
BRITISH ARMY
CHALLENGE SET
2025
RAPSTONE
ARMY

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GUIDING PRINCIPLES

This is the first version of the British Army's rapid capability development Challenge Set. It has been developed in support of the Army's ambition to double its lethality by 2027 and derived from extensive force development work conducted by Army Futures. It is intended to help engage industry partners in the search for new ideas and technologies which expedite the transition towards a fifth-generation Army. Identifying and spirally developing capabilities in response to these challenges is at the centre of the Army's contribution to the Strategic Defence Review. It will drive a significant programme of investment for the Army.

The Challenge Set is guided by several overarching principles:

1. **Digital Transformation.** The Army's priority is transitioning to a digital force, transforming operations through real-time data sharing, multi-domain integration, and AI-drive decision making.

2. **Deployable by 2027.** All solutions must deliver a viable Minimum Deployable Capability (MDC) by 2027. Novel applications of mature technology are welcome. Low TRL which is unlikely to deliver MDC by 2027 is out of scope. All procurement will utilise Defence's new Spiral Acquisition Model.

3. **Open and Interoperable.** The Army is driving towards an any/any future and full NATO interoperability; solutions which expedite this transition will be given weight. There is an expectation to have open architecture, compatibility across platforms, allies, and systems, and minimal barriers to integration and future development.

4. **New Ways of Operating.** The Army is looking for solutions which can quickly and cheaply support its transition to the new way of operating described in the Land Operating Concept[1]. In some areas the Army will be prepared to trade longevity and war-fighting resilience for capabilities which support training and exercising in the short term.

5. **Collaborative Partnerships with Industry.** For promising solutions requiring further development the Army will offer access to units, training areas, and testing environments to rapidly develop and refine solutions. Proposals which leverage this opportunity and reflect the value of the Army's contribution are welcomed.

6. **Supporting UK Industry.** The Army will privilege opportunities that directly support UK industry to deliver advanced capabilities in these priority areas. Partnerships are required to prove and scale fifth generation Army capabilities and the Army will help industrial partners in exporting these technologies to allied nations.

1 Land Operating Concept (LOpC) - Sep 2023.

CHALLENGE 1

How to Target the Enemy at the Greatest Distance Possible

Description. This challenge supports the requirement to **maximise stand-off** from threats, **reach as far as possible** into enemy fighting systems, and **maintain as much flexibility** on the battlefield as possible.

To do this introduces difficulties. Maintaining assured precision navigation and timing, ingesting diverse sensor feeds, integrating third party targeting systems, de-conflicting congested battlespace, maintaining low latency of target information, improving the speed and accuracy of decision-making processes, achieving precision and/or area effect of munitions, and maintaining resilience in the end-to-end targeting enterprise.

Our key focus areas are:

Target 1. Ground Manoeuvre Units[2] and Special Operations Forces[3] need to be able to see and strike hidden or beyond line-of-sight targets continuously, even at the smallest unit level. The goal is to dominate close combat by persistently spotting and engaging enemies first.

Operational Parameters:

- Must be compatible with the military and civilian (where applicable) regulatory frameworks.

Notes. Solutions are anticipated to be Uncrewed Aerial Systems (UAS) and Ground Based Systems, but novel sensor alternatives are welcomed.

Operational Use Case. Imagine a small infantry unit in dense urban terrain, detecting and eliminating an enemy sniper hidden multiple blocks away, through walls, at night, in adverse weather. This is achieved using autonomous equipment, advanced sensors, and precision strike - all in under a minute - with 100% accuracy and minimal risk to soldiers.

2 Ground Manoeuvre Units conduct tactical movement and engagements in a ground combat environment. These typically consist of infantry, armour, artillery, and other supporting elements that work together to achieve operational objectives on the battlefield.

3 For this Challenge Set, Special Operations Forces refers to the Land Special Operations Forces. This comprises of the Army Special Operations Brigade, 11 Brigade and 77 Brigade.

Target 2. The Army needs a way to connect the Sensor-Decider-Effector kill chain which can be replicated across any Corps, Brigade or Divisional Headquarters (HQs) to enable targeting at scale and speed.

Operational Parameters:
- Must be able to quickly share multi-source, multi-classification data via common data, storage, and front-end applications.
- Useable within a NATO construct and able to incorporate sovereign and multi-lateral data feeds.
- Must operate within relevant Emissions Control (EMCON)/Counter Surveillance Control Measures (CSCM) states.

Operational Use Case. A NATO task force built up of two or more allied nations including the UK must quickly identify and strike threats when they present. Information on these threats comes from satellites, drones, EW Systems, soldiers on the ground and other domains but it is scattered across different systems, security levels and countries. British commanders need a network that links to their allies to bring all this data together, share it securely, and work even when the enemy try to jam communications. It must process and share targeting output data in seconds, reduce decision making time by more than 50% and maintain secure operations with uptime greater than 99% even in congested environments.

Target 3. The Forward Land Forces[4] need a way to create a resilient high speed, high bandwidth voice and data network for their dismounted close combat forces to enhance situational awareness and enable more lethal close fight operations.

Operational Parameters:
- Useable within a NATO construct and able to incorporate sovereign and multi-lateral data feeds.
- Must allow different force echelons to use separate EMCON/CSCM during the mission whilst still being able to communicate.

Operational Use Case. Imagine a dense urban battle where the enemy ambushes troops from hidden positions and traditional radios fail due to interference. Without real-time updates, coordination slows and the risk of friendly fire rises. A next-generation voice and data network would instantly share enemy movements, friendly locations, and UAS intelligence, allowing troops to react faster and decide on how to strike with precision to win the fight.

4 The Forward Land Forces is the British Army's contribution to the NATO Force Model (NEM). It constitutes the balance of a Brigade to reinforce in Estonia.

Target 4. The Forward Land Forces need a way to extend the range and functionality of its current depth fires capabilities to enable greater reach of the strike complex.

Operational Parameters:
- Primarily focussed on enhancing munitions.
- Must be easily integrated or work with in-service systems (current depth fire capabilities are 105mm, 155mm howitzer, and 227mm rockets).

Notes. Novel solutions which are low cost and greatly extend out the effector's range/capability are strongly encouraged.

Operational Use Case. Imagine an enemy force setting up air defence and moving supply convoys deep behind their lines to protect and sustain frontline units. Current long-range weapons struggle to engage both static and mobile targets effectively. A multi-role strike capability would allow forces to adapt munitions, extend the reach of deep strikes, and adjust targeting reactively to hit hardened defences and convoys with precision to disrupt the enemy's operations.

Target 5. The Corps and Divisions need a way to create greater range (both distance and altitude) of fires capabilities to enable targeted strikes in the deep battlespace.

Operational Parameters:
- Must have a range greater than 250km.
- Must be able to be integrated within the existing force structure and network.

Notes. Solutions which are low cost per effector, can strike moving and static targets, and enable sustained fire are strongly encouraged.

Operational Use Case. Imagine an enemy has set up a critical command centre and supply depot deep behind their front lines. With long-range weapons over 250 km, the Army can strike these targets, disrupting their rear area operations to interrupt current and future operations. The system must be scalable to ensure continuous, long-term strikes through extended operations to pressurise the enemy and prevent them from re-grouping.

Target 6. The Forward Land Forces need a way to use existing equipment like drones, vehicles, or sensors to gather and share real-time information to build a Common Operating Picture[5] which enables better decision making.

Operational Parameters:

- Must utilise passive data transmission with minimal user interaction.
- Must integrate with existing Tactical and Operational Communication and Information Systems (TacCIS/OpCIS).

Operational Use Case. Imagine a combined arms Brigade conducting a complex obstacle crossing deep in enemy territory. In order to understand where all friendly troops are and make quick and appropriate decisions on battlefield movement, the Brigade HQ pulls information from standard equipment like drones and existing sensors to create a real time picture of friendly activity.

CHALLENGE 2

Survival and Manoeuvre

Description. This challenge addresses **protection[6] and movement** in an **increasingly transparent and lethal battlespace**.

To do this introduces difficulties. Blinding or destroying enemy sensors, actively deceiving enemy decision systems, disrupting enemy end-to-end fires pipelines, maintaining control of all friendly energy emissions across the visible spectrum, achieving physical protection against enemy munitions - direct and indirect, manoeuvring across natural and manufactured obstacles, manoeuvring through defended airspace, and creating obstacles to all forms of enemy manoeuvre.

Our key focus areas are:

Survival 1. Divisions need a way to detect, track, identify, defend and defeat Class 1 Uncrewed Arial Systems (UAS)[7] and their associated command nodes, data and GPS links at the furthest range possible to maximise survivability.

Operational Parameters:

- Must be applicable across all arms, mounted and dismounted, and across all echelons of the Divisions.

Notes. Solutions can be kinetic or non-kinetic, physical or electronic based, or a blend of capabilities.

Operational Use Case. A unit is preparing to assault an enemy position when enemy drones, too small to be easily seen or heard, begin scouting troop positions and relaying target data back to enemy forces. Within minutes, artillery strikes with deadly accuracy and FPV strike drones begin to cause casualties amongst friendly forces. By providing the ability to detect, track, identify and defeat these drones from the furthest possible range, friendly forces intercept the threat and prevent further strikes.

6 Protection refers to methods and technologies designed to safeguard soldiers and equipment from enemy attacks. This could include armour, defensive systems, or technology to shield troops from direct hits and threats like blast, bullets and shrapnel.

7 Class I UAS are small, self-contained and generally person portable. They usually operate at low altitudes below the coordination level. They typically support small unit ground forces and are generally controlled by a single individual.

Survival 2. Electronic Warfare (EW) Units need a way to attack the enemy's command and control nodes, communications systems, Global Navigation Satellite System (GNSS), UAS, and One Way Effectors to increase friendly survivability and ability to manoeuvre.

Operational Parameters:

- Must be an EW attack capability which avoids electronic fratricide.

Notes. May be multiple solutions (e.g. one to deny, degrade, deceive or disrupt GNSS and one to deny, degrade, deceive or disrupt UAS), or there may be one solution that can deliver a capability to disrupt all. Solutions that enable the proliferation of capability to lower levels are strongly welcomed.

Operational Use Case. Imagine an Electronic Warfare Team supporting a Manoeuvre Brigade tasked with conducting a rapid advance on an enemy position. The enemy rely on secure GPS and communication systems to control their operations and are using UAS to recce friendly positions before striking them with precision fires. By equipping the Electronic Warfare Team with a solution which disrupts enemy electronics and any interaction with GPS or GNSS, the enemy will be unable to make decisions and co-ordinate their effort, allowing the Brigade to advance untracked and enabling the objective to be secured.

Survival 3. Divisions, the Forward Land Forces and Special Operations Forces need a way to replicate visual, thermal, and acoustic signatures of force elements to deceive and present mass targets.

Operational Parameters:

- Must be uncrewed, attributable, and capable of being deployed alongside conventional vehicles.
- Must be physical capabilities which are convincing at close range.

Notes. Solutions which can be applied to combat support elements are strongly encouraged.

Operational Use Case. Imagine a small unit stationed in a remote area receiving intelligence reports which show a large enemy force is advancing against them. The unit is heavily outnumbered and faces the risk of being overrun. To avoid detection and buy time for reinforcements, the unit deploys physical decoys which generate fake visuals and the heat and acoustic signatures of additional vehicles and troops, thus making the enemy believe they are up against a much larger force. This causes the enemy to hesitate or misallocate resources to their strike. By deceiving the enemy, the unit can delay the enemy attack and protect the critical position, providing an opportunity to call in support.

Survival 4. Divisions, the Forward Land Forces, and Special Operations Forces need a way to generate false EW signatures which replicate the emissions of friendly forces and creates the illusion of friendly mass in the electromagnetic spectrum.

Operational Parameters:

- Must be capable of replicating a minimum of a Manoeuvre Company in the Electro-Magnetic Spectrum (EMS).
- Must be able to be transported, deployed, and operated by a team of dismounts.

Operational Use Case. Imagine a Battalion of infantry deployed to destroy a key enemy stronghold. They have limited resources and are outnumbered but to increase their perceived size and capabilities to the enemy, they deploy a system which creates a fake electronic signature. Assuming they are outnumbered, the enemy retreat, enabling the friendly troops to seize the position with minimal losses.

Survival 5. Ground Manoeuvre Units need a generalist mine detection and clearance capability at Platoon level to enable movement through mined areas.

Operational Parameters:
- Must be included in the Platoon's conventional equipment.
- Must not rely on specialist engineering equipment.
- Must not generate excessive dependency on the supply chain or unduly limit small unit primary capabilities.

Operational Use Case. Imagine a Platoon advancing through a rural area to a known enemy location which they plan to attack. An enemy Uncrewed Aerial System flies overhead and drops mines on the route, blocking their path both ahead and behind. The platoon needs a way of navigating the new obstacle and, by using an organic mine detection and clearance capability, they rapidly and safely clear a route forward without waiting for specialist teams. This allows them to maintain speed and keep the mission on track, ensuing safety and the ability to outpace the enemy.

Survival 6. Ground Manoeuvre Units need a generalist short gap crossing capability at Platoon level to enable movement across small rivers, gaps and other obstacles.

Operational Parameters:
- Must be included in the Ground Manoeuvre Units conventional equipment.
- Must not unduly impact small unit primary capabilities.
- Must be for gaps of at least 10m with varying depths.

Notes. Capabilities which can cross wider gaps or can allow small vehicles to cross are welcomed but must not make it a specialist capability.

Operational Use Case. Imagine a Platoon advancing towards a critical objective but the enemy has destroyed bridges and infrastructure over a small river creating a significant obstacle. The Platoon needs to cross the gap quickly to maintain momentum and avoid being channelled into a vulnerable position. Using a lightweight, portable crossing system, the Platoon can rapidly cross the river and continue their manoeuvre. This reduces their exposure to enemy fire and allows them to stay unpredictable, ensuing they can outmanoeuvre the enemy and complete their mission without delay.

Survival 7. Ground Manoeuvre Units and Manoeuvre Support Units[8] need the ability to rapidly generate or deploy obstacles to deny terrain or delay the enemy's rate of advance.

Operational Parameters:
- Solutions which focus on explosive barriers to shape terrain, counter enemy mobility, and attrit enemy forces in both complex urban and rural terrain are strongly encouraged.

Operational Use Case. Imagine a Platoon of ground troops tasked with holding a key position near a bridge that the enemy is rapidly advancing towards. The Platoon knows they are outnumbered and do not have the resources to hold the position for long. To buy time for reinforcements to arrive, they use portable systems to quickly deploy obstacles, such as explosive barriers, to shape terrain or deny roads leading to the bridge. This delays the enemy's advance as they are forced to navigate around the obstacles or clear them, slowing down their momentum.

Survival 8. Manoeuvre Support Units need a way to increase the number of crossing and breaching points in an enemy's defensive line to increase speed of manoeuvre and enhance current limited specialist capability.

Operational Parameters:
- Must work alongside existing specialist capability.
- Must be capable of detection and clearance.

Notes. Solutions should focus on uncrewed systems. Novel alternatives welcomed.

Operational Use Case. Imagine a heavy armoured Battlegroup advancing through an enemy minefield to reach a key objective. Holding limited specialist breaching capability, they utilise uncrewed systems to enhance the amount of points they are attempting to breach as well as the mass at each point. This increases the speed and span which the Battlegroup can breach the minefield, ensuring it maintains momentum to apply greater pressure on the enemy forces ahead.

8 A Manoeuvre Support Unit provides manoeuvre support to combat forces on operations. Their primary role is to enhance the mobility, counter-mobility and survivability of the force.

CHALLENGE 3

How to Exploit the Electromagnetic Spectrum and Cyberspace

Description. This challenge supports the imperative to **dominate the domains we cannot see**, across the **airwaves and inside networks, without inflicting fratricide** against our own requirements.

To do this introduces difficulties. Understanding enemy sensors, communications, and electronic warfare force posture, tricking enemy sensors, penetrating protected enemy networks, subverting the exchange of enemy data, maintaining control of all friendly energy emissions across the invisible spectrum, de-conflicting all forms of electronic attack with friendly sensor and communications requirements, and maintaining defence and resilience of friendly networks.

Our key focus areas are:

EMSC 1. Electronic Warfare Units needs a way to passively detect, recognise, identify, locate and exploit the enemy's communications and non-communications emissions in the radio frequency spectrum to find and effect targets.

Operational Parameters:

- Solutions for specialist and generalist users welcomed.
- Must feed into friendly communication and information systems to enable rapid dissemination of data to Battlegroup and Company level.

Operational Use Case. Imagine a high stakes battlefield where an enemy command post is coordinating drone strikes and artillery attacks against friendly forces. These orders are being sent through encrypted radio signals and hidden networks. Using a signal detection solution, ground troops can pinpoint the exact location of these transmissions, identify their purpose, and disrupt the enemy's ability to communicate. At the same time, this intelligence is used to help inform the launch of a precision strike on the command post, neutralising the threat before the next attack can be executed. By quickly detecting, tracking and exploiting enemy signals, friendly forces gain a decisive advantage, preventing further casualties and shifting momentum in their favour.

EMSC 2. Corps, Division and Brigade Headquarters need a way to receive and contribute to a Recognised Electro-Magnetic Picture (REMP)[9] to enable the rapid integration of the EMS into mission planning and battlespace deconfliction, and support targeting in the deep and close fight.

Operational Parameters:

- Must enable a view of both the friendly and enemy EMS pictures and integrate into existing TacCIS/OpCIS solutions.
- Must be intuitive for mission planners (e.g. a map overlay).
- Must utilise data from existing sensors and the Joint Force.

Notes. Solutions which enable rapid dissemination of data to Battlegroup and Company level are encouraged.

Operational Use Case. Imagine a Brigade preparing to assault an enemy stronghold 20 miles from their current position. Without a clear electromagnetic picture, co-ordination breaks down, and units risk ambush or enemy interference. By generating a Recognised Electromagnetic Picture (REMP), commanders will be able to identify friendly and enemy positions, adapt communications, and exploit enemy weaknesses, ensuring secure coordination, precision strikes and uninterrupted support.

EMSC 3. The Army needs a technological solution to train and test soldiers' understanding of the EMS and their operational activity within it, to increase their survivability and lethality.

Operational Parameters:

- Must enable soldiers to operate and be tested in an EMS up to Battlegroup training level.
- Must enhance an individual's knowledge of their own signature and how it impacts on any operational activity.

Operational Use Case. During a large-scale NATO exercise in Eastern Europe, an infantry Battalion is tasked with securing a key river crossing from the enemy. Prior to advancing they utilise their EMS training to consider how their signature might impact their lethality and survivability at an individual, team and Battlegroup level. They switch to pre-planned alternative communications networks and adjust targeting methods to reduce their signature which prevents them being seen, resulting in a successful attack and seizure of key terrain.

9 Recognised Electro-Magnetic Picture (REMP) is the electromagnetic environment as perceived or understood by an electronic warfare system or sensor. It represents the electromagnetic signals, emissions, and activities detected or monitored by the system within a given area or operational scenario.

CHALLENGE 4

How to Conduct Logistics in the Precision Age

Description. This challenge seeks to **sustain operations** in an **increasingly expanded, transparent and lethal battlespace**, where **dispersal and concealment** are the norm.

To do this introduces difficulties. Predicting and planning ever more complex logistic requirements, executing logistics across greater distances at each level of war, maintaining decentralisation while achieving mass and/or redundancy, reducing reliance on fuel and other consumables, increasing field power generation while minimising signatures, treating injuries at greater time and distance from hospitals, and repairing systems of growing number and complexity as far forward as possible.

Our key focus areas are:

Sustainment 1. Ground Manoeuvre Units and Brigade Medical Units need a way to extend the survival time of critically injured personnel[10] to ensure they reach Damage Control Surgery within 2 hours to enhance the survivability of personnel.

Operational Parameters:

- Must not generate excessive dependency on the supply chain.
- Should include generalist options as well as clinical specialist options.

Operational Use Case. During a combat assault, an explosion severely injures two soldiers, one with a punctured lung and the other with a major leg artery injury. The nearest surgical facility is over an hour away but with enhanced forward care and blood supplies on-site, the medical team stabilises the soldiers, keeping them alive for over two hours. This allows for a successful evacuation and treatment before their injuries become fatal, significantly improving their chances of survival.

10 Critically refers to T1 and T2 casualties. T1 casualties are the most critical and urgent cases that need immediate treatment. T2 casualties are those who require medical treatment within a few hours to prevent their condition from worsening significantly.

Sustainment 2. Divisional and Brigade Headquarters, and Ground Manoeuvre Units need reliable and flexible power sources, both on and off vehicles, to keep up with the increasing demand for electricity on the battlefield, reduce noise, and increase survivability.

Operational Parameters:
- Must reduce reliance on traditional fuels.
- Must focus on energy storage as well as generation and be no larger in size than existing power generation capability.
- Must provide the ability for silent power (including temperature and EMS).

Notes. Should aim to replace up to Brigade level power generation capabilities.

Operational Use Case. Imagine a frontline armoured unit in Eastern Europe, conducting extended operations in contested terrain. Traditional diesel generators are too noisy, risking enemy detection, and fuel resupply convoys are vulnerable targets. Instead, the unit relies on hybrid power systems; silent running battery packs integrated into vehicles, and portable solar arrays at the command post. Dismounted troops recharge drones, sensors and communications gear without exposing their position. Vehicles remain operational for longer without idling engines, reducing thermal and acoustic signatures. With flexible and reliable power, the unit moves stealthily, sustains critical systems, and enhances survivability in an unpredictable battlespace.

Sustainment 3. Brigades need a way to get vital supplies forward (food, water, ammunition and medical kits), without putting more people in harm's way, by using automated systems like drones or robotic vehicles.

Operational Parameters:
- Must focus on Uncrewed Ground Vehicles (UGV) and Uncrewed Air Systems (UAS) as supply solutions for the close battle.

Notes. Novel solutions beyond UGV and UAS are encouraged.

Operational Use Case. Imagine a Brigade operating in a high-threat urban battlespace where traditional re-supply convoys are prime targets for ambushes and Improvised Explosive Devices. Instead of risking soldiers' lives, autonomous ground and aerial systems move through contested areas, delivering ammunition, food, and medical supplies directly to forward units. AI-driven logistics hubs track demand in real time, ensuring supplies reach the right place at the right moment. With automation handling the dangerous work, troops stay in the fight longer, reduce exposure to enemy threats and maintain operational momentum, ensuring the mission never stalls due a lack of critical resources.

Sustainment 4. The Operational Support Brigades and Manoeuvre Brigades need a way to conduct predictive maintenance on their increasingly complex equipment across a dispersed operational footprint to increase equipment availability and reduce equipment failures.

Operational Parameters:
- Must enable repair forward as a primary principle.

Operational Use Case. Imagine a tank unit deployed across a vast desert, preparing for a major operation. A vehicle suddenly breaks down miles from the nearest repair team, delaying the mission and putting crews at risk. But with predictive maintenance, sensors onboard had already flagged a failing engine component. A repair drone was dispatched, and a replacement part was pre-positioned at a forward base. The fix was completed before the failure happened, keeping the unit moving without delay. By anticipating problems before they occur, commanders keep more vehicles in the fight, reduce downtime, and ensure no mission is lost through preventable breakdowns.

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