ministry of Defence, 7 March 2016; Detailed analysis is available in “Ajax uncovered: detailing the British Army's latest combat vehicle family”, Jane's International Defence Review, 11 November 2016

²⁹ Combat Vehicle Reconnaissance (Tracked). CVR(W) refers to the wheeled version. The CVR(T) includes the Scimitar reconnaissance vehicle and the Spartan armoured personnel carrier. Other variants include an ambulance, armoured command vehicle and armoured recovery vehicle.

³⁰ Defence Committee, [SDSR 2015 and the Army](#), 19 April 2017, HC 108 2016-17, para 130

³¹ Defence Committee, [SDSR 2015 and the Army](#), 19 April 2017, HC 108 2016-17, q63-70. The Army added it has not yet had the debate about where the equipment will be positioned.

³² Defence Committee, [SDSR 2015 and the Army](#), 19 April 2017, HC 108 2016-17, q66

³³ This includes FLAV/FFLAV; Tracer, FRES and FRES Scout. A timeline is available in appendix 3 of National Audit Office, “[The cost-effective delivery of an armoured vehicle capability](#)”, HC 1029 2010-12, 20 May 2011

³⁴ [HC Deb 1 July 2010 c48WS](#)

³⁵ [HC Deb 3 September 2014 c20WS](#)

years”.³⁶ The first 100 vehicles will be manufactured in Spain before assembly is moved to a new plant in Merthyr Tydfil in Wales.³⁷

The Committee wared repeats of the past could “fatally undermine” the Army’s ability to deploy a warfighting division with the new Strike Brigades.

The most recent Major Projects Portfolio data places the programme on amber but said the programme was on track to deliver the planned capability to performance, cost and time. The whole-life cost of the programme is given as £6.2bn.³⁸

Box 3: The abandonment of FRES

In 2001 the Ministry of Defence established the Future Rapid Effect System (FRES). This troubled programme replaced two previous programmes, Tracer and MRAV, to provide the army with a new fleet of medium weight armoured vehicles. At one stage estimated to cost £14bn it was intended to procure over 3,000 vehicles to replace the CVR(T) and FV 430 series among others. However prolonged indecision about the exact requirements and a complex procurement strategy delayed progress.³⁹ Elements of the programme were suspended in 2008 and in 2014 the MOD confirmed it was no longer pursuing a FRES programme but instead switched to SCOUT which was intended to “refresh our entire armoured capability”.⁴⁰ The Specialist Vehicle element of SCOUT eventually developed into Ajax.

Mechanised infantry vehicle (MIV): Boxer

The Mechanised Infantry Vehicle (MIV) was announced in the 2015 SDSR and will equip the new Strike Brigades alongside Ajax.⁴¹ This will be an 8x8 wheeled vehicle which, like Ajax, will come in several variants, likely to include protected mobility, command and control, ambulance, repair and recovery.⁴² The first vehicles will enter service in 2023 and the MOD expects to buy about 500 vehicles. The overall budget for the programme is £4.4bn over the next ten years, including acquisition and initial support costs.⁴³

This is all but certain to be fulfilled by the Boxer family of vehicles. The MOD has not signed a contract – the Assessment phase continues into 2019 – but made a significant announcement about the programme in March 2018: that the UK is to re-join the Boxer programme.

The UK chose Boxer for its Multi-Role Armoured Vehicle (MRV) programme back in the late 1990s as part of multi-national development

³⁶ [“Ministers announce Ajax delivery milestone in Wales”](#), Ministry of Defence, 18 September 2017

³⁷ [“Ministers announce Ajax delivery milestone in Wales”](#), Ministry of Defence, 18 September 2017; “Ajax uncovered: detailing the British Army’s latest combat vehicle family”, Jane’s International Defence Review, 11 November 2016

³⁸ [MOD Government Major Projects Portfolio Data 2017](#), 18 July 2017, listed as ‘Armoured Cavalry 2025’

³⁹ National Audit Office, [“The cost-effective delivery of an armoured vehicle capability”](#), HC 1029 2010-12, 20 May 2011. The report contains a summary of the FRES. Progress of FRES can be tracked via historical annual Major Project Reports by the National Audit Office, for example [Major Projects Report 2007 Project Summary Sheets](#), HC 98-II 2007-2008, 30 November 2007, p177

⁴⁰ [PQ208112](#), 10 September 2014

⁴¹ Cm 9161, November 2015, para 4.48

⁴² “DVD 2016: bidders line up for the British Army’s MIV 8x8 requirement”, Jane’s Defence Weekly, 9 September 2016

⁴³ “Oral evidence: Mechanised Infantry Vehicle Procurement”, Defence Committee, 24 April 2018, HC 958 2017-19, q94-100. The MOD had previously been reluctant to give an overall budget figure – see [PQ116496](#), 4 December 2017

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programme. The intention then was for over 700 vehicles to replace existing mechanised infantry vehicles but the UK formally withdrew in 2003 because the requirements changed (The UK needed the vehicle to be transported by a C-130 so it could be rapidly airlifted into theatre.⁴⁴ This is no longer an issue as it can be airlifted by A400M Atlas aircraft. Germany and the Netherlands continued to develop Boxer, with whom it is now in service.

That the UK has opted to re-join the Boxer programme may prompt questions by those frustrated by the MOD's lack of clarity about its acquisition strategy.

Several MPs signed an [EDM](#) in late 2017 calling for the MIV to be openly competed and to support the British armoured vehicle industry. The chair of the Defence Committee has repeatedly [questioned](#) the MOD's procurement plans for the MIV.

On the other hand, the MOD argued an open competition is not necessary because the capabilities of the contenders are well known to it and the urgency with which it is needed.⁴⁵ There are plenty of off-the-shelf platforms for the MIV programme available on the market, including General Dynamics (GDELS) Piranha 5, Finnish company Patria AMV, the French company Nexter VCBI and the German/Dutch ARTEC Boxer. The Army has looked at many of these for past (failed) programmes - Piranha, VCBI and Boxer all competed for the FRES Utility Vehicle programme in 2007.⁴⁶

The MOD said in its March 2018 [announcement](#) that it had conducted comprehensive market analysis of MIV's in service and Boxer delivered on "protected mobility, capacity, flexibility, utility and agility". The MOD informed the House in a written statement ([HCWS619](#)) on 16 April. The MOD told The Defence Committee Boxer was chosen because it was "either equal to or better than any of the other vehicles we considered" citing it having the best protection, the best growth potential, the best power-to-weight ratio (important for mobility), proven mission reliability, and comes with a great data on cost and performance.⁴⁷

That the Army was leaning towards Boxer was reported in the Times in late 2016.⁴⁸

While the MOD has not signed a contract for Boxer, and has made clear the programme remains in the assessment phase until 2019, it is clear the MIV programme is almost certainly going to be fulfilled by Boxer.

⁴⁴ [HC Deb 17 July 2003 c71WS](#); National Audit Office, "[The cost-effective delivery of an armoured vehicle capability](#)", HC 1029 2010-12, 20 May 2011; "Lord Bach announces way ahead on multi-role armoured vehicles and future command and liaison vehicle", MOD press notice, 17 July 2003; [Letter from Harriet Baldwin to Julian Lewis](#), 2 January 2018; William F Owen discusses the airlift decision in "[Explaining the British Army's Strike concept](#)", RUSI Newsbrief, 12 September 2017

⁴⁵ "DSEI 2017: MIV decision by 'end of year', says army leaders", Jane's Defence Weekly, 14 September 2017

⁴⁶ [HC Deb 3 December 2007 c825WH](#)

⁴⁷ "Oral evidence: Mechanised Infantry Vehicle Procurement", Defence Committee, 24 April 2018, HC 958 2017-19, q44

⁴⁸ "Army set to buy £3bn fleet from German firms", The Times, 15 October 2016

The timing of the announcement did not go unnoticed. In reporting on the MOD's "controversial intention not to hold a competition" Defense News observed "British procurement moves don't usually get announced in the middle of a four-day public holiday with Parliament in recess".⁴⁹ The Minister for Defence Procurement was questioned about the timing by the Defence Committee.⁵⁰

Boxer is produced by the Artec Consortium, a joint venture of Krauss-Malfei Wegmann and Rheinmetall. Boxer is a family of vehicles with a common chassis, upon which modules for different purposes can be attached. It is in service with the German and Dutch armed forces and Lithuania and Slovenia have also joined the Boxer programme. Australia announced in March 2018 it will buy 211 Boxer vehicles directly from Rheinmetall in a deal worth an estimated AU\$5bn. Australia selected Boxer over Patria's AMV.⁵¹

The Boxer programme is managed by OCCAR (see box 4). By re-joining the programme via OCCAR the UK will reassume the rights it had as a project partner.

The MOD has said it will consider the comparable benefits of manufacturing locations and different supply chains for Boxer prior to any Main Gate decision.⁵² The [MOD](#) and [Artec](#) say at least 60% of manufacturing of the vehicle could be placed with British industry and 100% final assembly could take place in the UK. The MOD has suggested Artec's planned investment in the UK could secure or create at least 1,000 jobs across England, Wales and Scotland. Artec has already signed partnership agreements with BAE Systems, Pearson Engineering and Thales UK. Rolls Royce provides the engines for Boxer. The Defence Committee [questioned](#) Artec and Rheinmetall on 24 April 2018.

The MOD also suggested Rheinmetall will launch a production and integration centre for armoured vehicles in the UK as part of the programme which, the MOD said, "would represent a significant commitment which would lead to long-lasting armoured vehicle capability in the UK".⁵³

Box 4: OCCAR

The Organisation for Joint Armament Co-operation. [OCCAR](#) was established by the UK, France, Germany and Italy in November 1996 in a bid to provide more effective and efficient arrangements for the management of collaborative procurement programmes between the four nations. Belgium and Spain have since joined OCCAR and it has 13 non-member participating states. It is not a procurement agency – it does not take procurement decisions on behalf of its members – but it does manage programmes placed under its management by member nations. OCCAR manages a range of projects including the multinational A400M

⁴⁹ "UK to re-join Boxer programme, 14 years after opting out", Defense news, 2 April 2018

⁵⁰ "[Oral evidence: Mechanised Infantry Vehicle Procurement](#)", Defence Committee, 24 April 2018, HC 958 2017-19, q35

⁵¹ "Rheinmetall wins \$3bn Australian armoured vehicle competition", Defense News, 14 March 2018

⁵² [DEP2018-0372](#), letter dated 03/04/2018 from Guto Bebb MP to Julian Lewis MP regarding the acquisition strategy for the Army's mechanised infantry vehicle

⁵³ "[British Army re-joins Boxer programme](#)", Ministry of Defence, 31 March 2018; "[MIV Boxer manufacture drives UK jobs and prosperity](#)", Artec press release, 3 April 2018

aircraft, in service with the RAF as Atlas. It manages the [Boxer programme](#) for Germany, The Netherlands and Lithuania.

The Defence Committee asked about oversight of the Boxer contract if it was acquired via OCCAR. ⁵⁴ the MOD said the OCCAR treaty “contains similar arrangements for collaborative programmes for participatory states. These arrangements afford the UK similar rights for transparency, cost assurance audits and progress reporting mechanisms as those required by the Single Source Regulations Office.”⁵⁵

Multi-Role Vehicle (Protected) (MRV-P)

The multirole vehicle (protected) programme are not armoured fighting vehicles but are included in the £19.1bn Land Equipment budget and are included in this briefing in part to explain what the programme is to avoid confusion with the MIV.

The Army is in the process of acquiring a family of protected general purpose vehicles to replace a number of vehicles in service including Land Rovers. The MRV-P has reportedly been divided into three groups with the first group. The first group of vehicles is expected to be met with an off the shelf purchase of the Oshkosh Joint Light Tactical Vehicle (JLTV) via a Foreign Military Sale (FMS) arrangement with the United States. The State Department has approved a possible sale of up to 2,747 JLTVs which, when accessories and support is included, has an estimated cost of \$1.035 billion.⁵⁶ DE&S, the procurement arm of the Ministry of Defence, said the decision to go buy the JLTV via a FMS arrangement was because of its extremely attractive price point and its ability to fulfil the MRV-P requirement. MRV-P Group 2 includes 4x4 or 6x6 requirement for a troop carrying vehicle (armoured personnel carrier) and an ambulance variant. Jane’s reported in January 2017 that three contractors remained in competition with a contract expected within two years for an initial buy of 150 APCs and 80 ambulances.⁵⁷

Box 5: Further reading

- [“The Boxer armoured vehicle and the British Army”](#), Think Defence blog, 29 March 2017r
- Nicholas Drummond, [“The genesis of medium weight wheeled forces”](#), UK Land Power blog, 6 December 2017
- Nicholas Drummond [“Critical UK Land Power Issues”](#), UK Land Power blog, 29 November 2017
- “Gearing up: European armies bolster the lethality and survivability of their AFV fleets”, Jane’s Defence Weekly, 7 November 2017
- [“British Army Medium Weight Capability”](#), Think Defence Blog, 27 September 2017
- William F. Owen [“Explaining the British Army’s Strike concept”](#), RUSI Newsbrief, 12 September 2017
- [“UK Land Power”](#), Joint Doctrine Publication 0-20, Ministry of Defence, 16 June 2017
- Defence Committee, [SDSR 2015 and the Army](#), HC 108 2016-17, 29 April 2017
- [“Land operations”](#), Army Doctrine Publication, Ministry of Defence, 31 March 2017

⁵⁴ [“Letter dated 25 November 2017 to Harriet Baldwin MP, Minister for Defence Procurement, Ministry of Defence on Mechanised Infantry Vehicle”](#), Defence Committee, 29 November 2017

⁵⁵ [Letter, 2 January 2018, from Harriett Baldwin MP, Minister for Defence Procurement on Mechanised Infantry Vehicle and attached relevant Parliamentary Questions](#), Defence Committee, 11 January 2018

⁵⁶ [“Ajax to MIV and the emergence of Strike”](#), Think Defence Blog, 27 September 2017

⁵⁷ [“UK confirms FMS JLTV buy for MRV-P”](#), Jane’s Defence Weekly, 26 January 2017

- “Ajax uncovered: detailing the British Army’s latest combat vehicle family”, Jane’s International Defence Review, 11 November 2016
- Ben Barry, “[Modernising the British Army’s Armoured Fighting Vehicles](#)”, IISS Military Balance Blog, 10 February 2016
- Public Accounts Committee, [The cost-effective delivery of an armoured vehicle capability](#), HC 1444 2010-12, 9 December 2011
- National Audit Office, “[The cost-effective delivery of an armoured vehicle capability](#)”, HC 1029 2010-12, 20 May 2011
- Army website, [Armoured fighting vehicles](#). This website is not very up to date but is included here because it provides photos and useful information on the vehicles.

Appendix 1: the new Strike Brigades

The 2015 Strategic Defence and Security Review announced plans under Joint Force 2025 for the Army to be able to deploy a war-fighting division of three brigades drawn from two infantry brigades and two new Strike brigades:⁵⁸

Create two new Strike Brigades that will provide a rapidly deployable protected force that can sit between the highly mobile but light forces in 16 Air Assault Brigade, and the heavy forces of the armoured infantry. The Strike Brigades will be equipped with the new Ajax vehicle family and a new Mechanised Infantry Vehicle.⁵⁹

What does this mean? William F Owen, writing for the defence and security think tank RUSI, says Strike “should be considered a highly deployable infantry force able to sustain movement, manoeuvre and long-range patrolling, under armour, for distances that a ‘heavy’ tracked force cannot match.” Owen adds “Ajax will provide effective direct fire support for MIV’s dismounted personnel in Strike’s concept of employment.”⁶⁰

The Ministry of Defence updated these plans in a written statement in December 2016 and has since made minor amendments to the sequencing of units to form Strike.⁶¹ In the 2016 written statement the MOD announced plans to establish a Strike Experimentation Group (SEG) in Warminster to ensure the first Strike Brigade is formed by the end of the decade. The SEG was established in April 2017.⁶² The first Strike Brigade battlegroup is expected to declare initial operating capability at the end of 2022 and be “fully ready to go to war” in 2025.⁶³ This assumes both Ajax and MIV are in service.

The first Strike Brigade - the 1st Armoured Infantry Brigade - will consist of two regiments using Ajax and two battalions of mechanised infantry with Mechanised Infantry Vehicle (MIV). The list below includes the vehicles currently operated:

- The Household Cavalry Regiment: Ajax from CVR(T)
- The Royal Dragoon Guards: Ajax from CVR(T)
- 1st Battalion Scots Guards: MIV from Mastiff
- 3rd Battalion The Rifles: MIV from Foxhound/Mastiff⁶⁴

⁵⁸ [National Security Strategy and Strategic Defence and Security Review 2015](#), Cm 9161, 23 November 2015, para 4.48

⁵⁹ [SDSR 2015 defence factsheets](#), Ministry of Defence, 15 January 2016

⁶⁰ William F. Owen “[Explaining the British Army’s Strike concept](#)”, RUSI Newsbrief, 12 September 2017

⁶¹ [HCWS367](#), 16 December 2016; [PQ117878](#), 11 December 2017

⁶² [PQ117878](#), 11 December 2017

⁶³ “DSEI 2017: British army begins strike brigade experiments”, Jane’s Defence Weekly, 15 September 2017

⁶⁴ [PQ117878](#), 11 December 2017; Freedom of Information Request [FOI2017/02130/78471](#), 10 March 2017. The list given in the PQ117878 (December 2017P) is different to the units named in the December 2016 written statement. The December 2016 WS said the first strike brigade would include the King’s Royal Hussars (rather than the Royal Dragoon Guards) and the 4th Battalion The Royal Regiment of Scotland (rather than 3rd Battalion The Rifles).

- Supported by a number of Royal Logistic Corps (RLC) and Royal Electrical and Mechanical Engineer (REME) units to provide close support logistic support.

Two further regiments will operate Ajax:

- The Royal Lancers: Ajax from CVR(T)
- King's Royal Hussars: Ajax from Challenger 2

The MOD said in January 2017 the King's Royal Hussar's would be the first field army unit to receive Ajax in 2019.⁶⁵

The following units are scheduled to shift to operating the new Mechanised Infantry Vehicle (MIV) under the Army 2020 Refine plans. According to the March 2017 FOI these are:

- 3rd Regiment Royal Horse Artillery (Ajax/MIV from Mastiff)
- 4th Regiment Royal Artillery (Ajax/MIV from Mastiff)
- 21 Engineer Regiment (MIV from Mastiff)
- 32 Engineer Regiment (MIV from Mastiff)
- 1st Battalion the Scots Guards (MIV from Mastiff)
- 4th Battalion the Royal Regiment of Scotland (MIV from Mastiff)
- 1st Battalion the Yorkshire Regiment (MIV from Mastiff)
- 3rd Battalion the Rifles (MIV from Foxhound/Mastiff)
- 3 Medical Regiment (MIV from Mastiff)⁶⁶

[Mastiff](#) is a 6x6 heavily armoured vehicle which carries eight troops and was brought into service under the Urgent Operational Requirement method. As of March 2015 Mastiff has an out of service date of 2024.⁶⁷

⁶⁵ [PQ60377](#), 23 January 2017

⁶⁶ Freedom of Information Request [FOI2017/02130/78471](#), 10 March 2017

⁶⁷ [HL5565](#), 19 March 2015

Appendix 2: how to categorise army vehicles

Land forces fall into three broad categories. These are helpfully summarised by the National Audit Office as:

Heavy forces - These are based around large tracked vehicles such as tanks. They offer the highest levels of firepower and protection with weights generally in excess of 45 tonnes. They have good cross-country mobility but their weight and size preclude rapid deployment over great distances.

Medium-weight forces - These are based on a mixture of tracked and wheeled armoured vehicles. Current medium-weight vehicles can weigh up to 45 tonnes but are easier to deploy over large distances than heavy forces and offer a balance of firepower, protection and mobility.

Light forces - These tend to be based on lightly armoured or soft-skinned vehicles, such as trucks and Land Rovers. They can offer high mobility and are quick to deploy but provide much lower levels of protection and firepower.⁶⁸

Army Doctrine 'Land Operations' explains this further, noting that in creating a force of a particular type, force design has to make trade-offs between protection, firepower, operational and tactical mobility, and logistic demand:

The forces with the most firepower and protection tend to be equipped with heavy armoured vehicles. To maximise firepower and protection, a compromise is made with operational and tactical mobility. Their operational mobility is limited by high logistic demand. But their tactical mobility is excellent, except in the most densely complex terrain, particularly when enabled by armoured combat engineers.

On the other hand, dismounted light forces have limited firepower and intrinsic protection. Yet they can theoretically go anywhere that human beings can go – into mountains, forests, marshes, buildings, caves or subterranean structures. But their operational mobility, without assistance, is limited to how far and fast a soldier can march. Of course, when light forces are supported, by aircraft or vehicles, they can go anywhere within a theatre very quickly.

The operational mobility of a force can be enhanced by trading off firepower and protection. The force can be equipped with armoured vehicles that are optimised for long range manoeuvre, but still have some valuable protection and firepower. This reduces the range of threats that they can deal with, but can give advantages, particularly if access to the theatre by sea or air is challenged or denied. Also, this level of mobility can enable rapid concentration and dispersion of a force, enhancing the scope for security and surprise.⁶⁹

⁶⁸ National Audit Office, "[The cost-effective delivery of an armoured vehicle capability](#)", HC 1029 2010-12, 20 May 2011

⁶⁹ "[UK Land Power](#)", Joint Doctrine Publication 0-20, Ministry of Defence, 16 June 2017, 7.09

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