NATO
MULTI-DOMAIN
OPERATIONS
ADAPTING BEYOND JOINT DOCTRINE

VIRTUAL • COGNITIVE • PHYSICAL

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"Born from the need to work together seamlessly in the most demanding circumstances, 'jointness' remains an important part of military doctrine. It is the basis upon which MDO-related thought is based. But the complexities we face today show that joint doctrine alone is insufficient for the military challenges of our era."

IN 2021, NATO's Military Committee tasked the two Strategic Commands to develop an initial concept for multi-domain operations (MDO) that integrates Allied thinking about how forces work together at the speed and scale of modern operations. Staff officers at Headquarters Supreme Allied Commander Transformation (HQ SACT) and Supreme Headquarters Allied Powers Europe (SHAPE) worked with Allies and partners to consider the meaning of MDO for NATO and their implications for Alliance forces.

Allies have travelled this path before. In the 1980s and 90s, NATO militaries conceptualized "joint" doctrine, which enabled the military branches of army, navy, marines and air force to work together as a coherent force. NATO further built on this feat by enabling interoperability amongst Allies as a multinational joint force. This joint collaboration was refined in the crucible of operations in Afghanistan, Libya, Iraq, and elsewhere over the past two decades. At the time, joint operations was controversial; some could argue that it remains so to this day, especially when issues of culture and history enter the discussion.

Photo by HQ SACT PAO

"In order to maintain warfighting advantage, we must have ironclad processes in place across all five military warfighting domains. NATO is developing and aligning concepts like multi-domain operations so that Allied nations can operate seamlessly together to defend our nations and people."

General Philippe Lavigne
Supreme Allied Commander Transformation, at the first-ever NATO Multi-Domain Operations Conference, March 17, 2022

A Portuguese Ogassa OGS 42 drone prepares for takeoff during NATO Exercise REPMUS 2022. Photo by NATO

PREVIOUS: (Clockwise) Mountain operations soldiers and NATO Air Policing Mission (photos by NATO); illustrations on cyberspace and space domains (Shutterstock); the amphibious command ship USS Mount Whitney (photo by Mass Communication Specialist 3rd Class Jessica Kibena, U.S. Navy).

"Moscow's reliance on large mass fires, the levelling of cities and the terrorizing of civilians through siege warfare serve as a potent reminder of the brutality at the base of human conflict."

LEFT: Thousands of residents of Irpin fled as Russian troops bombed the city. Photo by Drop of Light/Shutterstock **CENTRE:** Russia tests the nuclear-capable intercontinental ballistic missile RS-28 Sarmat on April 20, 2022. © Reuters **RIGHT:** Online conversation with NATO Secretary General Jens Stoltenberg and Deutsche Welle journalist Sarah Kelly, October 19, 2022. Photo by NATO

Born from the need to work together seamlessly in the most demanding circumstances, "jointness" remains an important part of military doctrine. It is the basis upon which MDO-related thought is based. But the complexities we face today show that joint doctrine alone is insufficient for the military challenges of our era. To wit, the operational domains of space and cyberspace each have unique characteristics that cannot simply be incorporated into existing joint doctrine; many critical capabilities within them are not owned by militaries. The proliferation of non-military actors that contribute to military success, including commercial entities, has intensified over the past several years. These actors must be considered during the planning and execution of military operations.

Indeed, there are other considerations, such as changes in military culture, that reflect broad social evolution. Social media is among the factors that need to be weighed in military operations of the 21st century. Simply put, even joint doctrine executed flawlessly is insufficient for the context in which forces of the Alliance are expected to operate, both today and in the future.

An Inflection Point for Transatlantic Security

Without effective NATO MDO, credible deterrence and warfighting advantage are at risk in the modern battlespace. NATO must provide a conceptual bridge between the fundament of human conflict with the modern additions that change the character of war in profound ways.

Russia's war of aggression against Ukraine is a harsh lens to witness how critical MDO is for NATO. On one hand, Russia's failed invasion demonstrates the timeless lesson that the fog of war and grim realities of human conflict remain persistent features of the battlefield. Moscow's reliance on large mass fires, the levelling of cities and the terrorizing of civilians through siege warfare serve as a potent reminder of the brutality at the base of human conflict. This war, as with all others, remains a contest of wills in which the victory often goes to the belligerent that makes the fewest mistakes on the battlefield.

On the other hand, the Russo-Ukraine War shows the criticality of operating in the cyberspace and space domains, the utility of drones and autonomous systems, and the im-

portance of adaptive leaders who can deliver effects across multiple domains at speed and scale. It reinforces the importance of effective mission command, planning, and sustainment. The conflict emphasizes the wisdom of civilized nations to demand that their armed services conduct operations in accordance with national and international laws. The need to get MDO right for NATO to navigate a broad spectrum of challenges is apparent from other recent experiences beyond Ukraine. NATO's two decades of operations in Afghanistan raise questions about lessons learned and the perpetual challenge of fighting terrorism. The increased presence of China's military in the Greater Middle East and North Africa presents new implications for the capabilities required to defend the North Atlantic area. Furthermore, long-simmering conflict zones, from Syria and Iraq to the South China Sea and the Arabian Gulf, offer further insights into the increasing need to orchestrate military activity and synchronize non-military activity in all operational domains at the speed of relevance.

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Beyond geopolitical challenges, the proliferation of disruptive technology across almost every part of society presents a double-edged sword. For example, the (yet unrealized) rise of artificial intelligence presents immense opportunities for free societies, but its introduction on the battlefield renders obsolete the assumption that warfare is a primarily human endeavour. From materials science to biological enhancement, disruptive technology creates both challenges and opportunities for militaries to adopt and counter novel combinations of technology better and faster than adversaries.

These factors compel forces of the Alliance to expand the manoeuvre space and maximize choice for political and military decision-making beyond the limits of joint doctrine. They indicate that military capabilities must operate in all five domains and deliver targeted effects in the three dimensions — physical, virtual and cognitive. Military commanders must conduct operations in an increasingly complex, hyperactive, urbanized and connected battlespace that has no geographical boundaries and where adversaries contest Alliance forces throughout all domains and across all levels of command.
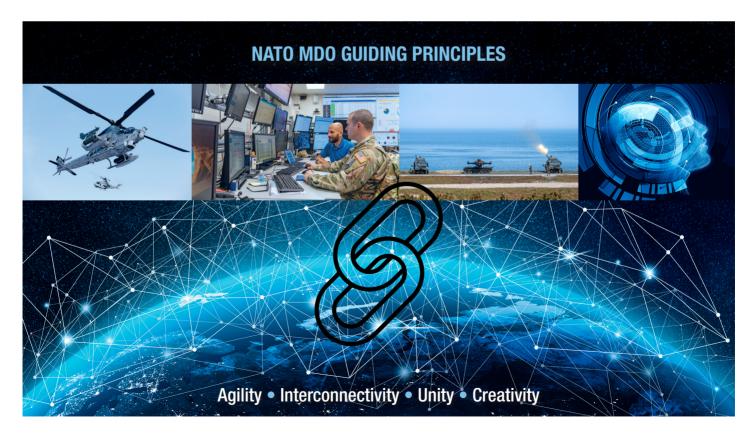
Working Definition, Vision, and Principles

NATO's working definition of MDO is "the orchestration of military activities, across all domains and environments, synchronized with non-military activities, to enable the Alliance to create converging effects at the speed of relevance". This definition recognizes the complexity of the modern operating landscape and the increased presence of non-military entities at all stages of conflict, while retaining the centrality of force as a response to military problems.

The Alliance's agreed vision is that its approach to MDO will enable NATO's military instrument of power to prepare, plan, orchestrate, and execute synchronized activities across all domains and environments, at scale and speed, in collaboration with other instruments of power, partners and stakeholders. The realization of this vision will deliver tailored options at the right time and place that build advantage in shaping, contesting, and fighting, and that present dilemmas which decisively influence the attitudes and behaviours of adversaries and relevant audiences.

To achieve the vision of NATO MDO, four guiding principles focus effort: unity, agility, interconnectivity and creativity. NATO's digital transformation effort underpins these principles. It fuses military assets and connects non-military actors that, through collaboration, can contribute to successful MDO.

Agility focuses on improving speed, from tactical resupply to strategic understanding. It enables agility in decision-making and in defensive and/or offensive actions. **Interconnectivity** enables the exchange of data and information to build understanding, whether or not the tactical units are interoperable. **Unity** is as important for MDO as it has been for joint or coalition warfighting, and for delivering a comprehensive approach, while emphasizing

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BELOW: (From left) COLD RESPONSE 2022 (photo by Torbjørn Kjosvold). NATO Cyber Security Centre (Photo by NCI Agency). Short-range air defence anti-aircraft missile and artillery system (photo by NATO). Artificial intelligence concept.

NATO MDO GUIDING PRINCIPLES

Agility • Interconnectivity • Unity • Creativity

"The essence of MDO is to **orchestrate what the military controls** and, through collaboration with an ever-broadening range of stakeholders, **synchronize the activities and capabilities of other actors.**"

the criticality of information sharing. **Creativity** is what staff and commanders will need in order to build blended multi-domain warfighting options and to appreciate what data may be available to support military activity.

The essence of MDO is to orchestrate what the military controls and, through collaboration with an ever-broadening range of stakeholders, synchronize the activities and capabilities of other actors that can help the military achieve its objectives — mindful that military objectives in turn support NATO's political objectives. NATO needs to exploit opportunities across all phases of conflict — shaping, contesting, and fighting — and from the tactical to the strategic levels, as well as with partners.

Rooted in Joint Operations and Forward-Leaning

MDO are a necessary progression from joint operations, or in casual parlance: "MDO goes beyond joint-done-right". The concept of MDO extends joint concepts and emphasizes the importance of domains rather than the military force operating in them. For example, the army, navy, marines and air force of some nations can all operate in the air domain. The delivery of effects in the air domain is the critical factor, rather than what brand of force carries out the activity. New structures for command and control help amplify this focus on domains and provide increased options for warfighting commanders.

The MDO concept also considers the broader operational picture to include non-military stakeholders, who all play critical roles as well. It will provide the conceptual space and capabilities required for forces of the Alliance to operate decisively in crises of the future and, ultimately, to gain relative advantage against adversaries, not necessarily across all domains, but sufficient to win.

NATO's working assumptions for MDO can be distilled into complementary parts. There are five operational domains: maritime, air, land, space, and cyberspace. Commanders orchestrate military activities across all five domains and synchronize them in collaboration with other stakeholders. Together, stakeholders create tailored options that deliver effects in three dimensions: virtual, cognitive, and physical. MDO focus on the military domain. Non-military stakeholders own capabilities that may be extremely useful in the pursuit of military objectives. NATO needs access to these non-military capabilities to reduce operational risk and increase probability of mission success.

Enabled by Digital Transformation

Given the sophistication of modern capabilities, it is self-evident to note that digital transformation is the key to unlocking the full potential of MDO. If the Alliance is to achieve its vision of MDO, then it will have to digitalize; there is no way to conduct MDO at the speed of relevance with analogue approaches.

Put simply: We need to connect with one another via systems with sufficient capacity to enable persistent interaction. Digital transformation efforts vis-à-vis MDO tend to gravitate towards technical specifications and the substantial investment in NATO's digital backbone. This is a welcome effort; however, for NATO to achieve the highest aspirations of MDO, it must widen the aperture regarding digital transformation beyond technology to include culture, processes, and people.

A common refrain in military circles is that joint **culture** took two generations to form within forces of the Alliance. Yet, advocates of MDO maintain that NATO forces lack the luxury of two generations to adapt a MDO culture. NATO must be proactive and incentivize the cultural precepts that underpin a MDO mindset. Importantly, a digitalized NATO needs **people** who are proficient in the world of data, which has its own set of mores — how forces of the Alliance reconciles military culture with that of data science within a MDO framework is a significant undertaking with potentially percussive benefits across the enterprise.

NATO's military leaders should consider the **footprint** of staff members in key strategic locations to enhance understanding and awareness as part of a broader meshed network that enables MDO. This includes **data factories** with data pipelines, algorithm generators, workflows, and storage that constitute the core infrastructures of data-driven MDO.

NATO will need to consider how **artificial intelligence** and **machine learning** can help harness large data sets to enable elegant and exhaustive operational pictures that underpin effective MDO. Moreover, NATO's **processes** need to be refined to automate and move human labor beyond the critical path of routine administration in order to achieve the requisite gains in speed and scale that MDO demands.

Building on Good Practices

MDO present both challenges and opportunities in other areas as well: escalation management, Alliance culture change, command and control, networking, wargaming, education, and training, to name a few. How Allies adapt national approaches to NATO MDO will have a direct impact on the concept's success and the collective operational success of multi-domain warfare, which exists beyond the simplicity of the physical effects dimension.

MDO expand the options available to a commander to apply operational art. Thus, we will need to ensure that NATO's supporting concepts and doctrine can use MDO principles in the long term. Allies expect no less. ✦