Prague 2024

THE CZECH ARMED FORCES VISION OF FUTURE WARFARE BEYOND 2040

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Prague, 2024

Content

Introduction

The success of an armed forces in a conflict is rarely the result of chance or random impulse. Victory is usually the result of strategic decisions made long before the outbreak of war. Militaries that have correctly anticipated the nature of the future war, adopted appropriate doctrines, and built up adequate capabilities, have usually been operationally successful from the very beginning. Others had no choice but to trade territory for time. They had to learn during the course of the battle. However, a military that is designed to defend a country of our size cannot afford such an approach.

The defence of the Czech Republic is based on active membership in NATO. It relies on a strong transatlantic link and the system of the European Union's Common Security and Defence Policy. Participation in the collective defence system does not relieve the Czech Republic of its responsibility to develop the capabilities necessary for the defence of its own territory.[1] In the future, it cannot be completely ruled out that the Czech Republic might have to defend itself independently, especially at the start of a potential armed conflict. Therefore, the Army of the Czech Republic must be built up as an integral part of the military element of Alliance's collective defence, but also as a force component of the national security system.

The "Vision of Future Warfare" represents the Armed forces of the Czech Republic (henceforth ACR) foresight of how to conduct future operations and what are the subsequent requirements for military capabilities beyond 2040. It is based on the anticipated evolution of the security environment, technological trends, and experiences from modern conflicts. It outlines the shape of the projected operational environment, provides a qualified estimate of conditions for conducting army operations within combat functions, and derives general requirements for capabilities beyond 2040.

The Vision takes into account the geopolitical and strategic realms of the country and seeks answers to questions related to the ACR's ability to maintain combat effectiveness and succeed in future wars.

Strategic Background

The considerations for the operational use of the ACR beyond 2040 are based on the assumption of that the country will remain a NATO member. A fundamental condition for the success of the ACR in the future war is the fulfilment of Article 3 of the North Atlantic Treaty[2], which creates the technical and doctrinal preconditions for the independent deployment, as well as for the successful operation of the ACR in an multinational formation in the event of activation of Article 5 of the same treaty. The importance of EU membership and the resulting implementation of Article 42.7 of the Treaty on the European Union is also recognized.[3]

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1 Czech Republic Security Strategy 2023 (Article 84).

2 "To achieve the objectives of this treaty as effectively as possible, the contracting parties will individually and collectively maintain and develop their individual and collective ability to resist armed conflict through constant and effective self-help and mutual assistance."

3 "If a member state becomes the target of an armed attack on its territory, the other member states shall provide assistance and support by all means within their power, in accordance with Article 51 of the UN Charter. This does not affect the special nature of the security and defence policies of certain member states. Commitments and cooperation in this area are in accordance with the commitments within the North Atlantic Treaty Organization, which remains the basis of collective defence for those member states that are members, and a forum for its implementation."

Delineation

The vision addresses the conduct of large-scale, high-intensity warfare against a technologically advanced state actor armed with nuclear weapons in a joint operational area, which includes the territory of the Czech Republic.[4] It takes into account the country's current capabilities and projected resource and demographic potential, but these are not regarded as major limiting factors.

How the Evolution of the Security Environment Will Affect the Operations of the Czech Armed Forces after 2024

In the security environment, the interests of the state and other actors in the system of international relations are realized and clash. Processes that have a significant impact on the security situation of the state take place here. Due to its geopolitical realm, the Czech Republic has little potential to shape the security environment. It is therefore even more important to anticipate its development and take necessary and timely steps to protect the country's security interests.

The security environment is addressed in detail by the Security Strategy of the Czech Republic and the Defence Strategy of the Czech Republic. NATO's Strategic Foresight Analysis 2023 deals with the prediction of the security environment up to 2043. This chapter of the Vision focuses on the impacts of security threats on the development of the ACR and the conduct of future military operations.

In the political domain, there is particularly the threat of weakening democracy and the rule of law in any NATO country, which could lead to a weakening of alliance unity and prolong the time needed to achieve the necessary consensus for Alliance collective decision-making process. Therefore, it cannot be assumed that in the event of a threat to sovereignty and territorial integrity of the Czech Republic, Article 5 of the North Atlantic Treaty would be activated without delay. The ACR must be capable of independently fulfilling the role of a credible deterrent force and an effective war-fighting military with the ability to temporarily conduct operations on its own territory until collective defence measures are put in place

To do so, it must build a comprehensive spectrum of capabilities across all defined and anticipated operational domains, environments[5], and functional areas. Where this is not possible, at least elementary capabilities and know-how must be developed and maintained, enabling their relatively rapid build-up if necessary. However, the command and control system must be comprehensively developed at all levels, including the strategic one.

In the social sphere, we expect the continuing trend of low population growth, which will be further caused by a rather positive migration balance. Migration and the impact of globalization on the Czech population could lead to a growth in the community of citizens who do not consider the Czech Republic as their national state and identify more with virtual and trans-nation societies than with the state.[6] Limited population growth and loss of

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4 The ACR Military Doctrine

5 Today, NATO has formally defined land, maritime, air, space and cyber domains. In addition, electromagnetic and information domains are also envisaged.

6 Mickiewicz, Piotr et al. „Security Environment out to 2035-NUP 2X35, p.13.

loyalty to the nation state within the population could negatively affect the cohesion, tenacity, and resilience of society, as well as the recruitment and mobilization potential.

The development of defence capabilities of European countries and the competition between the USA and China will lead to an increase in the prices of weapon systems and military materials. This will have an impact on the armament of the armed forces. It is unlikely that this negative effect could be compensated by an increase in the defence budget, as its increase will be primarily hindered by the need to control public debt.

The domestic defence industry is part of the global production chain. It can play the role of a product supplier or a system integrator. However, its ability to deliver quickly under crisis conditions, when established supply chains are disrupted, cannot be relied upon. Nevertheless, the domestic defence industry is very important for stockpiling, introducing new technologies, and ensuring their operational reliability. It will also play a unique role in keeping technically competent human resources within the country.

The mobilization of the ACR and the maintenance of its combat capability will largely depend on provision of secured supplies and the existence of sufficient stockpiles. The production of sophisticated weapons and weapon systems just before or during a conflict cannot be relied upon. The existence and size of stockpiles, the ability to disperse, conceal and protect them are important to the survivability of the ACR.

Due to insufficient resources, the ACR will remain a relatively small beyond 2040, which will be at a fundamental disadvantage in a prolonged war of attrition. The only realistic alternative is conducting manoeuver operations, which are less resource-intensive.[7] Even so, it will be necessary to ensure adequate supplies of weapons, ammunition, and other materials for conducting long-term high-intensity operations by a mobilization-reinforced ACR. This is vital for warfighting sustainment not only for the ACR but also for all governmental and non-governmental institutions, including civilian contractors.

In the technological domain, the development of emerging and disruptive technologies that will blur the differences between the physical and digital worlds can be anticipated. A soldier will operate in a team with intelligent and autonomous systems that will be key for analytical and decision-making processes, support, and the conduct of combat operations. Artificial intelligence will be involved significantly in the management of the technology and will be involved in the soldier's decision-making processes during planning, managing, and conducting combat activity.

The rapid implementation of the most advanced technologies for operational use will be crucial. However, the ACR are not leaders in technological innovations. Therefore, close cooperation with the industrial and academic sectors is essential. The ACR must acquire systems with open architecture and achieve the ability to quickly and flexibly adopt technological innovations from the civilian sector for operational use. As soon as recent system or platform is available, the ACR must be ready to immediately undertake a generational upgrade of each system, especially those linked with the speed and accuracy of the decision-making process.[8]

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7 Martin van Creveld, Steven L. Canby, Kenneth S. Brower: „Air Power and Maneuver Warfare" Air University Press, Maxwell Air Force Base, 1994, p. 12-19.
8 OODA cycle (Observe-Orient-Decide-Act).

Operational Environment Beyond 2040

The operational environment is a combination of variable conditions, circumstances, and influences that determine the way armed forces are used.[9] In the future, it is anticipated that operations will be coordinated across all operational domains and environments. However, real warfare occurs simultaneously in domains and environments that are recognized at the moment, therefore the formal introduction of additional ones is not excluded.[10] Friendly and enemy forces will be in permanent contact across several or even all operational domains at once. The army's rear areas and the entire territory of the Czech Republic will be within reach of enemy air attack capabilities, constantly monitored from space and throughout cyber realm.

The ever-increasing use of highly sophisticated weapons and weapon systems must be taken into account. Autonomous intelligent systems for warfighting will play a significant role in all areas. The continuing proliferation of weapons of mass destruction, the shift to urban warfare, and the development of tactical nuclear weapons, will increase the likelihood of using nuclear, biological, or chemical weapons.

The future operational environment will generate a larger amount of inputs to the decision-making process much more rapidly. All combat and support systems will need to process a massive amount of information from various platforms in near-real-time and provide data to an integrated command and control system, which will require the implementation of artificial intelligence. Achieving integration across all domains within the ACR and throughout the Alliance will be essential.

The key to success in the next war is to force the enemy to continually face a variety of dilemmas across multiple domains simultaneously. The pace of change must be such that the enemy is unable to respond flexibly and gradually loses the initiative. Success lies in gaining cognitive dominance over the enemy, creating the conditions for supremacy in the speed of the decision-making process and the maneuvering of forces. The battle to achieve cognitive dominance and the perception of reality will be conducted across five areas: competition for intellectual superiority, situational awareness, gaining a multi-domain operational picture, automation of cyber activities, and creating narratives in near-real-time.

The enemy will conduct, hybrid operations, criminal and terrorist activities psychological, and information operations targeting hearts and minds of soldiers and the population. These operations will dominate the early stages of the conflict. This will be combined with conventional combat operations. The lines between military and non-military aspects of conflict will be blurred.

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9 AAP 6

10 Sometimes cognitive or subterranean domains are mentioned.

Characteristics of a "battlefield"

The battlefield, in terms of a combat area, is the space used by combat units to conduct operations.[11] Military operations will be conducted simultaneously across all domains. There will be an effort to initiate combat at maximum distance using highly accurate systems that feature AI and thus a high degree of autonomy. Success in combat will largely depend on early warning capabilities, real-time situational awareness, and the ability to link and coordinate efforts across various domains.

The battlefield will be covered by a multitude of sensors, ranging from sophisticated military devices to civilian stationary cameras and even the mobile phones of the population. There will be no problem identifying force concentrations or movements of larger units. For survivability and maintaining combat effectiveness, it will be crucial to disperse units and have the ability to concentrate fire without concentrating forces. Training higher tactical units (from brigade level upwards) after the outbreak of conflict will not be possible due to the disproportionate risk of losses associated with concentrating a large number of troops in a small geographic area.

The extensive use of smart long-range weapon systems will enable rapid elimination of enemy force concentrations in the depth of their operational formation. Effective intelligence and a command and control system that allows for target identification and shortens the "sensor-to-shooter" cycle are necessary. Precision guided munitions will not only reduce collateral damage but also logistics requirements, thereby simplifying force manoeuvers. As the conflict continues and the ability to acquire sophisticated, smart munitions degrades, the proportion of less precise, simplified munitions will increase.

The directional pulse weapons with greater range and effectiveness will be enabled by the growth in electricity production and its storage capabilities. These lethal and non-lethal weapon systems will be key to eliminating disruptive enemy platforms, such as swarming drones.

Technological enhancement of human capabilities will help to achieve military superiority with less manpower. Systems using artificial intelligence, augmented by virtual reality, and synthetic biology devices will enhance human psychological and cognitive abilities.

All types of manoeuvers will be important. The warfighting will be highly dependent on the sophistication of communication technology and systems capable of acquiring, processing, and distributing information, data, and analysis in near-real-time.

Capabilities for rapid deployment of units in combat area will be increased. Units will be capable of quick regrouping as the situation unfolds, significantly affecting enemy manoeuver capabilities and responsiveness. Protection and mobility of critical components, such as command posts or logistic hubs, will be crucial.

Gaining superiority in cyberspace will be essential for own forces protection and concealment of the objective of combat operations. Units must be able to achieve and then maintain superiority in cyberspace, as cyberspace will become the primary communication and information domain during the preparation and conduct of operations.

Given the likely dispersion of units, the speed of manoeuver, and the need to maintain the element of surprise, emphasis will be placed on reliable, mobile, resilient, and secure communications that will enable the transmission of large amount of data.

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11 AAP 6

FORECAST OF CZECH ARMED FORCES' COMBAT FUNCTIONS BEYOND 2040

Small armed forces cannot afford failure at the tactical level of warfare. They will never have the resources and time to learn from tactical failures. Therefore, it is crucial that they go into the future war comprehensively prepared. In this part of the Vision, the character of the future war is predominantly viewed through the prism of "combat functions". Describing the behaviour of the ACR within combat functions is a precondition for defining the necessary capabilities and creating operational doctrines for the future war.

Combat functions are defined by both alliance and national documents with various differences. For the purposes of this Vision, the following combat functions are defined:

- Manoeuvre
- Kinetic and Non-Kinetic Effects
- Command and Control
- Intelligence
- Information Operations
- Protection
- Sustainability

Manoeuvre

Manoeuvre is a fundamental way to avoid the destruction of own forces by an opponent's strike and to concentrate effect on acquired targets. It involves tasks, processes, and systems that include movements and use of forces to gain a favourable position against the enemy and to align the use of forces in space, time, and purpose. Direct fire and close combat are part of the manoeuvre. Commanders use manoeuvre to concentrate effect to achieve surprise, shock, and maintain operational tempo. At the operational command level, manoeuvre is the means by which the commander sets the conditions of the battle in space and time, engaging or avoiding combat, or exploits developments in the situation to its own advantage.

To ensure the alignment of manoeuvres in space and time across all domains, it is essential to build-up the capability of multi-domain command capabilities at all applicable levels. All combat units, elements of combat support and combat service support must be dispersed yet integrated into a single resilient digital network so that they are able to achieve positional advantage or concentrate effect in an orchestrated manner without the need to physically concentrate forces and resources into large, easily detectable units. For achieving maximum operational reach[12] within the capabilities being build-up, the integration of sensors and effectors is essential.

The ACR must have the capability to create and deploy manoeuvre elements both within its own territory and in allied operations outside the country. The precondition for successful precise and rapid manoeuvre is interoperability between the ACR and allies, state and non-state actors.

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12 Distance and time for which the ACR is able to deploy its military force.

Autonomous weapon systems will be heavily represented in the structure of manoeuvring forces and resources. The speed of manoeuvre at the tactical level will also be influenced by technologies that enhance human capabilities. The decision-making process, supported by artificial intelligence, will enable high operational tempo and speed of manoeuvre.

Tactical manoeuvre in a specific domain will be aligned in space and time within a multi-domain operation. Simultaneous manoeuvring across all domains will be enabled by analytical and decision-making processes supported by artificial intelligence.

Kinetic and Non-Kinetic Effects

These encompass all tasks, processes, and systems that create lethal and non-lethal effects impacting the enemy across all domains. The goal is to degrade the enemy's capabilities and support or enable operations of own forces. This function may include means from several types of forces across various domains, including direct and indirect fire, air strikes, as well as psychological or informational operations. It gives commanders the ability to affect the physical component of the enemy's combat force, influence the moral component, and affect the enemy's will to fight.[13]

The priority in the field of joint kinetic and non-kinetic effects is to achieve the capability to concentrate fire or effects without the need to physically concentrate forces. Fire and non-kinetic effects must be precise, effective, economical, and correctly aligned in space, purpose, and time.

Effective kinetic and non-kinetic effects require significantly reduced time between target acquisition, achieving desired effects, and their coordination across all domains. The ACR must have a very fast decision-making process at all command levels, with the ability to coordinate strikes and effects across all domains, which is fully integrated into the Alliance system but can also function independently. Systems with the capability of kinetic and non-kinetic effects will be largely autonomous or semi-autonomous, with limited human decision-making involvement.

Capabilities must be developed in the land, air, and cyber domains, to ensure comprehensive execution of joint fires and denial of access to areas of interest, including achieving dominance in the electromagnetic domain.

In the land and air domains, the ACR must strive to detect the enemy and conduct effective direct and indirect fire at greater distances than the enemy. Under no circumstances should the enemy be allowed to dominate in this area. The ACR must have the ability to prevent enemy manoeuvre with indirect fire at least in tactical and operational depth, including air force agile combat employment. A realistic and clearly demonstrated capability to conduct individual strikes at strategic distances will have a deterrent effect, "make the enemy potential attack costly", and enable the ACR to play an active role in the Alliance.

In the realm of non-kinetic effects, the ACR must have significantly developed electromagnetic warfare capabilities at all levels, conduct navigational warfare, signal intelligence, and highly effective electromagnetic spectrum management. It must conduct psychological operations to influence the population in areas of interest to its advantage. Furthermore, the ACR must conduct information operations and enhance the resilience of their own soldiers and the population against psychological influence of the enemy.

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13 Key components of non-kinetic engagement are strategic communications, information operations and public relations. At the operational level, the Joint Targeting Process is part of this function.

Command and Control

This refers to the capabilities and systems that allow commanders to effectively exercise command authority over all subordinate forces through the integration of all combat functions. Command and control involves personnel, staffs, processes, tactical activities, networks, command posts and communication and information systems. Each of these components is critical for effective decision-making and maintaining the operational tempo needed to defeat the enemy. Command and control integrate all systems, combat functions, strategy, operational art, planning, risk assessment, and the decision-making process into a unified whole.

The command and control process beyond 2040 will be a highly technological matter, involving the maximum use of artificial intelligence for analysing large amount of data and preparing alternative solutions. However, the personality of the commander and the skilled staff at all command levels will remain critical elements. Although modern technology will allow for relatively detailed planning and precise decision-making even at higher levels of command, the execution of these decisions and the adaptation of operational plans according to the conditions of the evolving combat will depend on the ability of commanders to make independent decisions based on the current situation. Multi-domain operations will require the ability to understand the situation not only in one's own domain but also to comprehend events in all other domains and understand their own role in relation to other domains. This will place requirements on the quality of commanders and their staffs and on the technological tools supporting them.

The architecture and capabilities of the ACR command and control system will be crucial for achieving and maintaining supremacy over the enemy in cognitive functions and for the speed of the ACRs´decision-making process. Without these, an army with limited resources will not stand a chance of victory.

Leading multi-domain operations requires processing, fusion, and distribution of a large amount of information from various sources. Artificial intelligence will play a crucial role in continuously analyzing and assessing the battlefield situation and automatically distributing information to users during the execution of command and control processes. Operation leadership will be ensured by centralized decision-making with an increased level of decentralized execution. The use of artificial intelligence will shorten the time required to complete processes. Real-time sharing of classified information will be key in creating a common operation picture of the battlefield, in all domains. Planning and decision-cycle processes will be significantly accelerated by the use of quantum technology, neural networks, and other emerging technologies supporting artificial intelligence. This is particularly evident in time-consuming processes, of forces and resources deployment options or battlefield activity monitoring. All components of the decision-making process will need to be resilient against the effect of disinformation. Advanced data analysis and distribution of relevant data from sensors to effectors will enable to perform a highly effective targetting and rapid response to changes on the battlefield.

The complexity of command posts in terms of staff numbers will be reduced by the use of artificial intelligence and advanced human-machine interfaces. Education and training of staff members at all levels will be oriented comprehensively and in multi-domain framework. Staffs will routinely be supported by preselected, highly specialized personnel from the active reserve or personnel mobilized from the civilian sector.

Intelligence

Intelligence encompasses a set of capabilities, activities, systems, and tasks focused on identifying threats and understanding the environment for conducting operations. It is a vital part of the successful decision-making process and is essential for other combat functions such as kinetic and non-kinetic effects, manoeuvre, or force protection.

The main task of intelligence is to support the decision-making process of commanders at all levels of command and control. Intelligence support is based on the efficient, accurate, and rapid execution of the intelligence cycle, which includes the processes of management, collection, processing, and distribution of intelligence products.[14]

An adequately structured intelligence support system is a precondition for achieving the necessary speed and efficiency of the decision-making process and gaining cognitive dominance over the enemy.

The increasing complexity of the operational environment will necessitate the use of extensive military and civilian knowledge bases and expertise to support the synergistic effect in a multi-domain environment. The shortening of warning times will require adjustments to the organizational structure of the intelligence support system.

To gain superiority over the enemy, technologies and processes must be implemented to significantly shorten the time between target detection and effector impact. Intelligence support capability must also be present at the lowest level of command and control.

The intelligence support system will rely on a large number and wide range of automatic and autonomous sensors operating in various information collection fields. These will be fused into larger networks. Intelligence information will be distributed accordingly and in near-real time. Space reconnaissance and open-source intelligence will play a significant role. To protect against cyber threats, elements of the intelligence support system must be designed with cyber security in mind.

Information Operations

Information Operations (IO) encompass activities necessary to shape the information environment to ensure effective operation of own forces while simultaneously limiting the enemy's will and ability to understand ongoing events and achieve their goals. This primarily includes ensuring the availability of necessary information across all levels of command of own forces.

The information environment is unstable and constantly changing. The significance and influence of IO on operations will increase. Conducting operations will require the fusion of effects in the physical, cognitive, and virtual realms of the information environment. Defending our own information perimeter will require the ability to continuously adapt the way we protect personnel and information systems.

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14 Definition according to AJP-3

Cognitive warfare[15] will become another tool to support offensive and defensive manoeuvres. Insights into human perception combined with the development of information technologies will extend traditional capabilities in conducting information warfare. It will enable more targeted effects on selected individuals and groups. The use of deep-fake content[16] and its impact on the individuals and groups mind sets will lead to the introduction of tools for detecting deceptive information and implementing countermeasures.

Maintaining access to information will require control over the state's information infrastructure in the electromagnetic domain. Leading technology companies will become part of enabling protection and combat in the information environment. Systems that can verify the source of information and the integrity of transmission paths will be used to ensure information authenticity. In the public part of IO, there will be an emphasis on verifying online information and identifying enemy information operations. However, a key component of defence against enemy IO will be our own: active strategic communication, providing truthful information, and dissolving the enemy's false narratives.

Protection

Force protection includes tasks, processes, and systems that prevent or limit the possibility of detecting own forces, mitigate effects on own forces, and minimize potential damage and loss. The goal of force protection is to maintain combat effectiveness and preserve freedom of manoeuvre. Essentially, it involves everything that makes own forces difficult to detect and hit. If the territory of the Czech Republic is part of the operational area, force protection is linked to the protection of the state's critical infrastructure and population.

Regardless of the distance from Czech territory where ground engagement with the enemy occurs, the state's territory will be within reach of the enemy's cyber, information, space, and air capabilities. In order to maintain the functioning of the state, military operations, and support activities on the territory of the republic, as well as the effectiveness of military units, it is necessary to have an effective defence against space domain operations, information influence, cyber operations and air defence of objects and manoeuvring forces.

Protection against enemy IOs targeting the civilian population and soldiers will require combating harmful narratives through effective and understandable strategic communication.

To ensure the cyber defence of civilian infrastructure and troops, joint crisis procedures with other state and non-state institutions and companies will be important. Cyber space defence and supply chain protection will be necessary. The use of artificial intelligence technology will be essential for active threat hunting, penetration testing, and the security of cyber threats operation centres.

Protection against enemy actions in the space domain will be based on monitoring the orbital movement of enemy satellites, their capabilities, and adopting appropriate countermeasures. Kinetic effects against space domain assets are not anticipated, but electromagnetic and cyber effects will be a regular part of defensive measures.

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15 An attempt to influence a person's psychological and cognitive abilities in relation to selected topics and situations. Cognitive warfare operations target social entities, public and state institutions. They attempt to alter the value system. Using modern technologies, they try to manipulate the human mind.

16 Artificial intelligence creating fake videos and photos that are very difficult to distinguish from reality.

The goal of air defence (AD) will remain to prevent the enemy from carrying out successful air strikes. This will create a time window for transitioning to a war state and the commencement of the ACR operations. AD will protect the civilian population, state apparatus, key infrastructure, and the combat capabilities of the ACR. AD must be effective against wide range of air attack means from simple drones, through ballistic missiles, to manoeuvring hypersonic assets. This defence includes active measures against air attack assets before their launch. Force protection on the battlefield will be ensured using principles of threat assessment, risk management, and prioritization. The key to the survival of forces will be the dispersion of forces, deception, camouflage, and tactical manoeuvre. The importance of measures against weapons of mass destruction and the prevention of industrial pollution caused by military activity will grow. The ACR must have systems resistant to electromagnetic pulse. Command posts will have the capability for rapid deployment, assembly, and relocation, equipped with active and passive camouflaging capabilities. They must have autonomous operation capabilities independent of external energy sources, utilizing alternative options for electrical power with minimal emissions. Command posts will have the capability for dispersed deployment positioning with interconnectivity and data sharing in a cloud environment, with the ability to transfer functionalities without disruption of the command and control system.

The key to force protection is the dispersion of forces into small, mobile units connected through advanced command systems capable of concentrating effect in place, time, space, and purpose.

Sustainability

Sustainability encompasses all tasks, processes, and systems that ensure support and services for maintaining the freedom of manoeuvre and other actions, operational reach, and the long-term sustainability of own forces. It includes the preparation of personnel, logistic support, and medical and engineering support.

Sustainability is essential for maintaining operational tempo and the ability to withstand prolonged conflict. A critical aspect will be comprehensive logistic support. Strategic stockpiles, operational logistic hubs, and supply centres will be highly vulnerable elements. Multi-domain operations will require a comprehensive change in approach to the protection and distribution of supplies. Protecting logistic hubs and depots will be the first priority in ensuring sustainability.

Given the anticipated prolonged and intense operations and limited shared capacities of the defence industry within NATO and EU countries, a second priority will be achieving sufficient volumes of selected critical types of ammunition for at least 60 – 120 days of operations.

The logistic support system will be based on sharing production, transportation, storage, and repair capacities of the industry and services. This will necessitate adjustments to national and European legislation. The required system will enable the transformation of production for war effort.

A third priority will be the management of logistical support in the combat area. Emphasis will be placed on high mobility of supplies and operational management of their distribution.

A likely transition from automated logistic support systems to autonomous ones, and further to the introduction of robotic unmanned supply and transportation platforms, particularly at the front line of the battlefield, is anticipated.

Autonomous means will be used to perform routine preventive maintenance and for storing and distributing supplies. Higher efficiency and monitoring of logistical tasks will be supported by data networks with cloud services along with support models functioning with the use of artificial intelligence. All this will allow maintaining a comprehensive situational awareness of sustainability and the status of supplies in real-time and will improve logistical support planning.

For medical support, the capabilities of medical personnel will be enhanced by extended virtual reality, robotics, artificial intelligence, telemedicine, and bio-sensing. These technologies will help maintain high combat readiness of the soldier by enabling remote treatment and shortening treatment time. In a prolonged conflict, it will be necessary to move away from entrenched stereotypes of top-tier care for individual wounded, but the goal will be to return as many soldiers to combat in the shortest possible time. In a long-lasting conflict, realistic standards of medical care will need to be accepted.

3D printing and additive manufacturing will contribute to reducing the scope of exported stock. The ability to manufacture spare parts, including synthetic parts for medical purposes, will reduce the demands on the physical presence of logistical and medical specialists on the battlefield and will increase the combat readiness of individuals and equipment.

A significant factor will be the shortage of human resources. Staff shortages can be partially compensated by implementing highly intelligent technological systems and artificial intelligence into all combat functions. The Active reserve system will be linked with selected civilian study fields, which will allow to gain the necessary experiences.

The design of forces must comply with the requirements for their sustainability in prolonged conflict. Forces must be adapted for operation in alliance formations while maintaining sustainability.

FORECAST OF MILITARY CAPABILITY NEEDS
FOR THE CZECH ARMED FORCES BEYOND 2040

The description of the use of the Czech Armed Forces in combat functions in previous chapters lays the foundation for defining the essential military capabilities necessary for success in the future war. In this vision, military capability is defined as: "The ability to achieve the desired effect in a specific operational environment." To determine the required military capabilities, a hierarchy of capability divisions used by NATO and the EU was chosen.[17]

- Readiness
- Deployment
- Engagement
- Sustainability
- Command, Control, and Consultation
- Protection
- Awareness

Readiness

Readiness is the ability to ensure, prepare, and maintain sufficient and effective combat forces. This includes the size of units and staffs, their preparation and training. It encompasses building own defence capacities, planning for defence, and the ability to develop and implement appropriate doctrines. It also includes building ties and relationships with non-military actors at both strategic and operational levels. A necessary assumption for preparing for future conflict is the existence of a legislative environment that allows for the ongoing development of defence capacities and preparation for the emerging crisis. To achieve personnel readiness, the ACR must have the capability to acquire the human resources necessary to function under the demographic and social conditions beyond 2040. This means recruiting professional soldiers and active reserve soldiers for a peacetime armed forces. The state will need to consider new forms of mandatory or voluntary military service to prepare reserves and must be able to mobilize human resources in case of threats. The ACR must overcome current difficulties in personnel recruitment caused by a combination of negative demographic trends, deteriorating health of the young population, and the military's inability to compete in the labour market. The ACR must be able to respond flexibly to current labour market developments to attract and retain necessary specialists. Where possible, the army must be able to adjust service conditions so that people with physical disabilities can also serve. In the area of force development, the ACR must be able to analyze experiences from modern conflicts, accurately predict the character of the next conflict, and then apply this knowledge to appropriate capabilities, force organizational structure, technology implementation, doctrines, and training. The ACR must be able to innovate faster than the enemy. It must significantly shorten the "problem-innovation-implementation" cycle. Industry leads the development and implementation of new technologies. The ACR must be able to establish very close cooperation with the industry in technologically demanding areas and set up a system for the rapid implementation of new technologies. In the future operational environment, it will not be possible during conflict to prepare and

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17 IMSM-0028-2020 (INV), Distributon of the Bi-SC Capability Codes and Statements 2020 from 7. 2. 2020 EEAS(2020) 237 REV3), EU Capability Codes nad Statementts 2020 – EU CCS 2020 from 17. 4. 2020.

train larger units and formations by physically concentrating forces and resources in one space, as this would jeopardize their protection. The ACR must be able to train units and prepare commanders and staffs to utilize very advanced simulation and communication technologies, thereby avoiding the need to concentrate large forces in one area during conflict.

Deployment

Deployment is the ability to concentrate forces, move them to the deployment area, and integrate them into the operational task force.[18] After completing the task, they are withdrawn. This set of capabilities will be significantly influenced by technological developments in artificial intelligence, robotic and autonomous systems, and the advancement of digitalization and interconnectivity. The speed of deployment will be crucial for a timely response to rapid and unforeseen changes in the security environment. The Czech Republic must have a robust infrastructure to receive a contingent of allied forces, integrate them into the command and control system and then physically disperse and manoeuver them. Additionally, there must be the ability to facilitate the transit of alliance forces through our territory. Personnel, materials, industry, logistic supply routes, and resources must be prepared to engage in "host nation support" (HNS). The ACR units must be able to integrate seamlessly into the Alliance's command and control system and be fully compatible doctrinally with the alliance formation into which they will be integrated. The mobility and transportability of the ACR units must be at least on the same level as that of alliance units in whose formation they will be integrated. Where required, they shall be capable of being transported by air. The ACR must have the capability to transport special forces units and the ability to perform air evacuations of Czech citizens from remote areas using their own means. There will be a significant increase in the volume of multipurpose platforms and support platforms to reduce logistic demands and presence during force deployment. Nanomaterials will enable the use of lighter and more mobile combat and support platforms. Developments in biofuels and alternative fuels will reduce logistical transport demands and the scope of fuel supply requirements for deployed forces.

Engagement

Engagement encompasses a group of capabilities that enable forces to manoeuver, conduct offensive and defensive operations, and defeat the enemy. A key capability is to coordinate manoeuvers with all types of forces, in all operational domains simultaneously, thereby achieving positional advantage and the desired kinetic and non-kinetic effect on the enemy. The decision-making process must be faster than that of the enemy. In physical domains, it is crucial to be able to concentrate fire (effect) without needing to concentrate forces. In physical domains, the ACR must have a kinetic reach greater than the enemy, must be able to deny the enemy access to the combat zone, and move and redeploy forces. At the tactical level, they must be able to engage the enemy at greater distances than the enemy can respond. The ACR must clearly demonstrate the ability to conduct individual precision strikes from the ground and air at great distances as part of conventional deterrence. The space domain will become a common physical operational domain. The ACR must have at least the capability to create a situational awareness of orbital tracks, understand its impact on own operations, and include this in the

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18 Reception, Staging, Onward Movement and Integration - RSOMI

planning and decision-making process. It must understand its own vulnerabilities and dependencies on space domain products and services, be capable of at least passive protection, and have functional procedures for the outage of space domain products and services. In the information environment and the cyber domain, the ACR, regardless of physical size, will have a global reach. The ACR must be able to utilize this reach and have the capability to conduct targeted offensive cyber and information operations. They must develop the concept of cognitive warfare and implement it in practice. The ACR must have the capability to conduct manoeuver operations independently on their own territory or as part of allied forces. The numerical disadvantage must be compensated by the speed of manoeuver and decision-making processes, as well as the ability to sustain operational tempo and very quickly restore combat readiness.

Sustainability

Sustainability is a set of capabilities that enable the ACR to transition from victory in one battle to warfighting at operational and strategic levels. This set of capabilities is indispensable for success in any prolonged conflict and also significantly contributes to the credibility of the ACR as a deterrent force.

In terms of human resources, it involves the capabilities to prevent excessive combat and non-combat losses of personnel. This includes the ability to replace human losses and to substitute personnel with technical means including autonomous intelligent systems.

In logistics, it includes the capability to prevent excessive losses of equipment, repair damaged equipment, and acquire new ones. It is necessary to be able to create and replenish supplies for a prolonged conflict and ensure the protection of supplies during both the preparation for and the course of war. The ACR must have the ability to disperse supplies, protect them from destruction, and efficiently distribute them to dispersed units or units deployed outside the territory of the country. In the case of a previously known deployment area, this includes the pre-positioning of supplies.

In the introduction of weapon systems and other equipment, emphasis must be placed on their doctrinal and technological compatibility, interoperability, and the potential for further modernization ("upgrade").

The set of capabilities concerning sustainability will be influenced by technological advances in the area of robotic platforms, autonomous and unmanned platforms, the Internet of Things,[19] artificial intelligence focused on planning, maintenance management, distribution, and primarily the safe dispersion of supplies and supply bases with regard to the requirement for their effective protection.

Command, Control, and Consultation

This set of capabilities has both a technological component and a human or social component. From a human or social perspective, the Czech Armed Forces must have the capability to prepare commanders and staffs so that they can effectively command at all levels, coordinate the activity of other actors in the operational area, and communicate clearly with political leadership. This inevitably includes training commanders for personal initiative and the willingness to make independent decisions in accordance with the concept of "Mission

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19 A network of physical devices, vehicles, devices, and other equipment that are fitted with electronics, software, sensors, and network connectivity. This allows these devices to connect to each other and exchange data.

Command". The ability of commanders to make independent decisions must be expected and supported even during peacetime, while maintaining a decision cycle shorter than that of the enemy.

From a technological perspective, it is essential to have a robust system capable of sharing and processing large amount of data, supporting and accelerating the decision-making of commanders and staffs at all levels, and enabling the connection of a large number of dispersed, manoeuvring elements in real-time and at any distance. The use of artificial intelligence will allow for the reduction in size and increase in mobility of staffs, as well as ensure a very high speed of the decision-making process. The system must be robust, mobile, and distributed, yet resilient against jamming and deception as well as against cyber actions by the enemy. It must be integrated into the Alliance command and control system.

Protection

This is the ability to minimize the vulnerability of personnel, equipment, material, and activities to any threat and under all circumstances, including the effects of weapons of mass destruction. It includes the capability to protect information, material, and personnel against espionage, sabotage, subversion, and terrorism. It also includes defence, i.e., the ability to eliminate or reduce the effectiveness of enemy actions.

Even before the outbreak of armed conflict, the ACR must have the ability to protect soldiers and the population from the enemy's information and cognitive operations. They must have the ability to defend themselves in cyberspace and against the enemy's electromagnetic actions.

During the conflict, the ability to defend against a kinetic strike from the air and space will be crucial. This capability will prevent the enemy from shifting the combat to the civilian population and allows for force manoeuver and rear area operations. This includes defence against ballistic missiles and hypersonic weapons. This protection will never be absolute, therefore it must be based on realistic priority setting and risk acceptance.

The defence of the land and air domains must be based on the dispersal of forces, camouflage, manoeuvre, and strike at maximum distance. Static defence is only an option as part of an alliance deployment

With the increasing likelihood of the use of nuclear and chemical weapons, the ability to protect against weapons of mass destruction grows in importance. Without this capability, there is a risk of losing the combat capability of entire combat formations with a single enemy strike.

Awareness

This is the ability to set and maintain situational awareness and the level of knowledge required for commanders to have sufficient correct information for timely decision-making. This will help to develop the capability of effective intelligence in favour of securing defence and safety including timely analysis and evaluation of warning indicators. Awareness includes the ability to gather information from all sources and in all domains. The reach of reconnaissance must be greater than that of the enemy and greater than the reach of own kinetic means. This will create the conditions for gaining superiority in the speed of the decision-making process.

There must be the capability to gather, transmit, and analyze large amounts of data and support decision-making through the evaluation, analysis, integration, and interpretation of data.

Conclusion

The development of the global security environment does not give reasons for optimism. It is likely that in the coming years, competition among states for positions in the global security order and access to global public goods will increase. NATO is expected to remain key to the defence of the Czech Republic, but this does not relieve the Czech Republic of the responsibility for defending its own territory.

The ACR, as the main force component in fulfilling the national security strategy, must act as both an effective deterrent and combat force. This involves addressing the issue of capacity building despite limited resources. This can be accomplished by adapting to the anticipated environment to conduct future operations, adopting modern doctrines, and balancing construction priorities.

Firstly, the ACR units must be integrated into the alliance force structure. Additionally, the ACR must be capable of conducting independent operations to defend the country. Therefore, they must consider all operational domains in their decision-making process. They must adopt an operational concept that prioritizes the concentration of effect rather than the physical concentration of forces and manoeuvre over positional warfare.

They must have an effective mobilization system and sufficient supplies, including a secured replenishment system, to quickly and sustainably restore combat readiness and to leverage tactical-level victories into operational and strategic levels of warfare.

There is no expectation that the ACR will have material superiority over the enemy in the future conflict. Therefore, it is essential to strive for technological dominance, which will enable it to gain cognitive superiority and an advantage in decision-making speed. This cannot be achieved without the application of artificial intelligence and other disruptive technologies.

The ACR can stand in a future high-intensity conflict with a technologically advanced enemy, provided that it prepares for this conflict in interrelated areas of human resources, material, technology, and doctrine. It must create, maintain, and protect sufficient supplies in order to prevail in prolonged conflict. It must establish a competitive human resources management in the labour market.

The ACR must be able to perform a very rapid cycle of technological innovations, based on the adoption of civilian technologies for military use, so as to form the basis for gaining superiority over the opponent. The ACR must find confidence and consistency to adapt alliance doctrines for domestic environment. In specific areas, it must develop its own doctrines.

It would be naive to think that it would be possible to ensure 100% defence of the territorial integrity and all citizens of the Czech Republic at all times, and under all circumstances, while keeping the defence budget within politically acceptable limits. For this reason, setting realistic priorities and accepting conscious risks will be essential. These risks must be accepted and clearly named at the political level and communicated to the public. It is evident that as a medium-sized European state with limited resources, we have only limited options to achieve these goals. This Vision also shows that there is no insurmountable obstacle in the way. As Albert Einstein said, "doing the same thing over and over again and expecting different results is madness." Therefore, we must take a different path, and for this, we especially need cleverness, determination, and consistency. Where we lack sufficient capacity and quantity, we will employ adaptation, flexibility, and concentration of effect, thoughtful manoeuver, speed of decision-making, and the courage for technological change.