



# Dynamic Challenges and the Need to Adapt

## *Looking Ahead for the Improvement and Transformation of Joint Air and Space Power*

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Since its establishment in 2005, the Joint Air Power Competence Centre (JAPCC) has aimed to provide key decision makers with effective solutions to Air and Space Power challenges. This is our mission, and by doing so, we contribute to the safeguarding of NATO and our nations' interests. Throughout the last 16 years, the JAPCC has been an extremely active 'think tank' for Air and Space Power. As an operational-minded Centre of Excellence (CoE) for NATO, the JAPCC has

supported the development of concepts, the drafting of doctrines, as well as training, exercises, and other efforts to enhance the operational effectiveness of our combined and joint forces.<sup>1</sup>

Admittedly, the prevailing pandemic situation did not leave the JAPCC untouched. However, our personnel quickly adapted to the new working conditions, changed their daily routines while continuing to

pursue their activities, completing existing while also initiating new high-priority projects. The JAPCC continued to answer Requests for Support from NATO and allied nations, maintain exercise support and issue well-received publications. The White Paper on Resiliency in Space, and a comprehensive handbook covering the diverse aspects of countering the full spectrum of unmanned aircraft and their system components are just two examples. Additionally, with 'NATO Joint All-Domain Operations (JADO)', we launched a multi-year comprehensive project that is structured to address various challenges related to the requirements for operating in a multinational all-domain environment.<sup>2</sup>

### A Dynamically Developing Security Environment

The management of emerging conflicts is supposed to be a political and diplomatic endeavour. However, various actors continue to use the military as a primary means to deal with political conflict, as we have seen in areas like Eastern Ukraine, Syria, Libya as well as Nagorno-Karabakh. We also perceive an increasing competition between main state actors. Russia continues to threaten its neighbours, disregard international law, and interfere in our societies. The rise of China has seen an increased economic surge and various approaches to shape the global exchange of goods and services, and the rules governing the world economy in their favour. For many years, China has invested considerably in military and technological capabilities that enable the use of hard power. At the same time, they developed capacities and tools for orchestrated influence campaigns.

We are constantly subject to both open and disguised attacks on the cohesion of our Alliance and on that of our partners with whom we share common values. Cyber-attacks occur daily, and hybrid activities and the potential denial of access to areas and domains are all part of today's security challenges. New categories of weapons employing advanced technologies, including a huge variety of unmanned systems, anti-satellite weapons and hypersonic vehicles, all add new demands to the way we organize our defence.<sup>3</sup> This is a challenge to NATO and its member nations. Additionally, it is a demand on us, the military and civilian Air and Space Power experts, to support adjusting processes and structures, and promote the development of the capabilities to provide a credible force that will achieve success in current and future conflict environments.

### Consensus-Building and Decision-Making

NATO has acknowledged this dynamic security environment and the need to adapt. Allied Defence Ministers agreed in February 2018 to establish two new commands: Joint Force Command Norfolk, US covering the vast geographic areas from the US East Coast, past the Greenland-Iceland-UK gap into the Arctic, and the Joint Support Enabling Command in Ulm, Germany to ensure seamless, swift, and secure movements of NATO forces through SACEUR's Rear Area in Europe.



Additionally, the Alliance Chiefs of Defence (CHODs) agreed to NATO's Military Strategy in May 2019 and directed the implementation through two capstone concepts. The Concept for Deterrence and Defence of the Euro-Atlantic area (DDA) provides a framework for the employment of the Alliance's Military Instrument of Power (MIoP) to deter and defend against known threats, whereas the NATO Warfighting Capstone Concept (NWCC) sets a 20-year vision to develop the MIoP.

It is understood as well that the Alliance will have to support rapid consensus-building and decision-making. This has been particularly recognized in supporting the political process of consultation and coordination between allies and includes deliberations to strengthen pre-agreed authorities within NATO.<sup>4</sup> NATO commanders at a higher level will need the authority to initiate planning and increase readiness to enable appropriate and quick responses.

A political decision at the NATO Summit 2021 to draft a new Strategic Concept could be a starting point to further bolster authorities within the NATO structure at appropriate levels. A strengthened process in decision-making and taking necessary action should be complemented by a discussion on harmonized provisions of technologically enhanced capabilities while ensuring that we are able to integrate crucial existing



legacy systems. This will contribute to making use of NATO's limited resources synergistically, efficiently, and effectively and will signal NATO is equipped, trained and ready to act at speed.

## Leveraging Emerging Technologies

Nearly two years ago, NATO Secretary General Jens Stoltenberg outlined in a speech to the members of NATO's Parliamentary Assembly that 'our security depends on our ability to understand and adopt emerging technologies.'<sup>5</sup> Indeed, Emerging and Disruptive Technologies (EDTs) 'will play an increasing role in the

security environment'<sup>6</sup>, and operating in a demanding high-end threat environment will require capabilities that can make the best use of them. Automation, artificial intelligence, human enhancement, quantum and cloud technologies and others will have to be leveraged to support our forces when the speed of action and reaction is vital.

Defence innovation, balanced and coordinated, in our Alliance will be a decisive factor in achieving combined success. The NATO 2030 Reflection Group offered convincing arguments and recommendations, pointing out that the Alliance '... has an appropriate and as-yet underdeveloped role to play in providing a forum for discussion on all aspects of EDTs that have a direct bearing on the security of the

Euro-Atlantic area'. And, moreover, that 'NATO should serve as a crucial coordinating institution for information sharing and collaboration between Allies on the security dimensions of EDTs', should 'anchor EDTs in the NATO Defence Planning Process (NDPP)', and 'should encourage the incorporation of AI into strategic and operational planning ...'<sup>7</sup>

The JAPCC was prepared to initiate a discussion on the best ways to leverage emerging technologies for NATO Air and Space Power at our conference last year. The pandemic situation prevented such a discussion in a traditional conference setting, but we will seize the chance to incorporate this topic into our 2021

conference this September, as an underlying theme as well as a panel topic in the context of 'Delivering NATO Air and Space Power at the Speed of Relevance'. Should you not yet have had the chance, I recommend looking into the Read Ahead that was prepared to serve as an introduction to the Joint Air and Space Power Conference 2020.<sup>8</sup>

## Command and Control in Support of Joint All-Domain Operations

In the mid-1990s, 'Network-Centric Warfare' as a concept to achieve 'full-spectrum dominance' provided a vision for interconnected military forces that would achieve success based on enhanced situational awareness at all levels. At the time of its publication, the rapid advancements in IT and cyber technologies



had already been perceived, but still offered quite a visionary perspective. Today, the means to provide highly connected entities and systems are available, and further enhanced capabilities that create opportunities for a synergy of effects across traditional domains are in reach. It allows us to link the existing service-related capabilities in a way never imagined before and to adjust our Command and Control (C2) structures and processes accordingly. And it requires us to do so, because our competitors are continually exploiting new methods available through technology to seek a strategic advantage.

To operate across domains requires approaches to planning, C2 and execution of operations that allow rapid decisions and swift subsequent activities without delay. NATO therefore needs to consider how current C2 architectures and processes will have to evolve. Particular points that should be taken into account include providing authority to the right level of leadership and assessing whether supporting/supported relationships are still an effective tool when NATO has to provide C2 at speed. Synchronized and resilient C2, able to support rapid decision-making, is a necessary precondition to increase the survivability of our joint forces in the battlespace and enable the dynamic employment of capabilities that can present adversaries with an overwhelming set of simultaneous dilemmas.

The JAPCC's NATO JADO project is dealing with the important topic of how to organize our C2 for operations across domains and to identify and propose solutions to fully utilize the collective joint and combined capabilities of assets assigned to a NATO-led effort. The project will look into the operational planning process and assess how contributions can be made and where practices should be adjusted. Further aspects of research and assessment will make this project even more comprehensive. As an example, the JAPCC team is collaborating on topics of intelligence and situational awareness and how next-generation collection systems, with resilient large bandwidth data links, can process and disseminate huge amounts of real-time data in the form of actionable decision-making materials. The project is also considering how to best utilize major categories of



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kinetic and non-kinetic effects derived from a wider arsenal of all-domain capability advances for the Joint Force Commander, how to improve the targeting process in a NATO JADO environment, as well as the broad topic of leadership, education and training for operations in a combined all-domain campaign.<sup>9</sup>

### Space as an Operational Domain

Today, the planning and execution of military operations rely significantly on services offered and distributed by space-based capabilities; these capabilities have become a critical element in everyday operations. Furthermore, future joint all-domain operations will need the assured availability of space systems, their space, ground, user and link segments, and the Data, Products and Services (DPS) they provide. The technologies to be used to operate in, from and through Space are rapidly evolving.

Overall, we see that Space is highly dynamic and acknowledge that NATO's officially recognized fifth operational domain has become and will increasingly develop to be a congested and contested sphere. An increasing number of actors are strengthening their capabilities to achieve military objectives in Space, and we have to expect that agreed norms of benign and responsible behaviour may not be adhered to. Therefore, enhanced awareness of what is happening in Space is crucial. We need to understand those



factors that influence and affect operations of our own Space Systems, know how different actors act in Space and use Space capabilities, and develop methods to identify and attribute Counterspace activities. NATO and its member states must maintain access to DPS provided by Space systems – and the Alliance’s ability to maintain this persistent access will be an important aspect to deterring aggression.

NATO acknowledges the challenges and potential threats we are facing today. Once the NATO Space Centre at Allied Air Command in Ramstein is established and supported by dedicated Space experts, Space Domain Awareness (SDA) can be increased at all levels. The Space Centre ‘will help coordinate allied space activities, support NATO activities and operations, and help protect allied space systems by sharing information about potential threats.’<sup>10</sup> In the medium-to-long term, ‘the Space Centre can also offer opportunities for multidimensional integration that can prove to be innovation drivers for the Allied armed forces.’<sup>11</sup>

Being fully aware of the challenges in NATO to staff current and prospective billets in the NATO structure with educated and trained Space personnel, the JAPCC applied in December 2019 to assume an official role as CoE for Space. In January of this year, the Military Committee decided instead to accept an offer from France to establish a CoE dedicated specifically to Space in Toulouse. The JAPCC will

continue to lead and support Space-related work for NATO while this CoE is being established, and is actively engaged with HQ SACT and the French host nation’s establishment team to facilitate its development. Colleagues from this new CoE will then support NATO by assisting doctrine development, education and training, improving interoperability and identifying lessons learned. The JAPCC will, however, preserve dedicated Space expertise to ensure that Space aspects related to Joint Air Power continue to be incorporated in our work in key areas.

### Operating in the Electromagnetic Environment

As the example of Space demonstrates, all domains within our military activities are inextricably linked. Our forces have to operate in and across Air, Land, Sea, Space and Cyberspace. Capable adversaries will continue to exploit the possibilities offered to them to interfere. Electronic Warfare (EW) offers relatively low-cost tools and capabilities that may considerably hinder operations of our modern highly linked platforms by denying the use of the Electromagnetic Spectrum (EMS).

Ensuring the use of the EMS was a crucial capability for NATO forces at the height of the Cold War. During many of our crisis management operations, the use of the ‘new domains’ and the EMS was nearly uncontested. The capable opponents of today, including peer and near-peer competitors, will try to deny this uninterrupted use. In a situation of collective defence, NATO will have to counter comprehensive and orchestrated EW efforts to succeed.

It will therefore be crucial to maintain our ability to use and exploit the EMS and to counter those who would try to deny our freedom to operate. At a highly increased level of quality, the successful fight for control of the Electromagnetic Environment is an indispensable enabler for NATO forces. Means may be explored to circumvent the use of the EMS, however, our ability to employ defensive and offensive EW across the EMS will be indispensable. Maintaining access to this heavily contested environment

and the freedom to operate in it will be crucial to support the timely and survivable employment of joint forces and maintain the capability to achieve military objectives.

## The Speed of Relevance

NATO Joint Air and Space Power will have to be delivered at the speed of relevance. We need to ensure that strategic decisions continue to enable the application of cutting-edge capabilities and embrace new and emerging technology for their realization. Additionally, our structures and processes need to allow C2 for operations across all domains. The particular opportunities and challenges of the Space domain and operations in the Electro-magnetic Environment must be understood, and our concepts and doctrines will have to lay the foundation for operational approaches in an all-domain environment to maintain the necessary level of operational superiority.

Indeed, NATO's defence task has become particularly challenging. Deterrence and Defence will need to take into account the new security environment, shaped by increased state competition, dynamic and disruptive technological development, and the multitude and diversity of potential threats.

As I prepare to relinquish the role of Executive Director of the JAPCC in the near future, I would like to take this opportunity to thank you all for your continued interest and the robust exchange of thoughts and ideas which is so important for our work. Please continue offering your intellectual contributions to the development of NATO Air and Space Power. How we can best ensure that NATO Air and Space Power is delivered at the speed of relevance is going to be discussed at the Joint Air and Space Power Conference 2021. I sincerely hope to see you in Essen, and I look forward to a frank and straightforward exchange of perceptions, thoughts and ideas. ●

1. For a comprehensive overview of selected products, activities and achievements of the first 15 years, please refer to the JAPCC flyer 'Surface to Exosphere – The Joint Air Power Competence Centre's Impact on Transformation 2005–2020', available online at <https://www.japcc.org/portfolio/surface-to-exosphere-the-joint-air-power-competence-centres-impact-on-transformation-2005-2020/>.
2. Recent publications of the JAPCC can be found at <https://www.japcc.org/publications/>.
3. German Ministry of Defence, Reflections on the Bundeswehr of the Future, 9 Feb. 2021.
4. NATO Secretary General, NATO 2030 – A transatlantic Agenda for the Future, 11 Feb. 2021.
5. NATO Secretary General, Speech at the NATO Parliamentary Assembly Plenary Session, 14 Oct. 2019.
6. NATO 2030, United for a New Era, Analysis and Recommendations of the Reflection Group Appointed by the NATO Secretary General, 25 Nov. 2020, p. 19.
7. Ibid., p. 29 f.
8. The Read Ahead is available online at <https://www.japcc.org/portfolio/joint-air-space-power-conference-2020-read-ahead/>.
9. NATO JADO, A Comprehensive Approach to Joint All-Domain Operations in a Combined Environment, JAPCC Leaflet Feb. 2021, available online at <https://www.japcc.org/portfolio/nato-joint-all-domain-operations/>.
10. HQ AIRCOM, We coordinate NATO Space Matters, online at <https://ac.nato.int/missions/we-coordinate-nato-space-matters>.
11. NATO Parliamentary Assembly, Science and Technology Committee, Preliminary Draft Special Report, Space and Security – NATO's role, 2 Mar. 2021, p. 11, available online at [https://www.nato-pa.int/download-file?filename=/sites/default/files/2021-04/025%20STC%2021%20E%20-%20SPACE%20AND%20SECURITY%20-%20BRUNNER\\_2.pdf](https://www.nato-pa.int/download-file?filename=/sites/default/files/2021-04/025%20STC%2021%20E%20-%20SPACE%20AND%20SECURITY%20-%20BRUNNER_2.pdf).

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joined the Air Force in 1977. After obtaining his officer's certificate and his diploma in aerospace engineering he was trained as a Ground Based Defender on the HAWK weapon system. He went through various assignments with Air Defence units before participating in the General Command Staff Course in 1990.

He served as Deputy DCOS Stability and Director, Civil-Military Synchronization at the ISAF Headquarters in Kabul, Afghanistan. Afterwards he was appointed Deputy Commander and Chief of Staff, Response Forces Operations Command in Ulm, Germany, before he took over the duties of Chief of Staff, Multinationales Kommando Operative Führung/Multinational Joint Headquarters Ulm.

He took over command of German Air Operations Command in Kalkar and the Combined Air Operations Centre Uedem in September 2018. At the same time he also took over the duties of the Executive Director of the NATO Joint Air Power Competence Centre.

