

The 2023 EU Capability Development Priorities

TO BE READY



AIR
TRANSPORT

SPACE
OPERATIONS

AIRBORNE COMMAND AND
INFORM CAPABILITIES

MARITIME DOMAIN
AWARENESS

FULL SPECTRUM CYBER DEFENCE
OPERATIONS CAPABILITIES

SUSTAINABLE
AND AGILE
LOGISTICS

MEDICAL
SUPPORT

COHESIVE AND WELL-
TRAINED MILITARIES

CHEMICAL, BIOLOGICAL, RADIOLOGICAL
AND NUCLEAR (CBRN) DEFENCE

CRITICAL
INFRASTRUCTURE
PROTECTION AND
ENERGY SECURITY

MILITARY
MOBILITY

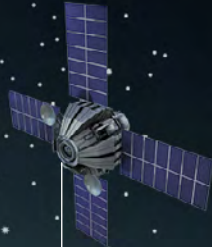
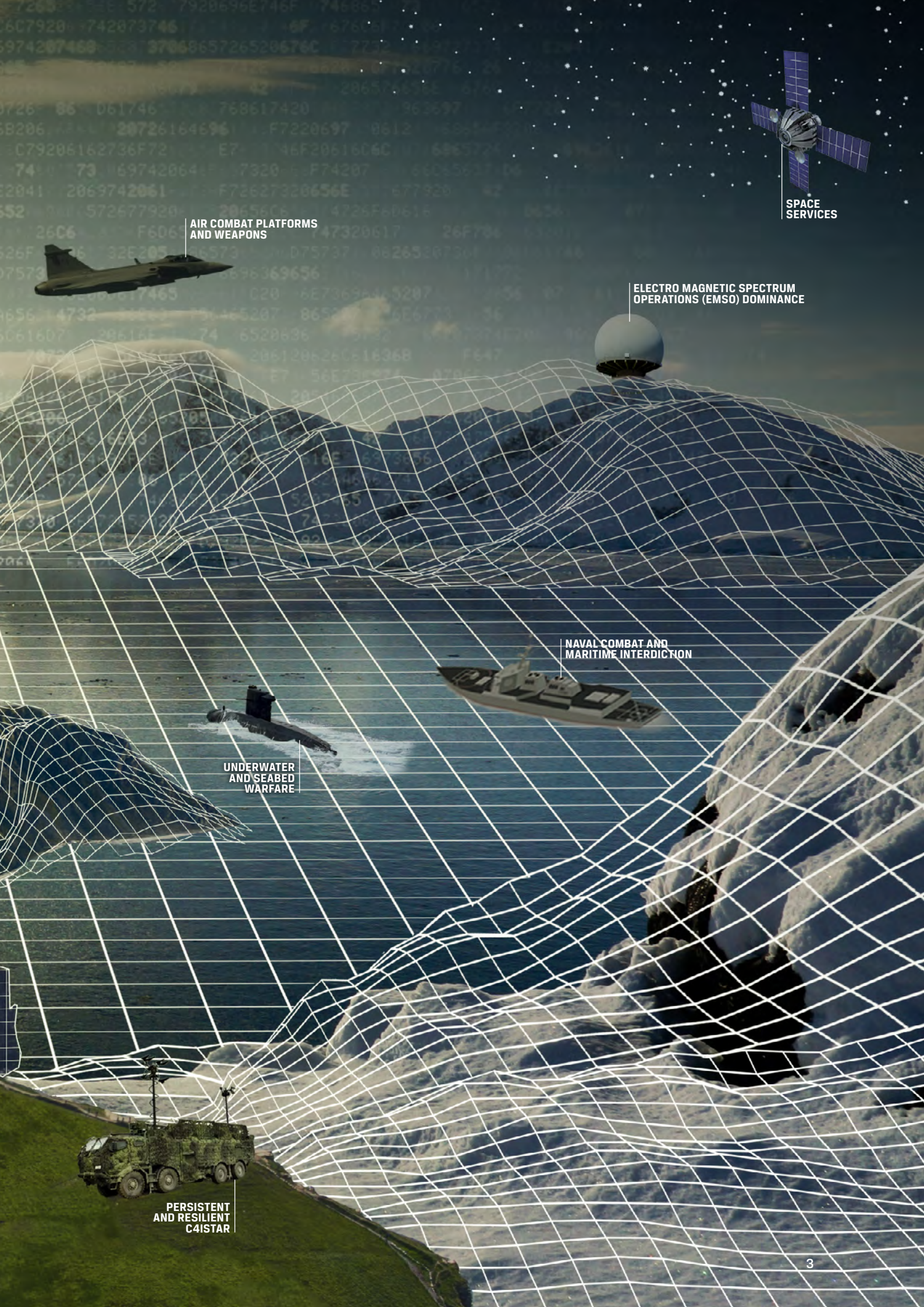
GROUND
COMBAT
CAPABILITIES

FUTURE SOLDIER
SYSTEMS

LAND BASED
PRECISION
ENGAGEMENT

INTEGRATED
AIR AND
MISSILE
DEFENCE

THE 2023 EU CAPABILITY DEVELOPMENT **PRIORITIES**



SPACE SERVICES



AIR COMBAT PLATFORMS AND WEAPONS



ELECTRO MAGNETIC SPECTRUM OPERATIONS (EMSO) DOMINANCE



UNDERWATER AND SEABED WARFARE



NAVAL COMBAT AND MARITIME INTERDICTION



PERSISTENT AND RESILIENT C4ISTAR

Overview

This document presents the outcome of the revision of the Capability Development Plan (CDP)¹.

It reflects the changes in the EU's strategic environment, political guidance provided by the Strategic Compass as well as lessons observed from Russia's war of aggression against Ukraine. This results in a set of revised Capability Development Priorities which will serve as the central reference for defence planning EU-wide and the baseline for all defence-related initiatives and instruments such as the Coordinated Annual Review on Defence (CARD), the Permanent Structured Cooperation (PESCO), the European Defence Fund (EDF) and any future EU Defence supporting tools. In line with the Strategic Compass, this set of priorities shall also serve as a prime reference for national planning.

Since 2008, the European Defence Agency has been regularly updating its CDP in close cooperation with its Member States and with the active contributions of the EU Military Committee and the EU Military Staff. The 2023 review resulted in 14 priorities across the five military domains, and a further 8 categorised under strategic enablers and force multipliers.

The 22 CDP priorities are the outcome of an in-depth assessment of short, medium, and long-term capability trend analysis. These trends cover existing capability shortfalls in the CSDP context, lessons identified from recent operations and missions, planned cooperation and potential for future European collaboration. They also encompass an analysis of long-term technology perspectives and future operational environments, including their associated requirements.

This revision reaffirms long-standing priorities and balances them with new ones arising from the profound shift in the EU strategic environment. It reflects where continued efforts in certain areas are still needed (i.e. cyber, or land based precision engagement) and where gaps previously identified have been mitigated (i.e. air-to-air refuelling and Counter-Improvised Explosive Devices).

However, the revised priorities also look to emerging threats, as we must prepare for the future and not just repair the past. They succinctly capture those next generation capabilities, vital to bolstering European military capability across all operational domains, addressing both operational realities and future threats and challenges.

Capabilities cover a broader operational perspective and often a wide spectrum of tools beyond the military realm narrowly defined along equipment and platforms. Acknowledging the complex and interdependent nature of capability development, this CDP revision underscores the key importance of strategic enablers and the appropriate mix between the qualitative and the quantitative dimensions, thus linking with the industrial dimension.

By maturing projects that implement these priorities, Member States will develop the necessary capabilities for the EU to act as a capable security provider and contribute to the defence of the European security order.

1. A military capability is the ability to perform actions in order to achieve effects. It is defined by minimum requirements along identified lines of development (DOTMLPFI Doctrine and Concept, Organization, Training, Material, Leadership, Personnel, Facilities, and Interoperability).

2023 EU Capability Development Priorities



LAND

- › Ground Combat Capabilities
- › Land Based Precision Engagement
- › Future Soldier Systems



SPACE

- › Space Operations
- › Space Services



MARITIME

- › Naval Combat and Maritime Interdiction
- › Underwater and Seabed Warfare
- › Maritime Domain Awareness



CYBER

- › Full Spectrum Cyber Defence Operations Capabilities
- › Cyber Warfare Advantage and Readiness



AIR

- › Air Combat Platforms and Weapons
- › Airborne Command and Inform Capabilities
- › Integrated Air and Missile Defence
- › Air Transport



STRATEGIC ENABLERS AND FORCE MULTIPLIERS

- › Electro Magnetic Spectrum Operations (EMSO) Dominance
- › Persistent and Resilient C4ISTAR
- › Military Mobility
- › Critical Infrastructure Protection and Energy Security
- › Sustainable and Agile Logistics
- › Medical Support
- › Chemical, Biological, Radiological and Nuclear (CBRN) Defence
- › Cohesive and Well-Trained Militaries

E BALANCED DECISIVE INTEGRATED



Ground Combat Capabilities

Future land forces must be a well-balanced mix of light, medium, and heavy forces. Land assets and platforms need sufficient mobility, protection, and concealment capabilities to ensure their own security, including increased firepower incorporating flexible payloads.

The Priority **GROUND COMBAT CAPABILITIES** addresses these requirements through focusing on armoured land platforms and their weapon systems as crucial capabilities for all land operations. This calls for units which will be agile, stealthy, and capable of engaging the enemy with direct and indirect firepower.



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KEY AREAS

Next Generation Manned and Unmanned Armoured Platforms

Upgrade and development of Main Battle Tank, Infantry Fighting Vehicle and Armoured Personnel Carrier, enabled to operate in all environmental conditions and to face novel threats, such as small Unmanned Aerial Systems using swarming techniques.

Modular and Multifunctional Systems of Systems for Effective Land Capabilities

Modular and multifunctional systems of systems to provide land capabilities that are scalable and tailorable to different operations, including high-intensity operations.

Balanced Land Capabilities contributing to Multi-Domain Operations

Developing capabilities for land forces to contribute to Multi-Domain operations.



Land Based Precision Engagement

LAND BASED PRECISION ENGAGEMENT capabilities are decisive in neutralising, denying, or destroying the adversary's advanced military capabilities. Indirect Fire Support weapon systems with extended weapons range, enhanced precision and mobility are key. In addition, artillery launched guided ammunition must be able to achieve both extended range and enhanced precision. Anti-tank weapon systems which offer a mixture of easy handling, increased versatility on engaging multiple targets, advanced

fire control and target acquisition devices must also be developed. Future developments will need to address the requirements for improved warhead effectiveness, confined-space capability, as well as a reduced potential for detection. Advanced long-range sensors for target acquisitions and greater integration of data fusion in the Command and Control architecture will speed up targeting cycles which will reduce response times and enhance fire support at scale.

KEY AREAS

Battlefield Tactical Information Sharing

Use of Artificial Intelligence, target and fire control systems with Command and Control open architectures to improve accuracy and greater flexibility of effects to be delivered.

Large Calibre Ammunition War Stockpiles

Adequate quantities of large calibre ammunition (artillery, mortar, anti-tank) war stockpiles.

Next Generation Anti-Tank Weapon Systems

Multi-purpose, with the capability to defeat Anti-Tank countermeasures, to receive/transmit targeting data from multiple sensors/sources and share data between multiple Anti-Tank weapons.

Next Generation Close Fire Support Systems

Including the development of manned/unmanned self-propelled weapons systems with a 360-degree capability, computerised Fire Control Systems, and automatic/semi-automatic loading system.

Very Long-Range Indirect Fire Support Capabilities

Platforms and ammunition able to deliver more accurate kinetic and non-kinetic effects in enemy depth at higher distances, while resilient to electromagnetic actions and cyber-attacks.





Future Soldier Systems

FUTURE SOLDIER SYSTEMS must contribute to enhanced situational awareness, increased lethality, and improved survivability, through coded and standardised information exchange, the potential inclusion of exoskeletons, new materials, wearable sensors, and brain-computer interfaces.

Greater use and integration of Artificial Intelligence and Augmented Reality systems will support interoperability. Future developments, including use of manned-unmanned teaming, will enable the next generation of cognitively enhanced soldiers, more interconnected and with a better understanding of the battlespace.

KEY AREAS

Equipment and Systems for Improved Survivability

Incorporating human enhancement technologies and adopting new advanced materials to exploit new opportunities for improved survivability in terms of protection, medical monitoring, concealment, deception, and camouflage.

Weapons, Arms and Equipment with Increased Lethality and Accuracy

Adequate quantities and development of small arms, light weapons and night vision devices will contribute to increased lethality and accuracy. Soldier mobility will also benefit from lighter individual equipment, while adapting and developing non-lethal engagement tactics, techniques and procedures which will be designed to support decision making in all possible scenarios.

Enhanced Individual Systems and Integration for full Interoperability in a Multi-Domain Operational Environment

Standardisation of voice and data communication, software, human interface devices and power supplies will increase interoperability in a Multi-Domain operational environment. In addition, the growth of unmanned platforms and systems will call for a significant improvement in Manned-Unmanned Teaming, requiring revision of existing tactics and procedures.





Naval Combat and Maritime Interdiction

The Priority **NAVAL COMBAT AND MARITIME INTERDICTION** centres on the ambition to deter and respond to current and fast-emerging threats and challenges, in a maritime domain becoming increasingly contested, where state of the art naval capabilities is key to protecting EU interests. This priority aims to ensure superiority in the maritime domain while also enabling the capability to produce effects in Multi-Domain Operations, making the most of the efficiency of autonomous systems, advanced weapons with deep precision strike capability, and taking advantage of persistent C4ISTAR and collaborative early

warning at the operational level. A need exists to reduce the diversity of equipment, enhance interoperability, and make best use of disruptive technologies for the effectiveness of naval combat systems. The analysis highlights the operational push for enhanced readiness and the ability to counter anti-access/area denial capacities. In addition, the requirement for the development of naval interoperable platforms which integrate advanced shared data analysis and decision-making capabilities, as well as smart weapons and autonomous systems, must be addressed.

KEY AREAS

Upgrade of Current Naval Surface Systems

Including both manned and unmanned, Combat Systems, smart Damage Control Systems, energy storage and management systems and Electromagnetic Warfare capabilities.

Next Generation Naval Surface Combat Systems

Including surface vessels, training systems, interoperability with previous generations, and integration in a Multi-Domain Environment.

Long Range Armed Manned and Unmanned Maritime Systems (UMS)

Including enhancing UMS capabilities in terms of endurance and communication to support interdiction.





Underwater and Seabed Warfare

The Priority **UNDERWATER AND SEABED WARFARE** focusses on ensuring that all underwater capabilities, including mine warfare and anti-submarine warfare capabilities, are ready to deter, counter, and deny any threat from a competitor. The underwater domain, including the seabed, is critical to the EU where the free flow of commerce, energy, and data must be protected. The Strategic Compass highlights that the growing use of underwater assets by both state and non-state

actors, combined with technological advances, are changing the nature of the underwater domain. The advent of seabed warfare requires the development of new doctrine to address new threats and capability challenges. From an Unmanned Maritime System perspective, there is a need to develop, enhance and exploit opportunities for endurance and autonomy of Unmanned Maritime Systems, and their further integration within operations.

KEY AREAS

Seabed Warfare and Deep-Water Operational Capabilities

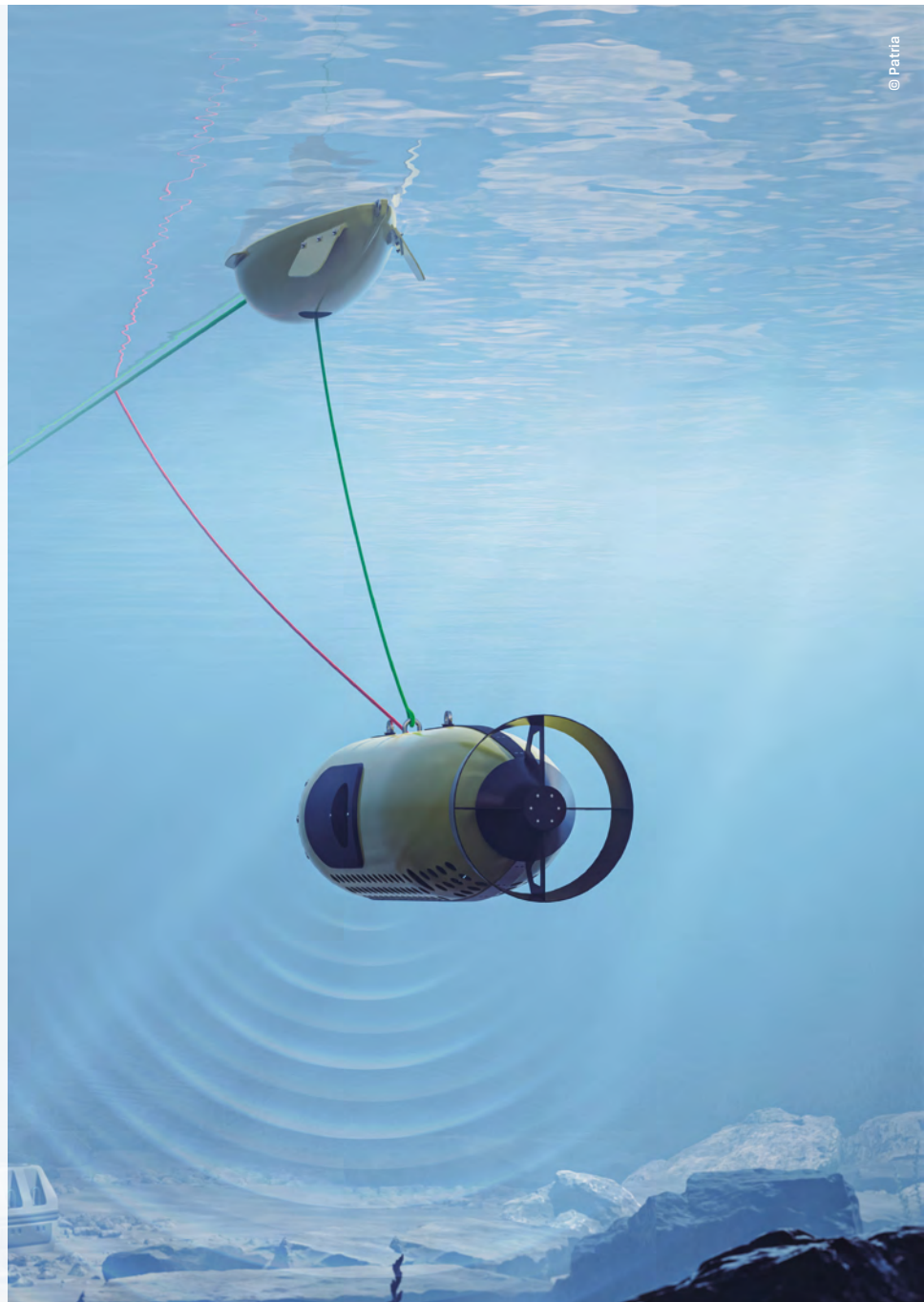
Seabed warfare CONOPS and doctrines need to be developed. Additional capability requirements include the development of Autonomous Underwater Vehicles and Unmanned Underwater Vehicles with a focus on, inter alia, advanced navigation and communications, efficient energy, and propulsion systems, performing persistent information gathering.

Underwater Force Protection Systems

Enabling and enhancing underwater situational awareness as well as the capability to protect naval forces and seabed installations.

Anti-Submarine Warfare Capabilities

The coordinated employment of static/deployable Underwater surveillance systems as well as submarines and Maritime Patrol Aircraft equipped with state-of-the-art technologies and sensors for enhanced data collection, Electronic Warfare, ASW and Intelligence, Surveillance and Reconnaissance tasks.





Maritime Domain Awareness

The Priority **MARITIME DOMAIN AWARENESS (MDA)** centres on developing a thorough understanding of the operational environment, vital for the success of any maritime operation. A complete Recognised Maritime Picture is only achievable when data about the situation both above and below water is collected, exchanged, fused, analysed, and interpreted. MDA requires continuous observation and compilation of pattern-of-life baselines (i.e. normality profiles).

To achieve this, civil-military cooperation is a vital enabler. Building on the achievements of the past years in terms of networking military information systems, as well as cross-sectorial connectivity, the future focus will be on improving data analysis by incorporating Emerging and Disruptive Technologies (EDTs) and utilising common databases. Tactical level information exchange must also be strengthened to ensure effective coordination in the area of deployment.

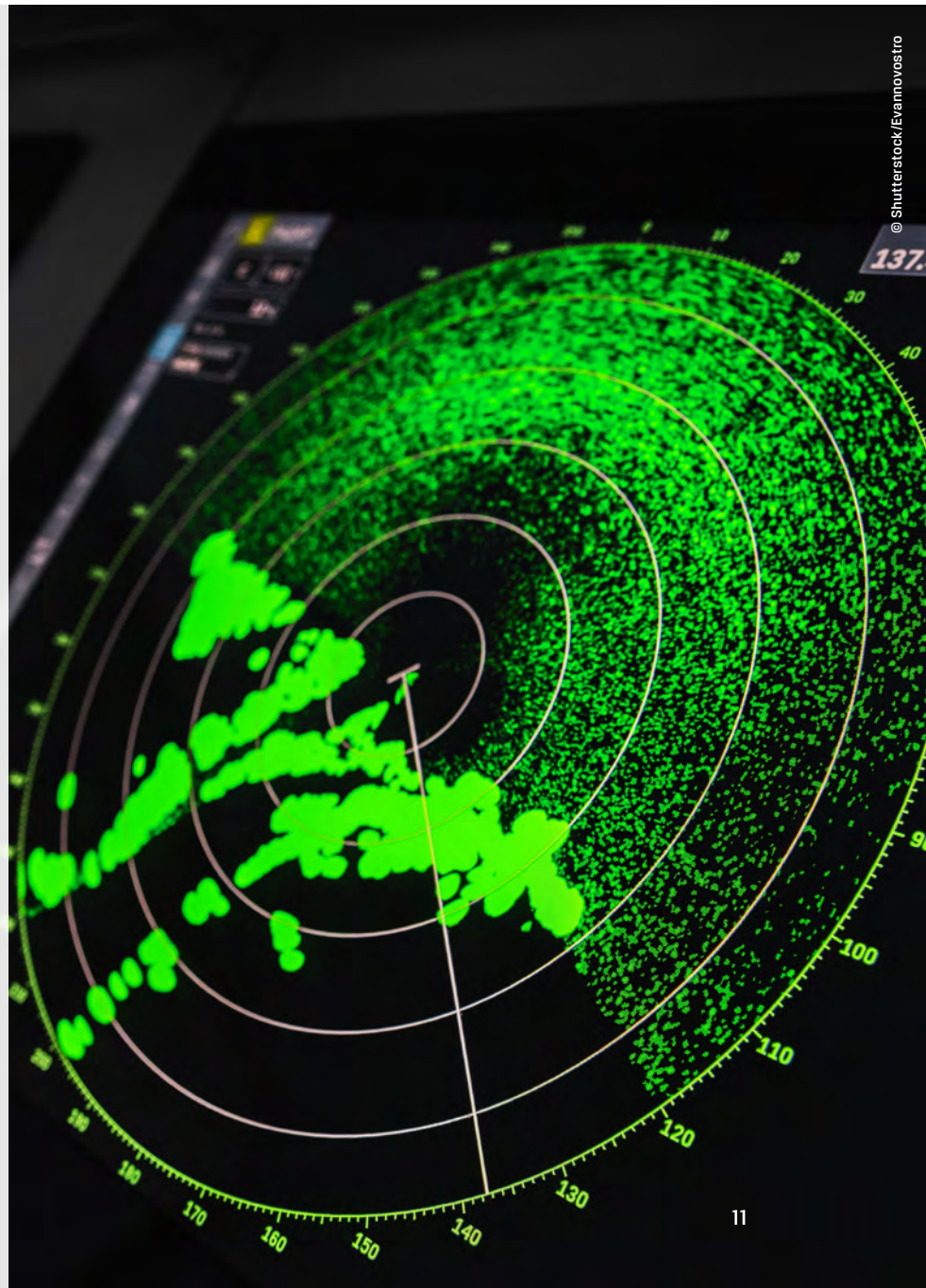
KEY AREAS

Next Generation Maritime Situational Awareness Capabilities

From a data collection and analysis perspective, capabilities will be improved through developing technology and creating an agile framework for cooperative use of data sources for maritime surveillance and open sources and databases, along with multinational fusion centres with supporting tools based on EDTs.

Comprehensive Underwater Surveillance Capabilities

Improvement of the capabilities for collection of information on underwater threats. This includes both the development of technology (e.g. digital barriers, multi-static systems, distributed optical sensing, unmanned systems, etc.) and multinational architectures and procedures. Gradual establishment of a flexible and resilient underwater surveillance architecture and integrating the underwater surveillance information into the established information exchange networks will need to be addressed.





Air Combat

The Priority **AIR COMBAT** encompasses all the capabilities where the engagement, notably in a denied environment, comes from the Air with the intent to achieve a kinetic or non-kinetic effect. Accordingly, it focuses in particular on multi-domains integrated systems (sensors, effectors, C2 and architectures) to conduct synchronised Joint Precision Strikes, working on. It addresses requirements to improve detection and tracking systems for rapid detection,

identification, and targeting of adversaries' assets, including Electronic Warfare effectors and deception means. Enhanced precision systems and effectors are also needed to detect, track and engage small targets, such as Low, Slow, and Small Unmanned Aerial Vehicles, including Hi-energy lasers and other Directed Energy Weapons engaging large numbers of small assets (swarms) and high-altitude assets such as slow High Altitude Platform Systems.

KEY AREAS

Upgrade of current Air Combat platforms

Including fixed, rotary, manned, unmanned platforms; the upgrade of Suppression and Destruction of Enemy Air Defences capabilities, including drones' swarms; the upgrade/development of Electronic Warfare (EW) capabilities.

Next Generation Air Combat Systems (fixed and rotary wings)

Including fixed/rotary wing manned air platform; fixed/rotary wing collaborative/wingmen drones; air launched armament; training systems; interoperability with previous generation systems; integration in Multi-Domain operations.

Armed Remotely Piloted Aircraft Systems (all categories)

Including fixed and rotary wings RPAS; the weaponisation of existing platforms; integration to other manned Air platforms.

Next Generation Joint Precision Strike

Including all types of Air launched armament; precision guided ammunitions; Air-to-Air missiles; cruise missiles; development of deep strike weapons; direct energy weapons; laser weapons.





Airborne Command and Inform Capabilities

The Priority **AIRBORNE COMMAND AND INFORM** encompasses all the capabilities related to COMMAND, INFORM areas where a manned or unmanned platform is used with the intent to achieve a non-kinetic effect. It addresses the lack of different airborne ISR capabilities (platforms and payloads) capable of collecting signals intelligence, measurement and signatures intelligence, and imagery intelligence (SIGINT, MASINT and IMINT). It builds upon lessons

observed from Russia's war of aggression against Ukraine highlighting the importance of persistent C4ISTAR (Command, Control, Communications, Computers, Intelligence, Surveillance, Targeting Acquisition and Reconnaissance) at operational level, based on a high degree of interconnectivity of assets from all domains. These assets must take advantage of advanced technologies but also include relatively cheap, simple, and potentially armed UAS.

KEY AREAS

Multi Mission / Reconfigurable Unmanned Aerial Systems (UAS)

Including the development of fixed and rotary wing platforms for different types of missions depending on the ground configuration with specific and interchangeable payloads; data transfer to other manned or unmanned Air platforms or Command post; related self-defence devices and armament.

Airborne Early Warning (AEW) / Maritime Patrol Assets (MPA)

Including the development and procurement of AEW systems, including UAS; development and procurement of MPA systems, including UAS; upgrade of existing fleets; interoperability with existing and future assets; integration in Multi-Domain Operations.

MALE / HALE RPAS and High-Altitude Platform System (HAPS)

Including the further development of the medium altitude "Eurodrone" Remotely Piloted Aircraft Systems (MALE RPAS); effectiveness in information sharing and exploitation; coordinated development of HALE RPAS; development of high-altitude flying platforms performing persistent data collection but also communication relay functions.





Integrated Air and Missile Defence

The Priority **INTEGRATED AIR AND MISSILE DEFENCE (IAMD)** encompasses all surface-based capabilities with the intent to achieve a kinetic or non-kinetic effect toward an airborne threat. It addresses the need to improve detection systems with new sensing technologies, quantum technologies, space assets, artificial intelligence, data fusion, and enhanced communication is clear. Effectors also

require further development, notably in the areas of Directed Energy Weapons to counter Unmanned Aerial Systems. The development of next-generation fully interoperable capabilities, notably air defence systems, complemented by Countering Unmanned Aerial Systems, is to be established as a European standard for Anti Access/Area Denial capacities, interoperable with NATO.

KEY AREAS

Next Generation Multi-layered IAMD systems

Including scalable solutions; the ability to detect the launch, trajectory and location of the adversary's ballistic/cruise missiles, including advanced mobile re-entry vehicles and/or hypersonic systems by developing a space-based Early Warning capability; the development of endo-atmospheric interceptor; the training systems; interoperability with previous generation systems; the integration in Multi-Domain operations; and interoperability with current and future IAMD and integrated C2 systems.

Upgrade of current Air Defence systems

Including C-RAM (Counter rocket, artillery, and mortar), MANPADS (man-portable air-defence systems), (Very) Short-range, Medium Range Air Defence systems; the decommissioning of soviet era Air Defence systems; the upgrade of effectors; the integration in Multi-layered IAMD systems.

Counter UAS capabilities

Including the dual use dimension of this capability; the integration in existing Air Defence C2 systems; the kinetic and non-kinetic effectors; the ability to counter Slow, Small, Low threats as well as drones' swarms.





Air Transport

The Priority **AIR TRANSPORT** encompasses all capabilities that enable the (re-) deployment of forces by means of air transport, sustained logistics through airlift, and any other specific mission that relies on the use of air transport platforms. The priority addresses platforms, such as strategic range transporters for medium/heavy/outsized payloads,

tactical fixed wing and vertical lift aircraft, manned and unmanned platforms, and smaller brigade-/platoon-level assets. It also includes the further development of air-to-air refuelling capacities and the development of management systems for the whole aerial logistics chain and platform/cargo-specific ground infrastructure, such as automated loaders and distributors.

KEY AREAS

Tactical Cargo Unmanned Aerial System (UAS)

Including platforms of 3 to 4 tons payload to complement similar size/payload manned tactical platforms, including autonomous cargo handover/takeover with manned tactical and strategic cargo platforms.

Next Generation Multipurpose Helicopter

To include a Manned-Unmanned Teaming-capable, optionally-piloted helicopter to perform personnel transport, light logistic and combat operations.

Air-To-Air Refuelling (AAR) UAS

Including the development / procurement of remotely piloted AAR tankers; the ability to perform manned-unmanned or unmanned-unmanned automated refuelling; the standardisation of procedures; the training systems; the interoperability with previous generation systems.

New Tactical and Strategic Air Transportation Platforms

Optimised access to existing, and development of, next generation medium tactical airlifter, development of strategic airlift solutions enabling the transport of heavy and outsized payloads; cooperative life-cycle, operations, and advanced training activities, AI/algorithm-based optimisation of cargo-pooling and distribution, and asset assignment for an air logistic flow management system at EU level.





Space Operations

The priority **SPACE OPERATIONS** encompass the launch, early-orbit, monitoring, management, execution, and protection of activities related to space missions and assets, ensuring their successful implementation and long-term sustainability in space. Space capabilities are fundamental to enabling all space operations, to protect satellites and to establish a framework of Space Situational Awareness (SSA) for

detection, tracking, identification, and characterisation of space objects as SSA is key to the use of space for military operations. Space assets will have to be robust, reliable, resilient, and redundant to keep a high operational availability, since Space is expected to become an increasingly congested, contested, and competitive domain, and each asset will be vulnerable to a wider range of emerging threats.

KEY AREAS

Space Situational Awareness

Focused on fostering the detection, tracking, identification, characterisation and attribution of all relevant space objects, risks, and threats from, in and to the space domain.

Access to Space

Based on regulated and coordinated regimes, focused on ensuring an autonomous, reliable, and versatile capability to efficiently deploy and maintain space objects from EU MS territory as well as other locations in support of defence objectives, including through responsive launchers.

Protection of Space Systems

Aims to identify risks and vulnerabilities, to protect and defend space systems in case of interference, malicious behaviour or attack, and to prepare response measures, e.g. to renew space systems.





Space Services

The priority **SPACE SERVICES** utilises space-based technologies to deliver defence capabilities in Earth Observation, Satellite Communication and Positioning, Navigation and Timing and are essential enablers in support of all operational domains. Capabilities developed at EU level in the context of the EU Space Programme, considering military requirements and commercially available services, will contribute to the overall defence landscape. Space services are critical

calling for an increase on collaborative initiatives, to address possible challenges related to the provision of key services considered essential to ensure and improve resilient C2 and information superiority. Lessons observed in Russia's war of aggression against Ukraine stressed the need to foster and enhance a robust EU MS satellite constellation, including for a tactical use in the frame of battle damage assessment confirmation.

KEY AREAS

Space-based Earth Observation Capabilities

Focused on reinforcing existing space-based intelligence and surveillance capabilities through persistent surveillance, improving interoperability, data sharing and data processing, integrating novel analysis and data fusion techniques whilst leveraging the use of Artificial Intelligence (AI) supported systems.

Positioning, Navigation and Timing

Focused on improving the accuracy and resilience of services, enhancing the robustness and security to detect, mitigate vulnerabilities (i.e. jamming, spoofing, and cyber-attacks) and developing receivers and algorithms for multiple Global Navigation Satellite System (GNSS) systems usage.

Satellite Communication (SatCom)

Focused on secure and guaranteed services, including inter alia usage of IRIS2 constellation integration and resilience of LEO/MEO (Low Earth Orbit/Medium Earth Orbit) constellations and terrestrial (5G) systems into SatCom systems.



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Full Spectrum Cyber Defence Operations Capabilities

The priority **FULL SPECTRUM CYBER DEFENCE OPERATIONS CAPABILITIES** focusses on ensuring the resilience of our own cyberspace, mitigation of known risks, and protection of mission networks from the full array of cyber threats. Full spectrum capabilities for cyber operations are essential to coordinate and manage cyberspace operations, perform battle damage assessment, prioritise key cyber assets, manage risk

and share information to ensure effective de-confliction, synchronisation, and integration of activities with friendly, neutral, and civilian actors. Full spectrum cyber capabilities will collectively enable effective defensive actions, ensure robust situational awareness, and the protection of vital mission networks in the ever-evolving cyberspace landscape. They will set the basis to project power and deliver effects through cyberspace.

KEY AREAS

Agile and Adaptive Cyber Capabilities

Addressing Cyber assets deployment, as well as convergence of Cyber and Electromagnetic Warfare at tactical level. Fast-changing cyber threats call for agile adaptation in the cyber domain, greater information sharing, shared situational awareness, increased supply chain security and incident management. Enhanced resilience will be reinforced through the development of non-legally binding voluntary recommendations to increase cybersecurity in the defence community inspired by the Network and Information Security (NIS2) Directive.

Improved EU Cyber Interoperability and Standardisation

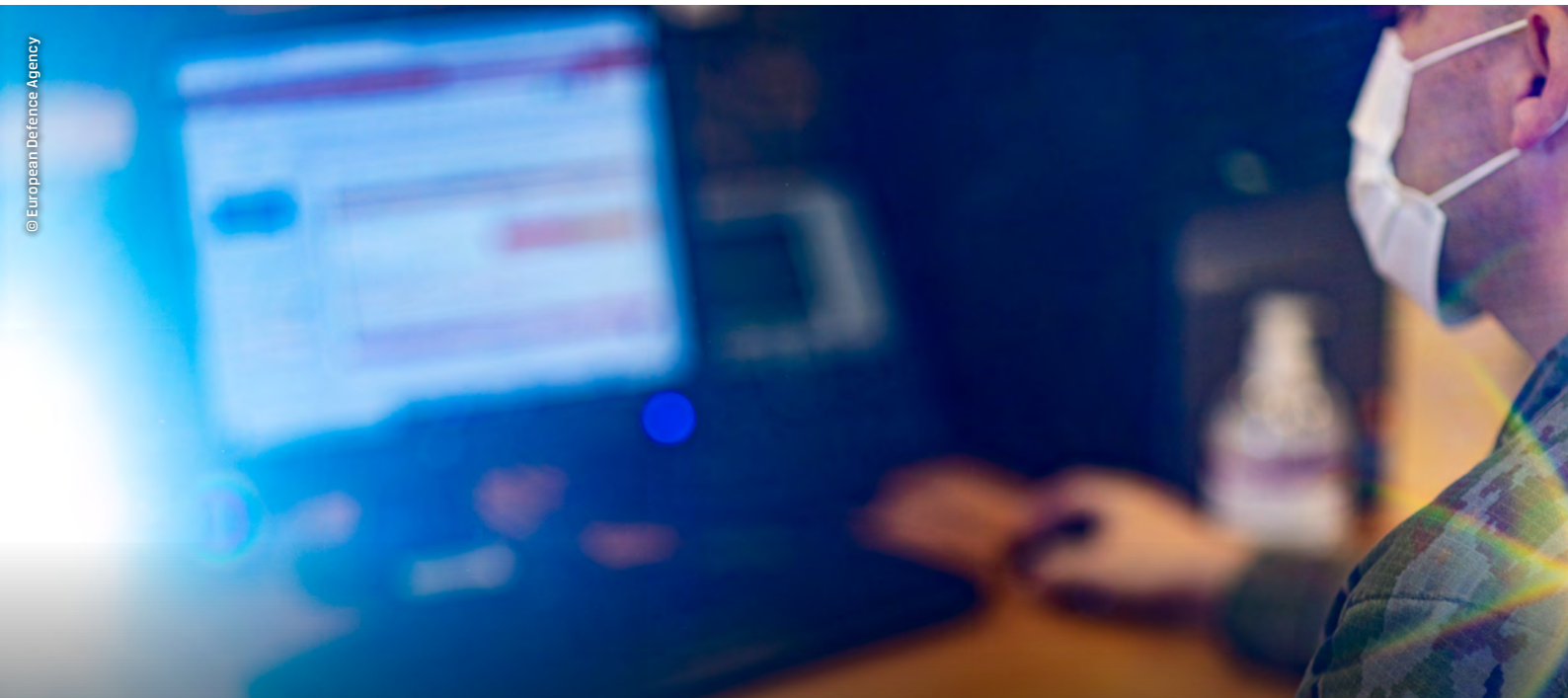
Increasing cooperation between civilian and military cyber entities to harmonise common approaches and standards for dual use products. The Enterprise Architecture for Cyber Responsive Operations will require further updates to keep the pace of the evolution of cyber warfare exploiting cooperation opportunities.



Cyber Warfare Advantage and Readiness

The Priority **CYBER WARFARE ADVANTAGE AND READINESS** focusses on research, improving technology and enhancing cooperation in cyber defence through joint capability development and increased investment to maintain a competitive advantage which is vital for both the EU and MS. In addition, increasing efforts on cyber defence education, training, exercises, and evaluation

including further experimentation to deploy effective and cutting-edge cyber capabilities, is a fundamental building block for cyber operations. Given the dual-use potential of cyber technologies, cybersecurity and cyber defence industries must also synergize their efforts to enhance capabilities effectively, adapting doctrine and procedures to address the fast-evolving challenges.



KEY AREAS

Advanced and Innovative Cyber Defence Technological Solutions to Information Warfare and Multi-Domain Operations

Research and innovation for Cyber domain capabilities will be key to stay abreast of technological developments by addressing the recent technology paradigm shifts on military systems driven by Emerging and Disruptive Technologies military applications and support long-term strategic investment decisions. State-of-the-art cyber defence technology will be crucial for reducing risks within capability-driven research through prototyping or experimentation. These capabilities will enable Information warfare and Multi-Domain operations, allowing cognitive superiority supported by different AI algorithms.

Enhanced Testing and Experimentation for Cyber Force Readiness

It will include the development of the network of testing and experimentation centres in the cyber domain and the activities related to the implementation of EU Policy on Cyber Defence. Increased readiness will be further strengthened through the Cyber Defence Exercises Programme.



Electro Magnetic Spectrum Operations (EMSO) Dominance

The Priority **ELECTRO-MAGNETIC SPECTRUM OPERATIONS DOMINANCE (EMSO) DOMINANCE** focuses on the fact that the future C4ISTAR environment and its digital infrastructure will be ever more critically important, due to the increasing proliferation of information and electromagnetic signals, requiring effective management and communication. Consequently, EMSO are essential for the planning and execution of military operations in all domains.

In air combat, improving the detection and tracking of systems for rapid detection, identification, and targeting of adversaries' assets, including Electronic Warfare effectors, and deception means is key. In addition, the need for new lethal and non-lethal systems to disrupt, deceive, and damage or destroy electronic systems across the electromagnetic spectrum, including the use of EW systems and directed energy weapons must be addressed.

KEY AREAS

Electromagnetic Spectrum Freedom of Action Capabilities

Critical to establish effective electromagnetic battle management for military activities. Armed Forces need to focus on the identification and categorisation of spectrum-dependent systems, services, and activities. It will be achieved improving, inter alia, electromagnetic order of battle for informed decisions about spectrum usage; the ability to plan and coordinate spectrum-dependent operations; the effective allocation and control of spectrum resources for an efficient utilisation of available frequencies through dynamic spectrum management solutions for spectrum sharing according with regulations and thus, minimising the risk of electromagnetic interferences.

Electromagnetic Warfare Capabilities

The kill chain for future kinetic engagement with precision fire effects will rely on Electronic Warfare effects on the adversary. Therefore, Electro Magnetic Spectrum-related technological developments which enable an advantage over an adversary will be essential.





Persistent and Resilient C4ISTAR

The priority **PERSISTENT AND RESILIENT C4ISTAR** encompasses the integration and utilisation of information as a critical enabler to gaining a decisive advantage in military operations spanning multiple operational domains. It emphasises the importance of leveraging relevant information through the operationalisation of mission-tailored Communications and Information Systems (CIS),

Command and Control and to enhance situational understanding, decision-making and coordination of forces and effects across land, sea, air, space and cyberspace. In this context, information superiority, as the ultimate goal, refers to the ability to gather, analyse and utilise information at the speed of relevance to increase operational effectiveness thereby ensuring an operational edge over adversaries.

KEY AREAS

Integrated Persistent Intelligence, Surveillance, Target, Acquisition and Reconnaissance (ISTAR) information sources

Developing an integrated network systems-of-systems that provides a timely shared situational awareness and early warning in a multi-domain environment. In addition, making use of AI-supported and algorithm-based tools.

Interoperable and Integrated C2 Systems

Develop interoperable and integrated C2 Systems by developing state-of-the-art systems coupled with day zero readiness deployable assets in a European framework and contribute with the design and implementation of a European Multi-Domain C2 approach.

Interoperable and Resilient CIS

Develop interoperable and resilient CIS notably at the tactical edge, is critical to ensure seamless communications to the most remote nodes of a unified mission network.

Digital Transformation of Armed Forces

Leveraging from dual-use technologies and innovation using concept development and experimentation within the scope of a rapid evolving Digital Transformation of Armed Forces.



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Military Mobility

The priority **MILITARY MOBILITY** is an essential enabler for the effective, timely, and safe deployment, movement and transportation of military personnel and assets in the frame of missions, operations, exercises, or day-to-day activities. Military Mobility enables the swift, efficient, and unimpeded movement of military personnel, materiel and assets – including at short notice and at large scale, across a well-connected network, with shorter reaction times, and secure and resilient infrastructure. Russia's war of aggression against Ukraine has

confirmed the urgent need to substantially enhance the military mobility of Forces, within and beyond the EU, where dual use transport infrastructure across the trans-European transport network will be strengthened. Effective mobility will be achieved by connecting all different nodes of transportation including consideration of innovative approaches to protecting the transport of personnel and goods. In addition, harmonised procedures and removal of procedural barriers will facilitate swift military movement.

KEY AREAS

Enhanced Sustainability, Resilience and Preparedness of Lift and Logistical capabilities

Ensuring future all-domain transport and lift capabilities. Within this area, the coordination with civilian maritime and aviation authorities will be ensured.

Accessibility and Availability of Civilian Transport Infrastructure for Military Platforms

Ensuring accessibility and availability when and where required.

Integration of Military Air Capabilities in the EU Airspace

Ensuring an effective, secure and safe access to airspace and use of air navigation services in the context of the Single European Sky will be critical to guaranteeing the availability, interoperability and readiness of the existing and future manned and unmanned Air Capabilities.





Critical Infrastructure Protection and Energy Security

The priority **CRITICAL INFRASTRUCTURE PROTECTION AND ENERGY SECURITY** addresses the requirement to bolster the resilience of critical infrastructure, including energy infrastructure, on which Armed Forces depends to preserve its sustainability and operational effectiveness. Effective protection of critical infrastructure entails the well synchronised actions of various actors, civil, civilian, and military. From an energy infrastructure perspective, the CDP revision underlines an expected growing demand of energy in the future operational environment, due to

higher level of digitalisation, proliferation of unmanned systems, increasing battlefield sensing, Directed Energy Weapons, and the trend toward platform electrification and other alternative propulsions. Civil and military energy supplies are difficult to separate completely since EU MS rely on civil energy infrastructure for its functioning and operations. Thus, the appropriate capabilities to address the protection of Critical Energy Infrastructure against hybrid threats, including climate change cascading effects and natural disasters, must be developed.

Irish Defence Forces



KEY AREAS

Civil-Military cooperation and Enhanced Information Exchange for Critical Infrastructure Resilience

Civil-military cooperation to further enhance interoperability and synergies and improve joint and comprehensive responses will lead to a more resilient and effective defence-related critical infrastructure. Periodic vulnerability assessments should be undertaken to identify interdependencies and cascading effects based on experiences.

Advanced Critical Infrastructure Protection Systems

Including the development of permanent detection systems through the integration of manned, unmanned, and fixed-sensor systems into a Common Operational Picture for critical infrastructure protection on land, at sea and on the seabed which will be used to detect, track, and identify threats across a wide area of operations.



Sustainable and Agile Logistics

The Priority **SUSTAINABLE AND AGILE LOGISTICS** encompasses the capabilities to facilitate the projection, sustainment, and effectiveness of forces. This logistic approach requires appropriate numbers of personnel, stocks, and materials, as well as technical and organisational means in place to enhance logistic capabilities. This will include developing future generation logistic systems and the implementation of new technical solutions, in order to streamline supply chain

management as well as logistic support activities in operations, notably with Additive Manufacturing (AM) capabilities. Extreme weather conditions will be more recurrent in the years to come, due also to climate change effects. Therefore, all maintenance equipment requirements and associated supply tasks will be affected, especially in expeditionary operations. Likewise, these severe conditions will have a higher impact on the systems significantly based on digital components.

KEY AREAS

Shared Stocks and Common Warehousing

To enhance operational readiness. Improving standardisation and interoperability of consumables and the exchangeability of spare parts.

Enhanced Military Engineering Capabilities

Through use of innovative solutions. Future requirements for sheltering and force protection may be enabled by implementing new materials technologies.

Federate Logistic Communication Network

To ensure coherent communication within various logistic processes. A common IT network to interlink national logistic systems and resource planning tools will be vital to enable a single application for a common stockpiling and warehousing.

Additive Manufacturing Based Enabling Capabilities

Reducing the military logistic footprint and delivery delay enhancing force projection and to support combat maintenance.





Medical Support

The priority **MEDICAL SUPPORT** is focused on the preservation and restoration of the health of personnel, thereby consequently contributing to the preservation of operational capacity. The priority Medical Support aims to foster and improve interoperability and medical capabilities for supporting greater efficiency of the medical services and facilities, also strengthening the

cooperation between military and civilian medicine. Medical techniques and procedures need to, where appropriate, have the agility to incorporate enabling technologies to deliver high quality health services where and when required. Additive Manufacturing will also support the production of synthetic medical products on-site and on demand.

KEY AREAS

Medical Treatment Facilities

More interoperable, flexible, modular, efficient and rapidly deployable medical assets, which includes MEDEVAC (as well for infectious diseases) especially under the aspect of limited holding capacity and Medical Treatment Facilities (ranging from high mobility to fixed).

Remote Medicine

Reducing logistic footprint, thus enhancing protection and survivability. The ability to treat wounded personnel by using remote techniques and therefore without deploying valuable doctors and assets will be vital to enable the treatment of patients either in transit during evacuation or close to the frontline.

Robotics and Autonomous Systems (RAS) for evacuation

RAS will enable faster response capabilities to casualties, such as unmanned platforms for MEDEVAC. Autonomous systems may be used to deliver critical medical supplies, bring capability forward, or establish a medical situation assessment.





Chemical, Biological, Radiological and Nuclear (CBRN) Defence

The priority **CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) DEFENCE** encompasses the capability for the upgrade and development of advanced individual and collective protection methods and systems against future evolving CBRN hazards and threats. CBRN defence must be

considered as a full spectrum capability requirement for hybrid response capabilities, crisis management operations and high-intensity confrontations. For CBRN situational awareness, networking of sensors and Europe-wide transmission of the data is deemed essential.



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KEY AREAS

Enhanced Sensors/Advanced Materials

Nanotechnology offers significant opportunities for the development of miniature sensors capable of detecting hazardous particles with negligible energy consumption. Likewise, other material technologies, such as self-decontaminating surfaces, are also expected to provide further active protection against persistent and evolving CBRN threats.

CBRN related Data Networking and Automation

The integration of CBRN advanced sensor and detection/identification devices into other platforms such as small autonomous vehicles or drones will be key to facilitating the accomplishment of several CBRN tasks by using robotics and autonomous systems, such as operating in CBRN hazard areas, conducting CBRN reconnaissance tasks, or transporting hazardous materials.

Improved and Innovative Recovery and Decontamination Methods and Equipment

All forces, including specialised CBRN Defence units, will need modularity, multifunctionality, and scalability to reduce costs and limit dependence on specific-purpose platforms.

Common CBRN Defence and Explosive Ordnance Disposal approach to explosive ordnance threats with Chemical/Radiological involvement (CBRN_e)

A common CBRN Defence and EOD approach is required to deal with improvised and/or conventional ordnance with additional chemical/radioactive age.



Cohesive and Well Trained Militaries

This Priority **COHESIVE AND WELL TRAINED MILITARIES** centres on the development of professional military education, training, and the cohesion of Armed Forces. The professionalism of defence personnel is an essential component to preparing for an ever-changing environment. The Long-Term Capability Assessment forecasts an exponential advance in

technology resulting in a largely digitised society. This societal shift will demand a review of doctrine, professional military education and training. Future training and interoperability will be supported by Artificial Intelligence and Augmented and Virtual Reality systems. This offers opportunities for collaboration, exploiting simulation systems for joint training.

KEY AREAS

Leadership Development and EU Military Culture

Future-proofed leadership development will need to develop and enhance the competencies required to lead in an ever-changing environment. The establishment of common educational frameworks will enhance interoperability.

Boosting Digital Skills and Competences to Enable Multi-Domain Operations

All Forces need to accelerate digital upskilling to be ready for the step-up from the traditional "manual" control of systems, towards a "cognitive" supervision of a complex set of devices. Therefore, Armed Forces must continuously develop and upskill.

Education and Training for Specific New Domains and Functions

Space and Cyber domains are still relatively young domains from a military perspective. Thus, their ever-evolving education and training requirements must be addressed.

Enhanced education and training enablers, and facilities

Emerging Disruptive Technologies bring several opportunities to add real value to training. Simulation systems to model adversary courses of action in severe operational environments can be supported by AI enabled systems, AR/VR and wearable sensors.



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