

The Explorer

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How Lessons are Shaping the Future

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Commander's Foreword: The Explorer 2025

It is a privilege to write my first foreword for *The Explorer* since assuming command of the Joint Analysis and Lessons Learned Centre in July, during the official Change of Command Ceremony which you can read about in this magazine. Joining the JALLC has reinforced my appreciation for the dedication, expertise, and professionalism of our staff, and the critical role they play in supporting NATO's mission today and into the future. My vision for the JALLC and indeed the NATO LL Capability is to ensure that both not only remain relevant for ACT and NATO in the future, but contribute to shaping that future.

In this respect, the 2025 edition of *The Explorer* reflects the JALLC's enduring relevance to the Alliance. This edition, once again, brings together a range of timely and relevant articles written by the JALLC's staff. Topics include the NATO Warfighting Capstone Concept and how it relates to Lessons Learned, the Future Operating Environment, and insights relating to what NATO can learn from the rise of drone warfare. These themes are not purely academic; they resonate directly with today's security environment, where the recent incursions of Russian drones into NATO territory and the launch of the Enhanced Vigilance Activity Eastern Sentry underline the need for the Alliance to learn and adapt with agility.

This edition also includes an article reflecting on drone adaptations and innovation in Russia's war against Ukraine. This article presents just some of the salient developments regarding drone technology and use in modern warfare, which NATO is learning from observing the war.

Of particular note, and looking to the future, this edition includes an article featuring one of our JALLC Innovation projects: the development of an AI Research and Analysis Tool (the JAI-RAT). This work exemplifies how we are harnessing new technologies that enhance NATO's analytical capability through innovative tools.

In addition to these feature articles, you will also find the latest updates on the NATO Lessons Learned Portal, highlights from our analysis projects, and news from our Training and Outreach team along with plenty of other professional and personal pieces. Taken together, these efforts reflect the JALLC's enduring contribution to ensuring that NATO can capture, share, and apply lessons across the Alliance—strengthening collective readiness, resilience, and effectiveness.

I hope you enjoy reading this edition of the Explorer. It demonstrates not only the expertise and commitment of the JALLC's staff, but also the continued relevance of the Lessons Learned Process in safeguarding our shared security. I encourage you to read the magazine, reflect on its themes, and consider how the lessons captured here can inform your own work and thinking. The challenges facing NATO are evolving rapidly, but by learning and adapting together, we will remain ready to meet them.



A handwritten signature in blue ink that reads "Cristinel Colibaba".

Cristinel Colibaba
Brigadier General, ROU A
Commander JALLC

Editorial: The Explorer 2025

In a world that seems to change by the hour, one thing remains constant: the importance of learning from experience. This edition of *The Explorer* asks a simple but profound question: how are the lessons we capture today shaping the future of NATO and collective defence? The answer, as you will see in these pages, is both practical and transformative.

Recent events offer stark reminders of why this matters. Russian drone incursions into NATO territory, the ongoing conflict in Ukraine, and the launch of Enhanced Vigilance Activity *Eastern Sentry* highlight a security environment that is dynamic, unpredictable, and, at times, unconventional. In such circumstances, the Alliance cannot rely on doctrine alone; it must rely on its ability to observe, analyse, and adapt. Lessons learned are no longer just reports on paper—they are the blueprint for readiness, resilience, and strategic advantage.



The articles in this edition explore precisely this. From the NATO Warfighting Capstone Concept to the evolving Future Operating Environment, and from the rise of drone warfare to the strategic insights that flow from careful analysis, our staff demonstrate how lessons become action. They show that learning is not a passive exercise but an active dialogue between experience and innovation, between the known and the unforeseen.

The updates from the NATO Lessons Learned Portal, our analysis projects, and the Training and Outreach team confirm this; each article illustrates a simple truth: the value of a lesson is measured not by its capture, but by its application. In the Alliance, learning is a collective enterprise, and its impact is multiplied when shared across nations, services, and disciplines.

As you read this edition, I invite you to think beyond the articles themselves. Consider how the insights presented here reflect a broader principle: that the future is not something that happens to us, but something we actively shape—one lesson at a time.

Jodie

The JALLC's Editor



NATO's North Star

The NATO Warfighting Capstone Concept

“The warfighting concept provides a long-term vision for maintaining and developing NATO’s decisive military edge ... Through the implementation of the warfighting concept, we will ensure that the Alliance continuously develops its military and technological advantage, as the character of conflict evolves.”

—Brussels 2021 NATO Summit Communiqué

NATO’s Warfighting Capstone Concept (NWCC) was formally adopted by Heads of State at the Brussels Summit in 2021. Designed to lay out a vision to guide NATO’s preparation for future conflict, it has come at a time when NATO is exploring several new approaches to the future—the 2022 Strategic Concept, NATO 2030, Digital Transformation, and the Concept for the Deterrence and Defence of the Euro-Atlantic Area (DDA), to name a few—while adapting to today’s challenges, which alone can seem overwhelming. To see how the NWCC fits in and what it offers the Alliance, we sat down with one of its key architects, Dr Kęstutis Paulauskas, Senior Strategy Officer at HQ Supreme Allied Commander Transformation (SACT), and with SHAPE’s Director of Communications Division, Mr Jay Janzen. What we discovered was that *NATO’s North Star* may be one of many stars in NATO’s sky but, like its namesake *Polaris*, it could prove to be the most useful.



Dr Kęstutis Paulauskas is the Senior Strategy Officer in the Allied Command Transformation. He is a member of the Warfare Development Fusion team. He was the lead writer of the NWCC. Between 2012 and 2019, he was a staff officer in the International Staff at NATO HQ, responsible for

the development of the Alliance’s deterrence- and defence-related policies. From 2001–2012, he served in various positions in the national administration of Lithuania. He is a recipient of NATO’s Meritorious Service Medal. In an academic capacity, he was a lecturer at the Institute of International Relations and Political Science, Vilnius University (2009–2012); a visiting fellow at the Institute for Security Studies of the EU (2005); and held positions at the University of Toronto (2005) and the KU Leuven (2007). He gained his PhD in political science in 2007. He is the author of a number of books and articles. His most recent publications include “On Deterrence” (NATO Review, 2016), “The Alliance’s evolving posture: towards a theory of everything” (NATO Review, 2018), “Space: NATO’s Latest Frontier” (NATO Review, 2020), and “NATO and the Eastern Flank” (Routledge Handbook of NATO, 2024).



Mr Jay H. Janzen is a strategic communications professional with over two decades of multinational and military experience. Prior to his current role at SHAPE as the Director of the Communications Division, Mr Janzen was a Brigadier-General in the Canadian Armed Forces, where he led efforts to enhance strategic communication and military public affairs capabilities. Earlier in his career, he was deployed to Bosnia and twice to Afghanistan, where he was involved in communications efforts. Previous notable positions include the director of Public Affairs for the Canadian Army, the Chief of Media Operations at SHAPE, and the Director General StratCom for the Canadian Armed Forces. He is a graduate of Royal Roads Military College, NATO Defence College, and the Canadian National Security Program. He was awarded the NATO Meritorious Service Medal and was appointed as an Officer in the Canadian Order of Military Merit.

By Allies, For Allies

The NWCC is certainly a transformative project, so it should come as no surprise that it was born in HQ SACT in Norfolk. This project was developed in a truly collaborative way, soliciting input from every level of NATO and every major player in the Alliance. Its development enjoyed considerable support from the SACT himself and from across NATO leadership. As the NWCC matured, it went through a robust review process, being endorsed successively by the Military Committee, first at Military Representative level, again at Chief of Defence (CHOD) level, then approved as the Alliance concept for warfare development by the North Atlantic Council (NAC), first at Permanent Representative level, again at Defence Minister level, and finally by Heads of State and Government at the 2021 Brussels Summit.

The NWCC is part of NATO's wider transformation efforts that arose from the 2019 NATO Military Strategy, which resulted in complementary efforts from SHAPE and HQ SACT to address current and future challenges—the former through the DDA and the latter through the NWCC. In the time prior to NWCC's final approval, there was extensive cross-fertilization between SHAPE, which had the lead for DDA, and HQ SACT in their reciprocal development, with bi-weekly coordination meetings between the two teams and input from Supreme Allied Commander Europe (SACEUR) as well as SACT.

This collaborative process allowed the NWCC team to overcome the institutional hurdles that such a project invariably faces. Some of the hurdles concerned the NWCC's use of new and innovative, but not officially adopted, NATO language. Others arose through establishing the need for a concept that looks to the future, instead of simply focusing on addressing the current environment and threats. A final hurdle involved encouraging a more proactive approach in countering current and future threats, for which the NWCC subtly but firmly advocates. In this vein, the NWCC seeks to provide an enduring vision of how NATO can adapt the military instruments of power (MIoP) of today to meet the challenges of the future.

It is no exaggeration, as Dr Paulauskas emphasised, that, by virtue of the fact that it was produced through such an inclusive process and because each and every Ally had a say in it, the NWCC really is a concept **by Allies, for Allies**.

4

“NATO's North Star' may be one of many stars in NATO's sky but, like its namesake Polaris, it could prove to be the most useful.”

Did you know?



Dr Paulauskas briefs the Secretary General at the SACT Change of Command ceremony on 23 September 2022.

A Collaborative Endeavour

The NWCC was developed through one of the most collaborative processes in NATO's history. Although the principal work was conducted by a core team of eight to ten multi-service, multicultural staff officers at HQ SACT, based out of their collaborative spaces known as the *War Room*, it involved a process that included every major player in the Alliance, brought in through an extensive series of engagements including:

- over 20 brainstorming meetings with SACT;
- eight meetings of the Military Committee (MC);
- four MC meetings at CHOD level;
- two NAC meetings;
- three major workshops with Allies (400+ participants each);
- engagements with SACEUR and two rounds with all of NATO's operational commanders;
- some 60 bilateral meetings with Military Representatives (MILREPs).

It is no exaggeration to say that the NWCC was developed “*By Allies, for Allies*”!

Balancing Risk: Closing gaps today vs preparing for the future

Throughout NATO's history, most of its policy documents, including and perhaps most especially the Strategic Concepts, have been backwards looking. They explain and codify where the world is now and how it arrived here since the last concept was published. This is helpful and necessary for understanding and addressing today's challenges, but it does not allow for balancing the risk of taking necessary action now versus being able to take different action in the future under different conditions and threats.

The DDA and the NWCC represent these two questions of risk now and risk later. DDA is about the best **employment** of the MloP we have right now to address current threats and challenges, whereas NWCC is about **development** of that MloP so that NATO can build and maintain decisive military advantage over the next 20 years. The approaches are complementary, but serve different purposes. And the idea to develop MloP, rather than start from scratch, is also important. After all, the MloP we invest in today will almost certainly still be in use in 2050 or even 2060, just as many of the systems and capabilities we have now entered service in the 1980s or even earlier.

This difference in outlook is evident in the focus areas of the two strategic commands today. As Mr Janzen told us, since 2021 SHAPE has been fully invested in DDA and ongoing work on its family of plans, while also dealing with real-world challenges, not least with the acute threat posed to the Alliance as a result of Russia's illegal invasion of Ukraine. SHAPE is focused on carrying out activities that NATO needs today to ensure that NATO can *fight tonight*.

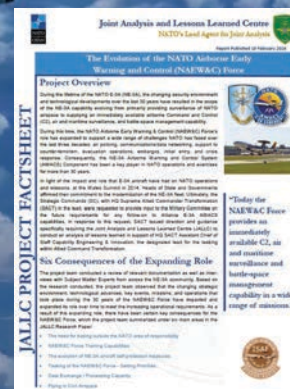
NATO's Airborne Warning & Control System: Still going strong

A good example of how the MloP we invest in today will still be in use in the future is the NATO E-3A aircraft. These aircraft are the key platform in the NATO Airborne Early Warning & Control (NAEW&C) Force. In 2016, the JALLC was tasked to analyse Lessons Learned (LL) in support of future requirements for the potential follow-on to these aircraft which are still going strong and subject to continuous improvements and updates.

During the lifetime of the NATO E-3A, which extended past 30 years, the changing security environment and technological developments resulted in the scope of the capability evolving from primarily providing surveillance of NATO airspace to supplying an immediately available airborne Command and Control (C2), air and maritime surveillance, and battle-space management capability.

NATO E-3A AWACS aircraft are based on the venerable Boeing 707 design which dates from the 1950s.

During this time, the role of the NAEW&C Force has expanded to support a wide range of challenges faced by NATO over the last three decades: air policing, communications/data networking, support to counter-terrorism, evacuation operations, embargos, initial entry, and crisis response. Consequently, the NATO E-3A Airborne Warning & Control System (AWACS) Component remains a key player in NATO operations and exercises. You can download a copy of the factsheet on the JALLC analysis report from 2016 [here](#).



Read more about JALLC's project on NATO's AWACS [here](#).



“It is about getting the balance right between ‘fight tonight’ and ‘fight tomorrow’, so that we are positioned to do both well. An approach that strives to blend legacy systems with emerging technology will provide advantage ... for example, enhancing the precision of legacy artillery by leveraging drone technology.”

Mr Jay Janzen (See the article on page 72 in this edition about the JALLC–Ukraine Initiatives)

In contrast, NWCC is about the *fight tomorrow*. Its main purpose is to make balancing between now and tomorrow a very deliberate choice. It is why so much effort was put into identifying the things that the authors believe will be the enduring characteristics of the future environment and on the five imperatives. In this sense, the NWCC’s greatest relevance is to the Capability Developers and Defence Planners who are essentially focused on that *fight tomorrow*.

Both Mr Janzen and Mr Paulauskas agreed that the result is a healthy tension between the two. The tension arises in determining where one can accept risk, now or in the future; whether to invest in something we know we can use immediately or in something that may or may not be the right answer later. Allies gravitate towards not accepting any risk today—by focusing on closing current gaps—which results in deferring risk to tomorrow. Trying to address future risk is much harder to do and carries its own risk of getting it wrong. The resulting gap is addressed through future-facing projects currently being conducted by the two strategic commands, with work on the Four Square Deterrence Study and the Cognitive Warfare Concept boding well for their coordinated efforts to balance risk.

Informed by Lessons: Looking back to look forward

The NWCC is forward looking but its development relied heavily on lessons learned. It may seem odd that a concept about the future characteristics of warfare should rely on lessons learned, which is intrinsically backward looking. But understanding the mistakes and successes of the past ensures that NATO can adapt efficiently for the future. As such, the NWCC did just that.

First, it did so by making sure the lessons from the process of developing the NWCC are captured. Doing so was especially important in this case because this was the first time NATO had developed a concept of this nature, in this completely collaborative manner, and with this sort of high-level review. The crop of potential lessons is abundant.

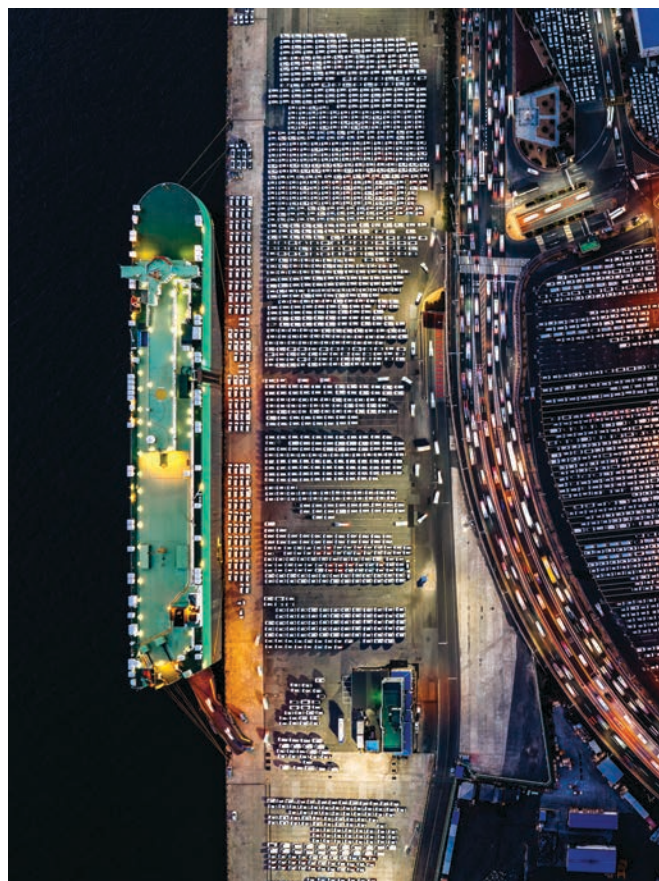
Second, it did this by conducting an extensive study of lessons available from the JALLC’s products. In addition to using lessons to develop the NWCC, lessons were also used to validate the NWCC after its endorsement. One of the more interesting exercises carried out by the NWCC team was a review of lessons from Russia’s war against Ukraine with a focus on validating the five Warfare Development Imperatives (WDIs). This review provided a better understanding of what is meant, in a modern context, by:

- cognitive superiority
- layered resilience
- the art of cross-domain command
- multi-domain defence
- influence and power projection.

The conclusion was that what is happening in Ukraine supports the proposition that the five WDIs are an effective organizing principle for NATO's warfare development.

The NWCC very much addresses the centrality of command in military thinking, especially through the relationship between Cognitive Superiority and Cross Domain Command imperatives. The JALLC's extensive work on command-and-control concepts was especially useful in this regard. With numerous reports and lessons on C2 concepts from the International Security Assistance Force (ISAF), major joint exercises, and multinational maritime operations, the JALLC has analysed most aspects of NATO command and control since its inception 23 years ago.

What the NWCC team discovered was that these lessons may not go far enough. They reveal that while NATO has expended a great deal of effort on C2—NATO has doctrine and C2 structures that are well established to address the staffing and execution aspects of issuing orders—there has been very little about the art of command; that is, understanding how a commander makes the right decisions at the right time, even when faced with the fog of war. This is, in fact, one of the key lessons from the NWCC process.



The Art of Command

The NWCC places a heavy emphasis on the distinction between *science of control* and *art of command* through the imperatives of cognitive superiority and cross-domain command. Cognitive superiority is about sensing, but also sense-making from the ubiquity of information pouring in, so a commander can understand what the enemy is trying to do, what is the enemy's art of command, and how they understand conflict. The nexus with cross-domain command is in overcoming, but also accepting, the fog of war, whether from too much or too little information.

The fog of war has always existed; therefore one must have a *manoeuvrist approach*. This means having complex strategies and campaign plans, but that describe a clear, simple core idea—the *elevator pitch*, as Mr Janzen called it—that everyone can understand and align with. This way everyone knows their role and, if any other guidance is lacking, can make decisions on the spot on how to achieve the objective and avoid paralysis.

The future operating environment will demand commanders with new skills and the ability to overcome the fog of war. There is a lot to be

excited about in how commanders are developed in Allied Command Operations (ACO). The NATO Defence College is a *gem* for developing the art of command. It should not be a surprise that NWCC is included in its courses, including in the General Flag Officers, Ambassadors' Course. Today's mid-grade officers—the Alliance's future leaders—are the ideal audience for NWCC and need this kind of professional development in their war college curricula.



Left: Field Marshal Douglas Haig, Commander of the British Expeditionary Force on the Western Front in the First World War, and General Fernando Tamagnini de Abreu e Silva, Commander of the Portuguese Expeditionary Corps which was integrated into Haig's forces, meet in November 1917. The Western Front's stagnant lines and horrendous casualties are generally attributed to lack of imagination and operational art in command.

Right: *No captain can do very wrong if he places his ship alongside that of the enemy.* The great British admiral Horatio Nelson exemplified the art of command in his detailed tactical orders. His most famous, those for Trafalgar, included this simple directive—the *elevator pitch*—designed to help his captains avoid the paralysis of command caused by the fog of war.

The Five Warfare Development Imperatives



Cognitive Superiority

Understanding the operating environment and potential adversaries relative to Alliance's own capabilities, capacities and objectives



Layered Resilience

Ability to absorb shocks and fight-on, across all layers, military, civil-military and military-civilian.



Influence & Power Projection

Shaping positively the environment to the Alliance's strengths, including generating options and imposing dilemmas on adversaries.



Cross-Domain Command

Revitalizing and enabling commanders' ability to understand the multi-domain operating environment and act rapidly and effectively.



Integrated Multi-Domain Projection

Protecting the Alliance's integrity to decide and act against threats in any domain, regardless of their origin or nature.

Find out more at
WWW.ACT.NATO.INT

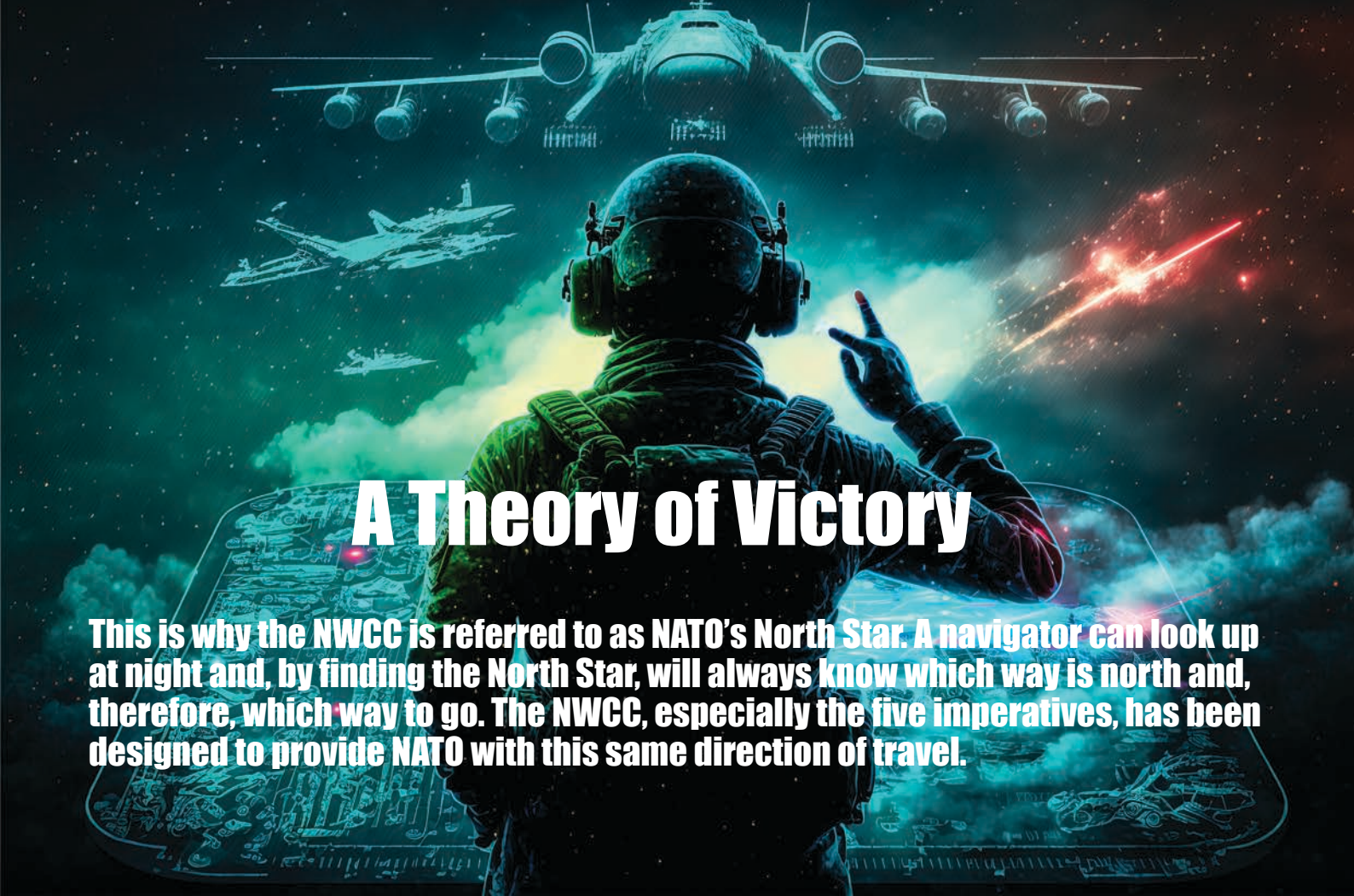
The North Star: A paradigm shift in NATO thinking

Faced with an ever-changing global security environment and potential adversaries able to contest us in all domains, according to Dr Paulauskas, "*We need to adapt, and we need to adapt rapidly!*" To ensure that NATO doesn't fall behind when it comes to being able to guarantee the long-term peace and security of Allies, a new way of looking at the future was needed. The NWCC has been developed to be the concept to address this need. Therefore, it is an entirely forward-looking, long-term vision of what actions NATO needs to take now to begin understanding, preparing for and, most importantly, getting ahead of the threat curve.

The threats to our peace and security are simultaneous, boundless, and persistent. Our resources are finite. NATO cannot defend everything, everywhere, all at once. So, we have to make deliberate, strategic choices and start shaping the environment ourselves instead of just reacting to adversaries. NATO must decide when to accept risk and when to take the initiative, recognizing key points of failure and identifying key strengths.

The five WDI provide the key to the NWCC as a road map for the future since they serve to organize and synchronize Alliance-wide warfare development efforts. In essence, the WDI are enduring characteristics of the capabilities NATO will need in the future. They provide decision makers with a basis for determining whether a capability will enhance NATO's ability to carry out its core tasks, minimizing the risk that we are expending our time and resources on something that may not be needed, and for determining whether we are creating the MIO that will, in fact, be able to effectively shape, not just react to, the future. One of the consequences of the North Star moniker is that, although of course the NWCC will be reviewed periodically and updated if necessary, it is an enduring description of what we face and what we need to do.

In short, the NWCC attempts to provide the guiding principles to keep us from having to constantly adapt to any potential adversary, but rather to allow us to make them adapt. This is why the NWCC is referred to as NATO's North Star. A navigator can look up at night and, by finding the North Star, will always know which way is north and, therefore, which way to go. The NWCC, especially the five imperatives, has been designed to provide NATO with this same direction of travel.

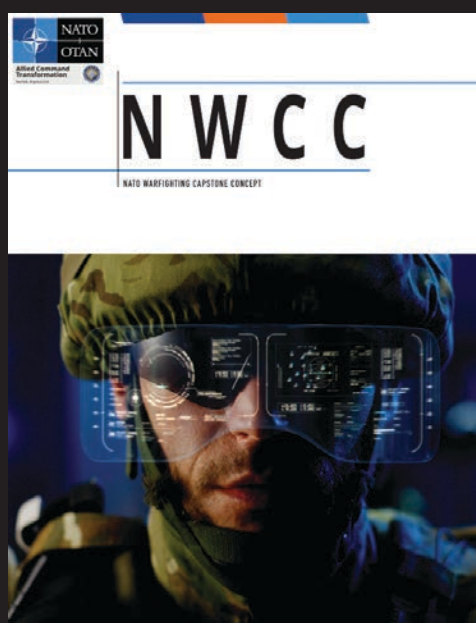


A Theory of Victory

This is why the NWCC is referred to as NATO's North Star. A navigator can look up at night and, by finding the North Star, will always know which way is north and, therefore, which way to go. The NWCC, especially the five imperatives, has been designed to provide NATO with this same direction of travel.

The message is clear. NATO faces difficult challenges today, and potential adversaries will not relent in attempting to further complicate things in the future. As the 2022 Strategic Concepts says, the Euro-Atlantic area is not at peace. The DDA,

on the one hand, addresses the *we're not at peace* aspects now. The Alliance, recognizing we are no longer at peace, can take deliberate action to shape the landscape to protect our territory, our people, and our values. The NWCC, on the other hand, is a call to action to recognize that NATO can be more proactive in how it addresses today's challenges and those future, likely more complex, ones.



Our final question to both gentlemen was, “*What should the typical NATO staff officer understand about the NWCC and the DDA?*” Both had clear answers:

“If you want to find out more about what’s inside the NATO Warfighting Capstone Concept, you can download a copy of the brochure here.”

“Read it [NWCC]! Reading it will help NATO staff understand that the NWCC is about how NATO can maintain—even regain—its edge so we can win. It is a Theory of Victory. And it is not merely an ACT product; all of NATO made it.”

—Dr Paulauskas



“DDA is a powerful declaration of Alliance unity, of our commitment to protecting the values upon which NATO was founded. All readers can get behind this.”

—Mr Janzen



Leveraging Lessons Learned in the FUTURE OPERATING ENVIRONMENT...

This graphic was created using Generative AI.



Mr Stefan Olaru is one of the JALLC's research analysts. Before joining the JALLC in 2012, he served for 15 years as an officer in the Romanian Army, mainly as an instructor, researcher, and Lessons Learned analyst. His work includes over 40 studies, projects, research papers, and publications in the fields of law, capability development, and international security. As a JALLC analyst, he has contributed to multiple analysis projects, Lessons Learned, and Innovation activities, including the NATO Lessons Learned Conference. Mr Olaru has a Master's Degree in Private Law and a post-graduate diploma in management.

NATO 2030 is an ambitious agenda aimed at preparing NATO for a new era of increased global competition and security threats. Lessons Learned (LL) play an important role in supporting NATO's 2030 ambitions, but NATO will face future challenges beyond the 2030 horizon for which it needs to be prepared. As technology continues to evolve, strategic foresight will be of the utmost importance.¹

1. Some ideas reflected in this article are inspired from public information included in various drafts about FOE produced by the HQ SACT/SPP/FOE team.

Security threats² such as terrorism,³ cyber-attacks, disruptive technologies, climate change, and challenges from Russia and China to the rules-based international order⁴ are among the challenges faced by NATO. The ability of the NATO Lessons Learned system to capture, analyse, and document lessons, as well as use the individual lessons, means it can provide guidance, inform the implementation of the 2030 Agenda, and learn the right lessons from the implementation.

2. Relevant documents related to the 2030 Agenda and more information can be found at <https://www.nato.int/nato2030/index.html>, date last accessed 14 June 2024

3. NATO, Madrid Summit Declaration, 2022

4. NATO, Vilnius Summit Communiqué, 2023



Mr Stefan Olaru, JALLC Lessons Learned Analyst, at the 2024 NATO Lessons Learned Conference, where in a futuristic demonstration of Digital Transformation, he spoke with his own avatar.



The Royal Danish Navy frigate *HDMS Triton* is part of the Joint Arctic Command Denmark. An important aspect of the FOE, recognized in NATO's Strategic Concept, is climate change. LL will help NATO adapt to changing environmental conditions, like higher ocean temperatures.

NATO will face future challenges beyond the 2030 horizon for which it needs to be prepared within a Future Operating Environment (FOE) where commercial data sources play an increasingly prominent role in shaping NATO operations. As technology continues to evolve, strategic foresight is of the utmost importance to leveraging emerging technologies and navigating the digital landscape.

The FOE is a dynamic and intricate system characterized by evolving conditions, complex interrelationships among diverse actors, adaptable strategies, various operational domains, advanced capabilities, and the influence of global, regional, and local variables. It spans the physical, cognitive, and virtual domains, which present challenges and opportunities to military forces and other actors who make decisions and employ capabilities to achieve warfare objectives amid complex and rapidly changing circumstances.

Warfare, as now practised, is increasingly embedded in a continuum of conflict and is conducted on a spectrum; from shaping through contesting to fighting and back to contesting or shaping through de-escalation. Though this continuum from peace to war remains an enduring characteristic of warfare—conflicts of today and tomorrow are, and will increasingly be, *fought* in the grey zone, between peace and war.

As a result, from the tactical extraction of LL to the imperative of human-centric capability development, NATO must foster interoperability and collective resilience. Moreover, the NATO LL Capability should be developed to ensure that decisions can be informed in all circumstances, including where commercial data sources diverge from the Alliance's mission objectives.⁵ Therefore, evolution of the NATO LL Capability is not only triggered by the need for improvement but by the need to evolve to respond effectively to the expectations and demands of the FOE.

In this regard, the NLLC 2024 presented in the Final Conference Report some takeaways that should be considered:

- **Adaptability and unity:** In the face of an ever-evolving security and technological environment, many lessons have the potential to support NATO's long-term transformation and adaptation, which should be based on a single coherent strategic outlook.
- **People-centric approach:** NATO needs to equip the right personnel with the right skills, knowledge, and tools that are necessary to work in a new digital landscape. LL will be no exception to this as we move towards the 2030 horizon and beyond.
- **Focus on Multi-Domain Operations (MDO):** As an Alliance implementing an MDO approach, ensuring that lessons are properly collected and exploited will be critical for NATO to integrate its military and non-military activities across all operational domains.
- **LL and Strategic Foresight analysis:** Although it is recognized that, in the short(er) term, lessons are needed at the speed of

5. Relevant lessons in this respect were also captured in the JALLC report on Lessons Supporting the Development of the FOE 2024 Study.

relevance, with regard to strategic foresight, LL should be considered a long-term effort to inform decisions and capability development as well as to inform Strategic Foresight product development. Lessons lead to transformation which results in effective and efficient future organizational structures, processes and—by design—successful missions and operations.

23 years of NATO's LL Capability

The journey so far...

Evolution

Since 2002, and the establishment of the JALLC, NATO's LL Capability has matured significantly. Every evolution has contributed significantly to enhancing NATO's absorptive capacity—the ability to recognize, assimilate, and apply new information for improved capabilities.

Key Milestones

2006: The interim Bi-SC LL Directive laid the foundation for a formal LL capability.

2009: The first NATO LL Roadmap provided a way ahead for the continuous optimization and improvement of the NATO LL Capability.

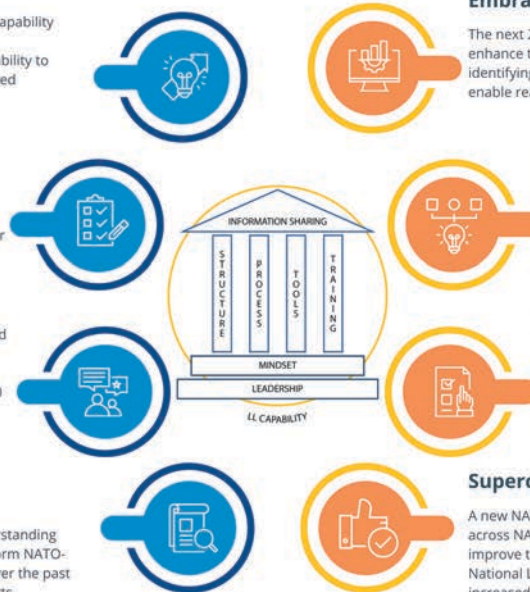
2019: The inclusion of LL processes in Allied Joint Doctrine for Operations formalized LL as a fundamental requirement in NATO operations.

Training and Tools

Dedicated training courses were developed to ensure a broad base of LL subject matter experts. The first LL course for 40 participants per year was launched in 2009. Today the JALLC runs multiple LL courses and engagements, training over 700 participants per year. Similarly, the NATO LL Portal has evolved from a simple LL database, to a sophisticated tool enabling NATO staff to manage the LL process, as well as supporting Allies and NATO staff to share and exploit LL.

Analysis and Impact

JALLC Analysis systematically develops knowledge and understanding from NATO operations, exercises, and other activities, to inform NATO-wide improvements in the short, medium, and long-term. Over the past two decades the JALLC has produced over 300 analysis reports, influencing policy, doctrine, and optimizing the way NATO does business.



Looking to the future...

Embracing Digital Transformation and AI

The next 20 years will see an increased reliance on digital tools and AI to enhance the NATO LL Process and LL Sharing. AI can, for example, help in identifying patterns and predicting outcomes. Digital transformation will enable real-time data sharing and collaboration.

LL as a Command Function

A key challenge with any LL effort is ensuring that LL are not just admired, but are applied to deliver improvements. The future NATO LL Capability needs to be more closely coupled with the Command function in NATO HQs. Improving visibility of LL with senior leadership will serve to ensure resources are prioritized to take action to avoid repeating avoidable mistakes.

Learning from Russia's war against Ukraine

Russia's war against Ukraine underscores the need for a robust LL capability. The NATO LL Capability will need to evolve to take into account LL from running the LL process during high intensity warfighting. Moreover, NATO needs to enhance its ability to learn from the experiences of others, not just its own experiences. The newly established JATEC represents a vehicle for this with Ukraine.

Supercharging LL Sharing

A new NATO LL Toolkit, due in 2027, will make it easier and faster to share LL across NATO and the Allies. New NATO LL standardization publications will improve the interoperability of LL staff, processes, and tools. A new NATO National LL Directors Group, chaired by the JALLC, will encourage and enable increased LL sharing from Allies through NATO.

The evolution of the NATO LL Capability

In order for the NATO LL Capability to evolve consistently with NATO's needs, the JALLC itself has continuously adapted to changes to the security environment and ensured the NATO LL Capability remains fit for purpose in the FOE. The above infographic broadly describes the evolution of the JALLC and the NATO LL Capability so far, and projects how it might evolve in the future.

LL in support of understanding FOE

Responding to the FOE demands is possible only by understanding the FOE, and leveraging the LL system can support a better understanding of it. Below are some examples of areas where LL can do this:

- By gathering lessons from past operations in complex and rapidly changing environments, NATO can understand better how to navigate and adapt to the multifaceted nature of the FOE. Previous interactions with a variety of state and non-state actors can provide insights into managing alliances and conflicts within the FOE. Lessons from the International Security Assistance Force (ISAF), in particular, will help NATO and individual Allies be better prepared for the complexities of the operating environment and the challenges of establishing command and control mechanisms.
- Lessons from dealing with Russia's assertive posture and other state and non-state actors can guide NATO's future strategies in monitoring and responding to similar threats. Insights from past encounters with asymmetric warfare tactics can help NATO prepare for, and counter, advanced and unconventional tactics used by adversaries. Historical data on the use of Diplomatic, Information, Military and Economic (DIME) instruments of power in various combinations can guide NATO's strategic planning and execution in future conflicts. For example, the JALLC's extensive work on lessons following the illegal annexation of Crimea and from the current war against Ukraine will help NATO and individual Nations to adapt their posture and operational plans and improve the synchronization between different instruments of power.
- Lessons learned from MDO across land, air, sea, space, and cyber domains can improve NATO's ability to coordinate seamlessly in the future battlespace. Experiences from past cyber and electronic warfare engagements can enhance NATO's defensive and offensive strategies in these areas. Insights from past reliance on global communication networks and space-based assets can help NATO ensure the robustness and security of these systems in the future. Lessons from past operations affected by environmental factors can guide future planning and resource allocation in response to climate-related challenges.

- Historical data on overcoming technological challenges can help NATO anticipate and mitigate similar issues in the future battlespace. Experiences from past collaborations with private industries can inform future partnerships and the integration of dual-use technologies, and help NATO determine which capabilities should be NATO owned and where it should rely on civil actors. This becomes even more relevant considering the increased use of drones in modern warfare, which are playing a critical role on the battlefield. (see page 15)
- Insights from previous information and psychological operations can improve NATO's ability to influence and counter adversaries' narratives. Lessons from current conflicts and competition can help NATO better understand and navigate the continuum of conflict, particularly in the grey zone between peace and war, giving insight on how NATO can lead the narrative and counter efforts to undermine our democracies.

Highlights of NATO efforts to improve LL Capability

To leverage the lessons in the areas presented above effectively, several efforts appear relevant within NATO:

- **Create comprehensive databases:** Develop and maintain comprehensive databases of LL from past operations, exercises, and engagements.
- **Update training programmes regularly:** Incorporate LL into training programmes to ensure that personnel are prepared for the challenges of the FOE.

- **Foster a culture of continuous improvement:** Encourage a culture of continuous learning and improvement, where feedback and lessons are actively sought and integrated.
- **Enhance collaboration and information sharing:** Facilitate better information sharing and collaboration among member nations and partners to ensure that LL are disseminated and applied widely.

Conclusion

NATO's LL Capability is critical to preparing for future security threats and challenges, both within the 2030 horizon and beyond. As technology continues to evolve and the security landscape becomes increasingly complex, LL can support a better understanding of the future operating environment and inform decision-making and capability development. While efforts are underway to improve NATO's LL Capability, there is still work to be done to ensure that the capability is effective in supporting NATO's long-term transformation and adaptation. By fostering a culture of continuous learning and improvement, and developing a future NATO LL Toolset (NLLT), NATO can enhance its ability to capture, analyse, and apply LL, thereby improving its level of preparedness and effectiveness in the FOE.

If you'd like to hear more about the FOE and NATO's, in particular ACT's, work in this field, click [here](#) to watch a video of former Supreme Allied Commander Transformation, GEN Philippe Lavigne, speaking at the Future Operating Environment Workshop 2023.

Future NLLT enhancing LL Capability to better prepare for FOE

Currently, these efforts are distributed across several Lines of Effort within the NATO LL Capability Improvement Roadmap. In particular, these efforts are focused on developing the future NLLT as part of the ETEE FS Capability Development Programme⁶ where several user groups provided their requirements, especially with regard to:

- data ingestion and integration with other tools, including authoritative tasking tools (e.g. Tasker Tracker);
- use of advanced analytics and machine learning, including analytics dashboards;
- near real-time monitoring and alerting functionalities, including capturing data from exercises and operations;
- knowledge management and collaboration functionalities, including libraries and communities of interest;
- enhanced search-and-retrieval functionalities, including advanced semantic searching engine; and
- enhanced user interface and experience, including intuitive dashboards and mobile access.

Considering these expected functionalities, the delivery of the future NLLT will enable users to enhance their ability to capture, analyse, and apply LL significantly, thereby improving NATO's level of preparedness and effectiveness in the FOE.

6. The ETEE FS CAPDEV Programme is the framework in which the NLLT will be delivered. The NLLT was associated to this programme in April 2023 based on the letter from DCOS JFD/HQ SACT on the ETEE FS Capability Programme Update: SACT; Education, Training, Exercises and Evaluations (ETEE) Functional Services (FS) Capability Programme Update; 04 April 2023, ACT/JFD/TT-6968/SER:NU1576; NATO Unclassified Releasable to Sweden.



Drone Adaptations and Innovation in Russia's war against Ukraine

K. Griff Griffin, JALLC Contractual Research Analyst

A fibre-optic cable trails across a muddy field in eastern Ukraine, unspooling behind a small First-Person-Viewer (FPV) drone as it lifts into the air. Forty kilometres away the operator keeps a direct link, indifferent to the jammers saturating the battlespace. In the Black Sea, a plywood-hulled Uncrewed Surface Vessel (USV) runs a low profile against the waves, carrying a shaped charge toward a naval anchorage. Further south in Yemen, a crude but effective Houthi-built surface craft is steered toward a tanker in the Red Sea, forcing commercial shipping into defensive postures.

Across continents and conflicts, uncrewed systems have moved from improvisation to daily practice. They are no longer experimental gadgets but integrated features of modern warfare, shaping tactics for state militaries and non-state groups alike. In this article we highlight some of the latest innovations in drone warfare that are being identified in the context of Learning Lessons from Russia's war against Ukraine.

Multi-domain drone evolution: From improvised platforms to core systems of warfare

Uncrewed systems have rapidly shifted from improvised tools to core features of modern conflict. What began as commercial quadcopters modified to drop grenades have evolved into integrated networks of reconnaissance, strike, and relay platforms. At sea, low-cost USVs threaten naval operations once dominated by capital ships. On land, Uncrewed Ground Vehicles (UGV) are now routinely used for breaching and demolition tasks. Non-State Actor Groups (NSAG) are also adapting these technologies, drawing on commercial supply chains and open-source knowledge. The result is a battlespace where drones are no longer experimental or supplementary, but embedded across domains, shaping tactics and strategy alike.

AIR

The air domain demonstrates the greatest maturity. FPV one-way attack drones are now routine for both Russian and Ukrainian forces. Russia has fielded fibre-optic-guided FPVs, such as the *Molniya*, providing operators with extended ranges immune to jamming. In parallel, massed salvos of *Geran-2* loitering munitions, often combined with decoys, have been used to saturate Ukrainian air defences and exploit vulnerabilities in critical infrastructure protection.

Ukraine has adapted by extending the range of commercial FPVs with relay nodes, while employing shaped charges against armour and hardened positions. More recently, low-cost interceptor drones have been deployed to counter incoming *Shaheds*, offering a more economical alternative to surface-to-air missiles. Despite high loss rates, the economics remain favourable: a USD500 drone capable of destroying a tank or artillery system represents a viable exchange ratio, even with attrition.

Beyond Ukraine, NSAGs have adopted similar approaches. Mexican cartels employ drones for surveillance and improvised strikes. In Iraq and Syria, online manuals circulate on modifying FPVs for offensive use. In the Sahel, militant groups primarily use drones for intelligence, surveillance, and reconnaissance, though the pathway to weaponization is increasingly evident. Availability to civilians and the diffusion of technical knowledge mean adaptation is limited less by resources than by initiative.

The impact is clear: drones have become integral to tactical formations, providing reconnaissance, target acquisition, and precision strike capability. Units on both sides in Ukraine now treat drone operators as essential members of platoon- and company-level structures, integrating their feeds directly into fire missions and manoeuvre planning.

Image generated using Generative AI.

MARITIME



Ukraine's early use of USVs, such as the *Magura V5* and *Sea Baby*, forced Russia to adapt its Black Sea Fleet posture, shifting away from Sevastopol and reinforcing port defences. These relatively low-cost systems inflicted damage on warships worth hundreds of millions of US dollars, demonstrating an outsized effect relative to investment.

Russia has since demonstrated offensive USV capability, sinking the Ukrainian reconnaissance vessel *Simferopol* in the Danube estuary in August 2025. Both sides now employ USVs offensively, prompting a contest of innovation in layered maritime defences, including barriers, patrols, and interceptors.

Elsewhere, NSAGs have also employed USVs. Houthi forces in Yemen have targeted commercial shipping in the Red Sea, while Somali groups use small uncrewed boats for smuggling and harassment. In each case, the strategic effect is disproportionate: defenders must commit significant resources to counter inexpensive threats.

The broader trend is clear. Where maritime warfare once centred on capital ships and missile systems, expendable platforms now challenge control of littoral zones and sea lines of communication. This compels navies to adapt to persistent, low-cost threats alongside traditional high-end challenges.

September 2019: Wave Glider, an unmanned system operated by the NATO Centre for Maritime Research and Experimentation, rises from the sea during an unmanned systems trial designed to integrate multinational platforms with NATO forces.

LAND

On land, UGVs have moved from experimental projects to operational employment. Both Russia and Ukraine deploy tracked demolition vehicles against trench systems and bunkers, while improvised ground robots have been used as mobile improvised explosive devices in urban fighting. These are not isolated innovations, but routine tools employed where terrain and mission profiles justify their use.

Beyond Ukraine, adoption is more limited. Some NSAGs in the Middle East have experimented with UGVs, but none at comparable scale or consistency. In other regions, such as the Sahel, militants continue to rely primarily on aerial drones. Yet the availability of commercial robotics and online modification guidance suggests broader adoption is a question of time rather than feasibility.

The logic is consistent: expendable uncrewed systems extend reach, reduce risk to personnel, and achieve effects traditionally associated with artillery, mines, or manned assaults.



Counter-systems and adaptation

Defensive measures have not kept pace with offensive innovation. Fibre-optic guidance renders jamming ineffective, drone stacks¹ saturate limited air defence capacity, and small USVs challenge radar and sonar detection. On land, UGVs exploit cluttered environments where line-of-sight defences are less effective.

Countermeasures exist but they are fragmented. Ukraine has employed cheap interceptor drones to offset the cost imbalance of missile-based defence. NATO Nations are trialling directed-energy systems, though range, coverage, and cost remain limiting factors. Jammers and spoofers continue to play a role, but attackers adapt quickly to bypass them.

The organizational challenge is equally significant. Forces that treat drones as optional equipment struggle to exploit their full potential. Those that create dedicated units with trained operators, sustainment structures, and command integration adapt more effectively. Russia and Ukraine have demonstrated that drone operators are not auxiliary specialists but essential enablers at tactical level. NSAGs, meanwhile, leverage agility, improvisation, and high tolerance for losses to remain competitive against state militaries.

An electronic systems specialist prepares a jamming system to intercept an uncrewed aircraft system during a NATO exercise.



NATO works with industry partners on counter-drone technology

NATO's Counter Unmanned Aircraft System Technical Interoperability Exercise (C-UAS TIE23) brought together military, scientific, and industry specialists to test high-tech commercial solutions used to detect, identify, and neutralize drones. Some 70 systems and technologies, including sensors, effectors and jammers, were tested live. The aim was to ensure that these high-tech solutions can connect instantly and operate together seamlessly.

The misuse of small and widely available drones has grown exponentially. Constantly improving the ability of counter-drone systems to operate together helps to strengthen Allied air defence and deterrence. The exercise was organized by the NATO Communications and Information Agency (NCI Agency) and hosted by the C-UAS Joint Nucleus within the Dutch Ministry of Defence.

Find out more [here](#).

¹ The term *drone swarm* has become common in both military commentary and media reporting, but it is a mischaracterization of what is happening in current conflicts. A true swarm, in robotics and military doctrine, implies autonomy, decentralized coordination, and emergent collective behaviour. What we see in the Red Sea, in Ukraine, and even in advanced military testing is better described as *drone stacks*: layered, operator-controlled deployments that achieve saturation by sequencing drones across altitude, vector, and timing, rather than through autonomous collaboration.

The decisive factor



A throwbot is remotely controlled by troops to go into buildings and give a live feed of the environment before troops enter the building to minimize casualty. Source: www.defenceimagery.mod.uk. Copyright UK MOD © Crown copyright 2023.

By 2025, drones are established across all domains as integral to modern conflict. In the air, FPV and loitering munitions provide precision strike capabilities at unprecedented scale and affordability. At sea, USVs threaten naval assets and commercial shipping. On land, UGVs extend reach and reduce risk in breaching and demolition tasks. NSAGs continue to adopt these systems, exploiting civilian supply chains and online knowledge to narrow the capability gap.

The decisive factor is not technology alone but organization and adaptation. Forces that invest in dedicated drone units, with coherent training and integration, gain enduring advantage. Those that treat drones as supplementary assets risk underperformance. For NSAGs, agility and innovation offset resource limitations. For Nations, the challenge is institutionalizing lessons from Ukraine and beyond: drones are not future threats or temporary additions—they are now central to warfare across air, maritime, and land domains.

The JALLC on drones

There are various JALLC products that have been published since Russia's illegal invasion of Ukraine that highlight the lessons being learned regarding the increasing and innovative use of drones and counter-measures. This article presented a summary of some of the latest developments. If NATO staff would like to find out more about the lessons relating to this topic, we recommend downloading relevant copies of the JALLC's *NATO Lessons Learned Portal Analysis Newsletter* from the NATO Information Portal (NIP) as well as the latest edition of the Key Issues and Trends from Lessons Learned Products and Multi-Domain Exercises.



Spanning the Divide

How Lessons can contribute to NATO's development of Multi Domain Operations



COL Arturo Sabando is the former JALLC's Lessons Learned Management Division Head. He joined the Spanish Army in 1985 and served in Infantry Units and staff positions. He served three previous NATO tours at CC-Land Madrid, Joint HQ Lisbon, and SHAPE, prior to joining the JALLC. He came to the JALLC after serving as Chief J7 at the Spanish Joint Operations Command where he was responsible for exercises, training, evaluation, and Lessons Learned. COL Sabando ended his tour in the JALLC in 2025.

There has been a lot of talk in NATO since the adoption of the concept for Multi-Domain Operations (MDO) by the Alliance in 2021. This idea, which adds two new domains—cyber and space—to the longstanding joint domains of maritime, land, and air, foresees NATO developing the capability to exercise dominance in the battlespace through full integration of command and control across all five domains. It also seeks to synchronize the military instruments of power (MloP) with other non-military instruments, such as diplomatic or financial instruments. According to HQ SACT, a *'Multi-Domain' mindset must go beyond [command and control of joint forces] to include military and non-military assets, which is the key differentiating factor between 'Joint' and 'Multi-Domain' Operations.*¹

1. <https://www.act.nato.int/>

“We must be able to prepare, plan, and execute synchronized military activities across all domains and environments at scale and at speed and we must be able to do this in collaboration with other instruments of power in a manner that decisively influences our adversaries...Our end goal is to create a multi-domain enabled Alliance that, through digital transformation, will seamlessly connect platforms and people across all domains, thus ensuring we can outfight any adversary.”

LTG Dave Julazadeh, then HQ SACT
DCOS Capability Development,
NATO Innovation Podcast, 22 December 2022

But this new concept, which has its origins in a 2018 U.S. Army Training Doctrine pamphlet, also raises some questions. How will NATO achieve the level of synchronization among the large number of different actors that MDO calls for? How do the two new domains, cyber and space, differ in their nature, use, and availability from the three traditional joint domains? Given that, for the foreseeable future, space is primarily a pathway for communication and intelligence collection (see article ‘Space—NATO’s Final Frontier?’ on page 25) that users access through cyber systems, how can one define the difference between these two domains?

Most importantly, what does MDO look like in a combat environment where, as should be expected, most, if not all, modern forms of communication and navigation have been disrupted or outright denied, or where a commercial provider decides to suspend service? While MDO assumes that attempts to disrupt these essential services will occur—indeed this is the main reason for including space and cyber space to begin with—current documentation seems to focus on overcoming such disruptions with less focus on learning to live, and fight, without the networked services upon which we’ve come to depend.

Given all of these questions, is the vision expounded upon by General Julazadeh even attainable?



NATO’s two strategic commands have joined forces to ensure that NATO’s efforts to achieve its MDO vision are properly coordinated between the warfighting and the warfare-development aspects. As such, a Steering Board, with representatives from both Allied Command Operations and Allied Command Transformation, has been established. The board is intended to steer a coherent and timely MDO Campaign Implementation Plan for NATO at the Strategic Command level. This board meets regularly and the JALLC, as you would expect, plays its part as an observer, ensuring that it stays abreast of the latest and upcoming developments in this fast-paced piece of work.

In fact, the JALLC has a long history of analysing NATO’s string of concepts for command and control (C2), whether through its work at high-level exercises such as the STEADFAST and TRIDENT series, to detailed reporting on the evolution of command structures in ISAF and other operations. Our work has covered everything from the impact of NATO Command Structure changes on meeting NATO’s evolving levels of ambition to how then-new concepts like Knowledge Management affected the generation of adequate situational awareness for commanders. The work was exemplified by the JALLC’s 2017 report on NATO’s C2 Capstone Concept. The vast number of lessons available in the NATO LL Portal (NLLP) in this regard are invaluable for shedding light on how to implement new concepts like MDO. And the JALLC, through its two decades of experience in this type of work, is well placed to help apply these lessons to support such implementation.

As a result, the JALLC reviewed observations, lessons, and other documents submitted to the NLLP that relate to C2 in MDO, considering how these lessons become relevant for further developing MDO. The results were then published in a JALLC NLLP Active Content Management (ACM) report. These reports differ from JALLC analysis reports in that, instead of conducting an in-depth, formal analysis based on new research to develop recommendations for a specific customer, ACM reports synthesize already published information on a particular topic from the NLLP with the goal of mapping the challenges and shortfalls presented by those lessons with the work-strands and efforts around MDO and to serve as a reference guide to the original submissions.

The ACM report on C2 in MDO, which has since gone on to inform NATO's Cross Domain C2 Concept, presents several overarching insights on MDO in NATO. One such insight is that MDO requires a very high level of expertise, especially in intelligence, targeting, and understanding of cultural and operational contexts to allow for full integration of C2 across the battlefield. This, in turn, implies that a very high level of training will be needed to develop the necessary expertise. Cyber expertise, in particular, is not available to the extent that all commands can leverage the uniquely advantageous capabilities this domain can bring to the battlespace. More generally, lack of clarity and insufficient flexibility with respect to C2 structures, especially when first stood up in a crisis situation, can hinder effective joint C2 across all domains.

According to the data used to compile the report, lessons and related information from Russia's war against Ukraine demonstrate that use of the electromagnetic spectrum will be extremely contested and complicated. The use of modern, inexpensive drones and other off-the-shelf technology has allowed for better targeting and posed direct threats to personnel and expensive military equipment. And yet reliance on modern means of communications and ISR may be difficult, as shown in Ukraine, where electronic warfare (EW) has successfully denied use of the cyber domain to the other side, while also resulting in EW fratricide to one's own systems. In many cases, both sides have reverted to legacy systems such as cabled field telephones or messengers to ensure communication.

FAQs

What is a Domain?

Within NATO's structure there are five areas of operations: maritime, land, air, space and cyberspace. Historically, operations in these domains have either not existed (i.e. space and cyber) or have functioned as largely independent entities within national militaries. Many Allied nations' militaries still function in this capacity today; however, given the speed of information, data flows, and adversarial capabilities, the necessity of orchestrating military activities across all domains as a single force is crucial for long-term defence and deterrence initiatives within NATO.

What is the Difference between Joint Operations and MDO?

Many military forces within the NATO ecosystem have *Joint* military capabilities. In the post-World War II restructuring of military forces, the emergence of integrated command structures that cut through inter-service rivalries was common throughout the militaries of NATO members. These *Joint* capabilities are associated with a collective focus and cooperation between traditional military services (think of the U.S. Joint Chiefs of Staff or the U.K. Permanent Joint Headquarters). While *Joint* command structures promote coordination with other armed services, a *Multi-Domain* mindset must go beyond that to include military and non-military assets. This is the key differentiating factor between *Joint* and *Multi-Domain* Operations.

What is the End Result for MDO Development?

NATO's large-scale goal for the development of Multi-Domain Operational capabilities is to synchronize the collaboration of various stakeholders throughout the Alliance and deliver a streamlined defence and deterrence system to its one billion citizens. In doing so, NATO will be better equipped to continue its mission of providing the North Atlantic and European regions with defence and deterrence capabilities that guarantee our freedom and security.



Click on this picture to watch an informative video on Multi-Domain Operations.

From the review of the lessons presented in this report, it seems that NATO will need to continue to strive to fully implement the ideas of MDO. It is suggested that bespoke-yet-flexible C2 structures and concepts for MDO operations will need to be developed and corresponding training needs to be at the very heart of NATO's training and exercises programme. In this respect the JALLC is also contributing to the development of MDO Exercises (MDXs) through its analysis of key lessons from recent MDXs. For example, in 2024 the JALLC reported on the key lessons from 2023 in this respect and the next iteration of this report will be published in 2025. The aim of these reports is to inform NATO's leadership on how future exercises can be improved and realism enhanced to ensure that NATO is not only training MDO, but training the right things, the right way.

Looking forward to the future of NATO's development of MDO, it seems likely that the greatest challenge will be in striking a balance in how MDO operations approach the use of the cyber domain, and in developing the cadre of experts and the necessary resilience in the systems to operate when an adversary has denied or exploited the electromagnetic spectrum. Nevertheless, MDO surely represents the future of NATO C2. As a relatively new concept to NATO, it will likely take time and resources to ensure it becomes fully, and practicably, operational. Ensuring that relevant lessons are captured, analysed, and utilized will undoubtedly help ensure this process is conducted efficiently.



The JALLC's sister organization, the Joint Warfare Centre (JWC), is NATO's only establishment that is chartered to create synthetic training scenarios. The scope of these fictitious but highly realistic settings and scenarios allows for exercises in both Article 5 collective defence and non-Article 5 crisis response operations mode at various levels of effort, from divisional up to multi-corps, and across all five military domains—air, land, maritime, cyberspace, and space. Find out more [here](#).



SACT, ADM Vandier, speaking at the 2025 Multi-Domain Operations Conference in Ankara, Türkiye, noted, “*Multi-Domain Operations are about defending our territory, our home, our children—through the critical connection and synergy between the military world and the civilian world.*”

SPACE

NATO's Final Frontier



A view from the planet's surface

This graphic was created using Generative AI.



Mr Chuck Ridgway was the JALLC Editor from 2005 to 2015. A retired US Navy surface warfare and reserve foreign area officer, he has worked for a number organizations over the last decade including

Africa Development Promise, One Earth Future Foundation, and the UN Office of Drugs and Crime. He currently consults with the US Defense Security Cooperation Agency on maritime security matters and substitute-teaches in Denver public schools. He returned to the JALLC to help put together this issue of *The Explorer*.

“Space is increasingly important for the Alliance’s and Allies’ security and prosperity. Space brings benefits in multiple areas from weather monitoring, environment and agriculture, to transport, science, communications and banking.”

—NATO Space Policy 2019

“If you want a new idea, read an old book.”

—attributed to Ivan Pavlov

NATO declared space to be a new operational domain in 2019, adding it to cyber, air, land, and sea, and thereby placing further emphasis on the need for multi-domain operations. Simultaneously, NATO released its first space policy, describing for the first time how the organization intends to approach, use, and defend this crucial area of future warfare. Five years later, what does this development mean for the typical NATO staff officer? How is one supposed to understand space and what role does it play in supporting operations in other domains? Chuck Ridgway, the JALLC's former editor—and committed advocate of *Seapower*—took a look and weighs in.

As a kid, I was a huge *Star Trek* fan. In fact, the show played a major role in my childhood dream of becoming a naval officer. Growing up in the 1970s and 1980s, there were a lot of exciting things

happening in space in our timeline too. I remember the last Apollo mission and the first landing of the space shuttle. I was also a military nerd and bought every book I could find on modern warfare.

Titles I owned included such works as *Navies of World War 3* by Antony Preston, published in 1984, *Modern Naval Combat* by David and Chris Miller from 1986, and *Advanced Technology Warfare* published in 1985 and quoted below.

I recently had a chance to thumb through these old treasures of mine and what I noticed was not that much has really changed, at least when it comes to hardware, tactics, or employment. *Modern Naval Combat*, for instance, profiles 44 classes of major warships. Thirty of them are still in service today, most with their original navy. The Mk50 Torpedo is still the main western anti-submarine weapon and the Harpoon missile is still the main anti-ship weapon. The challenges it describes in these warfare areas are still recognizable.

Space seems little different. The third chapter of *Advanced Technology Warfare* covers *Space Warfare*. It's not an exaggeration to say that one could take its text, change *30 years ago* to *70 years ago*, change Soviet Union to Russia, add that China is now a major player in space, change the acronyms for a few systems, and have a completely relevant piece for today. Take for instance:

At present, the overwhelming majority of both superpowers' space effort is devoted to 'non-weapon' purposes, such as intelligence gathering, communications and navigation. Space-based assets are 'force multipliers', allowing many traditional military missions to be conducted more efficiently, although as technology advances space systems are evolving into 'force enablers', opening up new mission possibilities. To cite just a few examples, satellite systems now existing or in development will enable global control of forces, improved tactical communications, all-weather navigation, precise weapons delivery independent of range, and long-range naval target acquisition.

*As reliance on military satellites has grown, so too has the awareness that the loss of satellites in wartime could be a crippling handicap. This has led to the development of techniques for disabling an opponent's satellites—either by destroying or jamming them—and has also led to the development of methods of protecting satellites from enemy action. Thus whereas space systems were formerly viewed as a means of aiding terrestrial military operations, space itself is now also seen as a new theatre of **actual warfare**. [emphasis added]*

Those words are 40 years old, yet they could just as well have come from the chapter *NATO in Space* in the book *NATO 2030: Towards a New Strategic Concept and Beyond*¹. The truth is, since the major accomplishments of the '60s, '70s, and early '80s, there have been few dramatic leaps forward with space, just steady refinement of technology, at least before Elon Musk came on the scene. The same family of Atlas rockets used to launch the Mercury astronauts were used to launch the late 1980s-era Fleet Satellite Communications satellites—two of which still serve the U.S. Navy—and are in use to this day, with each version of the Atlas having improved electronics and engines. Sure, we don't pick up film canisters dropped from a satellite using a C-130 anymore, and today's satellites now have the bandwidth to control a drone on the other side of the world that is beaming back a live video feed, but we are not yet talking about space marines engaging in zero gravity combat, or protecting space-based trade with space battleships. Those days may come, but probably not in my lifetime. The simple fact is that the vast majority of what space is used for is still communication, reconnaissance, and navigation, just like in 1985.

So, what does it mean that space was declared an operational domain in 2019, when the things we've been doing in and via space have been relatively stable for decades? As nations continue to put more emphasis on militarizing space, whether as a new domain or through the creation of independent Space Forces, it is important to keep in mind that, fundamentally, what we use space for has not changed. It is a pathway for data. It is not territory that can be held, nor a commons through which goods, other than information or occasionally international space stations and ballistic missiles, can pass.



Prior to the digital age, several U.S. spy satellites used film canisters like this one to get their images back to Earth. Film was reeled into the canister and dropped from space over the ocean. A parachute would open and the canister was retrieved by a passing aircraft.

But space is also the ultimate high ground. Space military assets are persistent and force the dilution of an adversary's power by making them take actions to avoid detection from ever-watching eyes. This persistent oversight is an important reason why space assets are *force multipliers*, that offer independent options only possible from space. And while, like the sea, space can't be held, one can exercise both control and denial strategies in space. The pathway for data is only created by satellites, which are physical things in orbit that can be interdicted, all while holding certain orbits and denying those same orbits to an adversary.

It is equally important as well to recognize what has changed. First is the vast increase in the amount of bandwidth available, made possible obviously through there being more satellites but also through both the advances in computing technology to process the bits and bytes, as well as more efficient exploitation of the electro-magnetic spectrum. When I was a communications officer on an Aegis cruiser in the 1990s, our fastest satellite comms system could operate at around 2400 baud (that is bits per seconds!). Today's shipboard Advanced Extremely High Frequency (EHF) operates in the range of 8 Mbytes per second per terminal, around 3000 times faster (still a lot slower than my home internet). The satellites themselves can serve far more end-user terminals at these higher speeds. This increase in bandwidth has allowed military users to employ live chats, send email (with large attachments), and use video-teleconferencing. In the past, they would have been dependent on formal message, limited bandwidth datalinks, and line-of-sight or HF terrestrial radio.

The result of this increased bandwidth, coupled with the much higher resolution and sensitivity of today's sensors, is that we have become far more dependent on using space. Modern military forces would be hard pressed to operate at all without access to space-based communication and the information transmitted through it. And we rarely practice getting by without it. Without, say, GPS, could our warship successfully make landfall within a hundred miles of the destination? Could a forward observer accurately call in artillery fire without using satellite-acquired intelligence information? Even terrestrial communications systems and networks rely heavily on the precision timing provided by GPS, without which they probably cannot run.

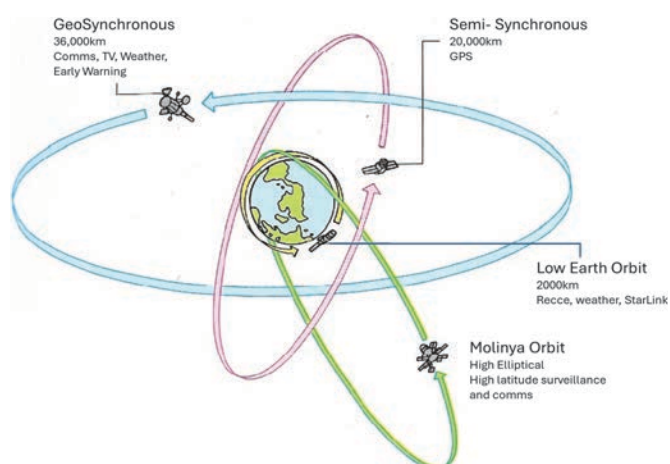
The second thing that has changed is that the commercial industry is now the leader in advances in space technology, pulling ever farther ahead of what even the U.S. government is capable of developing and fielding, and doing so at ever lower costs. SpaceX's recovery of its Heavy-Starship rocket in October 2024 is highly symbolic of these advances, especially in the area of reusable launch components, which sharply reduce launch costs. A



The UNIVAC 1232 computer. Used in U.S. Air Force satellite control facilities beginning in 1967, this was one of the most powerful computers available through the 1970s. It wasn't retired until 1990. It had 123 kB of memory.



The ground segment is just as important as what's in orbit. At Buckley Space Force Base in Colorado, satellites are controlled and updated, and their information is processed.



The most common orbits for satellites.

SpaceX Falcon launch costs about one-fifth that of an Atlas V's. This is a game changer, nowhere better exemplified than with StarLink. With per satellite launch costs of around USD 400 000, Elon Musk has created a constellation of 5000+ satellites in low-earth orbit that provide robust, high-bandwidth and, perhaps most important, very survivable communications connectivity.

But as industry outpaces government in space technology, governments, including militaries, become increasingly dependent on private enterprise for services critical to the warfighter. How will NATO Space Policy or the U.S. Space Force help if Elon decides to shut down StarLink in a conflict he doesn't like, especially one where other means of communication have also been targeted and degraded by the adversary?

NATO has gone some way to recognizing and addressing these issues with its recent NATO Commercial Space Strategy. Endorsed by Alliance Defence Ministers in February 2025, the strategy aims to develop a closer relationship with commercial space partners from Allied Nations in order to enhance the Alliance's operational space capabilities. You can read more about the strategy [here](#) including the strategic objectives and the approach to achieve them.

There is one more change that is perhaps most important. Our adversaries are increasingly able and increasingly willing to deny NATO the use of space. Gone are the concerns over anti-ballistic missile capability being *destabilizing* to nuclear deterrence and the stability that deterrence was meant to assure. Tests of anti-satellite weaponry and non-kinetic means of denying the use of satellites indicate such capabilities will be employed in future conflict.

In this environment, and until we *Earthers* become dependent on rare metal ores from the Belt, the purpose of space policy—and of space forces—is to ensure the use of space for its current purpose: a pathway for information. Ensuring this use involves not just operating equipment but also keeping an eye on what our adversaries are doing in space and analysing how that impacts us. It requires having options available when attempts are made to deny NATO the use of space, as they surely will be; and options for when these attempts succeed. As we've seen with the astronauts stuck on the International Space Station, when something goes wrong in space, it can take months to get new equipment up there.

NATO Space Policy goes some way to addressing the reality NATO faces today. Recognizing that NATO itself will not develop NATO owned and operated systems, the policy is designed to help ensure all Allies can benefit from the use of space, particularly those Allies who do not operate space programmes of their own.



Top: StarLink's constellation of over 5000 low-earth orbit satellites compared to Eutelsat's OneWeb constellation of around 600 (and growing). OneWeb satellites are now being launched on SpaceX Falcon rockets.
Bottom: Relative cost of StarLink versus other commercial satellites.



On October 31, 2023, an Israeli Arrow 2 missile successfully intercepted a ballistic missile fired by Houthis from Yemen. The intercept took place beyond the Earth's atmosphere, marking the first space warfare in history.

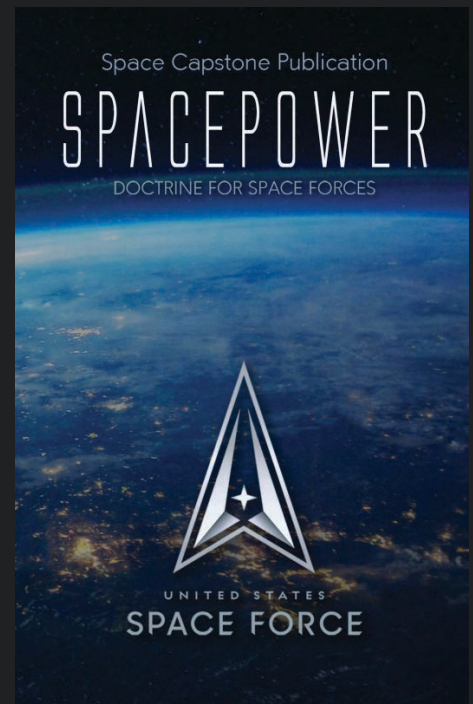


Purpose of Space Forces

NATO Space Policy arose at the same time and for many of the same reasons that the United States established the U.S. Space Force. Space Force was created to consolidate into a single bureaucratic structure the many programmes and projects that until then had been spread across the several military services and agencies with the aim of achieving better coordination and economy, while streamlining service. It also served to create a dedicated career field for space professionals, encouraging the development of intellectual capacity in this field.² Many NATO Nations have followed suit.

The U.S. Space Force views space as made of three segments: the orbital segment (spacecraft beyond Earth's atmosphere), the terrestrial segment (the ground-based equipment required to operate/interact with spacecraft), and the link segment (the electromagnetic spectrum connecting the terrestrial to the orbital segments). They all operate across physical, cognitive, and network dimensions.

Given that the mission of space forces is primarily to use pathways through orbital space for transmitting information, of whatever nature, space forces can best be viewed as a service provider, analogous to military logistics services. Much as many military branches have a dedicated logistics department—such as the U.S. Navy's Supply Corps or a separate branch, like the German military's joint logistics provider, the *Streitkräftebasis* (Joint Support Service), which ensure the delivery of *beans, bullets, and black oil* to combat forces—space forces exist to ensure delivery of bits and bytes or, as put in NATO Space Policy parlance, to ensure delivery of *space services* and *space data* by maintaining *space domain awareness*.



You can read the U.S. Space Force's capstone doctrine [here](#).



You can read NATO's overarching Space Policy [here](#).

2. <https://www.cato.org/policy-report/march/april-2021/was-space-force-good-idea>

NATO Space Policy also places a heavy emphasis on *resilience* in our use of space, which will lead to the development of approaches that will allow us to continue to fight, and win, when the use of space is denied to us, attempting to resolve the inherent tension between the fact that *Satellite communications are essential in all NATO missions* and *In security and defence terms, space is increasingly contested, congested and competitive and requires the Alliance to be able to operate in a disrupted, denied and degraded environment.*

Perhaps most importantly, NATO Space Policy recognizes that space, much like the maritime domain, is a global commons, whose use is open to all nations and citizens of Earth, governed by a rules-based international order. The idea, since incorporated into NATO's Strategic Concept, is that unfettered access to space is key to deterrence and defence and that access is being threatened by potential adversaries. Crucially, NATO now recognizes that attempts to deny the use of space as a global commons could rise to the level of an *armed attack* and result in invoking Article 5 of the North Atlantic Treaty. Nations in the past have gone to war to protect the concept of freedom of the seas. Are they ready to do so to protect freedom of space?

Lessons Learned from Space

It would be helpful to turn to Lessons Learned (LL) to see how NATO can best adapt to meet these needs. However, a search of the NATO Lessons Learned Portal (NLLP) for the word *space* is as likely to return as many lessons on there being insufficient parking *spaces* or office *space* at an exercise as ones concerned with the space domain. Those lessons that do exist focus on there being an inadequate understanding of this new domain and failure to include it in exercises in a meaningful way.

In part, this lack of space-related lessons is tied to the newness of NATO's policy about it. We have had just five years where space topics have been relevant to the NATO staff officers who populate the Portal. But it also results from the fact that we almost never have to operate without space-based communications and, as those few lessons make clear, very few exercises involve adapting in any meaningful way to a space- (or communications more generally) denied environment. Quite simply, there have not yet been many opportunities to learn space-related lessons.

Finally, the shortage of space-related lessons is surely a result of the more general problems NATO continues to face in developing its LL capability.

JALLC Analysis of Implementing the Military Contribution to Human Security

As NATO became increasingly involved in the crisis response operations of the 1990s and first decades of the 2000s, it became apparent, particularly through lessons learned from operations by the International Security Assistance Force (ISAF) in Afghanistan, that such military operations took place within a complex human environment. Challenges for NATO forces during those operations included avoiding civilian casualties, providing security for local populations, and accounting for the different perspectives of women, men and children. This realization led NATO to adopt a comprehensive approach to its operations, designed to ensure that NATO forces do not only focus on the conduct of combat operations against other armed forces, but were also prepared to ensure the security and protection of the people living in the area of operations.



Human security and good communication with local leaders go hand in hand.



ADM Mike Mullen, then Chairman of the US Joint Chiefs of Staff, in a Shura with local Afghan leaders during ISAF in 2010.

The UN Concept of Human Security

As NATO was developing its comprehensive approach, the UN was also addressing similar concerns, which were eventually encapsulated in the UN concept of *human security* which is defined as “an approach to assist Member States in identifying and addressing widespread and cross-cutting challenges to the survival, livelihood and dignity of their people.”

NATO has not formally adopted a concept for human security but, in 2020, the NATO Special Representative to the Secretary General on Women, Peace and Security established a Human Security Unit in NATO HQ. Nations then endorsed the Secretary General’s guidance on human security in June of 2022 and it was incorporated into the most recent version of NATO’s capstone doctrinal document, Allied Joint Publication (AJP)-01. AJP-01 introduces this term as an umbrella for several cross-cutting topics for which NATO does have

policy and which are related to the survival, livelihood, and dignity of people living where NATO might operate. This was followed by strategic military guidance from SHAPE intended to operationalize—that is, incorporate into its routine functioning—human security in the NATO command and force structure headquarters. SHAPE calls this the Military Contribution to Human Security (MC2HS) concept.

The role of the JALLC in supporting MC2HS

To better support NATO’s implementation of MC2HS, the JALLC was tasked to conduct an analysis in order to identify potential best practices, challenges, and gaps in the operationalization of human security within the NATO Force Structure (NFS). The JALLC analysis team set about reviewing extant policy and doctrine, consistent with SHAPE’s Human Security Guidance of 2023, focusing on six cross-cutting topics from AJP-01 (see below).

Cross-Cutting Topics

Protection of Civilians: This is a cross-cutting concept relevant to all three core tasks of NATO. NATO’s concept for protection of civilians foresees military forces actively needing to understand the human environment, mitigate harm, facilitate access to basic needs, and contribute to a safe and secure environment.

Children and Armed Conflict (CAAC): NATO is committed to implementing UN Security Council Resolution 1612 and related resolutions on the protection of children affected by armed conflict. NATO will integrate CAAC considerations into planning and the conduct of its operations, as well as training, monitoring, and reporting.

Conflict-Related Sexual Violence (CRSV): Preventing and addressing sexual violence in conflict settings is essential for maintaining trust with local populations and ensuring comprehensive security. NATO’s commitment to tackling CRSV has been bolstered by field experience and ongoing research, equipping personnel with the skills to detect, respond to and prevent these crimes.

Combatting Trafficking in Human Beings: Times of conflict, post-conflict, disaster and other crisis and emergency situations heighten vulnerabilities, particularly for women and children, to human trafficking and exploitation. NATO recognizes trafficking in human beings as a transnational problem, that requires concerted multilateral action to be defeated. NATO is committed to reinforcing efforts to prevent and combat such activity.

Cultural Property Protection (CPP): Cultural property can be destroyed or damaged unintentionally by opposing forces as collateral damage, or destroyed or damaged intentionally. Because of the importance of cultural property, not only to the local community but to society in general, it needs protection. NATO military forces have a responsibility to protect cultural heritage in times of armed conflict. The integration of CPP into a military mission requires identifying cultural property within engagement parameters, but also looking at the significance of cultural property for the identity and culture of the population.

Building integrity in operations: This includes transparency, accountability and counter-corruption, contributes to the success of the three Alliance core tasks, and is a key element of all Alliance activities. Corruption is a key feature of all conflicts, playing a pivotal role in the power dynamics of groups competing for resources and power. Countering corruption has to be an integrated aspect of conflict resolution, across all NATO political, economic, and military lines of activity.

Within these foundational documents, the team then identified 18 activities that NATO military bodies should carry out as part of implementing MC2HS in planning and executing tactical-level military operations. These activities range from the command-wide philosophies, such as protecting civilians from harm and incorporating a gender perspective, to more routine, specific staff work, like disaggregating data by age and gender.

The JALLC found that there is considerable discrepancy in how various policy and doctrinal documents define, describe or even include these activities. Since no one source provides a complete list of the activities to support MC2HS, it is little wonder that NFS headquarters operationalize MC2HS in various ways.

In most NFS headquarters, activities and associated guidance related to MC2HS are concentrated in the J9/Civil-Military Cooperation (CIMIC) branch(es). Much as learning lessons is often viewed as a task for the Lessons Learned staff, instead of a responsibility for everyone in a position to improve how NATO does business, MC2HS is important for all staff, not just those whose job description includes working with civilians. Likewise, many non-J9 staff associate human security with merely adhering to International Humanitarian Law and the Law of War. A population-centric mindset is one where all staff understand that incorporating the concept of human security must complement enemy-centric actions and recognize that human security should be a proactive effort that goes beyond the minimum requirements of international law. Mainstreaming MC2HS means that, even though most activities may be led or supported by a specific J-code or branch, the whole staff will need to contribute to them, making MC2HS a standing part of their working agenda.

A final interesting finding of the JALLC is that whereas higher-level policy and guidance on human security makes clear that it and the cross-cutting topics apply in all of NATO's core tasks, the activities are largely described for specific out-of-area, crisis-response operations. They may not be applicable in a deterrence and defence operation where NATO forces are operating on or near a NATO nation's territory where, presumably, human-security-related services would be provided by that nation's domestic agencies. This situation will likely require very different activities and coordination than in, say, Afghanistan, where owing to the lack of host nation capacity, many such services were provided by, or heavily supported by, the military force.

The JALLC published its report on the Military Contribution to Human Security in December 2024. NATO staff can find a copy via a NIP search or download directly from the JALLC Analysis Community of Interest in the classified version of the NATO Lessons Learned Portal.



Ensuring the security of the local population takes many forms, but being engaged and approachable is essential to all of them.

You can find out more about JALLC reports relating to human-security initiatives from our factsheets [here](#). Key reports include the following:

- [NATO Human Security](#)
- [NATO Protection of Civilians](#)
- [NATO Cultural Property Protection](#)



Informing the revision of the Allied Reaction Force Directive

The JALLC provides support to key NATO Exercises every year. That support can take various forms: from assisting and advising from a Lessons Learned (LL) perspective in the planning stages of an exercise, to informing Before Action Reviews, to observing and analysing aspects of an exercise in the context of one of our analysis projects. In this article, you can read about one of these JALLC analysis projects, which took our team to Exercise STEADFAST DETERRENCE 2024 (STDC24) to develop findings and recommendations relating to logistics.

In October 2023, SHAPE published the Allied Command Operations (ACO) Allied Reaction Force (ARF) Directive implementing the new ARF concept. As a crucial component of the new NATO Force Model, the ARF began replacing the NATO Response Force (NRF) in the second half of 2024. The ARF is capable of carrying out the full spectrum of operations and missions and serves as a rapidly deployable strategic reserve.

In the autumn of 2023, NATO Rapid Deployable Corps Italy (NRDC-ITA) was selected as the Interim HQ for the ARF. Exercise STDC24 was designed to train and evaluate NRDC-ITA as NATO's first ARF HQ. Exercise STDC24 brought together more than 900 military and civilian personnel from NATO, Allied Nations, and partner organizations in response to a simulated, highly complex crisis in the North and the Arctic region, and offered many opportunities to the Training Audiences to exercise pre-crisis military deterrence within Supreme Allied Commander Europe's Area of Responsibility with coordination and interactions becoming more efficient from Day 1 until the end of the exercise. Exercise STDC24 represented a rich learning opportunity for the review and revision of the ARF Directive.

One of the key areas of the ARF Directive that was being trained and tested during Exercise STDC24 was logistics. The JALLC was tasked to observe Exercise STDC24 and conduct an



Exercise Control, or EXCON, run the exercise, ensuring the training audience meets the training objectives.



The JALLC project team deployed to Exercise STDC24 in order to observe and analyse the conduct of the exercise with the focus on logistics.

analysis, providing recommendations to inform the future revision of the ARF Directive, specifically in the area of logistics.

The subsequent JALLC analysis report presents the JALLC's findings which include, for example, the inherent challenge with writing strategic directives, noting that on the one hand they should not be overly prescriptive, but on the other, they should provide enough details for the HQ staff to plan and execute operations. Reviewing the ARF Directive and observing Exercise STDC24 revealed that, although many of the necessary components exist in the ARF Directive, it often lacks enough specificity, resulting in the possibility of broad interpretation.

From the JALLC's analysis, it became evident that some of the lessons identified and recommendations proposed required a broader approach than just changes to the ARF Directive. These lessons and recommendations refer to more extensive changes within NATO that could be taken into consideration to further improve the success of the ARF concept and logistics more generally.

You can acquire a copy of the JALLC's report on Exercise STEADFAST DETERRENCE 2024—Lessons on Allied Reaction Force Logistics, with the appropriate security clearances, from the classified version of the NATO Lessons Learned Portal where you will find a wealth of JALLC Analysis reports and other lessons-related information.

“Exercise STDC24 brought together more than 900 military and civilian personnel from NATO, Allied nations, and partner organizations in response to a simulated, highly complex crisis in the North and the Arctic region...”



The transport of military forces and heavy material across the infrastructure of Europe was an important element in Exercise STDC24.



A Change of Command

Left to right: Outgoing JALLC Commander CDRE Correia, MGEN Ciolponea, and new Commander BGEN Colibaba.

2025 brought the JALLC a new commander. On 16 July 2025, Brigadier General (BGEN) Cristinel Colibaba, Romanian Army, assumed command of the JALLC from CDRE António Neves Correia, Portuguese Navy. MGEN Constantin-Adrian Ciolponea, the official representative of Supreme Allied Commander Transformation in Europe, presided over the ceremony. In this article, find out more about the change of command ceremony and the JALLC's new Commander.



The ceremony, which was marked by the traditional exchange of flags between the outgoing commander and the incoming commander, was attended by representatives from various NATO Bodies in Portugal and National entities, including their excellencies Dr Alvaro Castelo Branco, Portuguese Deputy Minister of Defence, and Dr Nuno Pinheiro Torres, Secretary of State Assistant for National Defence Policy, as well as MG Bogdan Cernat, former JALLC Commander and acting representative of the Romanian Chief of Defence.

CDRE Neves Correia, who took command of the JALLC in 2024, noted that he had been proud to command the JALLC. Highlighting some of the JALLC's achievements from the past two years, including the JALLC's work in support of NATO's learning from Russia's war against Ukraine and the continued extensive cooperation and relationship-building with the new Joint Analysis Training and Education Centre. He stated, "*The JALLC really is a remarkable organization. With a staff of just 49 people [the JALLC] provides NATO-wide support across its five key activities.*" You can read more about our activities [here](#).

BGEN Colibaba, who will be taking over command of the JALLC for the next three years, is no stranger to Lessons Learned with experience in the field throughout his career, including as Deputy Commander of the Romanian Land Operational Component Command, where he also acted as Chair of the Lessons Learned Board. BGEN Colibaba not only brings a wealth of operational experience to the JALLC, but also a Ph.D. in Military Studies and a Bachelor's degree in law, enabling him to bring his academic skills and experience to bear on the JALLC's renowned analysis reports.



MGEN Constantin-Adrian Ciolpunea presided over the ceremony on behalf of SACT.

"I have understood that Admiral Vandier wants us to be Bold in thinking, Fast in delivery, and Unified in purpose. I intend to meet his intent for ACT and I am committed to ensuring that the JALLC continues to meet his expectations as our Strategic Command strives to enable the transformation of the Military Instrument of Power: as SACT himself put it: from foresight to warfight."

Responding to the recent document from Supreme Allied Commander Transformation (SACT) ADM Pierre Vandier on his Vision and in Intent for Allied Command Transformation, BGEN Colibaba noted that, "*I have understood that Admiral Vandier wants us to be Bold in thinking, Fast in delivery, and Unified in purpose. I intend to meet his intent for ACT and I am committed to ensuring that the JALLC continues to meet his expectations as our Strategic Command strives to enable the transformation of the Military Instrument of Power: as SACT himself put it: from foresight to warfight.*"

You can read the new Commander's biography on the JALLC's website [here](#).

The JALLC thanks COM António Neves Correia for his commitment and dedication to the JALLC over the past year, congratulate him on his promotion, and wish him all the best in his new assignment. We are looking forward to working with our new Commander as he gets to know the JALLC, its staff, and what we do for NATO and the Nations.

A CONVERSATION WITH COMMANDER JALLC

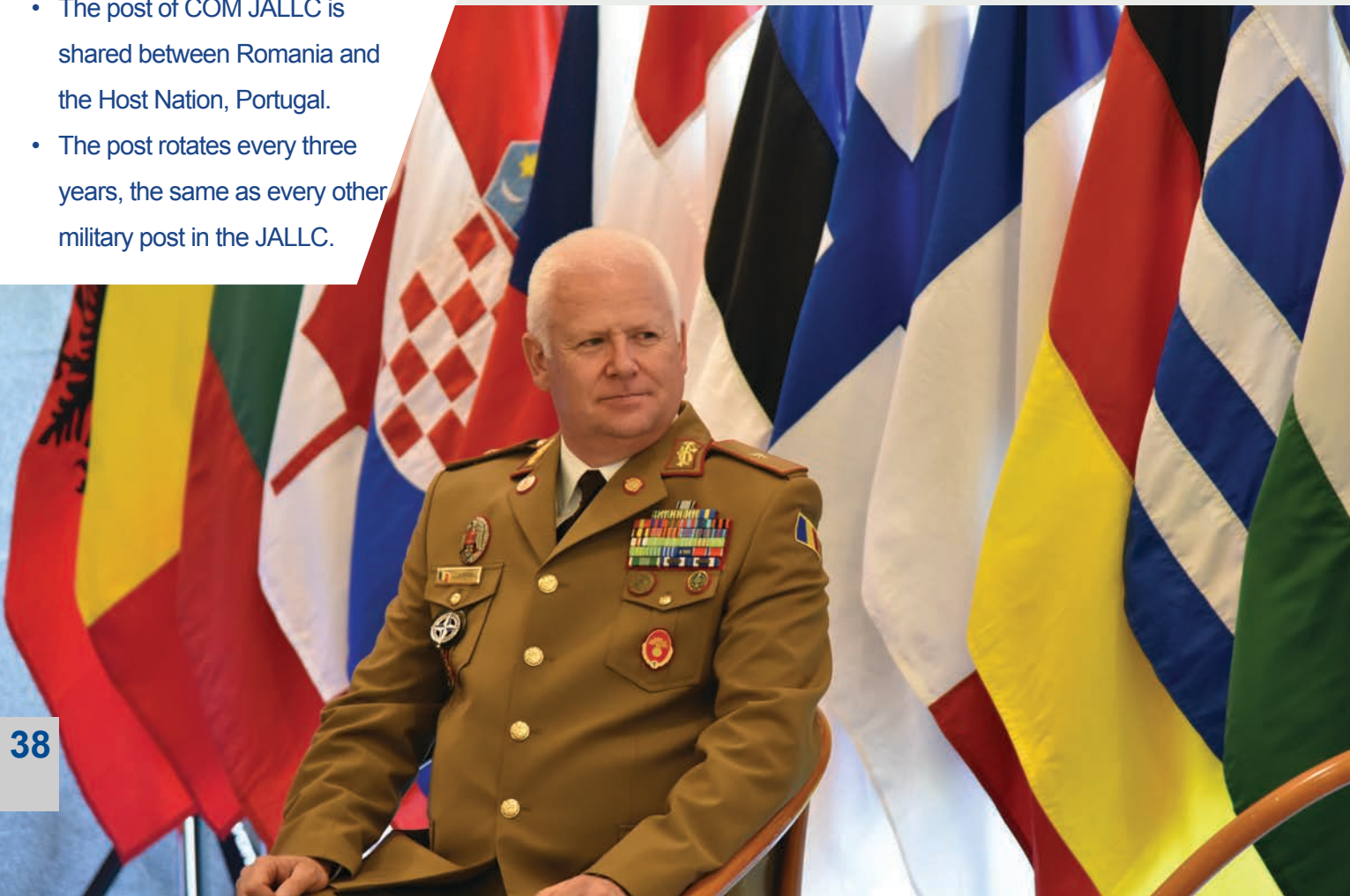
After his first 90 days in command, we sat down with the JALLC's new Commander, Brigadier General Cristinel-Dumitru Colibaba, to hear his first impressions of the Centre, his vision for the future, and the path that brought him to NATO's hub for Joint Analysis and Lessons Learned.

DID YOU KNOW?

- Brigadier-General Cristinel-Dumitru Colibaba (ROU A) was appointed to the JALLC as its ninth commander after the first three JALLC Directors.
- He is the third Romanian Commander to lead the JALLC.
- The post of COM JALLC is shared between Romania and the Host Nation, Portugal.
- The post rotates every three years, the same as every other military post in the JALLC.

The Commander first heard about the Joint Analysis and Lessons Learned Centre (JALLC) back in 2012, when (then) BGEN Mircea Mindrescu was the Commander of the JALLC. At that time, he was still a Major and didn't really pay too much attention to what the JALLC was: *"It was just another NATO acronym that was handy to know."*

His next encounter with the JALLC came in 2019, while attending the NATO Defence College. By then he had been promoted to the rank of Colonel and, as he recalls, the JALLC's previous Chief of Staff, COL Manuel Rosa, had approached him to ask for advice on how best to serve a Romanian Commander and what to expect from the (then) new COM JALLC, the then BGEN Bogdan Cernat. Little did he know that he would one day find himself being appointed to the JALLC as its Commander.





Left: COM JALLC is promoted to the rank of Brigadier-General.

Right: COM JALLC together with LGEN Marin, Chief of the Romanian Land Forces, handing over command of the 81st Mechanized Brigade.

Then, in early 2025, he once again met the JALLC during one of the Centre's training and outreach engagements to Romania. At the time, he knew the position of Commander was open and that he might be considered, though nothing was certain. In fact, several of the candidates for the post were in the same room when the JALLC team delivered their presentations on NATO's Lessons Learned Capability and the JALLC's supporting activities. COM was impressed by the professionalism of the team, their preparation, and their ability to speak knowledgeably across all related topics. *"I would like to command a NATO HQ like this someday,"* he thought.

Once appointed, he had the benefit of (the by now) MGEN Cernat being his Division Commander and a previous JALLC Commander with the experience of a three-year tour under his belt. COM took full advantage and was able to find out what it was like to command the JALLC. As he noted, the military rotate out after three years, but MGEN Cernat was able to tell me about some of the civilian staff who are still here, such as Tina (the COM's personal assistant), Jackie (the JALLC's Principal Operational Research Analyst), and Stefan Olaru (one of the JALLC's Research Analysts and a Romanian national).

As such, he joined the JALLC with a good initial impression, and that initial impression has not changed after his first 90 days in post. *"It's a great organization!"* he affirms. He enjoys serving the JALLC, Allied Command Transformation (ACT), and NATO, and relishes the challenges presented through the Centre's analysis projects. He takes particular satisfaction in watching his staff tackle difficult problems and develop credible solutions. *"From what I have seen so far, the recommendations the JALLC makes are really the best options to consider as they are based on evidence, thorough analysis, and rigorous review. Decision-makers can rely on these recommendations as credible and relevant solutions."*

"Decision-makers can rely on [JALLC] recommendations as credible and relevant solutions."



MGEN Bogdan Cernat as the JALLC's Commander (then BGEN) addressing the audience of the NATO Lessons Learned Conference in 2019.

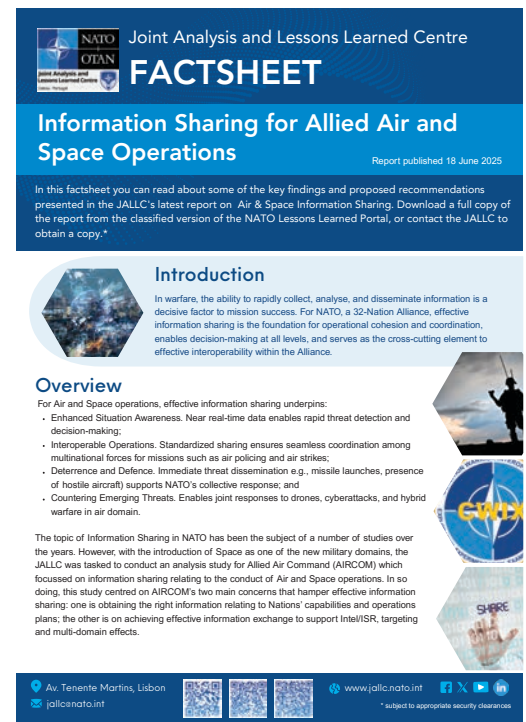
Among the JALLC's contributions to NATO, he highlights the Joint Analysis and the NATO Lessons Learned Portal Content Analysis as particularly significant, along with the Training and Outreach activities that ensure the NATO Lessons Learned Capability is implemented across the Alliance. *"It is clear that the JALLC takes its mission very seriously and aims to deliver the best quality services and products,"* he notes. At the same time, he stresses that there is always room for improvement.

In this context, his intention is to drive efficiency and streamline the JALLC's processes and structures to ensure the Centre delivers faster, better, and more relevant services and products. After more than 23 years of supporting NATO with analysis and lessons learned, he is determined to ensure the JALLC remains relevant, delivering at the speed of relevance, while maintaining the *flexible agility* required to foster warfare development and real transformation in today's fast-paced security environment. The JALLC should be, in his view, *"the entity that can trigger transformation across the DOTMLPFI spectrum and across all levels—Strategic to Tactical."*

"[The JALLC should be] the entity that can trigger transformation across the DOTMLPFI spectrum and across all levels—Strategic to Tactical."

This streamlining process is already underway, with a review of the JALLC's entire inventory of Standard Operating Procedures to identify efficiencies, capitalize on synergies, and leverage technology to enhance staff performance. He is also keen to align the Centre with ACT's drive for digital transformation and innovation, including the introduction of artificial intelligence to enhance staff capabilities and act as a force multiplier.

He sees the future JALLC as a key player in helping NATO harness lessons learned effectively and efficiently, shaping the future of the Alliance to respond to evolving security threats. *"Based on what we are seeing in Russia's war against Ukraine, it is evident that shaping the future in terms of warfare development begins with understanding the lessons of the past, rapidly; that is where I see the JALLC's relevance to NATO's future."*



The JALLC publishes summary factsheets on its Joint Analysis Projects such as the one pictured here on Information Sharing for Allied Air and Space Operations. You can download these factsheets from the JALLC's website.



COM JALLC with MGEN Adrian Ciolponea, Supreme Allied Commander Transformation's Representative in Europe during the Change of Commander ceremony at the JALLC in July 2025.

The Commander's long and distinguished career has been shaped by a lifetime of service. Inspired, growing up, by his grandfather's stories of military life—the core values, the discipline, and the education—he set his sights on a career in uniform. At age 14 he was selected to attend the Romanian Military College, a prestigious institution dedicated to instilling military values in its pupils. He has never forgotten the uniform he wore there, especially the distinctive red stripe down the trousers, meant to inspire pupils to aspire to become General Officers one day. More than three decades of service with the Romanian Armed Forces have followed, but those formative years remain a strong influence on his outlook today.

Readers can learn more about BGEN Colibaba's military career in [his biography on the JALLC website](#).



The uniform of the pupils of the Romanian Military College with its red stripe. This red stripe is also on the uniform of Romanian General Officers and is intended to inspire the pupils to aspire to achieve the highest rank.



COM JALLC with the JALLC Team on the 23 Anniversary of the JALLC in September 2025. The team are all sporting the new JALLC T-shirt which was the winning design of the internal competition earlier that year. You can watch the video of the JALLC's 23rd Anniversary [here](#).



The 2024 NATO Lessons Learned Conference

Since 2003, the JALLC has hosted the NATO Lessons Learned Conference (NLLC) on behalf of Supreme Allied Commander Transformation (SACT). Over that time, it has become an important event in NATO's Lessons Learned (LL) calendar, bringing together participants from NATO and National entities, and thereby developing a stronger NATO LL community. The event provides participants with the opportunity to exchange information within the NATO LL community and stimulates discussions on the best and most suitable practices for improving the current NATO LL Capability, enabling the continuous transformation of the Alliance.

As the next edition of the NLLC takes place in the autumn of 2026, in this article we take a look at some of the highlights of the last edition, which took place in April 2024 at the Portuguese Military Academy in Amadora.

The NLLC 2024 Edition (NLLC 24) focused on the theme of the NATO LL Capability in support of 2030 Efforts, and allowed the NATO LL Community to build upon the success and lessons gleaned from past conference.

The NLLC 24 was a huge success: with almost 300 participants from over 160 entities in some 32 nations (including four Partner Nations: Ukraine, Australia, New Zealand, and the Republic of Korea), as well as representatives from industry and academia showcasing the latest advances in augmented reality, hologram technology, and robotics.



The agenda was packed with interesting presentations and opportunities for discussion and questions. Highlights included the formal opening of the conference by then Deputy Supreme Allied Commander Transformation, GEN Chris Badia, appearing on stage as a recorded hologram; a live video call with Mr Stanislav Haider, Ukraine's Deputy Minister of Defence in 2024, who spoke about the Ukrainian LL experience in the battlefield; and a recorded message from Mr Tom Goffus, Assistant Secretary General for Operations in 2024, who spoke on the urgency to learn lessons in general, but especially those being observed from Russia's war against Ukraine.

In addition to these high-visibility guest speakers joining us from locations around the world, a series of in-depth panel discussions provided insight into topics of interest to NATO as it implements the new Strategic Concept, pursues the NATO 2030, and adjusts to the imperatives posed by Digital Transformation and the NATO Warfighting Capstone Concept. These panel discussions brought in diverse perspectives, opinions, and expertise from across the Alliance.

The NLLC 24 Magazine is available on the JALLC's NU website. The magazine provides a detailed overview of the presentations, discussions, and notable activities that took place during NLLC 24. Additionally, insightful statistics provide a glimpse into the significance and impact of this year's conference.

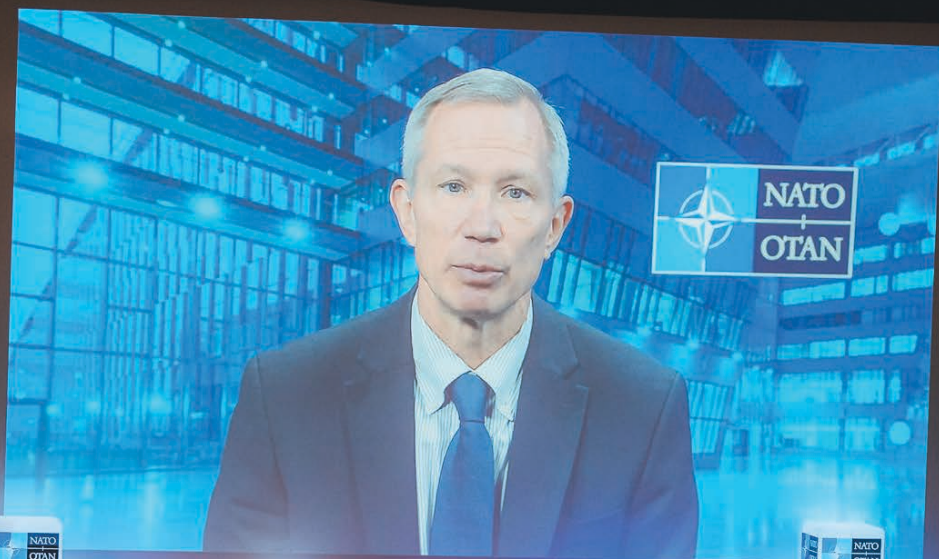
The annual NLLC provides an open forum for the exchange of ideas and stimulates a spirit of collaboration and open-mindedness that enables us to continually embrace new ideas and explore innovative solutions to complex challenges. Watch out for the next edition of the NLLC by following the JALLC on social media (Facebook and X) and keep an eye on our website for more information regarding dates and the theme. Be an active part of the vibrant NATO LL Community and be sure to register for the next conference.



Ukraine's Deputy Minister of Defence at the time, Mr Stanislav Haider, addresses the NLLC 24 audience.



Panel discussion allowed for interaction with the audience.



Assistant Secretary General for Operations in 2024, Mr Tom Goffus





Conference Summary

Participants:

282 registered participants from 32 nations

Location:

Portuguese Military Academy, Amadora, Portugal

Dates:

16–17 April (LL Tools Day on 15 April) 2024

Keynote Speaker:

Mr Tom Goffus, NATO Assistant Secretary General for Operations in 2024

Special Guest Speaker:

Mr Stanislav Haider, Ukrainian Deputy Minister of Defence in 2024

Partner Nation in the Spotlight: Australia

Australia's Defence Force (ADF) plays a pivotal role in managing lessons learned within the Indo-Pacific region, offering valuable insights for collective defence efforts. With extensive experience from operations alongside NATO, the ADF is an example of a structured approach to lessons management, including immediate hot washes and comprehensive After-Action Reviews (AAR) to ensure that observations are effectively captured, reviewed, and applied to enhance operational effectiveness.

It was in this context that LTC John F. Edwards CSC of the Royal Australian Infantry Corps addressed the NLLC 24 audience on Australia's current efforts in Lessons Learned, adding to the richness of the content on offer to the audience in the room.



Panel Topics*

LL in the Digital Transformation Age

Moderator: GCAPT Richard Paine RAF
—LL Analysis Division Head; JALLC

Key Speaker: RADM Nick Wheeler RN
—Director of NATO Digital Staff; IMS

Speaker: Ms Kamila Lenarczyk—Project Portfolio
Officer/Enterprise Portfolio Section; NATO
Office of Chief Information Officer

Speaker: RADM António Gameiro
Marques, Portuguese Navy—Director General;
Portuguese National Security Office

Speaker: Ms Jackie Eaton—Principal Operational
Research Analyst; JALLC

Enhancing Alliance Learning through LL Sharing and Interoperability

Moderator: COL Arturo Sabando, Spanish Army
—LL Management Division Head; JALLC

Key Speaker: MGEN James R. Kriesel, USAF
—Director J7; United States European
Command

BGEN Manu Tuominen, Finnish Army—Assistant
Chief of Staff (ACOS) J7, Defence Command;
Finnish Defence Forces

Mr Robert Trabucchi—Deputy Director;
NATO Standardization Office

* The posts/job titles/ranks listed here are those as the
time of the NLLC 24.

The NLLC 24 Magazine is available [here](#).

**The NLLC 24 Report is available
on the classified version of the
[NATO Lessons Learned Portal](#).**

NATO LL Capability Development in Support of Other NATO Capabilities

Moderator: Mr Alan Hoff—Capability Monitor;
CAPDEV/HQ SACT

Key Speaker: MGEN Norbert Wagner, German
Army—Commander, NATO Joint Force
Training Centre

CAPT Marc Gander, French Navy—Deputy
Director; Operations & Planning
Division; IMS

COL Robert Prentice, British Army—Future Plans
and Requirements Branch Head; SHAPE

NLLC Magazine



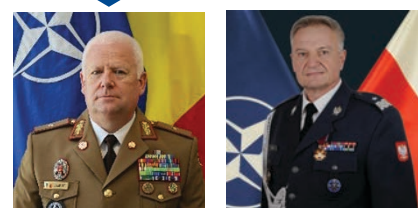
You can read more about the NLLC 24 in the dedicated magazine available to download [here](#) at the JALLC's website. You can read full summaries of the presentations from the speakers, read what the panels had to say and discuss, and find out more about some of the technological solutions that were on display in the forum during the breaks.

The next edition of the NLLC will be in 2026 and will be announced via the usual channels closer to time.



Brothers in Arms

In July 2024, a decision was taken at the Washington NATO Summit to establish a NATO–Ukraine Joint Analysis, Training, and Education Centre, dubbed: the JATEC. Within 6 months, the inauguration of the JATEC took place in its new home in Poland on 17 February 2025, attended by leaders from NATO, Ukraine, and Poland. In this article, presented by the Commanders of the JALLC and the JATEC, we take a look at how NATO has been learning from Russia’s war against Ukraine through the JALLC’s activities, and how the JALLC is supporting the JATEC as it progresses to Full Operating Capability.



The JALLC’s Commander, BGEN Cristinel Colibaba (pictured left) and the JATEC’s Commander, BGEN Wojciech Ozga, are both dedicated to ensuring that NATO learns as much and as effectively as possible, from Russia’s war against Ukraine. By working together and taking advantage of the unique capabilities of the JALLC and the JATEC, NATO will not only learn but also be able to enhance its support Ukraine.

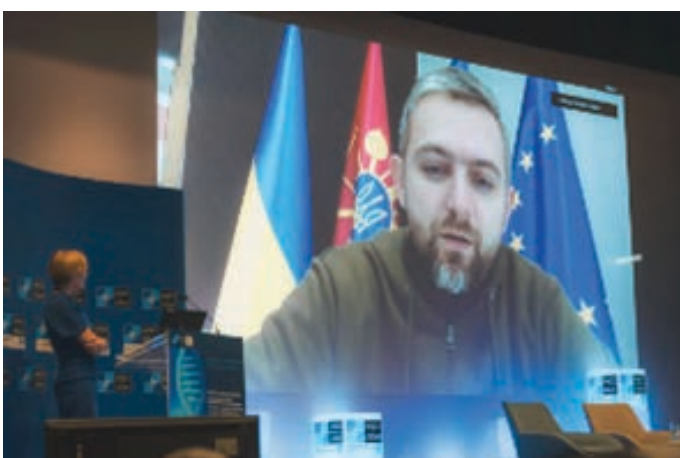
NATO: Learning from others

NATO has always taken every opportunity to not only learn from its own experiences, such as exercises, operations, and missions, but also from the experiences of its Allies and its Partners. This was already evident in 2014, in the wake of Russia's illegal invasion of Crimea, but perhaps even more so since 24 February 2022, when Russia started the full-scale invasion against Ukraine. Based on its experience of learning from past operations, NATO recognized the potential value to the Alliance of capturing the lessons information being generated on the battlefield, as events unfolded, to inform its own policies, capability development, training, and exercises.

Moreover, the security of Ukraine is of great importance to NATO and its member states. Relations between NATO and Ukraine date back to the early 1990s and have since developed into one of the most substantial of NATO's partnerships. Since 2014, in the wake of Russia's illegal annexation of Crimea, cooperation has been intensified in critical areas and, since Russia's full-scale invasion in 2022, NATO and Allies have provided unprecedented levels of support. As such, NATO recognized that this was an opportunity not only to learn from Ukraine's experience, but also to further enhance the Partnership and, in the context of Lessons Learned (LL), support them in their efforts to develop a sustainable and effective LL capability.

As a consequence, the JALLC, as NATO's lead agent for Lessons Learned, was tasked with supporting NATO's efforts in this context, which it did through its various activities. From setting up an initial *hotspot* in the NATO LL Portal for potential Lessons and Best Practices relating to the war just weeks after it broke out in 2022, to the later establishment of the current JALLC-Ukraine Initiative in 2024—as the follow-on from the hotspot in the NATO LL Portal—which is currently the single point of reference for NATO's Lessons Learned Information relating to Russia's war against Ukraine.

The JALLC also included Ukraine in its LL training and engagement programme, with Ukrainian defence staff participating in multiple virtual and live engagements, allowing NATO and Ukraine staff to begin to work together in LL.



Top: Ukrainian NGO Boryviter (which functions as Ukraine's Lessons Learned Centre of Excellence) participates in a working-level meeting to exchange ideas and experiences of working in Lessons Learned (October 2023).

Middle: Ukrainian Deputy Minister of Defence, Mr Stanislav Haider, addresses the NATO Lessons Learned Conference hosted by the JALLC (April 2024).

Bottom: Boryviter joins the JALLC's team delivering the Lessons Learned Staff Officers and briefs the participants on what they do (June 2024) and on Lessons from Russia's war against Ukraine.

The JALLC was also tasked to analyse (NATO Lessons Learned Portal and open-source) lessons-related material to draw lessons from the war in Ukraine that have gone on to inform NATO's decision-making and, in particular its exercises, ensuring NATO exercises are as realistic as possible based on the latest experiences from the battlefield.

In 2024 alone, the JALLC published multiple analysis reports on the topic, delivered various training sessions and engagements, and ensured a continuous LL dialogue remained open with our Ukrainian defence counterparts. As such, NATO has already done much to ensure that it is learning from Russia's war against Ukraine while it is bolstering Ukrainian efforts to develop a robust National Lessons Learned Capability.

From Lessons to a lasting partnership

As NATO's appetite for lessons from Russia's war against Ukraine increased, and the focus on LL gained momentum within the Alliance, it was decided that dedicated resources should be pooled in a specialized centre. This new centre would work even more closely with Ukrainian counterparts, with the intent to learn more deeply from Russia's war against Ukraine by leveraging existing relationships while enhancing NATO's partnership with Ukraine. The idea for the JATEC was born and swiftly endorsed at the Washington Summit in July 2024, where the Heads of State and Government referred to the establishment of the JATEC as a significant step in NATO-Ukraine relations, creating the first joint NATO-Ukraine institution which will be: *"... an important pillar of practical cooperation, to identify and apply lessons from Russia's war against Ukraine and increase Ukraine's interoperability with NATO."*

Since then, the JALLC, in the wider Allied Command Transformation context, has been working with the JATEC project team over the past year, contributing to the initial concept of the JATEC, identifying potential problems with setting up a joint venture with a NATO Partner, and helping to work on the solutions. Consequently, the JALLC-JATEC relationship was strong from day one of the JATEC's doors officially opening early in 2025. As the JALLC continues to work with the JATEC to ensure the smooth handover of the Ukraine LL-related activities that the JATEC will absorb from the JALLC, this relationship will only strengthen further.



On 9–11 July 2024, NATO Leaders met in Washington, D.C., where the North Atlantic Treaty—NATO's founding document—was signed in 1949. They gathered to commemorate NATO's 75th anniversary and took important decisions to set the strategic direction for the future of the Alliance.

On the topic of support to Ukraine, Heads of State and Government issued a Statement of the Ukraine Council, in which Allies welcomed the launch of the NATO Security Assistance and Training for Ukraine (NSATU) in Germany and the establishment of the JATEC in Poland. The intent of the JATEC was acknowledged as being to identify and implement lessons learned during Russia's war of aggression and increase Ukraine's interoperability with NATO.



Find out more about the key decisions below and read the full [Washington Summit Declaration](#) and the [Statement of the NATO-Ukraine Council](#) for more information.

What is the JATEC? More than Lessons Learned

The JATEC's mission, functions, and objectives extend beyond its central role in Lessons Learned. As a vital component of NATO–Ukraine cooperation, the JATEC focuses on enhancing interoperability, strengthening deterrence, and supporting defence transformation. Positioned as a key pillar in the NATO–Ukraine relationship, the JATEC is committed to advancing the defence capabilities of both sides, improving cooperative security, and fostering better integration between NATO and Ukraine.

With its civil–military structure, the JATEC integrates military and civilian expertise, enabling a *whole of society* approach to security. This framework allows the JATEC to address a wide range of security challenges, considering not just military concerns, but also societal, informational, and economic dimensions of modern threats. By blending military and civilian perspectives, the JATEC ensures a comprehensive response to complex, multi-dimensional threats.

Key functions and objectives of the JATEC include:

Training and Education: The JATEC plays a crucial role in improving Ukraine's training processes to enhance interoperability with NATO forces. Working with NATO's training bodies and civilian experts, the JATEC helps develop Ukraine's Professional Military Education (PME) system, ensuring alignment with NATO's Defence Education Enhancement Programme (DEEP) and a comprehensive national defence approach.

Experimentation and Concept Development: The JATEC creates frameworks to test new military concepts, technologies, and tactics, integrating military and civilian insights. These efforts foster innovative security solutions that enhance NATO–Ukraine operational readiness across all sectors of society.

Capacity and Capability Development: The JATEC helps Ukraine align its defence planning and capability development with NATO standards, focusing on military and civilian resilience. This includes supporting improvements in Ukraine's defence industry and procurement systems, ensuring they meet NATO requirements and promote self-sufficiency.

Interoperability: The JATEC ensures Ukraine's defence and security sectors evolve in line with NATO's Interoperability RoadMap, facilitating cooperation between military and civilian entities to enhance overall readiness and adaptability.

By fostering collaboration across military and civilian sectors, the JATEC enhances the ability of both NATO and Ukraine to address evolving security challenges effectively, ensuring long-term stability and resilience in the Euro-Atlantic region.

Explanation of the JATEC Emblem

The emblem of the JATEC represents its mission, values, and multinational collaboration. On the left, a half-circle displays the colours of the Polish flag, symbolizing Poland as the host nation and highlighting its commitment to NATO, regional security, and multinational military cooperation. On the right, the colours of the Ukrainian flag represent Ukraine's partnership with NATO and its role in collecting lessons from the war, developing new capabilities, and advancing interoperability with NATO. In the centre, three white blocks convey multiple meanings. Firstly, they represent the JATEC's three pillars: Analysis, Training, and Education. Secondly, they reflect NATO's three strategic core tasks: Deterrence and Defence, Crisis Prevention and Management, and Cooperative Security. By mirroring Ukraine's national symbol, a coat of arms bearing a trident, JATEC underscores its unique status as the first NATO–Ukraine NATO entity and the first NATO organization co-governed by NATO and a partner nation.



Handover–Takeover

Given the importance of the topic, naturally there needs to be a diligent handover-takeover of some roles and responsibilities, the current and ongoing activities, as well as legacy records and other material. The JALLC is currently embracing its role as the outgoing entity; still supporting NATO's efforts to learn from Russia's war against Ukraine, still supporting Ukraine in the development of its national Lessons Learned capability, but at the same time supporting the JATEC as it prepares to take over the relevant activities from the JALLC as it reaches Full Operating Capability.

One example of the activities the JATEC will take over include fostering the relationship with the Ukrainian Ministry of Defence staff and the NGO: Boryviter—Ukraine's centre of excellence for the development of defence sector personnel in the field of Lessons Learned. The cooperation between the JALLC and Boryviter has, so far, mostly related to the development of the Ukrainian National Lessons Learned Capability. But it has had some advantages for NATO too, as the conversation has been two-way. On the one hand, the JALLC has been able to provide insights into NATO's approach to doing Lessons Learned, while on the other hand, NATO has been able to take advantage of learning how the Ukrainians have had to develop their capability—and the related Lessons Learned tool—at breakneck speed to be able to capture and exploit lessons from the battlefield at the speed of relevance. In fact, the JALLC is currently working on a joint project with the Ukrainian Ministry of Defence and Boryviter to review the national Lessons Learned Process, with the JATEC participating in the project, remaining in lockstep as it progresses so they can learn and gain experience from the JALLC's staff in this area.

Another facet of the JALLC's Ukraine-related activities has been the inception of the JALLC–UKR Initiative. After a year of the JALLC being consistently tasked to conduct analysis relating to Russia's war against Ukraine, it became clear that the JALLC needed to dedicate resources to the topic. It stood up a tiger team focused on this work. The team has two permanent JALLC analysts who can be—and have been—augmented as required. The JALLC–UKR Initiative carries out research and analysis for requested projects, manages a dedicated database in the NATO LL Portal, which is intended to capture all of NATO's related Lessons information, and provides regular updates on Lessons Learned aspects of Russia's war against Ukraine in the form of a newsletter, three editions of which have been published since the first one came out in February 2024. This is potentially another facet of the JALLC's current work that will eventually be absorbed into how the JATEC progresses the LL aspect of Russia's war against Ukraine.

However, until the JATEC is fully operational, the task remains for the JALLC to keep up the good work NATO has been doing to learn from Russia's war against Ukraine and to support Ukraine in their LL efforts.



An example of a JALLC Lessons Learned Analysis product that was well-received across NATO. The JATEC will, in time, be producing its own analysis reports and other products.

JALLC–JATEC: The best of both worlds

While the JALLC and the JATEC are indeed going to be working closely together in their joint field of LL from Russia's war against Ukraine, they do retain their own unique qualities, resulting in NATO essentially getting the best of both worlds: two centres that need to *work jointly* to ensure the valuable learning from Russia's war against Ukraine is captured for the benefit of the Alliance, also ensuring that Ukraine can benefit from NATO's vast LL experience AND two centres with distinct capabilities that are designed to meet the specific needs of their specific stakeholders.



JALLC

Scope of Mission

Broad, NATO-wide focus, supporting the entire Alliance's Lessons Learned Process. It facilitates the collection and sharing of lessons from various NATO operations, exercises, and other operations globally, not just the war in Ukraine.

Target Audience

Works within NATO, analysing experiences and lessons, and supporting NATO Command Structure and other NATO bodies to manage lessons learned.

Size and Staffing

Has a smaller overall team than the JATEC, but a larger operational military presence in Lessons Learned and analysis.

Role in NATO Structure

The JALLC is a part of the NATO Military Structure and acts as NATO's lead agent for lessons learned, overseeing NATO-wide Lessons Learned processes and supporting war-fighting and warfare development within the Alliance.



JATEC

Primarily focused on Ukraine, with a focused scope centred around broad lessons learned from Russia's war against Ukraine. It helps collect lessons information and shares it with NATO to enhance Ukraine's defence.

Works directly with Ukrainian military and non-military partners to collect and analyse lessons information specific to Ukraine's defence needs.

Has a larger staff than the JALLC, but its LL team and Analysis team are relatively small with just four staff members dedicated to lessons learned and four to analysis.

A NATO–Ukraine joint civil–military initiative that focuses on practical cooperation between NATO and Ukraine, mainly in the context of Russia's war against Ukraine.

Stronger together

So what now? In the run-up to the JATEC achieving Initial Operating Capability, much consideration has already been given regarding how the JALLC and the JATEC will work together where their missions touch: LL, LL Analysis, and LL Training.

Although the names are similar, the reader should not be misled into thinking that the JALLC and the JATEC are twins. Despite both having *Joint Analysis* in their names, and both providing support to Lessons Learned Training in their own ways, the scope and type of activities are actually very different.

The JATEC's primary mission in this context is to support Ukraine's defence against Russian aggression by analysing lessons from the ongoing conflict and improving training standards and joint educational initiatives for the Ukrainian armed forces and civil institutions. The JATEC will achieve this by working closely with Ukrainian counterparts—both military and non-military—to help collect crucial lessons information from the frontlines. Once this information is gathered, the JATEC will be able to share it with NATO, ensuring that the Alliance has the most up-to-date insights. By doing this, the JATEC helps build a stronger, more integrated link between NATO and Ukraine, supporting Ukraine's civil-military development and improving NATO's ability to adapt and respond to emerging challenges.

Four Synergy Pillars



The JALLC's mission, however, is to support Alliance-wide implementation and sustainment of overall NATO's Lessons Learned policy through monitoring and supervising the NATO Lessons Learned Process within the NATO Command Structure and other NATO bodies. The JALLC is NATO's lead agent for the collection and sharing of lessons, accomplished through Active Content Management of the NATO Lessons Learned Portal, Joint Analysis and outreach to allies and partners. The JALLC supports mostly military aspects of warfare development and warfighting, improving NATO's ability to operate and adapt, through training, advising, and assessment activities which enable the establishment and sustainment of effective Lessons Learned capabilities across NATO. It achieves this through its various activities for NATO, the Nations, and its Partners, such as its comprehensive analysis capability and LL training programme.

So, while the JALLC and JATEC share complementary roles in supporting Ukraine in the LL context, they will each need to focus on their own distinct aspects within NATO's assistance framework. The Washington Summit Declaration is quite clear in this respect: where the JALLC is responsible for Joint Analysis and Lessons Learned in NATO, the JATEC is intended to focus on Russia's war against Ukraine. The JATEC's much more specialized scope will inevitably channel the Alliance's efforts regarding this topic in one centre, allowing the JALLC to refocus its efforts (back) towards the broader NATO-wide scope of its mission. Essentially this means that while the JALLC will retain its *helicopter view* of LL from Russia's war against Ukraine, able to perceive the bigger picture from the NATO perspective, the JATEC will be able to focus on what is happening at *ground level*, capturing and analysing what is happening on the battlefield in order to feed that back *up* into NATO and, where LL are concerned, to the JALLC.

Mission Focus: Both the JATEC and the JALLC are dedicated to lessons learned, analysis, and training. They aim to support NATO and UKR in improving military capabilities by capturing and sharing lessons from ongoing conflicts, especially Russia's war against Ukraine.

Collaborative Effort: The two organizations work closely together, synchronizing their efforts rather than competing. The JATEC will provide valuable input from the battlefield, which the JALLC uses to prepare reports and analyses.

Support to Ukraine: Both organizations are committed to helping Ukraine enhance its defence capabilities. They facilitate training, lessons-learned activities, and cooperation between NATO and Ukraine.

Knowledge Sharing: Both contribute to fostering a culture of shared learning, ensuring that lessons from the conflict in Ukraine are disseminated within NATO and between NATO and Ukraine.

So the JATEC and the JALLC are not in competition with each other; instead, they are focused on synchronizing their efforts to strengthen NATO's capabilities across a wide range of areas. The JALLC will be able to support the JATEC in its analysis and LL activities as NATO's lead agent and leverage the valuable input it receives from JATEC—specifically observations and data gathered from the battlefield in Ukraine with the support of Ukrainian (UKR) partners. This input can be incorporated into relevant JALLC analysis projects that will help shape NATO's future warfighting and warfare development.



There can be no doubt that the future of NATO's learning lies with the JALLC and the JATEC: working together while continuing to provide their unique capabilities to their respective target audiences. One thing remains clear: as NATO enters a new era of operational cooperation with Ukraine, this partnership will not only deepen interoperability but also enhance the Alliance's deterrence and defence posture. The experience will no doubt be impactful for the whole of NATO and any potential future cooperative relationships; an example of NATO learning lessons from Lessons Learned. By sharing analysis and coordinating training programmes, which in turn will help Ukraine's military capabilities align with NATO practices, Allied Command Transformation is supporting Ukraine's military integration within NATO frameworks.

The JATEC's Commander, BGEN Wojciech Ozga, on a VTC with NGO Boryviter, the Ukrainian Centre of Excellence responsible for developing Lessons Learned in Ukraine.



The JALLC Advisory and Training Team: Global Ambassadors of the JALLC

The JALLC has a dedicated team for training NATO and partner nations in the Lessons Learned (LL) process. This unit, the JALLC Advisory and Training Team (JATT), is a mobile training team with military and civilian specialists who deliver LL training and support across NATO and beyond. Given its far-reaching activities, the JATT has become known as the *Global Ambassadors of the JALLC*, serving as a bridge between NATO's command structure and its worldwide LL community.



LTC Oswald "Ossi" Fahrner joined the German Armed Forces (Bundeswehr), German Air Force, in 1987. He held various roles as a reserve and full-time officer. He had operational experience with KFOR in 2009, ISAF HQ Kabul in 2012, and the EU Mission Operation Sophia in 2017 and 2018 at OHQ Rome. This was followed by three years of international deployment as a public affairs officer with the NATO AGS Force (now NATO ISR Force) in Sigonella, Sicily, Italy. He has been serving as an Instructor at the JALLC since October 2023.



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COL Joaquim Ramalho, Portuguese Army, at the NATO LL Staff Officer Course. COL Ramalho led the JATT from 2022 to 2024 when he retired from service after more than a decade at the JALLC.



LTC Laimas Baliunas, Lithuanian Army, provides instruction at a JATT training event in Georgia in April 2024.

The Core Mission of the JATT

The JATT's primary mission is to train NATO personnel in the NATO LL process. This process is essential for capturing, analyzing, and sharing insights derived from operational experiences, and helps improve NATO's readiness and effectiveness. The LL process involves several key steps, from observation and analysis to implementing corrective actions and sharing insights on the NATO Lessons Learned Portal (NLLP). By mastering this process, NATO personnel ensure that valuable lessons are documented and also acted upon, enhancing overall operational efficiency.

The JATT conducts regular training sessions for a variety of audiences within the NATO Command Structure, NATO Force Structure, and Allies' national commands, focusing on all aspects of the LL process. Additionally, it brings this training to several NATO partner nations each year, including Georgia, Colombia, Kuwait, Tunisia, Ireland, and others. By doing so, the JATT strengthens NATO's partnerships and builds LL capabilities among Allies, reinforcing a shared commitment to security and resilience.



Participants from NATO's HQ Allied Land Command conduct a basic analysis exercise as part of a JATT LL training event in June 2024.

Training the Lessons Learned Staff Officers

The primary function of the JATT is the specialized training of Lessons Learned Staff Officers (LLSO). These officers play a key role within NATO and partner organizations, ensuring that lessons are captured, validated, and integrated into operations. The JATT holds three annual LLSO courses at the Swedish Armed Forces International Centre (SWEDINT) near Stockholm, Sweden, as well as an advanced course, the Lessons Learned Management Course, conducted once a year at the NATO School in Oberammergau, Germany.

These courses offer a structured and comprehensive curriculum for LL practitioners, covering topics such as data collection, analysis methodologies, intelligible writing, and the integration of findings into organizational policies. SWEDINT provides a robust environment for collaboration and learning, with superb facilities for bringing together LL professionals from over 40 nations to share experiences and strategies.

The JATT Team: A Global Representation

Currently, the JATT's core team consists of six officers hailing from NATO member nations Germany, Lithuania, Portugal, Romania, and the United States. This multinational team brings a wealth of knowledge and perspectives, contributing to the JATT's effectiveness in engaging a diverse NATO audience. Travelling extensively across the NATO landscape, acting as JALLC's ambassadors, they establish personal connections with NATO and partner nation personnel. These direct engagements foster trust and ensure that LL processes are understood, valued, and implemented on a practical level.

The JATT's outreach and the relationships it builds with stakeholders make it a crucial player in NATO's LL community. Its members embody the values of collaboration and innovation, bringing the JALLC's vision to life in the field and ensuring that LL knowledge continues to expand.

The Importance of Lessons Learned in Today's World

With ongoing conflicts, particularly Russia's war in Ukraine and escalating tensions in the Middle East, the need for an organized, effective LL capability has never been more critical. In light of these developments, the JATT has adjusted its training focus to address these crisis regions. LL training now includes an emphasis on the specific challenges and tactical lessons that arise in such environments, ensuring that NATO forces are better prepared to respond to complex situations.

By addressing these regional concerns, the JATT equips NATO and partner LL personnel with relevant, timely knowledge, helping them adapt to the rapidly changing security landscape. This adaptation demonstrates that the LL process is not merely about learning from the past but about applying those lessons proactively to shape the immediate future.

Looking Ahead: JATT's Vision for 2025 and Beyond

In 2025 alone, the JATT is expected to have trained approximately 502 NATO military members and civilians across 21 training weeks. This level of engagement highlights the growing demand for LL expertise



Colombian LL staff officers receive training on the ODCR (Observation - Discussion - Conclusion - Recommendation) format for lessons from the JATT at the Colombian Army Doctrine Centre in Bogota, in September 2024.

within NATO and its partners, as well as the JALLC's ongoing commitment to addressing this need. Looking to the future, the JALLC plans to expand its outreach further, prioritizing crisis-prone regions and tailoring its curriculum to meet the unique demands of each operational theatre.

The future vision for the JATT includes not only expanding its reach but also refining its methodologies. By adapting continuously to new challenges and incorporating feedback from the field, the JATT ensures that its training remains relevant and impactful. Moreover, the team is exploring opportunities to integrate advanced technologies into the LL process, such as data analytics and machine learning, to enhance the speed with which lessons can be derived from military operations.

The JATT is part of the future of Lessons Learned in NATO

The JATT is more than just a training unit; it is the face of the JALLC in the field, a trusted resource for NATO and its partners, and a critical enabler of NATO's LL capability. Through its dedicated work, the JATT not only strengthens NATO's operational effectiveness but also builds lasting partnerships around the world. As NATO and its Allies confront new and evolving threats, the JATT will remain a cornerstone of the Alliance's commitment to continuous improvement and global security.

History of the JATT

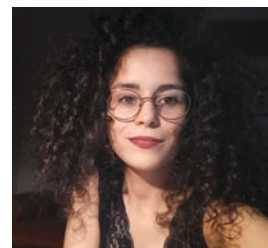
In 2010, the JALLC established the JATT as a mobile training team in order to develop and enhance the NATO LL capability across the Alliance and among Allies, Partners, and other organizations. Originally intended to assist Member and Partner Nations, as well as NATO Commands and Agencies, to establish and enhance their LL capabilities, the JATT advised on LL-related processes, including NATO's own LL process. The original team comprised two members, but the demand for the support of the JATT soon became so great that the team was expanded to include a third member. Today, the JALLC has six Training and Outreach Officers who are formed into bespoke teams to conduct assigned JATT engagements.



Portugal and NATO: Allies against Terrorism

Multinational troop deployed to
Operation Inherent Resolve in Iraq

Ms Joana Araújo Lopes* was an intern for the Lessons Learned Management Division at NATO JALLC (2024). She holds a PhD in History, Security Studies, and Defence, and is an associated researcher at IPRI-NOVA. Her academic research focuses on terrorism, counter-terrorism, security, defence, and diplomacy. Prior to working at the JALLC, she worked at the National Defence Policy Directorate of the Portuguese Ministry of Defence.



In order to shape our future, we need to understand our past. As the theme of this edition of *The Explorer* implies, a robust Lessons Learned capability is an essential asset to shaping any approach to countering current and emergent security challenges. Looking back to the past, especially with regard to counter-terrorism, is an important first step for moving into the future.

Terrorism is a persistent global challenge. Beginning with the birth of al-Qaeda in 1988 and culminating in the terrorist attacks of 9/11 in 2001, which led the U.S. to invoke NATO's Article 5 for the first time ever, the world witnessed a radical change. Terrorism had evolved from something largely seen as a criminal threat to be addressed at a national level to a transnational phenomenon that involves a set of non-state actors, ranging from organized groups like Daesh to lone perpetrators inspired by radical ideologies. This article briefly highlights six aspects of the approach taken by NATO and Portugal against this threat, highlighting some features of their relationship and cooperation.

First: Terrorism is a serious threat to international peace and security

In its Strategic Concept from 2022, NATO describes terrorism as, "*The most direct asymmetric threat*" to the security of the Alliance. Similarly, in the Strategic Concept of National Defence (2013), Portugal perceives terrorism as a global threat that may directly endanger its security, recognizing it as a source of international instability "*with high destabilizing impact.*"

Second: NATO members recognize that no country is immune to terrorism

Although Portugal has not been a primary target of jihadist groups, terrorism has a global nature. The terrorism threat refers to a wide array of activities—including terrorist attacks, radicalization or recruitment on- and offline—and Portugal is not immune to any. There are three main factors that may heighten Portugal's vulnerability to this threat: (1) it is a western democracy and a member of international organizations such as NATO, the EU, and the UN;

* The content of this article is the opinion of the author and does not necessarily reflect the opinion of the JALLC or NATO. The veracity of the information presented in this article has not been checked by the JALLC and is the sole responsibility of the author.

(2) it has strategic interests in geographical areas targeted by terrorist groups; and (3) it is affected by external geopolitical developments. Portugal is within NATO's southern neighbourhood, a vast geographical area confronted with several threats, risks, and challenges that remain core drivers of instability and insecurity. Terrorist groups, in particular, continue to endanger communities in this neighbourhood, being a source of violence and conflict in the region. Furthermore, the conflicts in Ukraine and in Gaza have fuelled grievances, disinformation, and extremism, and this has resulted in an increased terrorist risk to European countries.

Third: Cooperative security is a crucial pillar of counter-terrorism

NATO and its members, including Portugal, emphasize the importance of sharing information, capacity-building, and engaging in multilateral approaches to prevent, protect, and respond adequately to terrorism. NATO works with different regional and international organizations. NATO's Policy Guidelines are the key references by which Portugal abides fully. Portugal has been a steady contributor in all of NATO's counter-terrorism activities. For example, Portugal contributed to the International Security Assistance Force (ISAF), a UN-mandated, international, NATO-led mission from 2003 to 2014 to train and equip members of the Afghan armed forces to fight against the Taliban. Portuguese support continued in the NATO Resolute Support Mission (RSM) (2015–2021). Counter-terrorism was an important aspect and purpose of both ISAF and RSM. Portugal, likewise, contributed to NATO's Article 5 operation, Operation Active Endeavour (2001–2016)—the purpose of which was to deter and counter maritime-based terrorist activities in the Mediterranean—as well as to its successor, Operation Sea Guardian, a non-Article 5 operation launched in 2016.

Fourth: NATO and Portugal are partners in key counter-terrorism coalitions

There are two coalitions worth highlighting. The first of these is the Global Coalition against Daesh, with the aim of dismantling its networks and countering its global ambitions. Portugal is a founding member since 2014, and NATO is a partner since 2017, having contributed to the efforts through NATO Airborne Early Warning and Control System surveillance aircraft, intelligence sharing and the launch of the NATO Mission Iraq (NMI).

The second notable coalition is Combined Joint Task Force (CJTF) Operation Inherent Resolve (OIR), which was designed to support the military defeat of Daesh in Iraq and Syria and build the capability of local partner counter-terrorism and security forces to fight against the terrorist organization. From 2015 to 2020, Portugal trained the Iraqi Security Forces and supported the task force in Kuwait and Baghdad. The support is based on intelligence sharing. CJTF-OIR has close links with various stakeholders, including NMI.

Fifth: Technological developments are a priority in counter-terrorism

Cyberspace and new technologies have been intensely exploited by non-state actors, including for propaganda, radicalization, and the financing of activities. Emergent and Disruptive Technologies (EDTs), such as drones, 3D-printed weapons, and Artificial Intelligence (AI), have been used for malicious purposes, contributing to the further advancement of terrorist purposes. However, technologies can also be used to improve security, prompting more efficient operations. NATO and Portugal have been monitoring these developments. NATO, for



Left: Portuguese troops deployed to Iraq in support of Operation Inherent Resolve conducting counter-terrorism training for local forces.

Right: Vessels of Standing Naval Maritime Group 1, under the command of Portuguese RADM Alberto Correia (not pictured) in *NRP Dom Francisco de Almeida*, depart Lisbon on 11 November 2015 to join NATO's Article 5 counter-terrorism operation, Operation Active Endeavour.

instance, has launched DEXTER (Detection of EXplosives and firearms to counter TERRORism), an innovative system aimed at identifying carriers of explosives and firearms in mass-transit venues.

Sixth: NATO and Portugal are leveraging the lessons from decades of counter-terrorism work

Through 20 years of direct operational experience in Afghanistan and support to counter-terrorism efforts in Iraq, Syria, and across the NATO area of responsibility, NATO and Portugal have identified numerous lessons on countering terrorism. At the time, these lessons led to improvements in the conduct of counter-terrorism operations like ISAF or Operation Active Endeavour. Longer-term, they made contributions to the development of NATO and national doctrine, as well as to many intelligence tools and situational awareness tools in use today by NATO Nations. The JALLC, NATO's lead agent for Lessons Learned, is located in Portugal, and many counter-terrorism lessons are documented in JALLC products. Others lie in the operational records of NATO, national commands, and police agencies that are waiting to be studied and applied.

These six features are just a small part of the combined efforts of NATO and Portugal against terrorism. The key lesson learned from their approach to counter-terrorism is to tackle this threat

“Terrorism, in all its forms and manifestations, is the most direct asymmetric threat to the security of our citizens and to international peace and prosperity.”

—NATO's 2024 Washington Summit Declaration

with an emphasis on multilateralism and collective defence, while taking into account both the historical and current challenges of the international order. In counter-terrorism, one must strive to promote responses that foster a 360-degree approach, rooted in collective intelligence and the respect of the rules-based international order. NATO and Portugal will remain close allies in this endeavour. To quote the former NATO Secretary General, Jens Stoltenberg, “*Whatever happens, we are safer when we are united.*” Looking back and thinking ahead is strategically clever when navigating the current geopolitical environment: this is exactly what NATO is doing by using its lessons from the past to shape the future.



Portuguese troops deployed to Afghanistan in support of the NATO Resolute Support Mission in 2018.



A Brief History of NATO and Portugal

Anyone in the business of forecasting or projection will tell you that, in order to predict what may happen in the future, you must fully understand the past. Since its creation on 04 April 1949, the transatlantic Alliance has grown from 12 founding member Nations to 32, all working together to keep our people safe. A community of Allies bound together by common values of democracy, individual liberty, human rights, and the rule of law.

One of those founding Nations was Portugal. As NATO turned 75 last year, we take a look back at the history of the Alliance from the Portuguese perspective to understand what the future might hold. We discover how Portugal joined the Alliance, the various NATO commands and HQs that have been based in this highly strategic location, including details of how the JALLC came to be established there, Portugal's contributions to the Alliance, and the effects its membership has had for Portugal.

The North Atlantic Treaty was signed in Washington, DC, by 12 countries from Europe and North America: Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom, and the United States. The Treaty created the North Atlantic Alliance, whose purpose was to secure peace in Europe following the devastation of the Second World War, to promote cooperation among its members and to guard their freedom—particularly from the threat posed by the Soviet Union throughout the Cold War.

“As a founding member of NATO, Portugal has always seen the benefit of tackling global challenges with global solutions. Military cooperation allows for a better response, better results and a better use of resources.”

ADM Rob Bauer, Chairman of the Military Committee

NATO and Portugal: Stronger together for over 75 years

A Founding Member



José Caeiro da Matta, Portuguese Minister of Foreign Affairs, signs the NATO Treaty for Portugal in 1949.

Portugal was one of the 12 countries represented in Washington in early 1949 which sought to create this Alliance for our mutual defence. Its path into the Alliance was notable. At that time, Portugal had been spared the devastation of the Second World War from which the other founding European NATO members were still recovering. Its government, the regime of António Salazar known as the *Estado Novo* (New State), was focused on its overseas

possessions, geographically and in mindset far from the concerns caused by the Iron Curtain that had fallen across half of Europe.

In the Second World War, Portugal officially remained neutral, but by 1944 was openly supporting the Allies, primarily by providing airfield access for anti-submarine work in the Atlantic from bases in the Azores. Mid-Atlantic air bases proved to be an important element in eliminating the U-boat threat and would surely be just as important for hunting Soviet submarines. But there were philosophical reasons for Portugal's inclusion. Salazar had recognized that post-war European security would rely on the United States and was keen to benefit from that new reality. And U.S. diplomatic circles were generally favourable to working with Portugal.

As such, Portugal—along with Italy and several Scandinavian countries—was invited to the conference at which the North Atlantic Treaty, the principal details of which had already been worked out by Canada, the United States, and the Western Union powers of Benelux, France, and the United Kingdom, was to be signed.

The oldest defence Alliance in the world is that between England and Portugal, agreed in 1373 and sealed with the marriage of English princess Philippa of Lancaster to the claimant to the Portuguese crown, John of Aviz, in 1386. The year before, with help from English troops supplied by Philippa's father, John was able to defeat a Castilian force at the Battle of Aljubarrota and secure his throne. Philippa and John are buried in the magnificent Batalha Monastery, built to commemorate the victory at Aljubarrota, in two splendid side-by-side tombs, an eternal monument in stone to a defensive Alliance that is 639 years old and counting. Incidentally, John and Philippa were the parents of Portugal's *Illustrious Generation* of princes, including Prince Henry the Navigator, whose promotion of maritime discovery initiated the *Age of Exploration* after which this publication is named.



The tomb of Philippa of Lancaster and John of Aviz at Batalha Monastery, hands clasped in eternal friendship.

Timeline





Lisboetas (citizens of Lisbon) line up to view the mobile information stands, part of NATO's *Caravan of Peace* set up in central Lisbon to inform the population about NATO in September 1954.

1950s

The early days in NATO were marked by a concerted effort by the organization to engage the Portuguese government and inform Portugal's people about the purpose of the Alliance. In 1952, Lisbon played host to an important meeting of the NATO heads of state, at which it was decided to create a standing North Atlantic Council with permanent representatives, as we know it today, as part of a larger restructuring of NATO. The conference was a major diplomatic success for Portugal.

Hand in hand with this conference, NATO carried out a major public diplomacy campaign designed to educate the nations' citizens on the Alliance. This campaign, organized by the NATO Information Service and called the *Caravan of Peace*, set off across Western Europe and arrived in Portugal in September 1954, setting up information stands in central Lisbon, hosting talks and presentations on the Alliance, and including a visit by Lord Ismay, the first Secretary General of NATO.

1960s

The 1960s saw the establishment of the first permanent NATO command structure body, and thus the first openly visible, permanent presence of the Alliance in Portugal and in the Iberian Peninsula—a new maritime command for the Iberian Atlantic Area. COM- (later CINC-) IBERLANT was established in 1967 and moved into its new, permanent headquarters in Oeiras in 1971, in the facility today occupied by Naval Striking and Support Forces NATO (aka STRIKFORNATO). IBERLANT reported to the Supreme Allied Commander Atlantic (SACLANT) and was responsible for NATO naval operations in the Eastern Atlantic and approaches to Gibraltar.



The opening ceremony for IBERLANT, the first permanent NATO command in Portugal. The ceremony was moved outside the walls as a result of the damage from a bomb planted by communist terrorists the night before.

Establishment of first
NATO command in
Portugal, IBERLANT

1967

1967

Standing Naval Force
Atlantic
(STANAVFORLANT)
stood up

IBERLANT moves into
new headquarters facility
in Oeiras

1971

1974

Carnation Revolution
leads to establishment of
democratic government
in Portugal

1970s

Dissatisfaction with the *Estado Novo* was growing and NATO was sometimes a target of opposition. Communist groups carried out several terrorist attacks against NATO targets in the country, including one in June 1971 that successfully cut communications and power to central Lisbon during a NATO ministerial meeting. A few months later, a bomb exploded at the main gate to the new COMIBER-LANT facility on the eve of the official opening ceremony. Although no one was injured in these attacks, they represented a significant embarrassment for both the Alliance and the *Estado Novo* regime.

In 1974, young military officers, many of whom had NATO experience, replaced the *Estado Novo* and ushered in a new era of democracy in an event known as the *Carnation Revolution*.



Top: Portuguese soldiers with carnations in the barrels of their G3 battle rifles during the revolution which overthrew the *Estado Novo* on 25 April 1974.

Bottom: NATO meeting in 1974, Portugal's first after the *Carnation Revolution*.

The Carnation Revolution and the NATO Generation



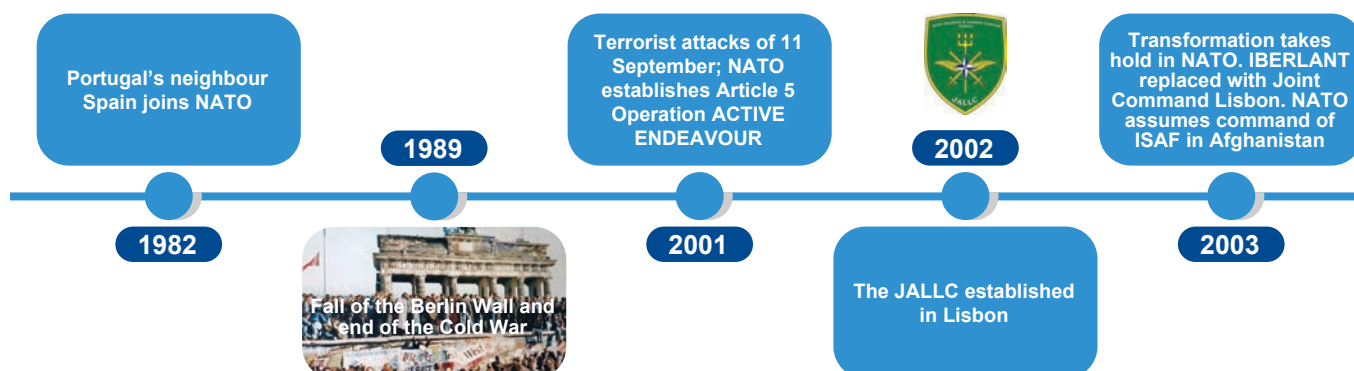
President Francisco da Costa Gomes

NATO's 75th anniversary came just weeks before another important milestone in Portuguese history, the 50th anniversary of the *Carnation Revolution* of 25 April 1974, which ended autocratic rule in Portugal and led to the installation of a democratic government. This revolution, so-called because participating soldiers put flowers in the barrels of their G3 battle rifles to show their peaceful intent, marked another step in

the expansion of individual liberty that the Alliance was created to defend. The following years saw the consolidation and strengthening of this democracy. NATO and individual Allies provided much support and guidance to the new government in Lisbon.

Portugal's membership in NATO had some influence on this outcome—many military members had served in NATO posts and exercises, broadening their outlook on what was possible in a free society and a soldier's role therein. Typical of the *NATO Generation* of officers who ushered in this turn to democracy was Francisco da Costa Gomes. Second president of the new government, as a young major in the early 1950s, da Costa Gomes was tasked first with leading the integration of Portuguese forces into NATO, followed by a tour at SACLAN in Virginia. In the 1960s, he was appointed Commander in Mozambique and then Angola, where he introduced new, population-centric approaches to counter-insurgency.¹ A member of the *junta* that governed after the Carnation Revolution, he was made president in September 1974, relinquishing this post following Portugal's first democratic election in 1976. It is perhaps for this peaceful handover of power, emblematic of the ideals upon which the Alliance was founded, that he and his generation should best be remembered.

1. Often overlooked is that when the International Security Assistance Force (ISAF) began, no NATO Nation, except perhaps the United States, had more recent or more relevant experience in counter-insurgency than Portugal, owing to the experience of the Colonial Wars which had ended just a quarter century earlier. Indeed, in 2003, most senior Portuguese officers and many leading politicians were veterans of the wars in Africa.





Top: Portuguese frigate *João Belo* (F480) in heavy seas during the 1983 deployment in the NATO Standing Naval Force Atlantic.
Bottom: Portuguese soldiers from the 2nd Armored Division use Chaimite V200 armored personnel carriers to steer their way.

1980s and 1990s

In the 1980s, the Portuguese military was reorganized and modernized. A new Ministry of Defence replaced the post-revolution military Council of Revolution and assumed all political and policy functions from the General Staff of the Armed Forces. Many of these reforms were driven by a desire to enhance Portugal's interoperability with, and ability to contribute to, the Alliance. These reforms had hardly been completed when the Berlin Wall fell. While this meant dramatic shifts in the overall security situation facing the Alliance, for NATO in Portugal it brought in a period of stability. CINCIBERLANT continued to operate, even though the Soviet naval threat in the Atlantic had disappeared, and Portugal continued to modernize its armed forces while contributing to operations in the Balkans. It took the terrorist attacks of 11 September 2001 in the United States to usher in a new era of transformation.

2000s

Enter Transformation

Transformation was the key word for NATO as the world entered the new millennium and it had a profound effect on Portugal's relationship to NATO. Proponents of new warfare concepts like *Network-Centric Warfare* believed that the Alliance needed to revolutionize the way it operated, leveraging technology and new ways of thinking about war. Through their advocacy, SACLANT was disestablished and replaced with a new Allied Command Transformation in 2003. IBERLANT became Joint Command (JC) Lisbon, losing its maritime focus, and was moved under the Supreme Allied Commander Europe (SACEUR). This command served for the next ten years as the principal staff for testing new, transformational concepts in deployable command and control arrangements in the Allied Action and Steadfast series of exercises, while also running counter-piracy operations and NATO's support to the African Union.

Transformation also brought the JALLC to Lisbon. Seeing the value of a deployable operations analysis capability, and wishing to create an institutional, lessons-learning capability, the leaders of transformation took the UK-based Permanent Maritime Analysis Team, which had focused on providing analysis of naval exercises conducted by SACLANT, made it joint and moved it to Lisbon.



Signing the MOU between the JALLC and RHQ SOUTHLANT establishing services to the JALLC.

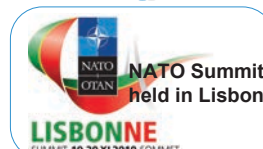
2004



France reintegrated into NATO Command Structure; takes command of JC Lisbon

2009

2010



JFC Lisbon disestablished; STRIKFORNATO moves into Oeiras facility

2012



Out-of-Area Crisis Response

The attacks of 11 September 2001 also led directly to the Alliance assuming new roles, especially in the fight against terrorism outside the NATO area of responsibility, and placing new demands on Allies to contribute forces to the resulting missions. Portugal was a staunch contributor, providing troops throughout NATO operations in Afghanistan, and contributing naval forces to maritime operations like the Article 5 Operation Active Endeavour and the counter-piracy Operation Ocean Shield.

In 2009, France rejoined the NATO Command Structure. This had a direct impact on Portugal as JC Lisbon now became a Joint Force Command (JFC) and received a three-star French officer as its commander, where it had previously been under the dual-hatted Commander U.S. Sixth Fleet.

This arrangement did not last long, however, as NATO continued downsizing in what was seen to be an increasingly peaceful world. In 2012, NATO



Portuguese troops deployed to NATO's Resolute Support Mission in Afghanistan in 2020.

disestablished several NATO command structure bodies, including JFC Lisbon. For the first time since opening 40 years earlier, the facilities in Oeiras were to be empty. Strong protest by the Portuguese government in the halls of NATO led to the arrival of a new tenant. STRIKFORNATO, a NATO Force Structure headquarters previously based in Naples, would move to Oeiras. By the end of 2013, STRIKFORNATO was settled into its new home, boasting for the first time Portuguese naval officers on its staff.



Left: COM JC Lisbon, VADM Fernando Melo Gomes PRT N, prepares to board a helo while embarked in his flagship, USS Mount Whitney, during Exercise ALLIED ACTION 05.

Middle: SACEUR, ADM James Stavridis USN, passes the flag from VADM Bruce Clignan USN to LGEN Philippe Stoltz, French Army, during the JFC Lisbon Change of Command.

Right: LGEN Philippe Stoltz honours the members of the Portuguese Air Force Maritime Patrol and Reconnaissance Aircraft detachment who participated in Operation OCEAN SHIELD in 2011.



The Past Decade

With its continuous downsizing and focus on out-of-area crisis response, the 2014 annexation of Crimea by Russia caused NATO to renew focus on collective defence and the Eastern flank. Both Portugal and the NATO bodies here have made marked contributions to this new focus. Portugal has continued to modernize its armed forces while contributing to deterrence operations on NATO's eastern flank. It has been among the most frequent contributors to Baltic Air Policing efforts and has a permanent troop presence in NATO's Enhanced Forward presence battle groups. STRIKFORNATO has been at the forefront of strengthening NATO command and control of maritime forces, especially by serving frequently as the command staff for Exercise BALTIC OPERATIONS (BALTOPS), which demonstrates the deterrent effect of NATO sea power in the Baltic Sea.

And the JALLC? No less than the rest, the JALLC has made its contribution to securing NATO over this past, much more tense, decade. Where prior to 2014, the JALLC's focus was on documenting lessons from Afghanistan, since Russia's illegal annexation of Crimea, the JALLC has turned out analysis reports on topics directly related to collective defence and enhanced forward presence. Most notable, perhaps, are the JALLC's reports on lessons from Russia's war against Ukraine. The JALLC has also been providing enhanced lessons-learned-capability support to NATO bodies and Allies' forces, and will soon begin supporting Ukraine through the newly established Joint Analysis Training and Education Centre (find out more about the JALLC's involvement in learning from the conflict in Ukraine and support to the JATEC in the article on page 60).

Conclusion

The story of Portugal and NATO, both geographically and politically, is certainly unique among Alliance members and is truly an inspiring one. For over 75 years, Portugal has supported



Top: COMSTRIKFORNATO, VADM Lisa Franchetti USN, meets with RADM Ingus Vizulis LVA N, commander, Latvian Navy Force Flotilla at Exercise BALTOPS 2018.
Bottom: GEN Valdemaras Rupšys, Chief of Defence of Lithuania, meets with Chief of the General Staff of the Portuguese Armed Forces, GEN José Nunes da Fonseca, during a visit by senior Portuguese defence officials to Lithuania in May 2024. The visit included demonstrations by Portuguese air policing and battle group personnel and staff talks with Lithuanian counterparts.

NATO's fundamental values of democracy, individual liberty, the rule of law, and human rights, and in no small way, the Alliance, especially during its first 25 years, has helped strengthen those values here in the land of the *Lusíadas*.



USS Enterprise CVN-65 enters the Tejo, passing Fort St Julian and the JFC Lisbon headquarters on 27 January 2011.





The JALLC considers itself a forward-leaning organization when it comes to innovation. The JALLC's Innovation Plan boasts some ambitious projects that range from improving reporting processes to using artificial intelligence (AI) to enhance existing tools. In this article, we find out how the JALLC is working to incorporate AI into its activities to become more efficient and increase output. We also take a look at one of the JALLC's ongoing Innovation Projects, the JALLC AI Research and Analysis Tool (JAI-RAT), which is currently being developed by a joint JALLC–NATO Communications and Information Agency (NCIA) team, and find out how one of the team members has been involved in this promising new tool.

Innovation at the JALLC

This graphic is taken from the front cover of *The Explorer* 2023 and was generated using an AI graphic design application: one of the many ways the JALLC is harnessing AI as a force multiplier and to enhance our work.

The JALLC's Innovation plan focuses on ways to increase JALLC efficiency and output in the near future by using new technology to enhance staff productivity. Although it is not used exclusively, AI is playing a big role in how the JALLC is looking at achieving this. As the JALLC does not have any AI subject matter expertise, Antonio Carvalho, who had previously worked for the NCIA's Data Science and AI team, was hired as a specialist to help advance the JALLC's AI development ambitions. Antonio's work for the NCIA predominantly focused on the use of Large Language Models (LLM) and how they can be incorporated into the way NATO works. This experience, coupled with his technical background, made him a great fit for

the JALLC's vision for the future of NATO Joint Analysis and Lessons Learned and its innovation aspirations.

As an expert in engineering and physics, Antonio's career has been shaped by the rise of AI, and in particular the increasing use of LLMs. But he also finds it fascinating: *"It's something about the way LLMs are continuously evolving that means we never really know what the next development is going to be or how we will be able to use it. It's a field that is continuously experimenting and evolving, and I enjoy the challenge of exploring the possibilities LLMs have to offer."* However, he noted, although LLMs are powerful and have the potential to increase efficiency and output in any

organization, their usefulness in the NATO context still needs some *proving*.

But NATO is well on its way despite being unlike industry or most public organizations in that it deals with classified information and a high-security environment. These restrictions can make using *off-the-shelf* LLMs more challenging and require bespoke solutions which take time to develop. Nevertheless, NATO has already created a *safe virtual space* to test LLMs and other AI-based solutions, and has been experimenting with existing solutions as well as developing its own bespoke applications. In fact, NATO has been innovating in technology for decades (see the sidebox), so nothing new there. But what perhaps is new is the speed at which technological advances are being made and, importantly, rolled out to staff.



An example of this in the JALLC context was the recent migration of the JALLC to the NATO Cloud and all the new applications and features that came with it. For an organization that was not yet familiar with Microsoft 365, it was a little overwhelming for some during the migration phase and for some weeks thereafter. But things are settling down and we, the JALLC, are learning the power and flexibility the new digital environment offers us. This is something that Antonio recognizes as the future of technological innovation and evolution in NATO—as much as any other organization. There are periods of intensive technological advancements where staff are asked to quickly absorb and adapt new technology into the daily routine, followed by a period of less-intensive evolution where staff settle into the new

From Cold War to Cyber Threats: A Technological Journey

When NATO was established in 1949, it was tasked with providing collective defence against the Soviet threat. During the early decades, the focus of innovation was on physical military hardware: air defence systems, nuclear weapons, and advanced radar technology. The cold, hard reality of the Cold War dominated NATO's technological efforts, with innovations aimed at deterrence and defence, including the deployment of long-range bombers and intercontinental ballistic missiles (ICBMs).

The technological revolution of the 1970s and 1980s brought new levels of sophistication to NATO's operations. The introduction of satellite communications and advanced reconnaissance systems allowed for improved intelligence-gathering and the coordination of multinational operations. Moreover, NATO began to develop a more interconnected communications system, enhancing coordination across different Nations' forces. The creation of the Combined Air Operations Centres (CAOCs) and more integrated logistics systems were direct results of these technological advancements.

As the 21st century dawned, NATO's technological focus shifted significantly with the rise of information technology. The Alliance began adopting network-centric warfare strategies, where technology was seen not only as a force multiplier but also as the backbone of operational success. The real-time sharing of intelligence, surveillance, and reconnaissance (ISR) data became a critical component of NATO's military doctrine, and innovations like GPS and precision-guided munitions revolutionized how operations were planned and executed.

The modern era has seen NATO invest heavily in cyber defence and artificial intelligence, reflecting the rise of new threats such as cyber-attacks and hybrid warfare. These technologies enable the Alliance to address evolving security concerns in an increasingly interconnected and digital world, ensuring that NATO remains agile and capable in the face of asymmetric threats.

environment and get comfortable using it. As technology evolves and increasingly becomes part of our daily work routine and rituals, we become more adept at *learning it* faster and better.

When it comes to AI, NATO is clearly invested in innovating, says Antonio; at least the organization is open to finding smarter ways to do things better. Whether this is out of fear of being left behind or a genuine desire to innovate better solutions is a question Antonio raises but subsequently deems irrelevant in the bigger scheme of things. *“It doesn’t really matter what drives innovation, as long as innovation drives intelligent change for solutions that will impact and benefit NATO in the future.”*

Despite not being with the JALLC for that long, Antonio has a good impression of the centre and its innovation capabilities. The JALLC is on par with its peers in this respect: it’s an innovator. It has an active and ambitious Innovation Plan, staff assigned to innovation projects, and already some success in developing prototypes and progressing new ideas (see below on the JALLC’s JAI-RAT project). As part of the JALLC’s Innovation Team, Antonio is working on projects that have the potential to increase JALLC efficiency and productivity: that’s an exciting prospect and can only be good for JALLC Customers and NATO as a whole.

The JALLC’s *Pet* Project: JAI-RAT

As a brand new staff officer at the JALLC, LTC Mustafa Ergin, Turkish Army, was tasked to do what at the JALLC is a fairly routine bit of staff work. In preparation for JALLC’s participation at Exercise STEADFAST DETERRENCE 24, MAJ Ergin dived into the NATO Lessons Learned Portal (NLLP) looking for reports, lessons, and other information related to logistics to inform the JALLC’s preparation for its engagement at the exercise. After about a month of work, he produced what the JALLC refers to as a short-term analysis report on the topic. This kind of work is pretty common at the JALLC, as it is for many other NATO staff officers.

But wouldn’t it be great if the vast amount of information contained in the NLLP—hundreds of reports, thousands of lessons—could be searched and summarized, not in weeks, taking up valuable resources, but in minutes and fully automated? This is the power of AI. Commercial AI-enabled tools such as ChatGPT that do this are already familiar to many in NATO. In fact, the previous edition of *The Explorer* delved deeply into the topic of using AI to support NATO’s work. But these commercial tools cannot access NATO specific information and experience, which is exactly the kind of information stored in the NLLP.

As such, in 2024, the JALLC began an innovation project to create a tool for reading the information in the NLLP and other sources of NATO information, which could produce summaries that could be used by JALLC Analysts in conjunction with running projects. Partnering with NCIA, a small team from both organizations (including LTC Ergin, three other JALLC staff members, and three programmers from NCIA) began the process of defining user requirements and then developing the necessary software, using a combination of commercially available and NCIA-written code, to create an AI tool that could work with NATO specific information.



The JALLC has been experimenting with the concept of using Large Language Models to enhance its capabilities for years. For example, in 2023 the JALLC held a workshop on enhancing LL Exploitation through Semantic Representation. You can download a copy of the factsheet [here](#) to find out more.



This logo, like the JAI-RAT, is still a prototype. We’d love your feedback on it.

The result is the prototype JALLC AI-Research and Analysis Tool (JAI-RAT). And it is already showing some progress. It is capable, using a chat feature, of responding to queries with a summary, a more detailed discussion, and an annotated reference list with inline citations. If, for example, it is asked to provide a summary of current lessons on implementing Maritime Situational Awareness in NATO, in about three seconds it produces around four paragraphs of text describing overall efforts, specific issues and shortcomings, and some other considerations, together with a list of documents upon which the response was based. The chat feature allows for follow-on questions to inquire about specific details of the original response.

It's still early days though and there are obviously some limitations. Currently it can only search the NLLP content, although other information sources are planned. This means that, at the moment, answers are limited to information that has been submitted to the NLLP, which can be very hit or miss depending on the topic. As the final paragraph of the response to the above query bluntly said, *"Overall, there is a dearth of lessons related to maritime topics more generally."* As a prototype, it does not directly search the NLLP, but rather a copy that must be updated periodically.

There are also issues with the intuitiveness of use and ease of logging in, and a substantial learning curve with crafting the query in the best way to get relevant and useful results. Like other generative AI tools, the tool includes a *temperature* setting which allows for some control of the level of creativity of the response. A lower setting will get results that are based on verbiage in the sources that is nearly identical to the terms used in the search, while a higher setting will allow for more creativity in the words used to provide the answer, which can offer a broader viewpoint, but which can result in responses that may well stray into totally different, more generic topic areas.

One interesting aspect of JAI-RAT is that, given that the tool bases its responses on the writings of two decades' worth of NATO staff officers, the style of the responses reads like typical NATO staff work. As such, this tool may serve as a good starting point where the product is to be used to inform a line of work or to initiate additional research, but the raw product produced by JAI-RAT will need a fair bit of human intervention if it is to keep the attention of a flag officer.

Nevertheless, JAI-RAT is showing remarkable potential to ease the burden on NATO staff officers. By reducing the time to produce an initial summary and bibliography to a couple seconds, someone tasked to produce a point paper, decision brief, or other piece of staff work can quickly get a good introduction to an unfamiliar topic and focus immediately on the right sources. The result should be better-quality staff work produced more quickly.

The work to improve and refine the tool continues. As such, it is also an excellent example of what can be accomplished in innovation when NCIA partners with a NATO command structure body that has a clear and well-defined requirement.

Just for fun we asked JAI-RAT, *Should NATO operate battleships?* with the temperature set to medium. The reply illustrates both what the tool can do and some of the shortcomings mentioned:

Based on the provided sources, there is no specific information about operating battleships. However, the sources do discuss NATO's role in stability operations and its relationships with other organizations. It seems that NATO should focus on its areas of expertise, such as military affairs and security provision and avoid duplicating the work of others. NATO should also seek to cooperate with partners and share resources when possible. In this context, NATO should operate battleships if they contribute to the alliance's military capabilities and are a part of a cooperative effort with other organizations.

In one respect, this makes sense as no NATO Nation has used battleships in over 30 years, so it is unlikely there is very much relevant information about them in the NLLP, which has very little information prior to 2004. And yet in follow-on questions, the tool reported some specific capabilities of battleships (e.g. naval gunfire support), indicating an understanding of what they are and leaving the user to wonder what information in the NLLP allowed the tool to identify these capabilities. In another respect, it's not a very useful answer as the information provided is very generic and simply relies on restating NATO's role and mission. It's the kind of answer you might expect from a politician, rather than a research assistant!



NATO's last non-U.S. battleship, the Turkish TCG Yavuz, NATO Hull Number B-70. The ship was placed in reserve in 1960 and was not sold for scrap until 1973, outlasting by three years the French battleship *Jean Bart*. Only the U.S. Iowa class served longer, with the last being decommissioned in 1992.



The JALLC–Ukraine Initiative: Supporting the Lessons Learned efforts of NATO and the Ukrainian Armed Forces

Since Russia's unprovoked invasion of Ukraine in February 2022, NATO has been unwavering in its support for the Ukrainian Armed Forces (UAF). The JALLC has since been contributing to NATO's efforts to support the UAF and helping to ensure that NATO learns lessons from Russia's war against Ukraine, through various activities and products, including our analysis reports, support to development of a national Lessons Learned (LL) capability, and Lessons Learned training. In order to amplify this support, in 2024, the JALLC established the JALLC–Ukraine Initiative to further support the LL efforts of NATO and the UAF.

NATO and the Ukrainian Armed Forces recognize the need for the UAF to learn and adapt faster than the Russian armed forces on the one hand, and for NATO to continue to capture, analyse, learn and improve from lessons coming out of the war. In this respect, the UAF has been able to capitalize on the NATO approach to LL, accelerating the establishment of a rapid and robust national LL system. In turn, NATO has had the opportunity to observe LL being *done* in the battlefield, gaining fresh perspectives on the real-world collection of LL in operations, that can be translated into transformation for the Alliance as part of its wider warfare-development efforts. One such opportunity for NATO to engage directly with the



NATO Secretary General Mark Rutte with Ukrainian President Volodymyr Zelenskyy on an official visit to Ukraine.



Ukrainian Deputy Minister of Defence Stanislaw Haider speaks via video link at the 2024 NATO Lessons Learned Conference.

UAF in the context of LL was at the 2024 NATO Lessons Learned Conference (NLLC). At this key event for the LL community, the Ukrainian Deputy Minister of Defence, Mr Stanislaw Haider, not only presented his insights on Lessons Learned from the battlefield, but was also able to answer questions (live via video link) from the audience; an opportunity that was greatly appreciated by those attending the event.

Given the importance of fostering cooperation in the context of the NATO–Ukraine relationship and the mutual benefits of working together in the context of LL, in 2024, the JALLC set up the JALLC–UKR Initiative. Intended to be the single point of reference for NATO’s LL information relating to Russia’s war against Ukraine, the JALLC–UKR Initiative is staffed by a dedicated team of JALLC analysts. These analysts, military and civilian, not only conduct Ukraine LL-related

analysis themselves, producing impactful reports that can inform NATO-wide decision making, but they also work with other JALLC analysis project teams conducting related studies to ensure that they provide and receive related source material and capture any relevant lessons being identified in the context of these other studies. For example, the JALLC is currently working on two analysis studies, with reports due to be published later this year. One study is intended to capture relevant lessons to inform NATO exercises, the other is intended to inform higher-level decision making within NATO, giving a sense of the breadth and depth of NATO’s need and desire to learn, as well as the sense of urgency. Both reports will ensure that relevant LL insights from Russia’s war against Ukraine are captured and used to improve and transform NATO.

The JALLC–UKR Initiative also hosts an Information Centre, intended to be a comprehensive repository



Ukrainian LL experts from the Boryviter Centre attend a workshop at the JALLC in September 2024.

of NATO's Ukraine–Russia LL-related information. This Information Centre—in its comprehensive format—is hosted as a Community of Interest on the NATO Lessons Learned Portal (NLLP) and is only accessible with appropriate clearances. But a publicly accessible (limited) version of the JALLC–UKR Initiative Information Centre is available on the unclassified version of the NLLP for which you can register [here](#). The JALLC–UKR Initiative Information Centre contains a wealth of searchable lessons information as well as relevant reports and documents being produced by NATO, Allies, and other organizations, offering a rich source of information for anyone interested in the topic. It is continuously being updated and monitored to ensure the most recent and relevant information is uploaded.

The JALLC–UKR Initiative also published several newsletters, updating the community on its activities and providing valuable insights into the LL aspects of Russia's war against Ukraine in the NATO context. These included relevant LL news, summaries of and links to useful reports, and insights on current affairs of interest to the community. With the inception of the JATEC, however, the need for the JALLC to produce these newsletters diminished. You can download the last edition [here](#).

But the JALLC's support to LL from Russia's war against Ukraine does not stop at the JALLC's doorstep. During the Washington Summit in 2024, the Nations agreed to establish the Joint Analysis, Training, and Education Centre (JATEC) for Ukraine. The JATEC is intended to be a NATO–Ukraine centre dedicated to supporting the transformation of UAF. The JALLC, including

through its JALLC–UKR Initiative, will leverage its analysis expertise to ensure that the JATEC is able to carry out its LL and analysis activities as swiftly and effectively as possible. The JALLC has already provided this support to the JATEC through these initial months after its inception and looks forward to continuing that support and to the fruitful JALLC–JATEC relationship in the future. You can read more about the JALLC–JATEC history, and future intent in our article on page 60.

In the meantime, the JALLC–UKR Initiative and the JALLC will continue to provide direct LL support to the UAF as required and will continue to support NATO in its endeavours to learn from experience to transform for the future.



The JALLC regularly publishes reports and newsletters on NATO's lessons from Russia's war against Ukraine and the JALLC–Ukraine Initiative's activities. Head over to the JALLC's website to find out more about these products and other relevant information: www.jallc.nato.int

Lessons from the Battlefield—the dual nature of modern war

Much has been made of the new technologies employed by both sides in Russia's war against Ukraine and their impact on modern combat operations. As the JALLC has found in producing its reports, many lessons have been identified on the impact of advanced technology on the fighting: the use of drones, the disruptive effect of electronic warfare, and the crowd-sourcing of intelligence and targeting information from civilians. Simultaneously, the susceptibility of such technology to jamming, spoofing, and interception/exploitation has led to a cycle of rapid innovation in countering its employment.

At the same time, many lessons submitted to the NLLP address more conventional war-fighting issues, some that sound almost antiquated, as if from a bygone era. These lessons concern things like the central role of artillery, the need for effective coordination of combined arms in land warfare, the value of main battle tanks but only when supported by adequate infantry, the slow and destructive nature of urban combat, the vast amount of conventional ammunition that is expended, and that railroads are important logistics nodes. Added to this is the fact that in countering the modern technologies, especially where drones and cyber are concerned, forces on both sides have often reverted to old-fashioned, yet more secure, ways of operating especially communicating, like hiding in trenches and using hard-wired field telephones.

This, then, is an important lesson from this war: the new technology may be flashy and exciting, but war is still war. It is ugly and still functions in line with the principles expounded by Sun Tzu, Clausewitz, and Mahan. Logistics still matters, trench foot is still a thing, and soldiers need a reliable supply of dry socks.



A Ukrainian soldier in a trench during the Battle of Bakhmut.



In a denied environment, communications may depend on tried-and-true systems like the field telephone and the soldiers needed to lay its cables.

JALLC Publishes All-New *JALLC Analysis Handbook*

Historically, as part of its mission, the JALLC has been tasked with delivering the *Joint Analysis Handbook*. The handbook is a key NATO reference document to help staff across NATO conduct analysis for Lessons Learned purposes. Over the years, new editions of the handbook have provided updates and additions, as the needs of the organization have evolved and JALLC has continuously improved its approach to analysis. However, as part of the NATO Lessons Learned Capability Improvement Roadmap, the JALLC was tasked with updating the handbook to ensure that the latest thinking, methods, techniques, tips, and processes are all properly captured. In this article, you can read more about the JALLC's analysis capability, which supports NATO's continuous improvement and transformation, and how the JALLC uses the *JALLC Analysis Handbook* to train its analysts to the highest standards.

The JALLC is NATO's centre dedicated to supporting and enabling the Alliance-wide implementation, sustainment and development of NATO's Lessons Learned policy and capability. It is a catalyst for change—able to harness the past to prepare for the future—enabling the Alliance to learn faster and better, while supporting a culture of continuous learning and improvement, enhancing NATO's performance and readiness, steadfastly anchored to the future, fostering innovation for learning at the speed of relevance.

As a core part of its mission, the JALLC conducts relevant and timely analysis across the full spectrum of NATO activities, according to priorities set by NATO's Strategic Commands, to support and enable the implementation and improvement of warfare development and war-fighting capabilities, and to advise strategic and higher operational decision-making across NATO. The types of analysis JALLC does are characterized as either: NATO Lessons Learned Portal Content Analysis, Key Issue Analysis, or Deep Dive Analysis.

All JALLC analysis is conducted to the highest standards of professionalism, ensuring the quality and rigour of all the content published under the JALLC's logo. JALLC analysis is conducted by mixed teams of military and civilian analysts who bring their wealth of experience and expertise together to deliver a product with analytical rigour and military relevance. JALLC analysts receive training in the way JALLC does analysis, based on the *JALLC Analysis Handbook*, and are supported through their projects by senior analysts acting as technical leads.



JALLC Analysis Handbook



Your guide to effective analysis

The new *JALLC Analysis Handbook*. [Available here!](#)

The handbook is key to the success of JALLC analysis and the products the JALLC develops to support NATO's continuous adaptation and transformation. In 2024, Katie Mauldin—the Senior Operational Research Analyst for the JALLC's Lessons Learned Analysis Division—revamped the old *Joint Analysis Handbook*, which had served the JALLC for over a decade, into a new *JALLC Analysis Handbook*—fully up to date with the latest analysis methods and techniques, with tips and tricks on how to ensure that an analysis project runs smoothly and with the desired outcome.

Although the handbook is written specifically with the JALLC analyst in mind, the principles presented in the handbook are industry standard and applicable to a much wider audience. Staff at other NATO bodies with Lessons Learned and Analysis responsibilities as part of their mission, such as the Joint Warfare Centre, Joint Force Training Centre, the NATO-accredited Centres of Excellence, and the NATO-Ukraine Joint Analysis Training and Education Centre, will all benefit from this product. If you are interested in finding out how the JALLC does analysis, or perhaps you want to learn how to conduct a successful analysis project yourself, download the handbook and get reading.



Previous editions of the *Joint Analysis Handbook*. The 4th edition was released in 2016.

1

INTRODUCTION

1.1 WELCOME TO THE JALLC ANALYSIS HANDBOOK

The Joint Analysis and Lessons Learned Centre (JALLC) Analysis Handbook describes the concepts, fundamentals, methods, and techniques that provide a baseline understanding for conducting a range of JALLC analysis projects/tasks. It has been produced to assist JALLC analysts to understand what is expected of them in their role at the JALLC, as well as to guide staff in other organizations with conducting analysis related to Lessons Learned (LL), especially within NATO or national military entities.

A number of *How to ...* guides are provided in support of this handbook. The *How to ...* guides provide more detailed guidance on selected design, planning, data collection, and analysis-related activities, and include useful templates, sample texts, examples, and hints/tips to avoid common mistakes. They can be accessed on the JALLC website.¹

1.2 HOW TO USE THIS HANDBOOK

This first chapter serves two purposes: first, to explain what the handbook is and what JALLC analysis is, and second (starting at sections 1.6 and 1.7), to describe the fundamental concepts that underpin JALLC analysis.

Each chapter following this first chapter describes different sets of activities in the lifespan of an analysis project/task.² However, those reading this handbook should not assume that the sets of activities occur only once or always occur only in the order in which they are presented in this handbook. Readers will find words like *iterative* and *concurrent* used quite frequently throughout this handbook to remind them, and reinforce their understanding, that analysis is not a linear process. Instead, each chapter is designed to offer the reader (and in particular, the new analyst) a sufficient amount of information to act as a handrail that accompanies them throughout the course of a JALLC project/task. The chapters in this handbook follow the logical progression of an analysis project/task; however, due to the non-linear nature of analysis, it is advisable to do two things:

- First, read the handbook once, from cover to cover, to become familiar with the terminology, concepts, and methods.
- Second, read each applicable chapter at the beginning of the relevant part of an analysis task/project. This will provide more substantive support to the set of activities that are the current focus within a given project/task.

After all, how do you eat an elephant?³

1.3 JALLC ANALYSIS AND LESSONS

The JALLC is NATO's centre for both lessons learned and related analysis—because, after all, lessons cannot be effectively identified or learned without some level of analysis. The

¹ www.jallc.nato.int; date last accessed 11 July 2024.

² Some JALLC analysts will observe that this handbook roughly follows the sequence of activities in the JALLC Project Approach (JPA) (Reference 1), which is the management tool for JALLC projects/tasks.

³ Famously, Desmond Tutu once asked this question, the response to which is “one bite at a time”. Although conducting a JALLC analysis task/project may seem daunting, overwhelming, or even impossible, it can be accomplished by gradually taking on a little bit at a time.

analysis that the JALLC undertakes and its relation to LL can be understood by first considering the definition of analysis in NATO:

“The study of the whole by examining its parts and their interactions.”⁴

Based on this definition, a variety of different activities that take place in NATO and military organizations—e.g. assessment, audit, evaluation—can be considered as types of analysis. JALLC analysis is one of these activities. What sets JALLC analysis apart from the other analysis activities is its focus on enabling learning from experience, either in the context of the NATO LL Process or in a wider context, for example in support of implementing and improving NATO capabilities or advising strategic-level decision making.

Lessons are “records of knowledge gained from experience that can be reused in the future”⁵. In NATO, lessons are formally generated as individual items that result from NATO Command Structure (NCS) and NATO Force Structure (NFS) HQs running the LL Process,⁶ and are then submitted to and managed in the NATO Lessons Learned Portal (NLLP).⁷ However, lessons are also often found in a variety of official documentation, such as doctrines, standards, handbooks, reports, and training materials (and increasingly in other media such as videos), and documents uploaded to the NLLP library area. Lessons generated outside the NATO LL Process are usually not presented in a formal lessons-reporting format.⁸

The analysis that the JALLC conducts considers both lessons generated by the NATO LL Process and lessons generated and reported in other contexts, going beyond the NATO LL Process.



Figure 1: Sets of Activities in JALLC Analysis

Every analyst or team that is assigned a new analysis project/task starts with a low level of understanding of the analysis topic and a low level of confidence in their own knowledge. The JALLC does not have a Subject Matter Expert (SME) for every potential analysis topic in NATO, so JALLC analysis teams use these different research and analysis activities to build their understanding and confidence of the analysis topic, from day one to the day the final product is published. Figure 2 depicts this relationship, where the x-axis shows the activities in a JALLC analysis project/task over time, and the y-axis shows the analysts' and teams' increasing understanding and confidence of the analysis topic.

⁴ NATO Terminology Database at <https://nso.nato.int/natoterm/content/nato/pages/home.html?lg=en>, record 18517, last accessed 11 September 2024. Note that the NATO Terminology Database has four definitions of *analysis*, two of which are NATO agreed. Of those two terms, the definition of *analysis* used in this context is the one that has general applicability, whereas the other definition is specific to analysis in the context of intelligence.

⁵ There is no definition of *lessons* in NATO. The definition used in this handbook is adapted from several definitions found in academic and research papers relating to Lessons Learned.

⁶ The NATO LL Process can be understood in more detail by reading the NATO LL Handbook (Reference 2). The NATO LL Process, at the time of writing this handbook, is depicted in Annex B.

⁷ nllp.jallc.nato.int, date last accessed 11 July 2024.

⁸ The formal lesson-reporting format in NATO is Observation Discussion Conclusion and Recommendation (ODCR), also explained in the NATO LL Handbook (Reference 2).

Exploiting Lessons Learned Information



The NATO Lessons Learned Portal (NLLP) is the centralized hub for all NATO Lessons Learned (LL) information. It is the gateway to the NATO LL Process and, as such, facilitates shared knowledge and learning among NATO and national entities.

In order to ensure NLLP content is leveraged to inform decision-making across NATO, the JALLC produces NLLP Content Analysis reports that summarize lessons and identify trends related to topics of interest. This includes the JALLC's regular NLLP Analysis Newsletters (see the example on the next page), which provide an overview of the NLLP items submitted and/or staffed within a given reporting period, specifically focusing on items relating to the strategic priorities specified in the JALLC Programme of Work. For the full versions of the newsletters, access the classified version of the NLLP and download the latest edition.

A highlight among the many NLLP Content Analysis reports delivered in 2024 was the report for HQ SACT on lessons supporting the Future Operating Environment 2024 (FOE24) Study. CDRE Ruud Schoonen (HQ SACT Acting Deputy Chief of Staff for Strategic Plans and Policy at the time of delivery) said that, " ... *the insights and expertise you shared proved to be highly beneficial, not only for FOE24 but also for our broader understanding of the strategic landscape.*" You can read more about NATO and the Future Operating Environment in the article on this magazine on page 11.

Additionally, the JALLC published two reports in 2024 relating to LL information sharing between NATO Nations and NATO, a topic that was a priority for SACT this year. The recommendations from the reports were discussed at the 2024 edition of the NATO LL Conference, resulting in an action to establish a periodic NATO–National LL leadership meeting to improve LL sharing. In fact, the first iteration of that meeting will take place in October 2025 in Estonia and will see National LL Leadership gather at this new LL forum.

In 2025, the JALLC released the latest edition of the Key Issues and Trends from Lessons Learned Products, which looked at Lessons Learned products published between 2023 and 2025 and at Lessons from Multi-Domain Exercises. This report identified 21 issues across seven themes ranging from Space and Cyber to Electronic Warfare and Autonomous Systems. This report will, no doubt, contribute to ACT's efforts in relation to the new Enhanced Vigilance Activity Eastern Sentry, which was announced in response to Russian incursions into NATO territory. The JALLC stands ready, as ever, to support ACT, NATO, and the Nations in this activity. You can read more about Multi-Domain Operations and Lessons Learned in the article on page 25.

The JALLC's NLLP Content Analysis products have been very well received and represent a visible example of how lessons can be exploited to enhance knowledge across the Alliance.



C-IED: A Polish Army explosive ordnance disposal (EOD) specialist walks towards a suspected improvised explosive device (IED) during Northern Challenge, a multinational exercise that takes place at the Icelandic Coast Guard facility in Keflavík, Iceland.



Maritime unmanned systems: In response to a more challenging security environment, NATO is stepping up efforts to deter and respond to threats in the maritime domain. Allies are strengthening situational awareness with new emerging and disruptive technologies. This includes conducting more high-end exercises connecting maritime surveillance assets across Allied nations below, on, and above the sea.



Joint press conference by NATO Secretary General Mark Rutte and Supreme Allied Commander Europe, GEN Alexis G. Grynkeiwich, announcing the launch of *Eastern Sentry*. Click [here](#) to read more.

NATO LESSONS LEARNED PORTAL ANALYSIS NEWSLETTER

2024: ISSUE 03 | JALLC/CG/25/072



(NU) This NATO Lessons Learned (LL) Portal (NLLP) newsletter, produced by the **Joint Analysis and Lessons Learned Centre (JALLC)**, provides an overview of the NLLP items submitted and staffed within the third period of 2024 (01 September – 31 December), focusing on NLLP items deemed relevant to the two Strategic Commands' (Bi-SC) priorities for JALLC analysis in 2024.¹ This newsletter aims to facilitate the exploitation of the valuable LL information contained within the NLLP by all NATO staff to ensure NATO continues to be a learning organization, and to inform on the status/health of the NATO LL Process, as applied in the NLLP.

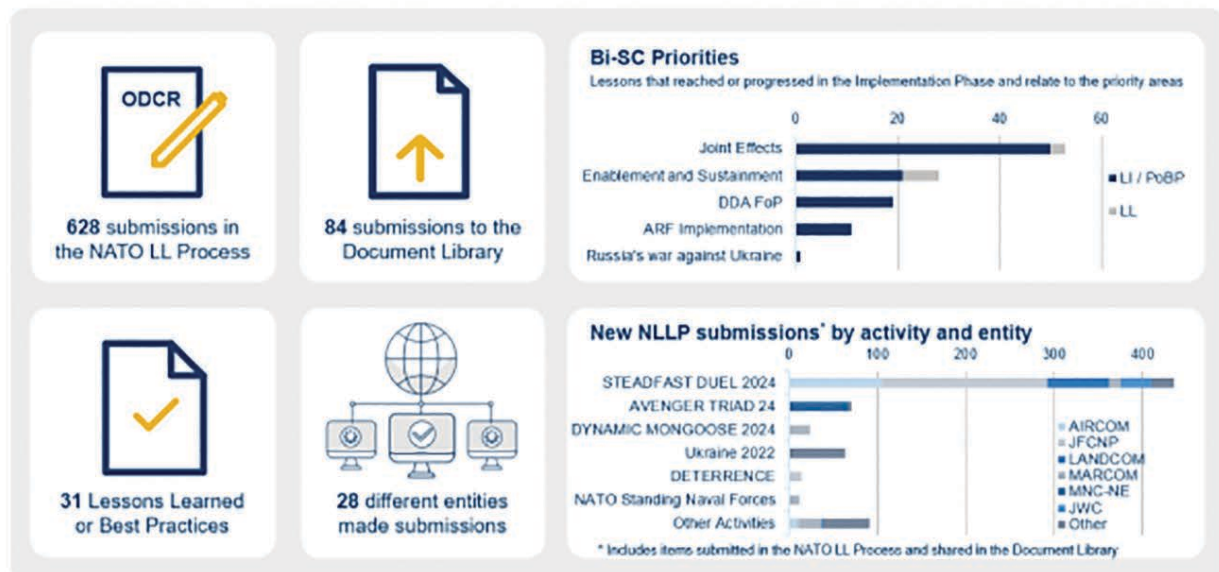
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- NLLP Activity: At a Glance
- [Content Overview](#)
- [Lessons relating to the Bi-SC Priorities in 2024](#)
- [NATO LL Process: Submissions & Staffing](#)
- [References](#)

LATEST HIGHLIGHTS

(NU) The transition to the new DDA FoP has highlighted a number of shortfalls in doctrine and procedures relating to Joint Effects, Enablement and Sustainment, the activation and execution of the DDA FoP, and ARF implementation. It is important that these lessons are learned before the next iteration of exercises to improve HQs' abilities to efficiently train the delivery of certain tasks, in order to enable effects and demonstrate credibility in deterrence activities. Lessons mainly resulted from exercises STEADFAST DUEL (STDU) 2024 (36%), STEADFAST JUPITER (STJU) 2023 (13%), and STEADFAST DETERRENCE (STDC) 2024 (10%). Lessons came from both NATO entities and Allies (GBR, DEU, SWE, and the USA).

NLLP ACTIVITY: AT A GLANCE



¹ The Bi-SC priorities for JALLC analysis, defined in the 2024 JALLC Programme of Work (Reference A), are: Russia's war against Ukraine; LL sharing among the Allies; current and potential future threats shaping Education & Training (E&T) within NATO command; Allied Reaction Force (ARF) implementation; activation and execution of the Deterrence and Defence of the Euro-Atlantic Area (DDA) Family of Plans (FoP); Joint Effects; and Enablement and Sustainment.

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Getting Engaged

The recent roll-out of the NATO Public Cloud (NPCL) throughout Allied Command Transformation (ACT) has inevitably had some start-up issues. However, it immediately offered an opportunity to raise awareness for the JALLC, its activities, and its products on the new internal communications platform: NATO Engage. In this article we look at what NATO Engage is, how it works, and how it is benefiting the JALLC and ACT as a rapid communications platform and a place to connect with staff.

NATO Engage, which looks and feels like other social media platforms, is one of many applications that is now available to ACT staff and is steadily being rolled out to Allied Command Operations (ACO) staff to connect the whole NATO Command Structure.

Jodie Lazell is the JALLC's Editor and has worked for the JALLC for over a decade. She holds two masters degrees (Dutch Corporate law and International Public law) and speaks English, Dutch, and Portuguese. She is also an active equestrian athlete and a keen social media content developer.

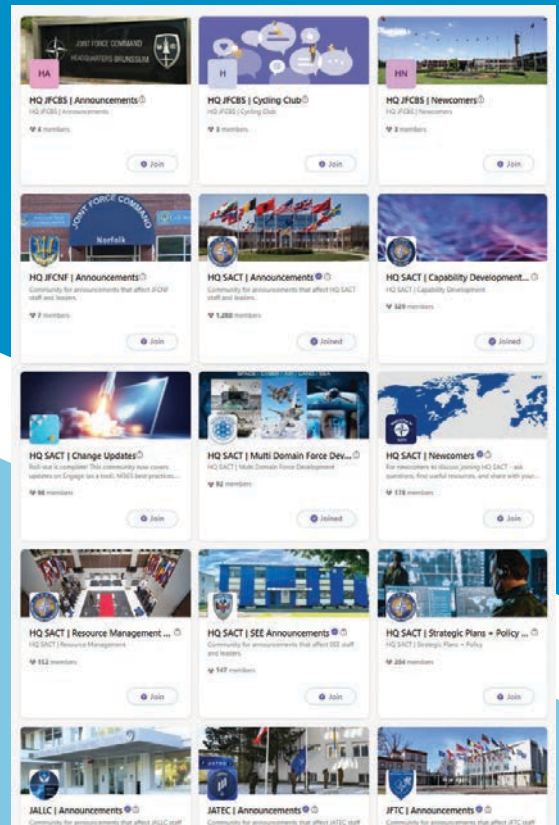
How does it work?

NATO Engage allows individual staff members to *post* on their own feeds about topics of interest to them. For example, Chief of Staff HQ Supreme Allied Commander regularly posts a vlog on what's going on at the HQ, what's coming, expectations, and any other news. The JALLC's Editor posts a weekly *Better Writing Tip* to help colleagues improve their English writing. There are also *Communities of Interest* that allow like-minded staff to get together digitally so they can share information and discuss topics. These communities range from the professional—such as the Lessons Learned and Digital Transformation Community—to the more personal and social, relating to sports and leisure topics.

Whether you love it or hate it (which some people do), it's here to stay, and you should ignore it at your peril. NATO Engage is fast becoming the rapid-response platform for ACT communications. For example, recently, Supreme Allied Commander Transformation himself, *rallied the troops*, with his announcement of NATO's Enhanced Vigilance Activity: Eastern Sentry. His call to action for innovative solutions was (perhaps appropriately) made on this innovative new communications platform for NATO.

This example also shows that NATO Engage is opening up channels across the organization's hierarchy, allowing SACT to speak directly, in one post, to all his staff across two continents and four Nations with the click of a button. The JALLC's own commander, General Cristinel Colibaba, has also harnessed this new communications tool, posting weekly about the NATO LL Process, with success. People are noticing. People are ... engaging.

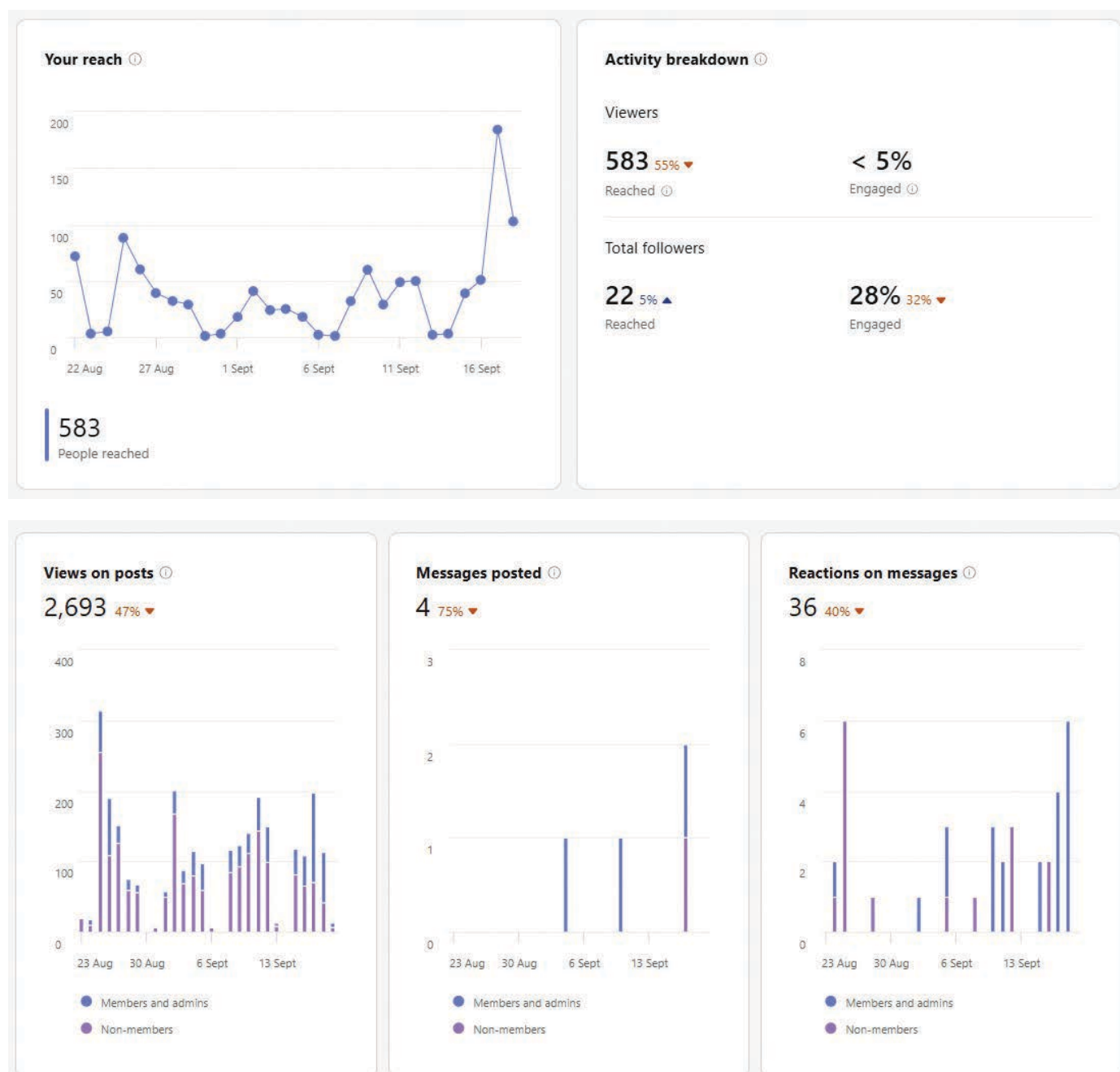
However, this increased visibility and awareness still requires staff to actually engage, perhaps as



A sample of the Communities of Interest currently on NATO Engage.



NATO Engage is allowing leadership to communicate directly with staff at all levels with the click of a mouse.



Much like on open-source social media platforms, NATO Engage provides users with insights into their metrics such as followers, likes, messages posted, etc. This allows users to assess the success and reach of their content and make adjustments to improve.

the name NATO Engage suggests. If you are *ON* NATO Engage then you will notice that some staff members are more engaged than others. Why? Initial investigations suggest a range of reasons from reluctant staff members, ranging from “*I don’t have time*” to “*I don’t have anything to post*” and “*There are too many communications platforms now.*” Nevertheless, NATO Engage perhaps offers a more informal way for staff to share thoughts, insights, and even recipes. It’s up to staff as to how they use it. So far, it seems to be having the desired effect: connecting staff that are countries and even continents apart and allowing for greater sharing of information.

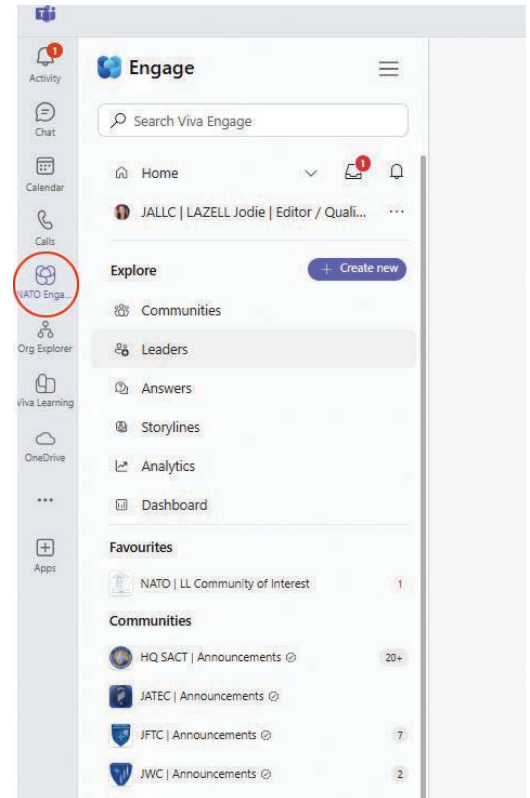
From the JALLC’s—and the Lessons Learned in particular—perspective, it certainly offers a golden opportunity to address a persistent problem: visibility and awareness. Over the last decade, the JALLC has seen a significant decrease in visibility of the JALLC’s activities NATO-wide and low awareness of the NATO LL Capability and how JALLC Analysis can benefit ACT work strands and NATO’s transformation more widely. This perennial problem was recently confirmed in the report published by the JALLC on the historical benefits of JALLC Analysis and Lessons Learned.

So what for LL?

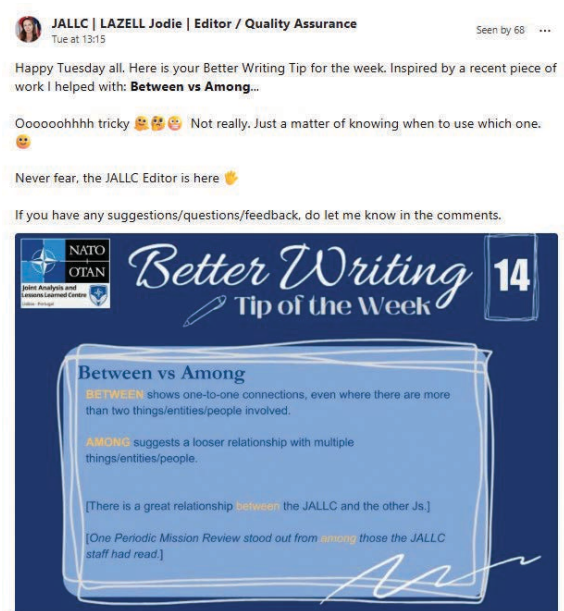
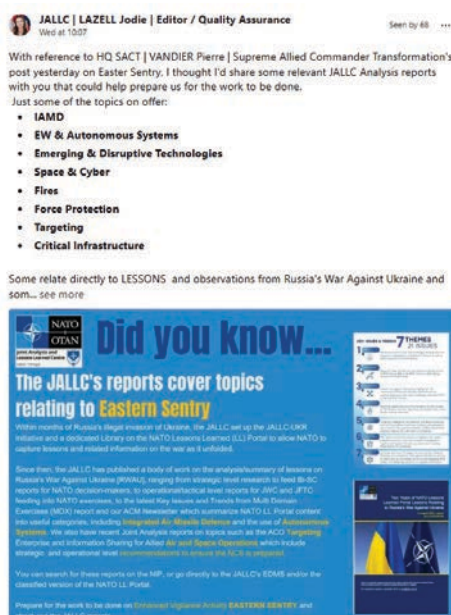
The recommendation has always been to communicate more, and more effectively. As such, NATO Engage has offered a new platform that allows the JALLC and the Lessons Learned message to, essentially, be delivered to the digital doorsteps of ACT (and now also ACO) staff. Since the launch of NATO Engage, the JALLC Communications team—recently bolstered by COM JALLC launching the Lessons Learned Community on NATO Engage—have been (pro)actively pushing the narrative. But is it having an effect? Well, that is perhaps for the next iteration of the report on the benefits of Lessons Learned to determine, based on the available evidence. There may be an opportunity at the upcoming iteration of the NATO LL Conference to survey staff to find out how we're doing and what they'd like to see. To be continued ... as they say.

NATO Engage is here to stay. The JALLC is using the platform as intended: to communicate information of relevance and interest to NATO staff on the application. It is a useful tool in the new suite of NPCL applications that could improve connection among the ACT entities.

If you haven't engaged yet, why don't you join the Lessons Learned Community of Interest on NATO Engage and drop us a message? We promise to get back to you.



A small icon with a big reach. You can find NATO Engage within the Microsoft Teams application as shown here.



A couple of examples of how NATO Engage allows me to communicate on very different levels to very different audiences using the same application: from informing the community about important JALLC reports that are relevant for ongoing work strands with my *Did you know?* series, to the weekly *Better Writing Tips* aimed at non-native and native English writers, who all appreciate a helping hand with those tricky English grammar, punctuation, and style rules.



The *Camiño de Santiago*: A Spiritual and Bonding Journey

By Lieutenant Colonel Sónia
Guerra Vicente

The *Camiño de Santiago* (the Way of Saint James) is more than just a path; it is a life-altering experience, an inner journey that challenges both body and soul. During the past summer, I had the privilege of walking the spiritual variant of this ancient route, arriving at the iconic Santiago de Compostela and continuing onward to the mystical town of Finisterre. In this article, I share my experience in the hope that it might inspire others to embark on this unique pilgrimage.

Preparation and Companions on the Journey

The decision to walk the *Camiño de Santiago* was not made lightly. I prepared both physically and mentally for the challenges I knew I would face. However, nothing could have truly prepared me for the intense emotions and the deep bonds I would form along the way. I was joined by my husband and two girlfriends who, like me, were seeking something deeper than just a long hike. Completing our group was the cheerful and ever-present Caramela, an eight-month-old dog whose energy and loyalty inspired us every step of the way.

This team had already done other *caminos* (*Caminho Português da Costa*, *Caminho Português Central*) so last year we chose the spiritual variant of the *Camiño de Santiago*, a less traditional route, but one rich in significance. This choice was driven by our desire to disconnect

from the modern world and connect with something greater. This variant offered us a more introspective and meditative experience, with untouched nature and breathtaking landscapes that seemed to transport us to a simpler, purer time.

Each day of the pilgrimage brought new challenges, and each challenge was an opportunity for growth. The climbs, the river crossings, and the long stretches under the blazing sun tested our physical limits. Yet, the mutual support and determination to move forward together allowed us to overcome every obstacle.

Reaching the Cathedral of Santiago de Compostela was an indescribable moment. The sense of accomplishment came with a deep feeling of gratitude—gratitude for being there, for having completed this stage of the journey, and for being able to share this moment with my companions.





The Cathedral of Santiago de Compostela

The cathedral, imposing and laden with history, seemed to embrace and acknowledge our effort.

However, for us, reaching the cathedral did not signify the end of our journey. We decided to continue onward to Finisterre, a place that the ancients believed to be the *end of the world*. This final stretch was a natural extension of our spiritual journey; a way to prolong the sense of discovery and reflection that the *Camiño de Santiago* had provided.

Finisterre: The End and the Beginning

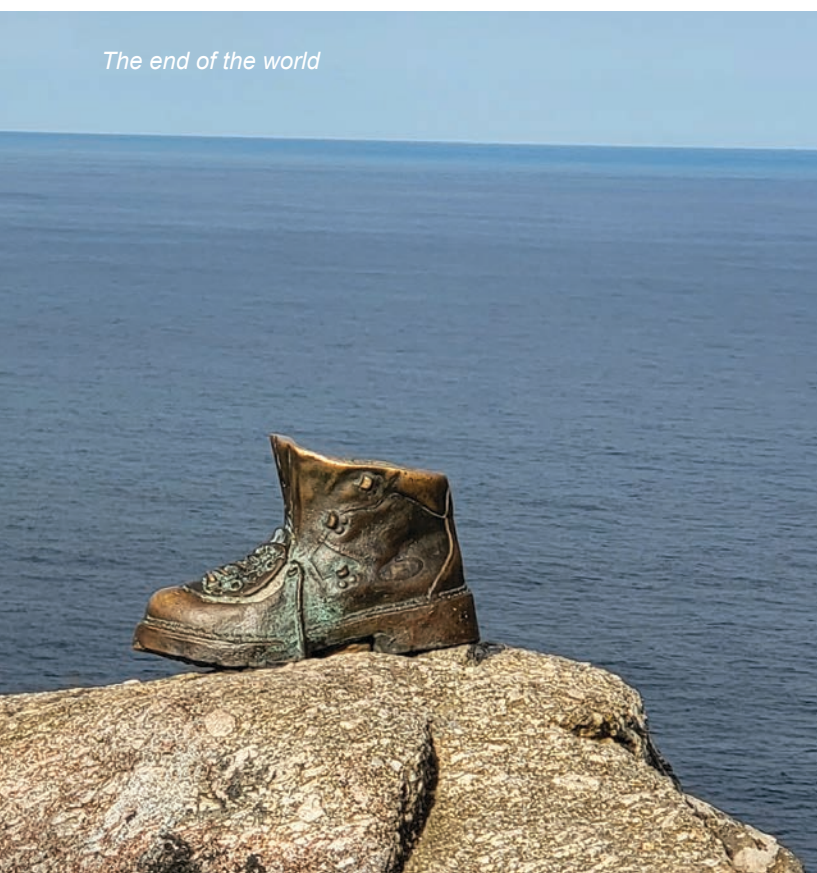
Arriving in Finisterre was like reaching the final period of a sentence, but also the beginning of a new one. There, standing before the infinite ocean, we felt that the journey had truly reached its peak. The sunset in Finisterre, with its vibrant colours and vast sea, evoked a profound sense of peace and completion in all of us.

Caramela's presence, always by our side, was a constant reminder that although the journey is often solitary, it is richer when shared. Her joy and

innocence brought lightness to the hardest moments, and her companionship made each day a little more special.

As one of my adventure companions so beautifully put it, and all of us fully agree, "*The Camiño today allows us to relive and remember familiar scents, discover new flavours, spices, and foods, encounter unique places, and meet fascinating people from various nationalities and from all corners of the world.*" The *Camiño de Santiago*, in its spiritual variant, taught me that the true challenge is not just reaching the destination, but fully living each step of the journey. The bonds I formed with my husband, girlfriends, and with Caramela are precious, and the lessons learned along the way are unforgettable.

I conclude this reflection with the certainty that the *Camiño de Santiago* is, ultimately, a metaphor for life. The road may be long and arduous, but each step, each obstacle overcome, brings us a little closer to ourselves and to what truly matters. In the end, we realize that the destination is not a place, but a shared experience—*Ultreia**!



The end of the world

* The word *Ultreia* is derived from the Latin word *ultra* which means *beyond* or *farther*. In the *Camiño de Santiago* context, *Ultreia* is a rallying cry of sorts for the pilgrims travelling along the Way of Saint James, a network of ancient pilgrimage routes leading to the Cathedral of Santiago de Compostela in Galicia, Spain. The word is often used as a greeting or encouragement among pilgrims. It serves as a reminder of the journey ahead and the ultimate goal of reaching Santiago.

(Source: www.CaminoWays.com)

Caminho Português: Quick facts



The Caminho Português with the Spiritual Route and the leg to Finisterre marked in green.

- Lisbon to Santiago de Compostela (Central Route): 640 km
- Porto to Santiago de Compostela (Coastal Route): 270 km
- Pontevedra to Padrón (Central Route): 40 km
- Pontevedra to Padrón (Spiritual Route): 74 km
- Santiago to Finisterre: 90 km

While most people know of the *Camiño de Santiago*, which runs from the Pyrenees to the famous town in Galicia, a lesser-known but equally important historic route is the Caminho Português. This route runs from Lisbon to Santiago, though many begin their walk in Porto. An alternative to the Central Route (the main route) from Portugal is the Spiritual Route, which diverges at Pontevedra and rejoins at Padrón, following the route over which the body of St James was originally carried to its resting place in Santiago. The spiritual route is a bit longer but passes through quieter, more rural areas and is preferred for this reason by many walkers to the Central Route.



Lieutenant Colonel Sónia Guerra Vicente

Meet Lieutenant Colonel Sónia Guerra Vicente, a true force of nature, literally! With 32 years in the Portuguese Air Force, Sónia has flown through the skies and through her career. A judo practitioner since the age of 4, she is as tough as they come, but she has a warm heart and always has a friendly smile for everyone; this is one of her great characteristics. Sónia is known to be demanding with herself, but she is the first to give a hand when someone is in need. While her background is in meteorology, she has worked as a public affairs and protocol specialist for the past 20 years. Sónia loves outdoor activities, although running is not her thing! The recent completion of her fourth stage of the *Camiño de Santiago* shows her passion for adventure and the outdoors.





The 21st International CSEL Conference in front of Lisbon's famous monument, the tower of Belem.

The Command Senior Enlisted Leader: An Established Concept in Nations— Transformational for NATO

Command Master Sergeant (CSM) André Sterling was appointed the JALLC Command Senior Enlisted Leader (CSEL) in April 2024. That wouldn't be unusual; CSM Sterling has been the senior non-commissioned officer (NCO) at JALLC since January 2020. What's new is the post, which came into formal existence with the release of the latest edition of MC-500, NATO's Peacetime Establishment (PE). As a result, CSM Sterling is the first permanent CSEL at any of Allied Command Transformation's (ACT) subordinate centres. In this article, you can read more about the CSEL post, its history and how the JALLC has embraced its implementation in NATO.

Many NATO Nations have a long history of including senior enlisted personnel in the command team. Senior sergeants and chief petty officers have always been regarded as the technical and tactical experts, equipment specialists, lead trainers of troops, and mentors to junior officers. Most importantly, they have served as the conduit between senior officers and the troops.

This role is perhaps most evident in how the U.S. Navy handles senior enlisted personnel, where the rank of chief petty officer was created in 1893. Sailors attaining this rank, though not commissioned, are treated much like officers, having their own mess deck—the so-called *goat locker*—and wearing uniforms akin to those of officers. The phrase *the Khakis* is used to refer to the Navy's leaders, referencing the uniform colour of officers

and chiefs as distinct from the blue dungarees of enlisted sailors. In 1967, the Navy took the concept a step further with the creation of the rank and post of Master Chief Petty Officer of the Navy, who serves as the primary advisor to the Chief of Naval Operations on matters affecting enlisted personnel. To this day, the U.S. Navy relies on the command triad of Commanding Officer (CO), Executive Officer (XO), and Command Master Chief to lead units and staffs.

This evolution took place much more recently in NATO. It wasn't until 2010 that the role of CSEL was formally introduced into the NATO Command Structure (NCS), with the release of the two *Strategic Commands' Strategy and Recommended Non-Commissioned Officer Guidelines*, which saw as an imperative: “*Institutionalize the role and*

function of Command Senior Enlisted Leaders to optimize the use of enlisted personnel within the NATO Military structure.”

CSM Sterling was on his first tour at JALLC at this time and immediately went about implementing the principles of the Bi-Strategic Command (Bi-SC) Guidelines. In this he had the complete support of then JALLC Commander Brigadier General Peter Sonneby, Danish Air Force. CSM Sterling left JALLC in 2013 and when he returned in 2020, he found that there hadn't been much advancement since his departure seven years earlier. Since the 2010 guidelines had been a first attempt that had relied on voluntary implementation, progress across the NCS had very much been individual-command dependent.

But in 2023, new guidance from the two Strategic Commands was promulgated titled: *Command Directive 040-002—Non-Commissioned Officer and Junior Officer Bi-Strategic Command Employment and Development Strategy*. This directive, notably no longer merely guidelines, instructs NCS commands to establish a CSEL position, using as necessary twinned-positions or voluntary national contributions to fill the role prior to incorporation into the formal PE. It also directs commands to *promote and empower* a 'Command Group' or 'Command Team' concept, comprising the Commander, chief of staff, and CSEL, analogous to the aforementioned command triad seen in the U.S. Navy.

CSM Sterling went to work, with support from recently departed JALLC Commander Commodore Artilheiro, submitting the necessary billet justification paperwork through HQ Supreme Allied Commander Transformation (SACT), with the gratifying result that his position of Chief Registry was formally twinned with the new post of JALLC CSEL in April 2024 in the newest NCS Peacetime Establishment.

As CSEL, he has two primary functions. The first is to lead and mentor JALLC's NCOs, and the second is to advise the JALLC Commander, particularly with respect to enlisted matters. In the latter function, progress has been made. Sterling is included in certain aspects representing JALLC and feels welcome to approach the rest of the command team with ideas and suggestions. But he sees possibilities for a more active role for the Command Senior Enlisted Advisor as a permanent member of the command group meetings, briefing during high level visits, or accompanying the Commander.

“As NATO transforms, so do its member nations, and vice versa. The extent to which this will influence the transformation of the Non-Commissioned Officer (NCO) Corps is the subject of this document which reviews the future of NATO's NCOs, defines critical capability gaps based on listed assumptions and implications, and delivers recommendations. The Alliance has never before closely examined the utilization of the NCO Corps. More effective use of the NCO Corps is essential to reach the full potential of NATO in the multi-national environment.”

—Bi-SC Strategy and Recommended Non-Commissioned Officer Guidelines.

“Critical thinking is embedded in the DNA of NCOs!”

Duties of the CSEL

88

- Reports to the Commander on matters that relate to all enlisted personnel/staff at other ranks
- When appropriate, represents or accompanies the Commander/Chief of Staff to official functions, inspections, conferences, and community and civic functions
- Advises the Commander on the formulation and implementation of changes in policy pertaining to enlisted personnel/staff at other ranks
- Represents the JALLC within ACT and ACO at internal and external functions as required by the Commander
- Liaises with the other CSELs and senior NCOs as required, assisting with issues and initiatives relating to enlisted personnel/staff at other ranks
- Takes the lead and oversees the professional development of the Other Ranks by promoting training, broadening opportunities, teamwork and mentorship.

The first function is where CSM Sterling has really felt rewarded. Mentoring JALLC's NCOs has given true meaning to the role of CSEL. He takes it upon himself to see that they get professional development—for example attending NATO or national leadership courses—are recognized for their work, and that they return to their sending countries with a robust record of accomplishment.

The other aspect of being CSEL that he finds rewarding is being part of the NATO CSEL network (see text box), which has given him a voice across NATO and access to advice and mentorship from other senior NCOs. He especially appreciates that it is very informal, with no red tape. If you need something, you can reach out and someone will get you an answer. As CSEL, *"You have to get connected and stay connected,"* he says.

CSM Sterling sees the advances in incorporating the CSEL role into the NCS as an opportunity for NATO to set the example that Nations can then adapt. This is at the very heart of transformation.



One of the duties of the CSEL is to advise the Commander.

The NATO CSEL Network

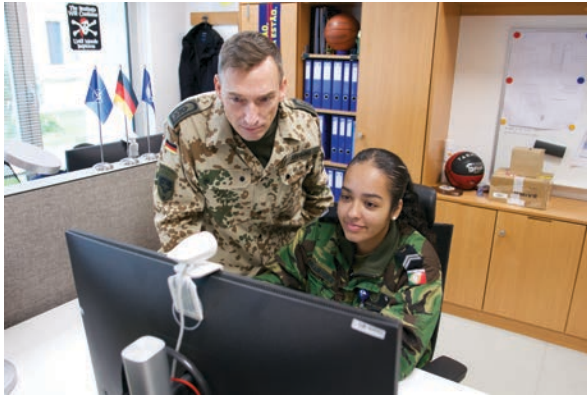
The NATO Command Structure CSEL network is led by the Supreme Headquarters Allied Powers Europe (SHAPE) CSEL SHAPE CSM Zoltán Kaszab, Hungarian Defence Forces, the HQ SACT CSEL, currently CSM Remigijus Katinas, Lithuanian Army, and CSEL EUCOM TJ Holland, US Army. Through it, CSEs and senior NCOs from NCS, NATO Force Structure, and national commands meet, interact, and share ideas and best practices.

The CSEL network meets multiple times per year, for example at the International CSEL Conference (ICC)—with the host rotating between SHAPE, HQ SACT, and U.S.–European Command (EUCOM)—or at the International Week, hosted by the CEAC of the Hungarian Defence Forces, CSM Tamas Zsiros. The 21st CSEL Conference was hosted by SHAPE and held from 26 to 29 May 2025 in Lisbon. The conference brought together senior non-commissioned leaders from more than 35 NATO Allies and Partners, including key attendees from Japan, Kosovo, Jordan, Ireland, Australia, and New Zealand.

The SHAPE CSEL maintains a web page called CSEL Corner that provides useful information for NCOs in NATO. It can be found here: <https://shape.nato.int/command-senior>



Celebrating National Sergeant's Day in 2024 with the JALLC. An event that celebrated everything our Sergeants do for us at the JALLC with the JALLC's staff and the former Commander, CDRE António Neves Correia (in centre with CSM Sterling on his right).



CSM Sterling says that mentoring is the most rewarding part of being the CSEL. He is seen here with the JALLC's Registry Assistant, Corporal Maria Aguiar.



Meet CSM Sterling

CSM (*Stabsfeldwebel*) André Sterling, German Army, is the JALLC's CSEL and Chief of the Registry responsible for the JALLC's administrative and secretarial support. He reported to JALLC in January 2020 for his second tour here. He served as Registry Chief on a previous tour from 2009 to 2013.

CSM Sterling entered the German Armed Forces in January 1995. After serving at Electronic Warfare Regiment 940 and finishing his education at the Military College for Staff in international Headquarters in Cologne, Germany, he was posted to his first international assignment in July 1997. From 1997 to 2009, CSM Sterling served in numerous positions at the HQ Multinational Division Central and the HQ Allied Rapid Reaction Corps in Rheindahlen, Germany. This was followed by his first tour at JALLC. He then served at the Bundeswehr Office for Defence Planning and the Bundeswehr Editorial Office in Berlin.

CSM Sterling has successfully completed various national Leadership Courses and the NATO Command Senior Enlisted Leadership Course at the NATO School in Oberammergau in September 2012.

He was awarded with the Bundeswehr Activity Badge for infantry services and leadership services in Gold, the German Armed Forces Achievement Ribbon in Gold with number 15, German Armed Forces Badge of Marksmanship in Gold, and the German Armed Forces Cross of Honour in Silver and in Gold.



Two wonderful children, Amélie and Fabiana, were born of his first marriage. CSM Sterling is married to Dr Tanja Sterling.



NLLP Updates

The last two years were a busy period for the JALLC's NATO Lessons Learned Portal (NLLP) team. While the team not only supported the JALLC-organized Lessons Learned (LL) capability training, they were also busy expanding the use of the NLLP, providing access to an ever-growing community of LL practitioners.

The efforts to train the NATO community in the NATO LL Process and the use of the NLLP have continued during this period. Several iterations of the LL Staff Officers Course (LLSOC) were offered, all of which included increased incorporation of the more extensive NLLP training. The JALLC also presented the LLSOC and LL Management Course (LLMC) students with updates on the process to replace the current NLLP with the new NATO LL Toolset, which is expected to be delivered in 2027.

The 2024 edition of the Local NATO LL Portal Managers Course (LNMC) was held from 12 to 14 November at the NATO Communications and Information Academy (NCI Academy) facilities in Oeiras, Portugal. The aim of this course was to provide NATO personnel assigned as local NLLP managers with the required knowledge and technical skills to effectively and efficiently use the NLLP to support the NATO LL Process in their organizations across the Alliance, ultimately improving NATO's overall LL capability. Feedback from the course was very positive.

The JALLC, through the JALLC-UKR Initiative (see page 72 for more information) and with the support from the NLLP team, continued to collect and share the lessons from Russia's war against Ukraine.

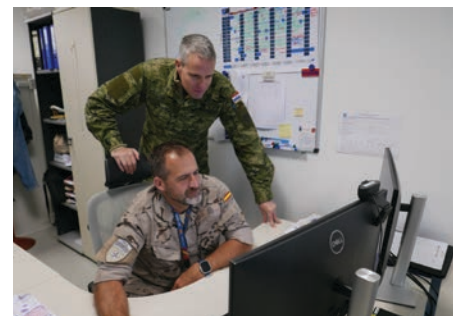
Also, as part of the JALLC's core tasks, the NLLP team continued to administer the NLLP: opening new accounts, assigning different permissions and roles to the users, approving submitted documents, creating requested and approved communities of interest, and generally helping users not only from NATO but also from nations with the goal of making the NLLP *more accessible and easy* to use. Finally, the NLLP team prepared for the upcoming deployment of the NLLP 2.0, the version which will implement the improvements suggested by the NATO LL Community in previous years. This means that, for the first time since its introduction in 2018, the NLLP will be upgraded.



Diving into the NLLP at the Local NLLP Managers Course.



Ms Ines Fonseca, JALLC LL Management Analyst, presents techniques for data visualization at the NLLP Local Managers Course.



Managing the NLLP is challenging but rewarding work. The JALLC's dedicated team work with managers and users across NATO every day.



JALLC Training and Outreach Engagements Updates

NATO's Joint Analysis and Lessons Learned Centre (JALLC) has significantly ramped up its training efforts in 2025, deploying mobile training teams across the globe to strengthen the Lessons Learned (LL) capabilities of military and civilian personnel in various regions. These initiatives highlight NATO's ongoing commitment to fostering a culture of continuous learning, cooperation, and operational effectiveness, which is critical in today's complex security landscape.

Between January and September 2025, the JATT trained over 415 students across 18 training engagements, with six more training sessions still scheduled for the remainder of the year. Additionally, the JATT participated in five outreach events throughout the year, promoting the NATO Lessons Learned Capability as a powerful tool for innovation.

Building capacity for Ukraine

The JALLC remains focused on supporting ongoing operations: the top priority was ensuring that those organizations supporting Ukraine received top-notch training to help them assimilate the lessons coming from the conflict there. To this end, the JATT deployed to support the newly created NATO Security and Assistance Training

for Ukraine (NSATU) and Joint Analysis, Training, and Education Centre (JATEC). Both of those organizations are focused on providing training and support to Ukrainian forces. As such, the JATT's deployment to both NSATU and the JATEC directly enhanced their ability to interoperate with NATO standards, disseminating critical lessons more rapidly between these key partners.

Honing multinational exercises

One of the best ways that NATO trains is through exercises. During Crisis Management Exercise 2025 (CMX25), NATO rehearses and tests the Alliance's ability to consult and make decisions at the strategic political-military level with civilian and military staffs. As part of the preparation for CMX25, the JATT deployed to train members of

NATO Headquarters, the IMS Staff, and EU and partner nation representatives who participated in the exercise. Showcasing its ability to tailor training to meet the need of its partners, the JATT focused on key aspects of the LL process as applicable to international members, enhancing the ability for NATO and the EU to mutually support each other during extreme events.

Reaching out to partners

Historically, the JATT has found that the best way to keep peace is through forging strong partnerships. In 2025, the JATT continued the tradition of building links with other nations by providing training on the NATO LL process to the General Staffs of Georgia, the Ministry of Defense of Tunisia, and through the NATO-Istanbul Cooperation Initiative Regional Centre (NIRC) in Kuwait. Additionally, the JATT provided specialized training to the national organizations of NATO members Finland and the Netherlands. By providing this training to personnel not actively filling a billet within a NATO organization, those personnel and organizations improved their interoperability with NATO in case of a crisis.



The JATT partners at the Georgian Simulations, Communications, and Information Systems Centre.



The JATT instructors prepare the Georgian Lessons Learned staff on the next lesson.

Multinational collaboration and learning in Sweden

SWEDINT (Swedish Armed Forces International Centre) has been a longtime partner with JALLC, and the tradition continued in 2025. SWEDINT hosted three iterations of the NATO Lessons Learned Staff Officer's Course (NLLSOC) in March, May, and September, with 109 students travelling from 22 different countries to participate in NATO's premier LL training. For 2025, NLLSOC unveiled a new training scenario where students practised the LL process on the sinking of Sweden's flagship Vasa in 1628. From refining an observation of a problem to analysing the situation and providing recommendations, students were able to extract valuable insights from a 400-year-old warship and apply the process to saving lives in today's conflicts.

Raising the level of Lessons Learned Staff Officers in Germany

Benefitting from the JALLC's long-standing partnership with NATO School Oberammergau (NSO), this year's Lessons Learned Management Course



A multinational group of students come together to identify the data necessary to develop a solid recommendation.



During LLSOC, students conduct an analysis of a real-life problem applicable to today's challenges.

will take place in beautiful Oberammergau from 26 to 31 October. The LLMC is an intensive course focused on honing the skills of experienced Lessons Learned Staff Officers with special emphasis on practical syndicate work. The mixture of personnel from headquarters and organizations of all different sizes and operational area focuses allows for a unique opportunity for students to share their talents with one another, raising the overall level of LL capability throughout NATO.

Training beyond the headlines

While these highlighted events showcase NATO's ongoing commitment to capacity building, the JATT's training efforts extend far beyond these. The JATT engaged with operational and tactical command organizations and with Centres of Excellence, as well as providing support to numerous conferences and visits. The team continually engages with numerous NATO and partner nations, offering bespoke training sessions that are often unpublicized but are critical for enhancing operational effectiveness. These sessions cover a wide array of strategic and tactical areas, ensuring NATO remains adaptable and prepared to face evolving security threats.

Through its extensive training programs, the JALLC reinforces NATO's ability to capture lessons from past operations, ensuring continuous improvement and readiness. This dedication to learning and adaptation helps NATO maintain its edge in an increasingly complex global security environment.



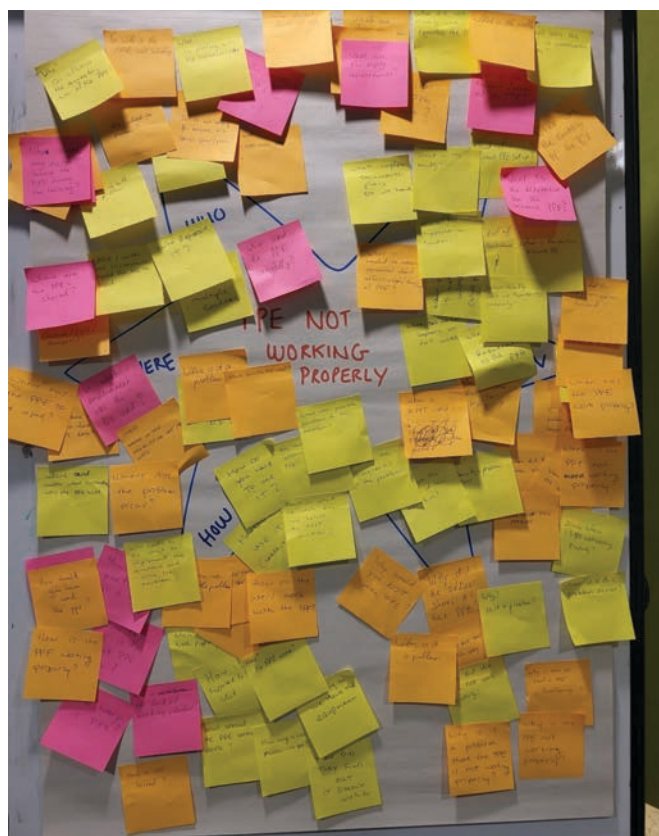
Students gain an understanding of the NATO LL Capability and Process in Romania.

As NATO continues to face new challenges, the role of the JALLC in promoting a culture of learning and resilience is more critical than ever. These training programs not only strengthen NATO's existing partnerships but also help build a cohesive, well-prepared network of military forces ready to respond to global security threats. The success of these initiatives underscores NATO's long-term commitment to fostering peace, stability, and cooperation across the globe. As the JATT enters 2026, the team looks ahead to continuing the hard work of engagement and spreading awareness.

If you are interested in partnering with the JATT to receive training and bolster your organization's Lessons Learned capability, contact us at jallc.jattpoc@nato.int or visit our page at: <https://www.jallc.nato.int/activities/training>



The JATT performs tailored training to familiarize the Netherlands' national staff with the NATO LL process.



The results of brainstorming potential causes of a problem.

Celebrating 75 Years of Portugal in NATO

The North Atlantic Treaty was signed in Washington, DC, by 12 countries from Europe and North America: Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom, and the United States. The Treaty created the North Atlantic Alliance, whose purpose was to secure peace in Europe following the devastation of the Second World War, to promote cooperation among its members and to guard their freedom—particularly from the threat posed by the Soviet Union throughout the Cold War.

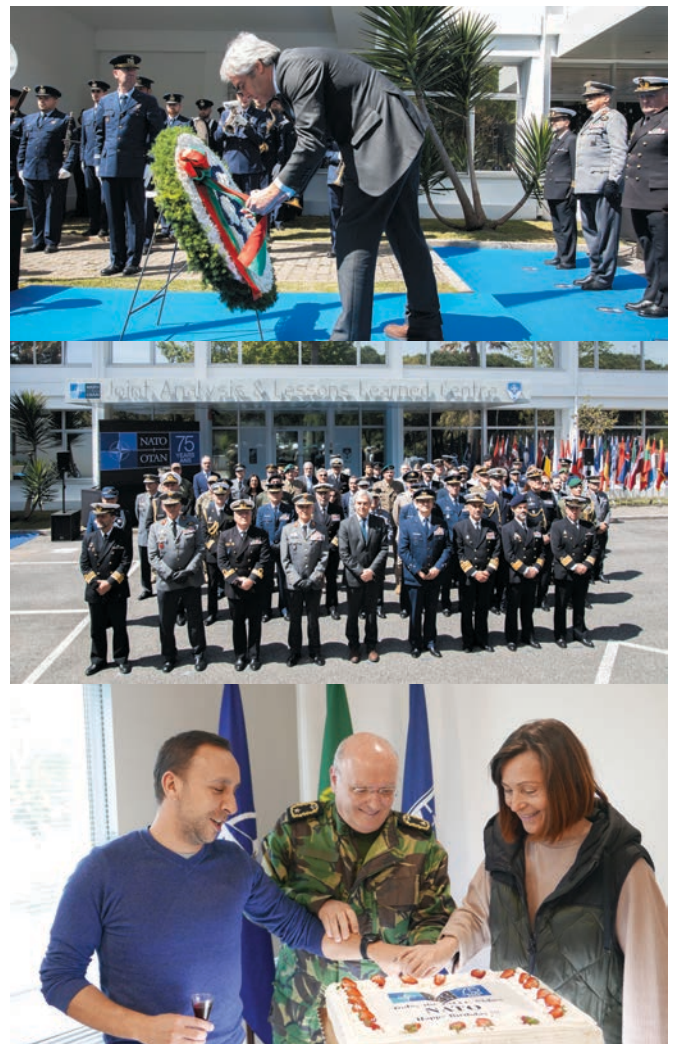
In 2024, across NATO, an important event was celebrated: the signing 75 years ago of the North Atlantic Treaty, which marked the creation of NATO and signalled the commitment of its members—then numbering just 12 nations—to the collective defence of their territorial integrity and the individual freedom of their people.

Portugal was a founding NATO member and is home to several important NATO bodies and Allied installations. The foremost celebration of this important milestone in the history of our organization took place at the JALLC, the only NATO Command Structure body in Portugal, on 10 April 2024.

A formal ceremony was held, presided over by a most distinguished guest of honour, his excellency Nuno Melo, the Minister for National Defence of the Portuguese Republic. Other high-ranking attendees included the Chief of Staff of the Portuguese Defence Force, GEN José Nunes da Fonseca, the Chief of Staff of the Portuguese Air Force, GEN Cartaxo Alves, as well as the vice chiefs of staff of the Portuguese Army and Navy and numerous defence attachés accredited to Portugal from Allied Nations.

The ceremony was the first engagement with NATO for the newly appointed Defence Minister, and Minister Melo took the opportunity in his speech to reaffirm Portugal's commitment to the Alliance, noting that we are only at peace as long as NATO is strong.

GEN Fonseca also addressed the audience, highlighting Portugal's history in NATO, the missions and operations to which it has contributed over the years, and the fact that at that very moment, Portuguese aircraft were patrolling NATO's eastern flank in the air-policing mission.



Top: Mr Nuno Melo, Minister of Defence of Portugal, lays a wreath during a ceremony celebrating the 75th Anniversary of NATO held at the JALLC.

Middle: Attendees assembled in front of the JALLC following the ceremony.

Bottom: On 04 April 2024, JALLC commemorated the 75th anniversary of NATO with an informal birthday party. JALLC's two long-serving staff members, Mr David Peixoto (left) and Ms Tina Kosswig (right), helped the Commander cut the cake.



The then JALLC Commander, CDRE Fernando Artilheiro, from the Portuguese Navy, reminded the audience that NATO's mission has always been, and still is, to ensure the collective defence of its Allies, emphasizing deterrence and defence, crisis prevention and management, and cooperative security through a 360-degree approach. The speeches were followed by a solemn wreath laying and a moment of silence recognizing all those who have made the ultimate sacrifice in serving the Alliance's ideals.

GEN Fonseca highlighted this aspect of Portugal's relationship to NATO in his speech: *"NATO has played a transformative and driving role for the Portuguese military instrument. It contributed to shape organizational culture, to modernize resources, to generate knowledge, to value the personnel, and to create infrastructures. It helped place Portuguese military capabilities at high levels of cooperation and exchanging experiences among Allies."*

The presence of such high-ranking, host-nation representatives highlights the importance that Portugal places on its membership in, and contributions to, NATO. As Minister Melo said, *"Portugal was yesterday, is today and will continue to be tomorrow, a capable, reliable and competent ally, contributing to a collective and effective response to the demands of the current strategic environment, in this credible and deeply respected Alliance."*

The choice to hold this ceremony at the JALLC illustrates both the JALLC's important role in ensuring the Alliance uses the past to make sure we are ready for the future, remaining equal to the demands of the ever-evolving strategic environment, as well as the value our host nation places on the JALLC's presence in this beautiful country. From the JALLC's perspective, the tremendous host-nation support from which the JALLC has benefited over the past 22 years is a shining example of Portugal's commitment to NATO.

While this special anniversary celebration may have taken place on just a single day, for 75 years NATO and Portugal have benefited mutually from membership of this Alliance that is now 32 nations strong.



JALLC in the News

Enjoy these highlights from 2024 and 2025. For more stories about the JALLC, visit our *website newsroom*.

The JALLC hosts NATO's Military Committee visit to Allied Command Transformation

In February 2024, NATO's Military Committee (MC), the Alliance's senior military authority, visited Allied Command Transformation (ACT) at the JALLC. Supreme Allied Commander Transformation (SACT), GEN Philippe Lavigne, French Air and Space Forces, along with many of the command's flag and general officers, met in Lisbon to greet the members of the Military Committee, with the JALLC, as one of the ACT subordinate centres, serving as host. The visit was a strategic engagement aimed at providing the Military Committee with first-hand insights into ACT's current work regarding the NATO Warfighting Capstone Concept and other transformational topics such as defence planning, joint force development, and lessons being learned from Russia's war against Ukraine.



National military representatives on the MC listen astutely to the SACT's opening remarks.



LTG Andrew Rohling, U.S. Army, Deputy Chair of the Military Committee, during a press briefing after the event.

The then Commander of the JALLC, CDRE Fernando Artilheiro, had the opportunity to present insights into how NATO is currently learning lessons and what can be done to improve the efficiency and effectiveness of the NATO Lessons Learned Capability. He also explained what the JALLC is already doing to address some of the challenges and where the Military Committee can provide their support in ensuring that lessons in NATO are not just identified, but actually learned and implemented.

The two days of presentations and discussions at the Military Committee's meeting in Portugal confirmed NATO's commitment to staying ahead of evolving security challenges by continuously improving and adapting its military capabilities. Insights gained from these discussions will help shape NATO's future military strategies and plans, ensuring the Alliance remains agile and effective in addressing emerging threats.

You can read HQ SACT's article on the Military Committee meeting [here](#), which looks at the topics discussed in more depth.

Operations Planning Committee visits the JALLC

On 17 September 2024, the [Operations Policy Committee](#) (OPC) took the opportunity to visit the JALLC to find out more about our [activities](#) and [products](#), in the context of the OPC's engagement at Exercise REPMUS (Robotic Experimentation and Prototyping augmented by Maritime Unmanned Systems), a Portuguese-led exercise that focuses on maritime uncrewed system experimentation, capability development, and interoperability.

The OPC is charged with the development and implementation of NATO's operations-related policy. It aims to provide coherent and timely advice to the North Atlantic Council, to which it reports directly. It also seeks to enhance collaboration between the political and military sides of NATO Headquarters. All member countries are represented on this committee.

In particular, the OPC was interested to find out more about the JALLC's activities to enable NATO to learn from Russia's war against Ukraine. The OPC was briefed on our various analysis and Lessons Learned (LL) summary reports for NATO that are being used to inform NATO doctrine and exercises. They also heard about our multiple engagements supporting our Ukrainian counterparts in understanding NATO's approach to Lessons Learned and supporting the development of their national lessons-learned capability.

The OPC discovered more about the [JALLC-Ukraine Initiative](#) which is currently serving the LL and wider NATO community in the context of learning lessons from Russia's war against Ukraine, but will also be able to provide support and contribute to the new NATO-Ukraine Joint Analysis, Training and Education Centre, approved at the Washington Summit early in 2024.

After a further short briefing on the wider scope of the JALLC's activities, members of the OPC engaged with JALLC senior staff in a question-and-answer session, providing further opportunity for the OPC to understand what the JALLC does.

The JALLC would like to thank the OPC for taking the time to find out about the JALLC and NATO's Lessons Learned Capability and we look forward to engaging with the committee in the future.



The JALLC Commander, CDRE António Neves Correia, greets members of the OPC on their arrival at JALLC.



The JALLC Commander delivers a briefing on the JALLC's Lessons Learned activities to the OPC.

First visit to the JALLC by Vice Admiral Simon Asquith CB OBE, Chief of Staff to Supreme Allied Commander Transformation

In March 2025, Vice Admiral Simon Asquith CB OBE, Chief of Staff to HQ Supreme Allied Command Transformation (COS HQ SACT), made his first official visit to the JALLC in Lisbon, Portugal.

The visit began with an office call with the JALLC's Commander, CDRE António Neves Correia and Chief of Staff COL Nuno Lopes, followed by a tailored briefing on the Centre's activities, internal structure, and key processes.

The briefing provided Vice Admiral Asquith with insights into the JALLC's role within NATO, highlighting ongoing projects, the Programme of Work, and the JALLC-Ukraine Initiative's contributions to the Alliance.

Recognizing the importance of institutional learning and continuous improvement, COS HQ SACT engaged in discussions on how NATO can further benefit from the JALLC's analysis and expertise. In particular, Vice Admiral Asquith had expressed an interest in better understanding some of the challenges faced by the JALLC in executing its mission, such as ensuring Alliance-wide leadership engagement in Lessons Learned and improving NATO staff's Lessons Learned mindset in general. COS HQ SACT acknowledged these challenges and affirmed his support to the JALLC's efforts to improve NATO's LL Capability.

Vice Admiral Asquith then proceeded to the JALLC Auditorium, where he addressed all JALLC personnel. In his remarks, he expressed his appreciation for the Centre's crucial work in support of NATO and acknowledged the dedication and professionalism of its staff. He underscored the value of the JALLC's contributions to strengthening the Alliance and enhancing its operational effectiveness.

To conclude his visit, Vice Admiral Asquith signed the JALLC's *Book of Honor*, marking the occasion and reaffirming his support for the Centre's mission.

His visit reinforced the significance of the JALLC's role in NATO's Lessons Learned Process and demonstrated HQ SACT's commitment to fostering a culture of continuous learning and improvement within the Alliance.

JALLC publishes report on Information Sharing for Allied Air and Space Operations

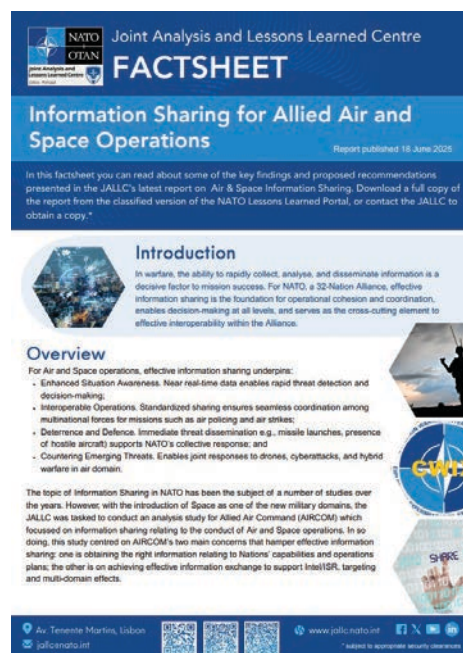
On 18 June 2025, the JALLC released its report on Information Sharing for Allied Air and Space Operations. The project, which was carried out for Allied Air Command (AIRCOM), was centred on AIRCOM's two main concerns that hamper effective information sharing: one is obtaining the right information relating to Nations' capabilities and operations plans; the other is on achieving effective information exchange to support Intel/ISR, targeting and multi-domain effects.

Key findings include issues regarding challenges to effective information sharing such as National caveats and a lack of standardization. JALLC Analysis Reports contain recommendations to remedy issues identified during the study and so contribute to the continuous improvement, Adaptation, Innovation, and Transformation of the Alliance.

You can download a copy of the accompanying factsheet [here](#), and the report can be downloaded from the classified version of the NATO Lessons Learned Portal with the appropriate security clearances and logins.



VADM Asquith with JALLC Senior Leadership during his visit to the JALLC.



HQ SACT's Deputy Chief of Staff of the Multi-Domain Force Development directorate pays a first visit to the JALLC

On 23 September 2025, the Joint Analysis and Lessons Learned Centre (JALLC) welcomed HQ SACT's Deputy Chief of Staff (DCOS) of the Multi-Domain Force Development (MDFD) directorate, MGEN Juan Jose Soto Rodriguez (Spanish Army), for his first official visit to the Centre.

During the visit, DCOS MDFD, who only recently took up the post, engaged with JALLC leadership and staff, gaining a deeper understanding of the Centre's contribution to NATO's Lessons Learned capability, as well as its broader role in supporting the Alliance's continuous adaptation. The discussions focused on the essential link between analysis, force development, and transformation, highlighting how the JALLC's outputs inform decision-making and capability development across NATO.

The DCOS MDFD praised the professionalism and expertise of the JALLC team and underlined the importance of Lessons Learned as a driver of NATO's effectiveness and readiness. He stressed that, in a rapidly evolving security environment, the ability to learn, adapt, and institutionalize lessons is a decisive advantage for the Alliance.



A commitment to strengthened cooperation and shared objectives.



The JALLC's Leadership engaging in dialogue and reinforcing mutual support with DCOS MDFD and MDFD staff officers.



A collective demonstration of unity and cooperation.



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