

Ministry of Defence - Written evidence (IUD0015)

Lords IRDC: Ukraine Inquiry – MOD Written Evidence

1. What does the war in Ukraine tell us about the changing character of warfare? To what extent are the lessons from the war in Ukraine applicable to UK Defence?

The opportunity to observe a peer conflict in Europe is rare. The scale of the conflict has been considerable, including fielding of legacy equipment and emerging technologies in a contested and degraded environment; challenges of logistical supply; manoeuvre in open terrain and in urban environments; long range fires; and surveillance in the close and deep battlespaces driving the narrative on both sides.

Observations on Ukraine have been considered as part of the evidence base used for the Defence Concepts and Doctrine Centre's (DCDC) campaigning and warfighting capstone concepts (NATO SECRET REL FVEYs) and the DCDC Global Strategic Trends Out to 2055 (due to be published in late Spring). The DCDC is using these, other evidence, and indicators of change to develop a Future Operating Environment that looks out to 2045. DCDC Doctrine is actively engaged, both internally with the MOD's Joint Lessons teams, and externally via open-source literature reviews, to analyse implications for UK and NATO joint operational level doctrine.

In addition, context is vitally important to drawing the right lessons. Many lessons do not have a direct relevance to UK Defence because the Russian, Ukrainian and British way of warfighting are all very different. Russia and Ukraine's operational approach has been predominantly attritional and land-focused. Lessons drawn from the use of British equipment and platforms by Ukrainian forces can't necessarily be directly applied to UK Defence, as the Ukrainians are sometimes using them in a different way to how they were designed to operate, following a different doctrine and using different tactics and training. However, there are some relevant strategic lessons which are fully detailed in the answer to question 11.

2. Is there a need for the UK to increase investment in integrated air defence and missile defence in light of the war in Ukraine?

The Defence Command Paper 2023 (DCP23), published in Jul 23, recognises the critically of Integrated Air and Missile Defence (IAMD). The challenge of protecting ourselves against attack from the skies, both overseas and at home, is at its most acute for over thirty years - as evidenced in the war in Ukraine, and recent events in Israel. To counter these threats, Defence has committed to enhancing extant IAMD capability, using the production of an internal IAMD policy to drive and cohere this. Through this, we must modernise our approach to air and missile defence, both for our own forces and through integration with Allies. In addition to the maritime Sea Viper Evolution Ballistic Missile Defence (BMD) programme and the voluntary commitment to contribute a UK BMD Radar to enhance the protection of NATO, Defence will also explore ways to build upon our offer to the Alliance, especially as investment continues in next-generation capabilities on Land, in the Air and at Sea. As the lead service for IAMD, the RAF will promote the use of advanced ground-based, airborne, at sea and space-based sensors, and an extensive range of air and missile capabilities, including countering uncrewed aerial systems (UAS), to detect, protect

and defend the UK and our overseas interest. Doing so will provide a major contribution to homeland defence and national resilience.

We are spending a record amount on defence. This already includes an extra £24 billion in cash terms between 2020-2025, the largest sustained increase since the end of the Cold War. The government fully recognises the growing security threat, which is why we have announced our plan to spend 2.5% of GDP on defence by 2030. This increase in defence spending starts now and will mean an extra £75 billion over the next six years. This will confirm our place as the biggest defence power in Europe. Defence is already increasing investment (including significant time) in IAMD and will continue to do so.

3. To what extent should the UK seek to increase its weapon stocks as a result of the war in Ukraine? What kind of weapons should it focus on procuring in greater quantities?

Defence's lethality will only be sustained through investment in munitions stockpiles for sustained, high-end warfighting. The war in Ukraine has demonstrated the need for sufficient stockpiles of munitions to maintain operations. Replenishing - and augmenting - stockpiles will demonstrate Defence's heightened readiness and credibility to deter threats and defend the nation and our Allies. Defence must, and will, therefore invest significantly in munitions and stockpiles through the coming decade. £1.95Bn was allocated in the 2023 Spring Budget to address long-standing challenges across the defence programme to improve our resilience, which will make us better able to respond to new threats. This funding is being used to build the department's munitions and medical stockpiles and support a wide range of critical activity. To date investments include support to deliver a large purchase of 155mm munitions, building storm shadow stockpiles, supply chain mapping, wargaming, enhancements to a range of critical infrastructure, and medical stockpiles.

A review of current stock holdings will continue, with a particular focus on mass expendable weapon systems, complex weapons, general munitions, and operational spares stocks to meet the needs of sustained operations. Critically we must provide industry with a coherent demand signal to increase industrial capacity and resilience.

4. What steps should the UK take to strengthen its military-industrial base and upskill the relevant workforce in light of the war in Ukraine? What are the main challenges, and how can these be overcome? How does the UK's approach compare to that of its European allies? a) How feasible is it for the UK and its European allies to maintain large stockpiles of weapons and munitions, and what are the trade-offs in doing so?

Industry is, and must feel, part of the Defence Enterprise. This must also be visible because being in perfect lockstep with a resilient industrial base will underpin Defence's credibility as a fighting force, demonstrate UK dependability as an ally, and deter adversaries. Defence's relationship with industry must not just be with the traditional primes, and relationship building must be open and welcoming for small- and medium-sized enterprises (SMEs) and those outside of the Defence sector to better collaborate with the MOD.

In the past, challenges have existed in transparency or early engagement with industry, but efforts are being made to move beyond the traditional customer-supplier

relationship, developing long-term strategic alignment that not only delivers the capabilities that are required now, but binds the MOD and industry into a joint endeavour that can sustain the nation in times of conflict. This will require a collective effort that combines the expertise of the whole Defence enterprise: military, civilian, and industrial.

Progress is underway, with increased investment in the UK's university sector and broader industrial base - for example, a new DSTL hub in Newcastle is established to help spread DSTL's geographic reach and harness the minds of the scientists, engineers and academics to develop cutting edge data science and AI to support our national security. This is also aligned to broader European approaches, with international partners also seeking to increase sustainable global capacity and speed of procurement, and new innovative technology. The UK is leading the way on the creation of such initiatives, and the MOD supports the development of NATO's Defence Production Action Plan (DPAP), which will increase allied standardisation and interoperability in key munitions and will reduce barriers to industrial cooperation between Allies.

As far as capacity to store weapons and ammunition safely and securely is concerned, although this is carefully governed and licensed in UK and in allied nations, this is unlikely to be a limiting factor, certainly in the near to medium term. In the longer term more capacity could be provided if necessary. The more relevant constraints relate mainly to the cost of procuring the items (particularly for complex weapons such as guided missiles and torpedoes), the capacity in industry to build the weapons at high rates, and the safe lifetime of the weapons before they become life-expired and requiring disposal - usually related to the chemistry in the propellants and explosive materials. There can also be constraints deeper in the supply chain from global bottlenecks in supply of key materials or components, such as have recently been experienced for example in semiconductor chips or explosive compounds.

For many weapons, particularly the high-end complex weapons, the approach has traditionally been driven principally by economic factors which usually favour a single (or phased) stockpile buy. The maintenance of capacity to produce any weapon depends upon elimination of obsolescence through the supply chain, the existence of plant/machinery and space for production, and sufficient trained workforce. Obsolescence drives non-recurring costs from redesign/requalification, which can be large if there has been an extended gap in production. However, maintaining the trained workforce, plant and space is a recurring cost, which therefore represents a choice or trade. Growing the capacity in industry for manufacture also takes time and cost, to establish and commission the production facility, and to recruit and train staff.

Recently, the escalating demands for weapons has led the MOD to consider adopting an "always-on" strategy for some weapons, recognising the need for a more responsive capability which can be "surged" if needed. Equally, the establishment of a large stockpile followed by a dearth of production orders - can drive an inefficient "boom-bust" approach in Industry.

Due to the gradual expiry of the explosive materials and propellants - typically over 10-20 years - there is a cost to holding the stockpiles and this is why a more flexible supply is being sought and considered. Also, especially for complex weapons, the

threat environment is evolving ever more quickly, and weapons often need modification or enhancement to respond to that. The larger the stockpile, the greater this risk and cost to maintain the relevance of the weapons. Increasingly this can be achieved through software changes, but this can take time and hardware modifications across a large stockpile can represent significant time and cost impacts. This is why more flexible manufacturing approaches are being considered which may provide the ability to meet demand with less "inertia" in the stockpile.

5. How can the UK Armed Forces update their training and exercises to incorporate the lessons from the war in Ukraine?

Joint Warfare is the lead for the design and delivery of Combined/Joint Task Force-level collective training to PJHQ and the UK's Very High Readiness operational level deployable headquarters. These events focus on training the command and control (C2) element of the Integrated Force. The training vehicles used to achieve the specified outcomes, range from a wargame to tabletop exercises to command post exercise where the whole headquarters operates in a simulated environment.

The training requirement for these events is defined by the end-user, in the majority of cases this is Commander Joint Operations (CJO). The requirement for an exercise is based on a number of inputs, including areas of potential operational risk and lessons. The mechanism to incorporate lessons from the war in Ukraine, where they have direct relevance and are appropriate to this level of collective training, is already in place and being exploited.

At a more tactical level, the challenge function (Red Team) that operates during the delivery of an exercise is incorporating the appropriate lessons into the way they stimulate a response from the training audience or react to the actions of the UK headquarters. The employment of a dedicated team to fulfil this function has meant there can be a consistent and coherent approach to application of appropriate lessons.

There are a number of lessons identified from Operation INTERFLEX (the training at scale of Ukrainians in the UK) which would be relevant to the challenges UK Defence might face.

- i. Time would be the fundamental constraint. Training time will never be long enough, resulting in a tension between delivering training quality and training quantity.
- ii. A short training programme must be ruthlessly efficient and focussed on the skills which gave the most significant qualitative advantage. A 'narrow but deep' approach, focussing on the core skills and building muscle memory is more beneficial than a 'broader but shallow' approach.
- iii. Training must be highly responsive to the realities of the war and must be designed to evolve and keep pace with changes to adversary tactics, techniques and procedures, whilst taking account very diverse start states of the trainees.
- iv. Survivability and lethality must be allied to the mental resilience to survive and be lethal on an enduring basis. The psychological preparedness of soldiers is improved by demanding and realistic training.
- v. Reducing risk to force in training can increase risk to mission through lack of experience of operating in higher risk conditions. Fully training for the psychological and physical stresses of high-intensity combat involves

pushing the edge of the risk envelope in training to reduce the subsequent risk in combat. This requires all parties involved to understand the relative balance of risk and reward through the whole system to maximise chances of organisational success and for those delivering training to have a range of policy freedoms that are responsive to the realities of war.

- vi. A force raised at scale from civil society comes with increased number and complexity of medical needs; this has implications for both training and medical support.
- vii. We must not drain our instructors from training establishments to support the first echelon. If we do, it will make it exponentially more difficult to train the second echelon and reduce the quality of the output.

6. What progress has been made in increasing joint procurement and harmonising defence systems among NATO allies, especially among our European partners?

The UK launched the NATO Multinational Procurement Initiatives (MPIs) on munitions and missiles at the NATO Defence Ministers meeting in February 2024. Fifteen countries including the UK have so far signed the Munitions MPI Letter of Intent and thirteen have signed the Missiles Letter of Intent. The MPIs aim to increase missile and munition defence industrial capacity through channelling more of our spend through multinational multiannual contracts. At the NATO Washington Summit in July 2024 our MPI objectives include for the UK and European Allies to commit to spending more of their collective missile and munition defence spend through joint procurement, as well as making specific new missile and munition joint procurement announcements.

The UK has also launched the DIAMOND (Delivering Integrated Air and Missile Operational Networked Defences) initiative which aims to promote air and missile defence interoperability within Europe in support of NATO, with an immediate focus on increasing the use of Ground Based Air Defence.

More broadly, the UK is a leading advocate of NATO's Defence Production Action Plan (DPAP) which was agreed at the 2023 Vilnius NATO Summit and aims to accelerate joint procurement, boost industrial capacity and enhance interoperability across the NATO Alliance. The new Integration Design Authority (IDA), publicised in September 2023, will work with allies and across the industrial sector to create open standards for Defence operating systems and protocols, as already demonstrated with the Land CEMA architecture and Pyramid Open Avionics architecture. Defence Equipment and Support, and Strategic Command, will take responsibility for ensuring industry contracts deliver against these standards and that integration into the defence 'system of systems' is demonstrated before completion of delivery into service. Progress also continues more closely with allies and partners to develop cutting-edge capabilities.

Defence is seizing opportunities presented by the creation of NATO's Defence Innovation Accelerator for the North Atlantic (DIANA) - with its European headquarters in London, twinned with a second in Tallinn - to improve the collective capabilities of the whole Alliance. Through better understanding our respective R&D priorities, science and technology (S&T) capabilities, and industrial bases, we can exploit 'best in class' capabilities as well as nurturing sovereign strengths.

7. How have drones been used by both sides in the war in Ukraine and what has been their impact for the way the war has been fought? What lessons should the UK Armed Forces draw from the use of drones in Ukraine?

Uncrewed systems (UXS) are moving the close battle into the deep and making rear areas more vulnerable. They are increasingly used as weapons of psychological warfare against both combatant and civilian populations. When used at scale by trained generalists in frontline units, UXS are decisive in every tactical action. However, although UXS-enabled Intelligence, surveillance and reconnaissance has improved targeting and shortened response times, they have not necessarily enabled the taking of ground.

UXS should be simple enough to manufacture quickly and at low cost, but engineering standards must be high enough to achieve a low failure rate. The ability to spiral develop at the speed of relevance is critical. Unmanned Aerial Systems (UAS) and Counter Unmanned Aerial Systems (C-UAS) will be a feature of all future conflicts, this is the new normal. Gaining air superiority at high altitude (where crewed airframes face crewed airframes), will not prevent the near surface from remaining contested.

We need to better understand the near surface, grapple with the difficulties of airspace management and adapt battlefield behaviour to protect ground forces in a battlespace where UAS provide persistent surveillance and targeting capability. As set out in Defence's recently published Drone Strategy¹, our approach to uncrewed systems will drive a more deliberate and coherent partnership with our industrial base, ensuring vital onshore resilience and component stockpiles. In close partnership with industry, we will spirally and collaboratively develop platforms and components to keep up with relentless cycles of battlefield adaptation, whilst driving sovereign industrial strength - and the export opportunities necessary to reinforce such resilience. We will also work across Government to foster a pro-innovation regulatory environment, delivering the ability for uncrewed military platforms to be tested as effectively as possible on UK sites, and within our sovereign airspace.

8. What role has the space domain, including satellite communications, played in the war in Ukraine, and how has this differed from previous conflicts? What are the implications for the UK Armed Forces?

Access to space is vital for both our everyday life and military operations. For the Ministry of Defence (MoD), space is important for a range of capabilities including global command and control, Intelligence, Surveillance and Reconnaissance (ISR), communications, precision targeting and missile warning. The space domain will play an increasingly vital role in future military operations.

However, the space domain is increasingly competitive, congested and contested. The international security context, characterised by persistent, aggressive state competition, has led to certain adversaries actively pursuing the development of space capabilities and technologies intended to disrupt and deny others' use of space, threatening global stability and security.

¹ <https://www.gov.uk/government/publications/defence-drone-strategy-the-uks-approach-to-defence-uncrewed-systems>

The space industry is expanding quickly, and the technology is advancing rapidly, leading to increasingly sophisticated commercial products that are readily available; enhancing the role of the commercial sector within the domain. Commercial entities have provided a wide variety of assets and services to support Ukraine.

Consequently, commercial space services have been subject to attack. These services were an early target in the conflict, designed to undermine Ukrainian military operations. For example, a cyber attack against a satellite communications network operated by Viasat impacted customers within Ukraine and many other customers across Europe. It was not until the mass rollout of an alternate, readily available commercial solution of the satellite communications network Starlink, that communications for Ukraine could be re-established.

Starlink represents a newly developed capability, supporting mass communications from Low Earth Orbit (LEO) via its mega constellation of over 5,000 satellites. The gifting of over 20,000 Starlink commercial satellite communication terminals from various sources into the country provided much-needed Command and Control support for Ukraine, and a vital lifeline to enable operations and humanitarian support.

Further to this, commercial space actors across the globe provided timely satellite imagery which countered Russian disinformation campaigns of troop movements. There has also been widespread GPS jamming. These examples serve to reinforce and demonstrate the space domain's importance in securing information advantage and enhancing military operations, as well as the value of further developing our use of commercial technologies to support operations and enhancing national capabilities.

In line with this assessment, there has been a significant increase in the use and demand for commercial satellite communications (SATCOM) by the UK MOD military users. The MOD operates a robust hybrid network utilising commercial services. As these capabilities evolve, commercial services will become an even more integral part of this network, bolstering resilience and preserving our advantage over rapidly developing adversary capabilities.

The Ukraine conflict has demonstrated some of the benefits and pitfalls of adopting commercial services. Military users have benefitted from ease of access and adoption (due to low training burden), but its availability and integrity have been compromised, to varying degrees, in a contested environment. Whilst some attacks may be targeted at those enabling defence activities, others are less discriminatory and will affect a much wider, civil population as shown by the attack on Viasat. The MOD is currently looking at ways to incorporate commercial services while maintaining the resilience and security needed to support military operations.

The Integrated Review Refresh 2023 reinforces the need to take an integrated approach to deterrence that brings together all levers of state power. The MOD will apply this approach to the deterrence of space threats, coordinating across Government and with our allies. Space also plays an integral role in supporting and enabling integrated deterrence in all other domains to respond to broader threats to the UK.

HMG published the UK's first integrated civil/defence National Space Strategy (NSS) in September 2021. This set out a vision to 'build one of the most innovative and attractive space economies in the world', as well as to 'protect and defend UK

interests in space' and sustain the UK's competitive edge in space science and technology. The MOD are working closely with DSIT on the implementation of the NSS.

In February 2022 the MOD published our Defence Space Strategy (DSS) which directly supports the NSS. It articulates how the MOD will deliver the NSS' 'protect and defend' goal through space-related capabilities, operations, and partnerships. The DSS highlights the importance of international partnerships in delivering our space ambition and in contributing effectively to global resilience. The MOD are strengthening our bilateral and multilateral relations with our Five Eyes partners, NATO and other key allies. This work is vital to developing the capabilities and resilience needed to operate effectively in modern conflict, taking on the lessons from Ukraine.

The war in Ukraine has reinforced the pivotal role space has in the build-up to an armed conflict and beyond. Resilient, assured systems must be high priority for the space domain, to provide persistent and effective support to the warfighter. The value of space-based capability to Ukraine has been critical to many aspects of the conflict including areas such as understanding force dispositions, tracking Russian actions, communicating within the country, as well as projecting to the global community.

9. What lessons have the UK and NATO learned from the war in Ukraine about the management of escalation of force?

Following Russia's full-scale invasion of Ukraine in 2022, Allies activated NATO's existing defence plans. Over 40,000 NATO troops, along with significant air and naval assets, are now under direct NATO command in the eastern part of the Alliance, supported by tens of thousands more from Allies' national deployments.

Further, at the Vilnius Summit in July 2023, NATO Allies agreed the most fundamental transformation to NATO's deterrence and defence posture since the cold war, including a new generation of warfighting plans. NATO remains the cornerstone of the UK's defence, and our commitment to the alliance remains ironclad.

The UK has made its strongest commitment yet to the Alliance and provides the full spectrum of defence capabilities to NATO, from our nuclear deterrent to offensive cyber capabilities to our conventional Armed Forces. This means almost all our forces, across all domains, will be made available to support NATO – with the vast majority at the highest levels of readiness – to support the deterrence and defence of the Euro-Atlantic. Other Allies have made similar commitments with their force offers, and combined with the introduction of the new warfighting plans, NATO is undergoing the biggest overhaul of Allied collective defence and deterrence for decades.

10. Is the hybrid threat to the UK posed by Russia evolving as a result of the war in Ukraine, and if so, how?

Russia's activity and capability development – which spans conventional, nuclear, and novel military technology, state-sponsored disinformation outlets, offensive cyber, hostile activity by intelligence services, chemical weapons, and threats to undersea infrastructure – continues to pose a threat to UK and partner interests. Russia has historically engaged and continues to engage in the sub-threshold space alongside

conventional tactics, seeking to gain an advantage across the spectrum from competition to conflict. While Russia's failures in Ukraine have significantly weakened its land and guided-weapon capabilities, it retains capable nuclear and strategic forces, and has the intent and capacity to rebuild and regenerate. Russia's maritime and air forces also remain largely intact. The Russian state continues to actively threaten the UK and our allies below the threshold of armed conflict around the world.

11. What other lessons can we draw from the war in Ukraine for UK Defence? What are the implications for the UK's defence priorities, including manpower?

1. The first strategic lesson is the value of collective security alliances, but also the need to invest in them if we are to deliver credible assurance and deterrence. The recent experiences of Ukraine and Georgia, compared against those of NATO members such as Estonia, Lithuania and Latvia, demonstrate that membership of a collective security alliance has clear benefits.

NATO members have gained the assurance of both collective security agreements, and the credible deterrence caused by the physical presence of NATO forces on their territory, demonstrating to potential adversaries the commitment of NATO members to guaranteeing our shared security.

Member states must continue to build credibility by investing in interoperability and preparedness through international training events and continuing to develop enduring relationships between partner forces and headquarters.

2. We assess that the Western Way of War has not been invalidated by the Ukraine conflict, but that it needs to be invested in. Here, we are using the Western Way of War as a shorthand for the UK/US approach using Joint, Combined Arms, Manoeuvre warfare, following the command philosophy of mission command.

We contrast this against the more attritional, fires-heavy approach using centralised control that we have seen from the Russian forces over the last year. We cannot use Ukraine to validate the WWoW, as both Ukrainian and Russian forces are operating using a more Soviet approach, and we have not seen some equipment used in the way for which it was designed. But nor can we say that the WWoW has been invalidated.

We are not saying that had Ukraine fought differently they would have fared better. However, what we can say is that the challenges encountered by the Ukrainians during this year's offensive, including a contested air environment, depth defences and mass, appear to be precisely those the WWoW was designed to combat.

Ukraine has demonstrated the need to have all the capabilities, but crucially, indicates that forces must be properly trained and equipped to employ them in combination, at the right time in the right place to overmatch an enemy.

3. The importance of the 'battle of the narratives'. Strategic communications and information activities have been key for all sides in influencing a range of audiences and actors.

From a UK defence perspective, driving the media agenda, both ahead of the invasion and during the conflict with pre-emptive disclosure of intelligence proved invaluable to

contradicting Russian disinformation attempts. Initial observations have shown that the UK can develop our abilities by combining all media and information operations activities within a coherent pan-government response. This would have the benefit of maintaining coherent messaging enabling our message to reach middle states as well as our long-term allies.

We must also consider the benefit that Ukraine has generated from democratising messaging down to the level where footage from body-worn cameras can be uploaded online by front line soldiers to support a national narrative.

4. Rapid adaptation is critical, especially to win the technological battle. We have seen that in peer warfighting, at least in attritional warfare, the side with the most technologically exquisite capabilities, at the outset of the war, may not always win. The ability to adapt quickly in response to lessons can deliver a significant advantage. Ukraine's optimisation of its Warfare Development demonstrates the opportunity to conduct rapid adaptation in conflict by enabling the direct link between the warfighter and the technology developer.

The lesson for the UK is how critical 'rapid adaptation' has become, and the need to ensure we continue to use our organisations like Defence Science Technological Laboratory (DSTL) and innovation hubs to employ rapid adaptation where possible and appropriate. For rapid adaptation to be effective Defence's policies, permissions, and procedures must be optimised to cohere the different approaches to force development across single Services and enable greater sharing of information and data with industry and across Defence departments.

5. The need to build a latent reserve of Fighting Power at a national level. The Ukraine conflict has reminded us all that peer warfighting requires significantly more resources and material than recent counter-insurgency campaigns, and that forces can only stay in the fight if those stocks can be replenished.

Requirements aren't just for stockpiles of ammunition, but for reserves across classes of supply, and of personnel, infrastructure, and platforms. Much of the UK's support to Ukraine has focused on developing Fighting Power, not just through gifting ammunition and platforms, but through training Ukrainian soldiers and headquarters. This means that not only does our first fighting echelon need to be fully resourced to fight on the first day, but that forces need sufficient stockpiles of equipment, supplies and spares to immediately replenish the force.

Further back, the force needs the training infrastructure and capacity to rapidly train volunteers and formations to form a second and subsequent fighting echelons. And we need the relationships with industry to rapidly replace our equipment, platforms and munitions. This is a whole of Government and national endeavour.

6. Capability Integration. Our support to Ukraine, especially in terms of training and gifting of equipment, has demonstrated the power of combining capabilities. To do this, we need to continue to ensure that our capabilities are integrated by design, both across our different services, and with our allies through underpinning and coherent enterprise architectures. Capabilities delivered by industry must be compliant with these architectures and wider Defence standards. However we must remain flexible enough to enable our systems to be more adaptive and responsive open standards and architectures.

7. Control of the airspace is a pre-requisite for any successful campaign or operation. Russia's failure to achieve the initial success it had hoped for has resulted in air parity, the lowest degree of Control of the Air. The argument is that the Ukraine Conflict has developed into 'trench warfare' in part because neither side can gain and maintain Control of the Air. Counter-Integrated Air Defence Systems (C-IADS) are therefore a critical element within this, not just Air to Air.

8. There are a number of lessons identified from a Cyber/Electronic Warfare perspective:

- I. The lack of a warfare centre for the Cyber and Electromagnetic domain is a significant gap which denudes our ability to draw together a coherent analysis of domain lessons. Investment in this capability is required to ensure that we are able to draw together independent observations and insights from across Defence, understand their significance and respond accordingly.
- II. Ukraine has demonstrated the need for rapid change and innovation, particularly in digital, cyber and EW capabilities. The ability to solve problems quickly through introducing prototypes and testing and iterating them requires a greater risk appetite than conventional procurement and an investment in people and skills. Success in the CyEM domain necessitates a shift in workforce structures, training, recruitment, career paths and retention mechanisms in order to grow the digital skills we need.
- III. Cyber resilience is essential and cannot be assumed. The dispersal and distribution of digital operations and assets may be required (Ukraine's government acted quickly to disburse its digital infrastructure into the public cloud supporting by companies such as Microsoft). The ability to operate in cyberspace depends on partnerships between military, civilian and industry. Cyberspace is global and information operations and cyber operations are not just focussed on the disputed landmass.
- IV. Operating in a degraded and contested electromagnetic environment should be assumed and a coherent approach to developing EW capabilities and TTPs across Defence is required.

In the last two years, the world has changed – geopolitically, technologically, economically. The threats and challenges we face have evolved. An environment of global competition has shifted to one of contestation.

That is why the update to the Defence Command Paper in 2023 underlined Defence's two clear ambitions: to protect the nation and help it. The war in Ukraine has reinforced the importance of NATO to our national security, as well as that of the whole Euro-Atlantic region. Continuing to strengthen the Alliance and maintaining its unity are essential over the coming twelve months and Defence will continue to prioritise our support to Ukraine in 2024 and 2025.

The UK has committed almost all our Armed Forces and military capabilities to NATO under the new NATO Force Model – our strongest ever force commitment to the Alliance. The UK and our Allies have a competitive advantage over our adversaries through the solidarity of 32 nations and the multiplying effect of interoperable forces. In NATO, Allies do not fight alone. It is through NATO and the UK's wider Alliances and partnerships that the UK provides a credible defence from and deterrence to the threats the country faces. The UK can draw on the capabilities of the 32 NATO Allies and not only from our own armed forces. In tandem, the new AUKUS and GCAP

partnerships exemplify our commitment to deepening the relationships between the Euro-Atlantic and Indo-Pacific regions, and to facing the threats of the future together.

In addition, we are committed to one-in-two generations programme of modernisation of the UK's nuclear forces, underpinned by long-term investment. Defence has received an additional £3 billion over the next two years, and a further £6 billion over the subsequent three years, which will be invested across the defence nuclear enterprise.

We will also accelerate modernisation of the force. As we learn more from Ukraine about the changing nature of modern battle and explore the opportunities in AI and automation, we will maintain our force levels broadly at the levels announced in DCP21. Beyond the significant upgrading of our Nuclear Systems, with Dreadnought on track to deliver in the 2030s, our programme of modernisation and mobilisation of conventional forces will address shortfalls in capabilities where we cannot continue to maintain risk. Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) capabilities, as well as Electronic Warfare capabilities, signals intelligence and cyber, will grow in importance.

The lethality of our Forces will be enhanced too. The Royal Navy continues to develop lethality to complement its carrier and amphibious strike capabilities. It has bought the Naval Strike Missile capability at pace allowing precision strike on land and at sea. The Army is enhancing its deep fire capabilities, to counter and hit deeper targets more precisely. As the department focuses more on Artificial Intelligence, digital capabilities and assuring supply chains to modernise our Armed Forces. By maintaining part of our Equipment Plan (£288.6 billion over the next decade) as uncommitted spend, we have the flexibility to better adapt to changing technology and emerging threats.

We have also introduced high ambitions on shortening procurement timelines and embracing spiral development to enable this as highlighted in the new Integrated Procurement Model. The new model will drive increased pace in delivery of military capability to UK forces on the front line, so that we stay ahead of our adversaries in a fast-changing strategic environment. It will also address systemic challenges in defence acquisition, such as those identified last year by the Defence Sub-Committee's inquiry into Defence Equipment and Support.

To ensure our capabilities are integrated by design, we have established the Integration Design Authority (IDA) to offer Integration as a Service to Defence. They will provide an integration aiming marker for Defence and support the new Integrated Procurement Model. Part of the work will be to take a threat-based mission orientated systems of systems approach to support future capability development and procurement, presenting intelligent mechanisms for evidence-based decision making by identifying integration risks and opportunities across capabilities to overcome our adversaries.

The UK population and economy have become enmeshed with and dependent on cyberspace and the Electromagnetic environments. The Cyber and Electro-magnetic domain (CyEM) operating concept highlights opportunities for integrated operations for improving delivery of CyEM. The concept is aligned with the multi-domain integration change programme which will continue to mature beyond 2025.

We've seen from the war in Ukraine how new challenges and the rapid pace of technological development impacts the way we operate and this includes making best

use of our people and technological capabilities, maximising the value and impact of the data we hold and that our people are highly skilled, confident and motivated to work collaboratively to deliver the mission. Having the right skilled people in the right place at the right time is central to maintain our strategic advantage and as a priority Defence is committed to implementing the recommendations of the Haythornthwaite report.

To reiterate from the lessons learnt from the war in Ukraine, success in the CyEM domain necessitates a shift in workforce structures, training, recruitment, career paths and retention mechanisms. This work is underway and Defence also introduced the Unified Career Management approach to improve the armed forces' ability to retain and develop personnel in specialist roles. UCM manages a defence-wide 'Cyber Cadre' which is a group of cyber specialists from across the armed forces. The UCM model enables these personnel to undertake more cyber roles across defence throughout their career, and will therefore see their cyber career choices increase, benefit from improved career stability, and deepen their cyber expertise.

We also must do other things differently – setting out a new alliance with industry; taking a campaigning approach (an evolution of persistent engagement) recognising the indivisibility of theatres; increasing the productivity of our force rapidly; and the approach we take to our people. As budgets are finite, this can only be achieved by aggressively driving productivity across the Defence Enterprise – around the world and at home.

To be truly competitive and to deliver even greater effect, the Department must be strategy-led, threat-informed, outcome-focused, and data-enabled. We are applying best-practice techniques to deliver an organisation which is aligned, mission-focused, leaner and more productive.

1 May 2024