



THE MAGAZINE OF THE JOINT WARFARE CENTRE

THE THREE SWORDS

STAVANGER – NORWAY

TECHNOLOGICAL FRONTIERS

On the Precipice of the Seventh Military Revolution



JOINT WARFARE CENTRE

2030

TRANSFORMATION PROGRAMME

SHAPING THE FUTURE OF THE JWC AND NATO'S WARFARE ADVANTAGE

STRATEGIC FORESIGHT ANALYSIS

Adapting NATO to the Battlefield of the Future



MAJOR GENERAL RUPRECHT VON BUTLER ASSUMES JWC COMMAND
BATTLE OF NARRATIVES IN THE ARCTIC / NATO LESSONS LEARNED
STRENGTHENING NATO'S COMMAND AND CONTROL

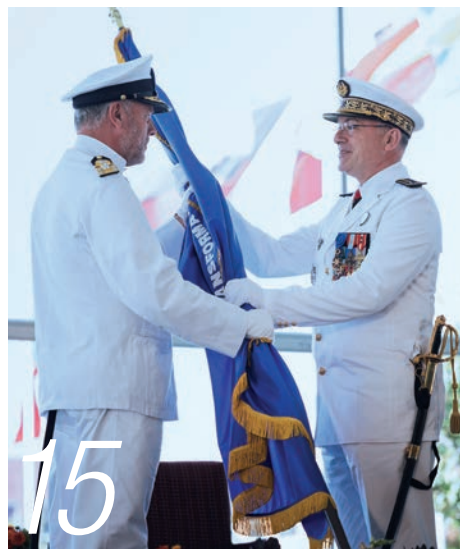


ON THE COVER

The Future Issue, front cover designed by Isabel Birchard, HQ SACT Visual Information Specialist: NATO 2030 is the Alliance's agenda for meeting the challenges of tomorrow. The 2030 Transformation Programme is the Joint Warfare Centre's local endeavour to match that ambition. In this edition of The Three Swords, we discuss not only 2030, but also the future of science and technology in the Alliance as well as Headquarters Supreme Allied Commander Transformation's (HQ SACT) Strategic Foresight Analysis. That is why this edition of The Three Swords is entitled The Future Issue.

ACKNOWLEDGEMENTS

Jay Paxton, Chief Public Affairs Officer, Allied Command Transformation; Samantha Lester and Paolo Giordano, HQ SACT Communications Branch; Lt Col Sonia G. Vicente and Jodie Lazell, Joint Analysis and Lessons Learned (JALLC) Public Affairs Office





CONTENTS

December 2024
Issue No. 40

"By preparing exercise participants for multi-domain operations at the strategic and operational levels, the Joint Warfare Centre is instrumental to NATO's ability to fight and win, while exercising key elements of NATO's deterrence strategy." (pp. 64-67)

Major General Ruprecht von Butler,
Commander Joint Warfare Centre



80



100



102

- 5 Foreword by Major General Ruprecht von Butler, Commander JWC
- 6 The JWC Welcomes its New Commander
- 12 NATO Bids Farewell to Jens Stoltenberg, Welcomes Mark Rutte
- 15 NATO Welcomes Admiral Pierre Vandier, Supreme Allied Commander Transformation

EXCLUSIVE

- 18 **NATO's Strategic Foresight Analysis**
By Dr Gergely Németh, Former Head of Strategic Foresight, HQ SACT
- 25 **Transforming NATO's Deterrence and Defence: Technological Frontiers**
By Dr Bryan Wells, NATO Chief Scientist

INNOVATION

- 33 **Interview** Learn All About NATO's First Machine-Learning Tool: AI FELIX

JWC 2030 SPECIAL REPORT

- 38 **JWC 2030 Transformation Programme**
By Colonel Kevin Rafferty, Deputy Chief of Staff (for) Exercises, Training and Innovation, JWC
- 49 **Lessons for NATO 2030**
By Andrew Eden, JWC
- 53 **The JOPG Leaders Workshop: Problem-Based Coaching**
By Major Joshua Marano and Lieutenant Colonel Jens Janis, JWC
- 59 **Exercise Report: STEADFAST DETERRENCE 2024 STEADFAST DUEL 2024**

FEATURE/OPINION/GUEST AUTHORS

- 68 **Exclusive: The Case for C2 Capability Lifecycle Governance**
By Major Ralph Dekker, NATO Command and Control Centre of Excellence

- 74 **How to Prepare and Deploy an OLRT**
By Cdr Cornelis van der Klaauw, JWC
- 80 **How Russian Narratives Spread from Ukraine to the Arctic**
By Hope Carr, Canadian Armed Forces, and Dr Cameron Carlson, University of Alaska Fairbanks
- 85 **Gender Perspective**
By Lieutenant Colonel Lena P. Kvarving and Julia Dalman, Nordic Centre for Gender in Military Operations
- 90 **Nuclear Deterrence Part II**
By Wiesław Gozdziwicz, JWC
- 95 **Meet the JWC's Doctoral Researchers**
- 100 **NCIA Outsourcing Initiative**
By Manisha Parmar, Head of Capability Development, NCIA
- 102 **Field Study: Operation Freshman**
- 110 **Portfolio Section**





EDITOR'S LETTER



DEAR READER,

This is my first contribution to this publication, which is the Joint Warfare Centre's warfare development journal focusing on our organization, our capabilities, our people, and NATO's top defence- and security-related topics.

As NATO's premier organization for full-spectrum joint operational- and strategic-level warfare, the JWC continues to be at the forefront of shaping the way NATO trains for the future.

We hope you will enjoy this issue's interesting features, such as our look at emerging trends, cutting-edge developments in science and technology, and advancements in NATO's command and control.

While reading, please keep in mind that The Three Swords grants authors space to express personal thoughts and views. These views do not necessarily reflect the official positions of the Joint Warfare Centre, Allied Command Transformation, or NATO as a whole.

Lieutenant Colonel Michael Walbeck
German Army
Chief Public Affairs Officer
pao@jwc.nato.int

THE THREE SWORDS MAGAZINE

Joint Warfare Centre Public Affairs Office

Lieutenant Colonel Michael Walbeck, German Army
Major Elisabeth Quindesland Eikeland,
Royal Norwegian Air Force
Inci Kucukaksoy, NATO International Civilian

Editorial Production

Inci Kucukaksoy
Ruby Morrigan

Layout

Inci Kucukaksoy

.....

THE THREE SWORDS is the Joint Warfare Centre's authorized journal published by the Public Affairs Office. It presents a compilation of articles, editorials, opinions, news and general information related to the JWC as well as a variety of key defence and security issues.

The views and opinions expressed in this journal are those of the authors and do not necessarily represent the official position or policy of member governments or of NATO.

Submissions have been edited for length, clarity and organizational standards.

.....

NATO Joint Warfare Centre Public Affairs Office

PO Box 8080, Eikesetveien
4068 Stavanger, Norway
Tel: +(47) 52 87 9131/9132

Website: www.jwc.nato.int

Follow us on social media:

Facebook: [/NATO.JWC](https://www.facebook.com/NATO.JWC)
X: [@NATO_JWC](https://twitter.com/NATO_JWC)
LinkedIn: [/nato-joint-warfare-centre-norway](https://www.linkedin.com/company/nato-joint-warfare-centre-norway)

Printed by
Aksell



Major General Ruprecht von Butler German Army Commander Joint Warfare Centre

I AM HONOURED to have taken command of the Joint Warfare Centre in Stavanger, Norway, as of September 11, 2024. This is a unique organization with the ability to propel NATO's readiness into the future. The Joint Warfare Centre forms part of NATO's defence architecture, which enables the Alliance to campaign across the peace, crisis response, and conflict continuum; it delivers Alliance readiness; and contributes to NATO's deterrence threshold. In leading this establishment, I will focus on maintaining the Alliance's warfare advantage as the geo-strategic security environment continues to evolve.

The Joint Warfare Centre is NATO's transformational hub in Europe, responsible for executing NATO's largest computer-assisted command post exercises and advancing warfare development to support the Alliance's enduring relevance.

The exercises focus on NATO's core tasks of deterrence and defence, crisis prevention and management, and cooperative security. In addition, the JWC's exercise activity generates substantial support to NATO's warfare development.

For Allied Command Operations, the Joint Warfare Centre operationalizes the Deterrence and Defence of the Euro-Atlantic Area (DDA) family of plans, which increases the readiness of the NATO Command and Force Structure headquarters, delivering and building the Alliance's deterrence threshold. For Allied Command Transformation, the operationalization of new concepts helps maintain the Alliance's warfare development. The combination of these maintains the Alliance's warfare advantage.

It is this synergy between the Joint Warfare Centre's "warfighter first" approach and innovation in all strands of capability development that makes our organization NATO's premier instrument to deliver immersive, realistic multi-domain training focused at the operational and strategic levels.

The Joint Warfare Centre is renowned for its computer-assisted command post exercises, processes, and delivery of bespoke training objectives to meet the needs of the warfighters. To maintain pace with the evolving strategic security environment, the Joint Warfare Centre's exer-



cises have expanded into the strategic environment and continue to test the boundaries of multi-domain operations. The adaptation of the exercises is a testament to the agility of the Joint Warfare Centre's staff.

As NATO looks towards 2030 and beyond, the Joint Warfare Centre implements its JWC 2030 Transformation Programme, which will deliver substantive and sustainable change to meet the Alliance's level of ambition. In my short time in command, I have already noted the quality and professionalism of our people, and the depth and breadth of activities across the Joint Warfare Centre. This is a reflection of what is taking place across the Alliance. Moreover, the Joint Warfare Centre is welcoming personnel from additional Allied countries in 2024. With new staff members from Portugal and Finland, we grow ever more diverse, just as the accession of new member states strengthens NATO as a whole.

Within this edition of *The Three Swords*, there is much to recommend, and I will highlight three articles. First, Supreme Allied Commander Transformation's (SACT) Strategic Foresight Analysis, which explores the opportunities and challenges of the future; secondly, the article penned by NATO's Chief Scientist, Dr Bryan Wells, focusing on the technologies that will shape our future operating environment. And thirdly, the report on the Joint Warfare Centre's 2030 Transformation Programme, which provides an insight into the transformation journey so far and the path forward.

To conclude, I would like to express my sincere gratitude for the longstanding cooperation and friendship Norway has extended towards the Joint Warfare Centre. Our host nation's support is fundamental to our ability to carry out our mission within NATO. To enjoy the hospitality of Norway, along with the iconic mountains and fjords of this special region, is a privilege indeed.

Dear reader, enjoy this issue of *The Three Swords*. I look forward to presenting future issues that will undoubtedly detail more achievements and successes for this unique NATO establishment.

Together, we make NATO stronger. ✦

THE JWC WELCOMES ITS NEW COMMANDER

MAJOR GENERAL RUPRECHT VON BUTLER



IN A CEREMONY held at the Joint Warfare Centre (JWC) on September 11, 2024, Polish Army Major General Piotr Malinowski handed over command to his successor, German Army Major General Ruprecht von Butler. Prior to joining the JWC, Major General von Butler commanded the 10th Armoured Division in Veitshöchheim, where he was responsible for the German Army's "Division 2025", a programme aiming to reestablish a combat-ready German division by 2025.

French Air and Space Force General Philippe Lavigne, NATO's Supreme Allied Commander Transformation (SACT) at the time, presided over the change of command.

Established in 2003, the JWC is a cornerstone of NATO's collective training infra-

structure, serving as the premier training facility for full-spectrum joint operational- and strategic-level warfare. With a workforce comprising over 260 staff members from 18 NATO member states, the JWC is dedicated to ensuring the Alliance's readiness.

As the day holds special significance in NATO's history, the change of command ceremony began with a moment of silence honouring the heroes and victims of the September 11, 2001, terrorist attacks. The commemoration was followed by the official changing of command, symbolized by passing the JWC flag, which represents the Centre's proud history, tradition, and accomplishments. Major General Malinowski accepted the JWC flag from Senior Chief Warrant Officer Andrzej Woltmann, the

Centre's outgoing Command Senior Enlisted Leader, and passed it to General Lavigne, who in turn handed it to the incoming Commander, Major General von Butler, signifying the transfer of responsibility and authority.

General Lavigne then welcomed Major General von Butler and showed his appreciation for Major General Malinowski's achievements, including the full operational capability of the JWC's wargame design, the successful execution of major exercises such as STEADFAST JUPITER and STEADFAST JACKAL, and certifying NATO's first Allied Reaction Force Headquarters with the first iteration of Exercise STEADFAST DETERRENCE.

The SACT spoke about the importance of the JWC's mission to maintain readiness





Clockwise: Distinguished guests and the JWC's leadership and staff during the ceremony; Major General Ruprecht von Butler assumes command of the JWC; Major General von Butler (left), General Philippe Lavigne (middle) and Major General Piotr Malinowski (right) following the transfer of command; the outgoing and incoming Commanders' arrival to the ceremony with General Philippe Lavigne.



and adaptation of NATO Command and Force Structure headquarters through the delivery of NATO's most complex computer-assisted command post exercises and continuous innovation in warfare development.

In reference to the first in a new series of exercises, General Lavigne mentioned Exercise STEADFAST DETERRENCE 2024, which was executed at the JWC in May: "This was the first of its kind for NATO and was developed to look at real-time deterrence, as the Alliance moved to a campaigning continuum."

The SACT continued by saying that the exercise "marked a historic moment for the Alliance, since the certification of the Allied Reaction Force is a monumental achievement for NATO's New Force Model."

In his farewell speech, outgoing Commander Major General Malinowski reflected on his tenure at the JWC. "My time at the helm of this organization has brought me countless insights, challenges and achievements," he noted. "It has been a very busy and highly rewarding time, during an era of upheaval and change within the global security environment."

Major General Malinowski said: "During this time, the world changed forever, and so did the Alliance. Russia invaded its neighbour Ukraine with full force. NATO was joined by its new Allies, Finland and Sweden."

He added: "The JWC plays a pivotal role in ensuring that our Alliance is ready to meet the challenges of today and tomorrow, and that readiness may never have been more important than now. I would not be prouder that I had the privilege of leading so many adaptable, experienced, innovative and dedicated personnel in the pursuit of excellence."

MAJOR GENERAL VON BUTLER has studied industrial engineering at the University of the German Federal Armed Forces in Hamburg. He was the Chief of Division I, Directorate-General for Forces Policy at the German Federal Ministry of Defence from 2018 to 2021, where he was responsible for forces readiness, space operations and joint forces planning. In 2021, he was assigned as Commander of the 10th Armoured Division in Veitshöchheim, before taking command of the JWC.



MAJOR GENERAL RUPRECHT VON BUTLER

German Army
Commander Joint Warfare Centre



Major General Ruprecht von Butler was born on April 27, 1967, in Coburg, Germany. He started his military service in 1986. In the same year, he began reserve officer training with the 12th Armoured Reconnaissance Battalion in Ebern, while studying at the University of Erlangen-Nuremberg. In 1989, Major General von Butler was re-assigned as platoon leader at the 12th Armoured Reconnaissance Battalion. In 1991, he went on to study industrial engineering at the University of the German Federal Armed Forces in Hamburg.

In 1995, he was assigned as information technology officer at the 13th Armoured Reconnaissance Battalion in Gotha. Following this assignment, he served as the Company Commander of the 2nd Company, 14th Armoured Reconnaissance Battalion in Beelitz from 1995 until 1997. From 1997 to 1999, Major General von Butler was appointed military assistant to the Commanding General of the 4th Corps in Potsdam.

In 1999, he completed his Command and General Staff Training (42nd Army General Staff Course) at the Bundeswehr Command and Staff College, Hamburg, and was assigned as ACOS G3 (Plans, Operations and Training) staff officer at the 1st Air Mechanized Brigade in Fritslar. In 2002, he served there as Chief of Staff. From 2002 to 2003, Major General von Butler served as ACOS J3 (Plans and Operations) at the Kabul International Brigade as part of NATO's International Security Assistance Force (ISAF) in Afghanistan. He then attended the British General Staff Officers' Training at the Joint Services Command and Staff College at Watchfield, United Kingdom, from 2003 to 2004.

His next assignments included personnel manager at the Bundeswehr Personnel Office in Cologne (2004–2007) and Commander of the 13th Reconnaissance Battalion in Gotha (2007–2009), before he re-deployed to Afghanistan as Chief of Staff for the Provincial Reconstruction Team Feyzabad as part of the ISAF mission.

From 2009 to 2011, Major General von Butler was the Assistant Chief of Branch, Policy Planning Staff, at the office of the German Minister of Defence. He was subsequently assigned as the Chief of Afghanistan Operations Control Group at the Bundeswehr Joint Forces Operations Command in Potsdam, where he served until 2013. In the same year, he was re-assigned to the Federal Ministry of Defence for a year, where he oversaw the individual personnel management and development of officers in pay grade B3 and above.

In 2014, he was appointed Commander of the 37th Armoured Infantry Brigade in Frankenberg, Saxony, until his assignment as Chief of the J3/J5 Division (Exercises and Planning) at the Bundeswehr Joint Forces Operations Command in Potsdam. Major General von Butler then took over as Chief of Division I, Directorate-General for Forces Policy at the Federal Ministry of Defence, being responsible for forces readiness, space operations and joint forces planning. In 2021, he was assigned as Commander of the 10th Armoured Division in Veitshöchheim.

Major General Ruprecht von Butler became the Joint Warfare Centre's 11th Commander on September 11, 2024. He is married and has five children.





Above, clockwise: Colonel Petter Bjørge, the JWC's Director of Management, giving a bouquet of flowers to welcome Mrs Iljana von Butler; Vice Admiral Jan C. Kaack, Chief of the German Navy, speaking with Major General von Butler; Major General Trond Kotte speaking with Major General and Mrs von Butler; the Royal Norwegian Naval Forces Band performing at the ceremony; Major General von Butler during the reception with Mr Hans Vik, the Chief of Norway's Southwest Police District.

In his first address as Commander JWC, Major General von Butler stated: "Assuming command of the Joint Warfare Centre is a humbling experience, and an honour that I take on with great enthusiasm and ambition, but also respect. I have learned already how fantastic the team is, which is working here for NATO's readiness and advantage."

Major General von Butler reflected on the enduring legacy of September 11, noting that it was remarkable to assume command of a NATO organization on this date.

"At the time of the attacks, I was in the United States with the Bundeswehr Command and Staff College," he said.

"I always feel very emotional whenever I see the headlines about the attack on America. The world changed that day, and the NATO Alliance brought up Article 5 immediately. Not much more than a year later, I found myself as ACOS J3 at the Kabul International Brigade as part of NATO's International Security Assistance Force in Afghanistan."

Major General von Butler then spoke about the changing nature of warfare. He underlined that the JWC provided the Alliance a unique warfare capability to ensure our warfighters' readiness to meet the challenges of today and the future. "As One Team, we shall strive every day to render the JWC and NATO even more fit for today and tomorrow," he said.

AS MAJOR GENERAL VON BUTLER assumes command, the JWC is poised to continue its mission of providing immersive, realistic multi-domain training and integrating cutting-edge technology to keep the Alliance prepared for future challenges and threats. The Centre's commitment to excellence and innovation will be instrumental in ensuring NATO's ability to adapt and thrive in a rapidly evolving security environment.

Senior military and civil service officers from across NATO and Norway, the diplomatic community in Oslo and distinguished guests from Germany and Poland, the Centre's senior

leadership, as well as many dignitaries from the Rogaland region attended the ceremony. The guests included Ms Lone Merethe Solheim, Deputy County Governor of Rogaland; the mayors of Sandnes, Sola and Randaberg and the acting mayor of Stavanger; Mr Hans Vik, Chief of the Southwest Police District; and Major General Trond Kotte, representing the host nation Norway and the Norwegian Armed Forces. Also present was Vice Admiral Jan C. Kaack, former Commander JWC, who currently serves as the Chief of the German Navy.

The Royal Norwegian Naval Forces Band, led by Chief Petty Officer Eivind Sandgrind, supported the JWC's change of command with several celebratory music pieces as well as the NATO hymn and the Norwegian national anthem. ✦

Article by Inci Kucukaksoy,
JWC Public Affairs Office (PAO) • Photos by
Tore Ellingsen, Norwegian Home Guard PAO

WHO'S WHO AT THE JWC

DEPUTY COMMANDER AND CHIEF OF STAFF

Brigadier General Raymond L. Adams came to the Joint Warfare Centre (JWC) from Force Headquarters Group, U.S., New Orleans, Louisiana, where he served as the Commanding General.



BRIGADIER GENERAL RAYMOND L. ADAMS



United States Marine Corps
Deputy Commander
and Chief of Staff
Joint Warfare Centre

B RIGADIER GENERAL Raymond L. Adams was commissioned in 1999 upon graduation from law school. He currently serves as Deputy Commander and Chief of Staff, NATO Joint Warfare Centre in Stavanger, Norway.

Brigadier General Adams served on active duty from 1999 to 2003, when he transferred to the reserve component to pursue a civilian career.

His operating forces assignments include: Platoon Commander (Operation IRAQI FREEDOM) and Company Commander 1st Battalion, 25th Marine Regiment; Commanding Officer 1st Battalion, 25th Marine Regiment; Executive Officer 25th Marine Regiment; Deputy Commander/Senior Reserve Advisor 25th Marine Regiment; Deputy Commander Force Headquarters Group; and Commanding General Force Headquarters Group.

His headquarters and staff assignments include: military prosecutor, deputy Staff Judge Advocate, and legal assistance officer, II MEF; 6th Motor Transport Battalion S-3A; Aide-de-Camp to Lieutenant General John F. Kelly, Commander, Marine Forces Reserve and Marine Forces North; Marine Air-Ground Task Force (MAGTF) Staff Training Program Individual Mobilization Augmentee (IMA)

Detachment Operations Officer, Chief of Staff, and Officer in Charge; and Force Design 2030 planner in Combat Development and Integration/Capabilities Development Directorate.

His joint force assignments include: Human Intelligence Officer, United States Northern Command J-2 Intelligence Directorate and Politico-Military Planner, Joint Staff J-5 Strategic Plans and Policy Directorate.

Brigadier General Adams is a graduate of The Basic School, Naval Justice School, full-length Infantry Officer Course, resident Marine Corps Command and Staff College (with honours), School of Advanced Warfighting, Advanced Joint Professional Military Education, National War College (with honours), where he received the Excellence in Writing Award and Best Thematically-Focused Individual Strategy Research Project Award, Reserve Senior Staff Course, Johns Hopkins University's Art of War program, Air University's Cyber Operations Executive Course, the University of Oxford's Executive Leadership Programme, Georgetown University's Congressional Operations Seminar, and NATO's Generals, Flag Officers and Ambassadors Course.

Brigadier General Adams was appointed to the Marine Corps Reserve Policy Board for a second term in 2023. ✦

“The JWC has a **great team** of military and civilian personnel, and I look forward to continuing **to make NATO better together**, ensuring that our great Alliance is fit for the future.”

NATO Washington Summit,
July 12, 2024. Photo by NATO

NATO Highlights

- "Takk, Jens Stoltenberg!"
- Mark Rutte takes office as NATO Secretary General

EMBRACING NATO 2030





Takk, Jens!

Jens Stoltenberg's 10 years as NATO Secretary General were some of the most turbulent years in the Alliance's history. Endorsed on June 14, 2021, his "NATO 2030" initiative continues to be an ambitious agenda to make sure NATO remains ready, strong, and united for a new era of increased global competition.

NATO Review

Reflections on a Decisive Decade

by Jens Stoltenberg

NATO Secretary General from
October 1, 2014 to October 1, 2024

THE WORLD HAS changed profoundly since 2014 when I took up my post as NATO Secretary General. Putin has brought brutal war back to Europe, global competition has accelerated, and many challenges — from terrorism to disruptive technologies and from cyber-attacks to climate change — have transformed our security landscape and our everyday lives. As the world has changed, so has NATO.

This past decade has undoubtedly been the most transformational one for the Alliance since the Cold War. We have strengthened our defences by putting tens of thousands of combat-ready NATO soldiers on our Eastern flank for the first time in our history. We now have half a million troops on high readiness across the Alliance, backed by substantial naval and air power. We are ramping up the production of military capabilities and building closer ties between our defence industries across Europe and North America. Allies have significantly increased their investments in defence.

The number of Allies spending at least 2% of their GDP on defence has gone from three in 2014 to 23 in 2024. We do all this

not to provoke war, but to prevent war and preserve peace. That is NATO's core mission. NATO has not only become stronger, it has also grown larger. Four countries — Montenegro, North Macedonia, Finland and Sweden — joined our family, and Ukraine is closer than ever to NATO, where it rightfully belongs. We have also deepened our partnerships with countries in the Indo-Pacific region, expanded our partnerships in our Southern neighbourhood, and brought our cooperation with the European Union to unprecedented levels.

In 10 years, NATO has also become more agile and ready to tackle challenges from wherever they might come. We declared cyber and space new domains of operation, alongside land, sea and air. We are strengthening the resilience of our societies and critical infrastructure, striving to eliminate harmful dependencies on authoritarian regimes. We now have a greater focus on innovation and deep tech, with NATO's new Defence Innovation Accelerator (DIANA) and our billion-euro NATO Investment Fund.

The challenges posed by China's coercive policies and the security impacts of climate change are now firmly on NATO's agenda. These changes have been crucial, and NATO will continue to adapt.

After a decade at the helm of the Alliance, I would like to offer five lessons that are key to NATO's continued success.

The first lesson is that our security does not come for free. We have to be willing to pay the price for peace. After the Cold War, when tensions went down, so did our defence spending. When our security is at stake, as it is today, it is clear that our defence budgets need to go up. The more we spend, the stronger our defences, the more effective our deterrence, and the greater our security.

The good news is that since 2014, when Allies agreed to move towards spending 2% of their GDP on defence, investments in defence have gone up substantially. For the first time, collective defence spending in Canada and Europe has gone above 2%. The bad news, however, is that 2% benchmark is no longer enough.

At the NATO Summit in 2023, Allies approved robust, new defence plans for the security of Europe. These plans come with specific capability targets, including weapons, forces and readiness levels that individual Allies need to provide. To meet these targets and ensure that we can execute these plans, if needed, Allies will need to spend significantly more than 2% on defence going forward.

The second lesson is that freedom is more valuable than free trade. Our economic choices have security consequences. Until recently, some Allies believed that buying gas from Russia was a purely commercial matter. However, we have seen that relying on gas from Russia made us vulnerable. We must not





Above, from left: The Swedish flag is raised at NATO Headquarters to mark Sweden's accession as NATO's 32nd member state; Jens Stoltenberg prepares for a flight in a Eurofighter. Photos by NATO



3,654 days at the helm

make the same mistake with China. We need to better protect our critical infrastructure, avoid exporting technologies that can be used against us, and reduce our dependence on critical materials from strategic competitors. This is crucial for our security. This does not mean Allies should build barriers amongst themselves. Protectionism between Allies is not good for our security, or for our economies. On the contrary, in line with Article 2 of our founding North Atlantic Treaty, Allies must work together to enhance economic collaboration.

The third lesson is that military strength is a prerequisite for dialogue. This is clearly demonstrated in Ukraine. I do not believe we can change President Putin's mind about a free and independent Ukraine, but I do think we can change his calculus. By giving Ukraine more weapons, we can make the regime in Moscow understand that it cannot win on the battlefield and that the only option for Russia is to come to the negotiating table.

Although paradoxical, the shortest path to peace and dialogue in Ukraine is through providing more weapons to Ukraine. Since Putin's full-scale invasion in February 2022, there has been no basis for constructive dialogue with Russia. But as President Zelenskyy himself has made clear, Russia will need to be part of any peace deal. It is for Ukraine to decide when the time is right for talks, but it is clear that power is the only language Putin understands. Dialogue

only works when it is backed by strong defences.

The fourth lesson is that military power has its limits. Afghanistan is a case in point. Following the terrorist attacks against the United States on 9/11, it was right to send NATO forces into Afghanistan. Our military intervention helped degrade al-Qaeda and prevent Afghanistan from being a safe haven for international terrorists to attack our countries. We achieved our original objectives, but we also saw the cost of mission creep.

Building a democratic and united Afghanistan with equal rights for all was a worthy goal, but it was too ambitious. What started as a focused counter-terrorism operation became a large-scale nation building exercise. However, after 20 years, the Taliban were gaining ground and the international community had failed to build a stable Afghan government that could keep their own country safe after we left. The fact that the Afghan government and the security forces collapsed so quickly demonstrated why it was right to leave. There was no evidence that staying for another 20 years would have changed the outcome. We may be called upon again to intervene militarily beyond our borders in the future. However, any future operation must have clearly defined objectives throughout the operation. We must be clear about what NATO's military might can — and cannot — achieve.

The fifth and final lesson is that we

should never take the bond between Europe and North America for granted. On both sides of the Atlantic, we must recognize the value of the transatlantic alliance and invest in it. Europeans must understand that without NATO, there is no security in Europe. 80% of NATO's defence expenditure comes from Allies that are not members of the European Union. These Allies contribute significant resources, but they are also strategically positioned to secure the European continent, from Türkiye in the south and Norway in the north to the U.S., Canada and the UK in the west.

For their part, Americans must recognize the value of their friends and allies in NATO. From Korea to Afghanistan, America has never had to fight alone. Thirty-one countries make substantial contributions to U.S. security and interests. They multiply America's power and influence globally. This is an advantage that no other major global power has. NATO is one of America's greatest assets.

In a more dangerous and interconnected world, the security challenges we face are too big and competition too fierce for any NATO country to do it alone. I do not believe in Europe alone and I do not believe in America alone. I believe in Europe and America together in a strong NATO. Investing in the transatlantic relationship is the only winning way forward for our peace and security — now and for generations to come. ✦

Welkom, Mark!

MARK RUTTE took office as the North Atlantic Treaty Organization's 14th Secretary General on October 1, 2024. As a former Prime Minister of the Netherlands, Mr Rutte has a distinguished record of domestic and international achievements including security, defence, employment and social affairs, and economics. He is a strong supporter of global and transatlantic cooperation.



Above
Mark Rutte, addressing the media during the ceremony to mark transition to the new NATO Secretary General, October 1, 2024

Left
Mark Rutte officially receives the gavel from outgoing NATO Secretary General Jens Stoltenberg. Photos by NATO

Mr Rutte joined NATO following a distinguished domestic and international career. He served as Prime Minister of the Netherlands for almost 14 years from October 2010 to July 2024. As the longest-serving Dutch Prime Minister to date, he presided over four coalition governments, proving his ability to forge consensus without compromising on his values.

During his tenure, he steered the Netherlands through times of significant national and global upheaval, including the economic crisis, the coronavirus pandemic, and the war in Ukraine. He is a committed European and transatlanticist and was instrumental in bolstering his country's role at the heart of NATO and the European Union.

The downing of Malaysia Airlines Flight 17 (MH17) by Russian-backed forces over Eastern Ukraine in 2014 marked a turning point in Mr Rutte's premiership. It cemented his belief that no country can respond to today's interconnected security threats alone: *we are stronger together*. He was a member of the Dutch parliament from January to May 2003 and leader of the liberal Dutch People's Party for Freedom and Democracy (VVD) from 2006 to 2023. He led his party to election victory in 2010, becoming the first liberal Prime Minister to be appointed in the Netherlands in 92 years.

Mr Rutte started his professional career in the private sector in 1992, working in human resources management for Unilever and its sub-

sidiaries. He studied Dutch history at Leiden University and has been a guest teacher at the Johan de Witt group of schools in The Hague since 2008.

In his first address as NATO Secretary General, Mr Rutte outlined his three priorities for the Alliance. "The first is to keep NATO strong and ensure our defences remain effective and credible, against all threats" he began. "My second priority is to step up our support for Ukraine and bring it ever closer to NATO, because there can be no lasting security in Europe without a strong, independent Ukraine" he continued, adding that his "third priority is to strengthen our partnerships" in a more interconnected world. ✦



"The **readiness** of our forces; their ability to **deter** and, if necessary, to **defend**; the **quality of our plans** — are all essential to our **Alliance's credibility**."

— Admiral Pierre Vandier

NATO HAS A NEW SUPREME ALLIED COMMANDER TRANSFORMATION

by **Commander Samantha Lester**
Communications Branch
NATO Headquarters Supreme
Allied Commander Transformation

ON SEPTEMBER 23, 2024, Admiral Pierre Vandier assumed the role of Supreme Allied Commander Transformation from General Philippe Lavigne. Admiral Rob Bauer, Chair of NATO's Military Committee, presided over the ceremony, underscoring the critical strategic importance of Allied Command Transformation and its subordinate commands, such as the Joint Warfare Centre, within the Alliance.

"Allied Command Transformation plays an invaluable role in ensuring that the Alliance safeguards the security and interests of its members against both the current threats and challenges we face today, as well as those that may arise in the future and beyond our present imagination," Admiral Bauer said.

"Allied Command Transformation is a symbol of NATO's confident embrace of the future and its challenges."

Allied Command Transformation and the Joint Warfare Centre, both established in 2003, share the mission of equipping NATO with the training necessary to maintain its military advantage. While Allied Command Transformation oversees the broader strate-

gic direction by leading the development of future military structures, forces, capabilities and doctrines, the Joint Warfare Centre serves as the Alliance's central training hub for all aspects of simulated large-scale and multi-domain warfare at the operational and strategic levels. This collaborative relationship ensures that NATO remains well-prepared to meet evolving security challenges.

Before the symbolic passing of the command's flag to his successor during the ceremony, General Lavigne shared a reflection of his time at Allied Command Transformation: "We pursued the operationalization of our warfare development efforts. Using innovation, experimentation, modelling and simulation to make





Above, clockwise

Samantha Lester, the author and the narrator for the ACT change of command ceremony; Admiral Pierre Vandier receives the ACT flag from Admiral Rob Bauer; Captain Laurent Jeansoulé, Aide-de-Camp, handing a bouquet of flowers to welcome Mrs Vandier; General Christopher G. Cavoli, Supreme Allied Commander Europe; Admiral Vandier's first address as NATO's new Supreme Allied Commander Transformation. Photos by ACT PAO

our products and those of others better, more resilient. And by drawing on lessons learned for training and education in Norfolk, Mons, Stavanger, Bydgoszcz and Lisbon."

ADMIRAL PIERRE VANDIER, a seasoned French naval officer, brings a wealth of leadership experience to his new role as Supreme Allied Commander Transformation. His operational combat background has honed his strategic vision and tactical acumen, making him well-suited to lead one of NATO's two strategic commands.

During his first address to Allied Command Transformation as their Supreme Allied Commander, Admiral Vandier set forth his vi-

sion: "The readiness of our forces; their ability to deter and, if necessary, to defend; the quality of our plans — are all essential to our Alliance's credibility. For all of us here, maintaining our military credibility calls for an extraordinary effort to modernize our training, aggregate new technologies, and invent new combat tactics that will give us operational superiority in a context of rapid global rearmament."

Admiral Vandier's commitment to modernization and technological innovation will ensure that Allied Command Transformation, and its subordinate commands such as the Joint Warfare Centre, remain a vital force for NATO in addressing emerging security challenges across the Alliance. ✦



Above

General Philippe Lavigne receives the NATO Meritorious Service Medal from Admiral Rob Bauer. Photo by ACT PAO

JOINT WARFARE CENTRE



"The STEADFAST series of exercises demonstrate the Joint Warfare Centre's commitment to NATO's ongoing adaptation to a multi-domain-capable Alliance."

— Major General Ruprecht von Butler, Commander Joint Warfare Centre

Photo by Tore Ellingsen

"As **future competitors** grow more familiar with changing circumstances, they will increasingly attempt to wage **new forms of war** that will profoundly change our current Clausewitzian concept of warfare, which primarily revolves around the battlefield and manifests itself in the military means of state power. The **convergence of technology** will not only be transformative on a societal level in the next 20 years but will also change the **character of warfare**, where military capabilities are increasingly **autonomous, networked, multi-domain** and **precise**."



WITH THE ADOPTION of NATO's 2022 Strategic Concept, Alliance heads of state and government recognized that "the Euro-Atlantic area is not at peace" anymore. Acknowledging that NATO faces an environment of pervasive competition, they established an appreciation of diverse and increasing challenges across all operational domains. Potential adversaries and strategic competitors show enduring intent to deteriorate the Alliance's ability to fulfil its core tasks, amidst increasing frequency and extent of disruptive events. NATO Allied Command Transformation's unique futures research project, the Strategic Foresight Analysis, took the Alliance's Strategic Concept as a baseline (i.e. "a fragmented world") and explored the evolution of trends and trajectories.

In the future world of "pervasive competition," technology will enable, the weakening applicability of rules will incentivize, and power politics will drive actors increasingly into the insufficiently regulated global spaces, be it space, the atmosphere, the Arctic, the seabed, the territories of failing states, or segments of the virtual or cognitive effect dimensions.

Future competitors will engage across a blurred continuum of competition at the global, regional, and sub-regional levels, with both state and non-state actors. These changes occur amidst systemic shocks, including the after-effects of the COVID pandemic, the Russo-Ukrainian war, and the Israel-Hamas conflict. The international order is thus in transition, becoming increasingly multipolar amidst intensifying great power competition

and fragmentation at all levels. Major structural drivers, including climate breakdown, resource scarcity, and the age of AI and emerging disruptive technologies, will continue to affect states, societies, and armed forces, altering the character of competition and conflict.

In sum, Europe is not at peace today, and unfortunately enough, the aforementioned challenges will become *sui generis* and continue to grow in the future, due to underlying changes in the international systems, fuelled by technology advancements, disruptions, and the changing attitudes and capabilities of actors. As actors grow more familiar with changing circumstances, they will increasingly attempt to wage new forms of war that will profoundly change our current Clausewitzian concept of warfare, which primarily revolves around the battlefield and manifests itself in the military means of state power.

An example of this development is Russia, which is conducting attritional warfare against Ukraine utilizing all instruments of power. As part of its warfare, Russia is attempting to shape and disrupt Allied policies and actions through sub-threshold activities such as cyber-attacks and disinformation campaigns directed at Allied nations. Reducing Alliance cohesion and undermining NATO's core values appears to be a long-term objective for Russia. Currently there is also war, violence and unrest in parts of the Middle East, Northern Africa and the Sahel, creating a spectrum of challenges for the Alliance, particularly on the southern flank. These challenges are occurring

in a context where war is absent from NATO's territory — but so is peace. NATO's military instrument of power is increasingly stressed by these new challenges and developments in an era in which the rules are changing, and so is the character of both war and peace.

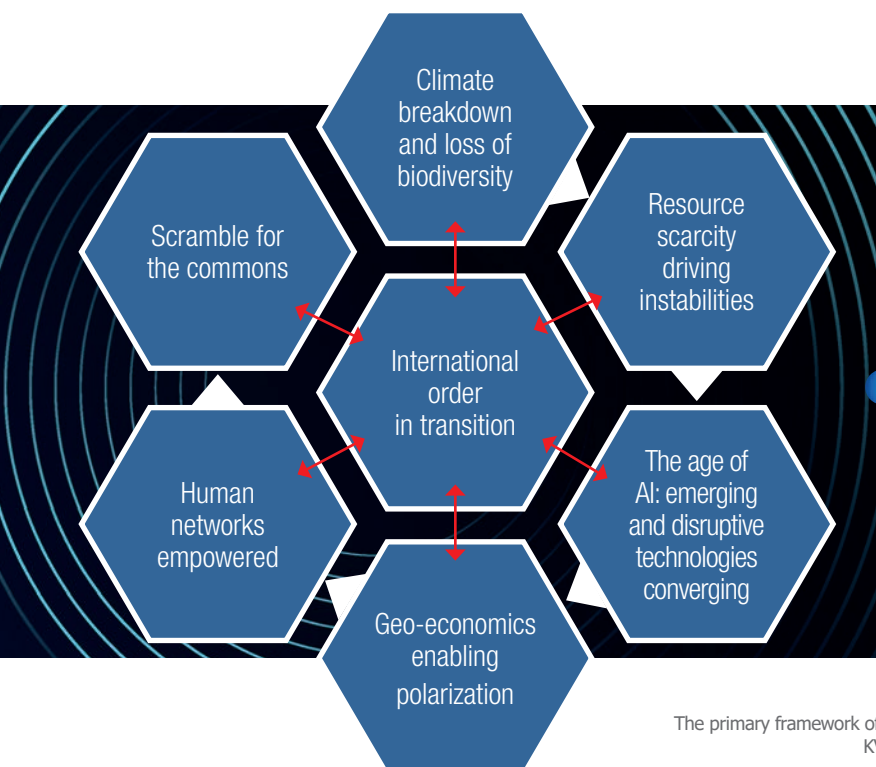
We are thus living in "an age of unpeace," a phrase coined in 2021 by Mark Leonard, founder of the think-tank European Council on Foreign Relations. We must develop a thorough understanding of the consequences of this unpeace in order to inform NATO's warfare development and defence planning efforts. In this article we will summarize the results of the most robust collaborative futures research of recent years, with a view to helping military thinkers and the warfare development community to reflect on emerging problem sets that may shape the utility of the military instrument of power.

Evolving Strategic Environment

The Strategic Foresight Analysis 2023 (SFA23) was developed as a collaborative research project that included nine workshops and 800 participants, as well as two full review rounds with Allies, partners and stakeholders from across the NATO enterprise, amounting to more than 50 different entities.

This collaborative effort has confirmed the further deterioration of NATO's strategic environment, which is increasingly fragmented due to systemic shocks and the changing behaviour and capabilities of actors within the





"It was the knowledge of the Arctic that really gave us fundamental indications about the climate change and what it was really about."

— Jonas Gahr Støre
Norwegian Prime Minister



Above
The primary framework of the seven drivers of change. @SFA23 HQ SACT. The Norwegian Coast Guard vessel KV Svalbard in Lilliehöökfjorden. Photo by Torbjørn Kjosvold, Norwegian Armed Forces

system. The outlook is further complicated by climate breakdown, loss of biodiversity, and resource scarcity, driving instability and conflict.

Resource scarcity is expected to increase and drive further instability, competition, and conflict. As climate breakdown further degrades vital ecosystems and interrupts the services they provide, the demand for renewable and non-renewable resources and critical raw materials is set to increase, while competition and dependencies for these resources become more acute. The high demand and scarcity of resources may cause a tipping point at which competition turns into confrontation. The green energy transition is emerging as a central element for the future of international and domestic affairs.

Geo-economics fuels polarization, with economic activity shifting towards Asia and established systems changing due to security concerns and digital transformation. Pervasive competition unfolds amidst major shocks to the global economy, further increasing polarization. Geo-economic blocs will form due to the securitization of supply chains and alternative digital ecosystems. Adapting to the Fourth Industrial Revolution will pose significant challenges and disruptions to states, societies, and armed forces.

Emerging and disruptive technologies (EDTs) will reshape these states, societies, and

"The international order is in transition, becoming increasingly multipolar amidst intensifying great power competition and fragmentation at all levels."

armed forces, with converging effects across multi-dimensional environments. The convergence of technology will not only be transformative on a societal level in the next 20 years but will also change the character of warfare, where military capabilities are increasingly autonomous, networked, multi-domain and precise. This will empower a growing number of actors, including commercial and terrorist organizations, to pursue their autonomous

objectives more effectively and increasingly challenge traditional state power. Accelerating technology development and a changing public-private nexus will profoundly impact security and military matters. Converging effects across operational domains as well as physical and non-physical dimensions will expand the scope and shape the character of competition.

The rise of networked non-state actors, technological empowerment, urbanization, and information/disinformation overload are highly certain. Technology accelerates interconnectivity, empowering groups and individuals to pursue objectives independently from state actors. The ability of human networks to adapt rapidly makes them formidable allies or foes.

Societal and commercial capabilities emerge as indispensable elements of modern competition and warfare. These human network trends will profoundly affect international relations, security, and governance, creating both opportunities and risks. Cities will emerge as the most critical nodes for future military operations, with sub-state actors becoming more agile, adaptable, and scalable. Human networks will be empowered by technology diffusion and increasingly impact international and intra-state affairs. Commercial entities will drive both energy and industrial transition, changing the character of warfare.



These trends and trajectories, altogether and in the absence of efficient global cooperation to mitigate global challenges, are leading to pervasive competition. Such a dynamic will entail accelerating changes, strategic shocks, pervasive instability and autocratic states substantially challenging and further fragmenting the rules-based international order, with intensifying strategic competition as well as the emergence of new forms of security cooperation and military alliances. A pathway of pervasive competition across all domains, dimensions and in all times was considered as a most likely scenario by all research participants who exercised and wargamed optional pathways.

This environment will be complex, congested, commercialized, contested, and inadvertently confused. Strategic competitors will attempt to achieve effective coordination across their instruments of power to limit the Alliance's military instrument of power in peacetime, through shaping, contesting and exploiting disruptions and instabilities, and confronting from a position of strategic advantage. Potential adversaries will grow their efficiency to coordinate and employ instruments of power, while non-military instruments will likely gain more relevance. These adversaries will likely

prefer to avoid open and direct conflict with the Alliance due to NATO's advantage in the military instrument of power. Their objectives will reflect that, in attempting to conceal intent and capacity to achieve strategic surprise. These adversaries may introduce plausible deniability to avoid attribution and response. They may make extensive use of EDTs and cyber warfare to cause lasting damage to critical infrastructure, and conduct robust technology-enabled cognitive warfare designed to undermine unity.

Challenges to the Military Instrument of Power in the Future of Pervasive Competition

The Strategic Foresight Analysis 2023 outlines the shape of things to come, where the military instrument of power will be entangled in a wider range of national instruments. Future military challenges will involve adapting to technological, economic, environmental, and social changes as well as creating a heterogeneous, efficient and sustainable force design that is fit for the future. NATO must develop resilient, adaptive capabilities, leveraging both military and commercial innovations, to ad-

dress evolving threats and maintain security in a rapidly changing world.

As we enter an era of pervasive competition, state and non-state actors are shifting their attitudes and behaviour. Global defence spending metrics trace how states hedge against the deteriorating security environment. Non-state actors benefit from democratized technology, creating strategic effects and surprises. Commercialization enables private actors to play pivotal roles in strategic competition, while societies become battle-deciders, with resilience as a fundamental prerequisite for campaigns. The military forces of democratic countries and their potential competitors will increasingly diverge in trajectories driven by technological limits and opportunities; demographic factors; labour market necessities; different ethical, moral and legal thresholds; and threat exposure.

Growing asymmetries between forces, including in their design, structure, capabilities and employment concepts, emphasize the need for reassessment. Warfare is transitioning with changes in manoeuvre and fire balances; increasing lethality and attrition; shifting human-to-machine combatant ratios; the revival, proliferation and diffusion of long-range strikes; and formidable anti-access area denial

"Future military challenges will involve adapting to technological, economic, environmental, and social changes as well as creating a heterogeneous, efficient and sustainable force design that is fit for the future." First (Allied Reaction Force) and third (patrolling the seas around the Arctic) photos by NATO. Second, fourth, fifth and sixth images by Shutterstock depict quantum technologies, green energy, hypersonic missiles and the complex information environment, respectively.





Above

An F-35B supersonic stealth strike fighter above the British aircraft carrier HMS Queen Elizabeth. Photo by Dane Wiedmann, Lockheed Martin

capabilities. In the face of these omnipresent, novel challenges, armed forces will need to adapt quickly, and in doing so, they will rely increasingly on societies and commercial actors to sustain efforts.

Additionally, states may face challenges in their ability to generate fighting power in the future. These challenges include the costs of adapting to climate change and switching to green energy, keeping up with rapid technological changes, and facing economic and financial limitations. Social factors, such as the need to spend more on welfare and dealing with labour challenges due to aging populations and a shortage of skilled workers, will place further demands on state resources. The defence sector will also see cost increases, making it harder to manage. NATO's core tasks — deterrence and defence, crisis prevention and management, and cooperative security — will be influenced by the changing security environment.

Fulfilling these tasks will require a collective effort from member states to provide

the capabilities that are necessary in order to remain effective in future operations. Interconnectivity will grow across various instruments of power. The effectiveness of NATO's military instrument of power will be tested by technological disruptions and adversarial strategies. The future character of warfare will involve simultaneous, persistent threats across all domains.

Economic and environmental factors will affect the deployment of military instruments. In unstable areas with resource shortages, states might resort to warfare to address dire conditions. Protecting natural resources, trade routes, and supply chains will become a priority, involving new technologies such as unmanned naval and aerial assets and expanded precision strikes. Non-state actors may also gain capabilities to challenge states and commercial entities in these areas. The lack of international governance will lead to increased competition for resources in spaces such as the cyber and information domains.

MILITARY DEVELOPMENT will be complicated by the growing complexity of warfare. AI-enabled manufacturing and sustainment,

along with collaborative efforts within NATO, may alleviate some pressures and create resilience. Innovations such as autonomous delivery services, drones, AI, and quantum computing will optimize logistics operations. However, the future will still involve labour-, cost-, and technology-intensive military equipment, leading to risk aversion with high-value assets.

Augmented decision-making could change the offense-defence balance, providing tools for high-tempo operations and global manoeuvres, but also creating new requirements for early detection and response to threats. EDTs will increase operational speed and transparency, compressing the tactical, operational, and strategic levels.

Future military designs will likely be heterogeneous and commercialized, with private-public sector innovation playing a significant role. This will raise concerns about trust, reliability, and dependency, necessitating a focus on military resilience and long-term defence planning.

Defence budgets will be pressured by competing state resource demands and rising warfare costs. The war in Ukraine has increased the likelihood of major conflicts, driving global



armament efforts. Stockpiles and readiness are below optimal levels, incentivizing defence investment. Inflation, high demand for weapons, and uneven access to critical materials will keep prices high. Budget deficits will rise globally, and GDP growth in Allied countries will lag behind pre-crisis levels. Aging weapons systems and recruitment challenges will increase maintenance costs and personnel expenses.

Alliances built on aggregated capabilities and unified efforts will be crucial for deterring state actors and addressing multidimensional threats. However, deterrence efficiency will be challenged by fragmented security environments, modern technologies enabling intent concealment, and non-state actors with high-risk acceptance. Societal resilience through public-private coordination could enhance deterrence by denial.

The military instrument will rely on commercial enablers to detect, deter, and defend against aggression. The complex security environment will present challenges in the cognitive and normative aspects, however. Adversaries will contest human networks before physical confrontation.

Data will become a strategic resource, with AI affecting sensor-to-shooter systems and automated decision-making. Space assets will be crucial for multi-domain operations, making the battlefield more transparent. Interconnectivity and increased use of automated systems and sensors will be key for military advantage. Critical EDTs, such as hypersonic missiles and autonomous weapon systems, will become prevalent.

The ability to control the military instrument of power through time and space will remain critical. The time between warnings and conflict escalation will shorten, and information flow will accelerate. Leveraging data and information will provide cognitive superiority. The military instrument must offer varied approaches to deliver synergistic effects across multi-domain operations.

CRITICAL IMPLICATIONS of these considerations are further deliberated in NATO ACT's Future Operating Environment (FOE) research, with four key focus areas: impact of technology, intent and capabilities of actors, changing character of battlespace, warfare in transition. The FOE study will further inform warfare development and defence planning efforts at ACT.

Since NATO adopted the 2022 Strategic Concept, we have known that we are not at peace anymore. With the SFA23, we also assess that pervasive competition is unfolding across all effect dimensions, with all instruments of power, and at all times. We at ACT work hard to change our views of peace and war. We are developing our ideas of how to generate and orchestrate fighting power in a globalizing battlespace; how to develop concepts to tackle attrition, lethality, mass and lower cost; and how to address extended-range strikes and ubiquitous violence by state actors and terrorists alike.

Accordingly, our work is intended to assist NATO in adapting to this complex, congested, commercialized, contested, and confused environment. The Future Operating Environment 2024 aims to anticipate conditions affecting capability employment, providing a framework for forward-looking capability development to ensure Allied forces remain adaptive, resilient, and effective.

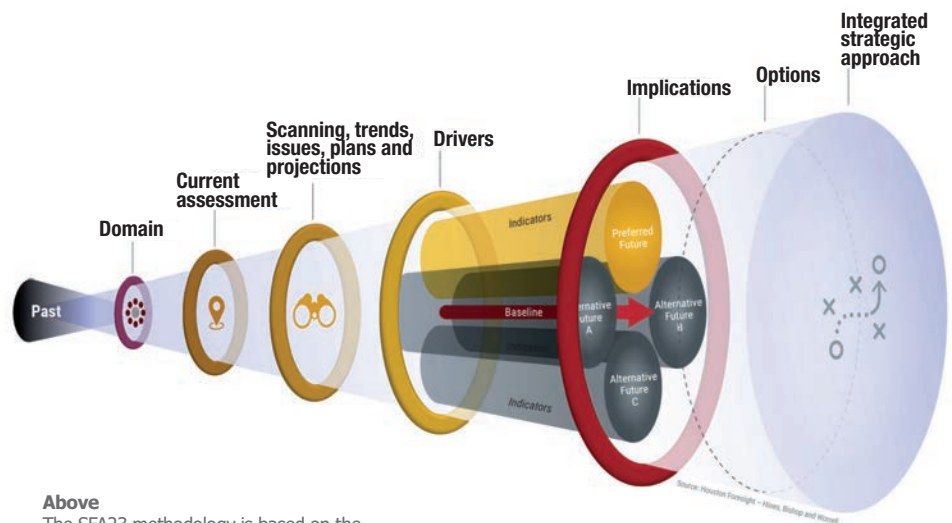
How Can NATO Adapt to Future Battlefield Requirements in the Age of Multi-domain Threats?

The answer to the main question of this article is relatively easy, while the actual process needed to implement the answer is likely challenging. We must become better at capturing future

— mainly technological — changes and capitalize on them better and more quickly than our opponents. We should also not forget that many of the measures needed to deter, defend against and mitigate effects of multi-domain threats and actions are already available. The challenge often lies in detecting these threats early enough, and employing and coordinating actions to handle them. As Clausewitz put it: "In war, as in life generally, all parts of the whole are interconnected and thus the effects produced, however small their cause, must influence all subsequent military operations and modify their final outcome to some degree, however slight. In the same way, every means must influence even the ultimate purpose."


We must understand how we got to where we are. Understanding the current state of affairs requires historical and cultural context. Without this understanding, which must include accepting that some of our past assumptions and decisions were potentially wrong, we are unlikely to make the right decisions for the future.

We must understand the current situation and its implications for the future. To move from observation to understanding requires assessments. In the face of multi-domain threats, it will be essential to differentiate between competitive behaviour and actions that are military in nature. This will require persistent efforts to



Above
The SFA23 methodology is based on the Framework Foresight Model, tailored to the objectives of ACT. Source: Houston Foresight





"At ACT, we are developing our ideas of how to generate and orchestrate fighting power in a globalizing battlespace."

U.S. B-52H bomber aircrafts provide assurance and contribute to deterrence particularly along NATO's eastern flank. Photo by NATO

improve situational awareness through the exchange of data, between the commercial and public sectors, between the civilian and military government sectors, and between international organizations. We must also share our assessments of situations, threats or incidents and their potential implications.

We must identify the opportunities and challenges of the future through constant and vigilant horizon scanning and engagements. By identifying events and trends, we will be able to assess their implications for the future, and more specifically for the future operational environment. The use of EDTs stands to improve our ability to identify events or trends that affect the future. As entities engaged in long-term future assessments increasingly exchange data, they will grow their ability to capitalize on opportunities and to address challenges through risk mitigation.

We must routinely challenge our assumptions of the future. Any changes that occur may affect our current actions and our plans to develop capabilities for the future. Our assumptions shape our trajectories, and the more we are invested in them, both financially and emotionally, the harder they are to change. If we can, we should incorporate flexibility into our plans, much like we aim to do when developing plans for a military operation. No plan survives contact with the enemy, as the adage goes. We are quite certain that the future will bring disruptions and shocks that will force us to change direction. Through training and exercises, modelling and simulation and through experiments, we must rigorously challenge

and test the assumptions and assessments that form the basis for our present trajectories. We must also be willing to fail during these efforts.

We must be willing to change our own trajectories and plans. The steps above potentially provide the foundation to make right decisions for the future. The central questions are: are we willing and able to change, and if so, how much? Will we change the entire DOTMLPFI (doctrine, organization, training, materiel, leadership and education, personnel, facilities, interoperability) framework? Do we change whom we work with and how? Our commercial partners and obligations? In the end, it comes down to how we handle risk. The increasingly rapid changes, and the increasing frequency and likely negative consequences of future shocks and disruptions necessitate greater flexibility and an ability to change our trajectories in order to retain NATO's competitive edge. We should also maintain focus on implementing changes where they have the most impact on the Alliance's ability to carry out its core tasks.

Conclusion

Experts working on future assessments are generally quite pessimistic and focus on future threats. We would like to take a more positive approach in concluding this article.

Firstly, NATO and Allied countries are at present addressing many of the challenges and opportunities posed by the future. Allied Command Transformation is developing concepts such as Cognitive Warfare and Cross-Domain Command to provide broad avenues of progress towards future cognitive superi-

ority. There is also massive interest and effort across the Alliance to increase the volume of systemic futures thinking, including through foresight capabilities and processes as well as a more designed cooperative network between foresight and futures organizations.

Secondly, although it may be debatable or not apply to all innovation, we believe free societies and democratic states will have an advantage over authoritarian states in the field of technological innovation. The combined potential of 32 states — each with their own history, culture, expertise and nuanced outlook — is immense and will provide a range of possible solutions to future challenges. The commercial sector is leading in diverse research and development across the Alliance, and the number of start-ups and research fields provides grounds for optimism.

The work conducted across the NATO Command and Force Structures contributes to our positive outlook. The daily efforts of our military and civilian personnel demonstrate and cement NATO's core values. These values have proven resilient over time and in the face of adversarial actions, and they will prevail over multi-domain threats in the future.

Finally, NATO's ability to foster reflection and critical thinking in all processes endows us with a strong advantage over strategic competitors and potential adversaries. Our decision-makers and strategists must plan effective responses to the increasing complexity and overall deterioration of the security environment. It is the role of critical thinking in defence policy and analysis to broaden existing horizons and raise novel problems to assist in that endeavour. ✦

ON THE COVER

TRANSFORMING NATO'S DETERRENCE AND DEFENCE TECHNOLOGICAL FRONTIERS

by Dr Bryan Wells
NATO Chief Scientist

with contribution from
Angelo De Lucia
NATO Science and
Technology Organization

"Quantum physics tells us that no matter how thorough our observation of the present, the (unobserved) past, like the future, is indefinite and exists only as a spectrum of possibilities."

Stephen Hawking



Above, from left
NATO Exercise BOLD FUSILIER, photo by NATO; F-35 fighter aircraft, photo by Onar Digernes Aase, Norwegian Armed Forces

THE LANDSCAPE OF global defence and security is undergoing a profound transformation, driven by rapid technological advancements. In an age marked by relentless technological progress, NATO stands at the forefront of innovation, navigating the intricate balance between advancing technologies and strategic imperatives. As NATO's Chief Scientist, I consider it both an honour and a responsibility to ensure that we have the best possible understanding of the opportunities and challenges that future technologies may present for the Alliance's deterrence and defence strategies.

This article explores the implications that these changes will have for NATO, focusing on the integration of emerging and disruptive technologies, the driving forces for technological progress, major trends shaping the security environment, and the far-reaching implications for NATO's security landscape and its future capabilities. Finally, it describes the possible state of technology with a twenty-year outlook.

1 | Technological Advances Changing NATO's Deterrence and Defence

Technological innovations, particularly in artificial intelligence (AI), cyber capabilities, and unmanned systems, are reshaping NATO's approach to deterrence and defence.

Technological advancements are fundamentally reshaping NATO's deterrence and defence strategies, ushering in a new era characterized by unprecedented challenges and opportunities. These new technologies enhance operational efficiency, strategic precision, and adaptability, enabling NATO to respond more effectively to threats. The integration of AI into defence systems facilitates the processing of vast amounts of data for intelligence analysis, threat identification and strategic planning, thereby strengthening NATO's situational awareness and operational capabilities.

Moreover, changes in military operations, accelerated by advancements in information communication technology, have fundamentally altered NATO's approach to de-

terrence and defence. Precision-guided weapons and net-centric warfare capabilities have reshaped the battlefield, necessitating adaptive strategies to maintain NATO's technological edge. At the heart of this transformation lies the democratization of weaponizable dual-use technologies and the emergence of AI-driven capabilities, which are redefining the character of NATO's strategic posture.

Easier access to technologies, particularly in the digital realm, has opened the way to powerful tools, allowing both state and non-state actors to wield unprecedented influence on the battlefield. For instance, the proliferation of swarm drones has expanded the scope of warfare beyond traditional boundaries, posing significant risks to civilian populations and critical infrastructure. Furthermore, the race for AI supremacy, fuelled by rhetoric that the leader in AI research will dominate global affairs, adds a new layer of complexity to NATO's deterrence calculus.



In addition, Russia's advancements in hypersonic glide vehicles, with their ability to reduce time to target dramatically, present NATO with formidable challenges in strategic deterrence and defence planning.

At the same time, the advent of cyber and information operations has blurred the lines between physical and virtual warfare. Cognitive warfare campaigns conducted through social media have emerged as potent tools for state and non-state actors that seek to undermine societal resilience and stability. This necessitates a holistic "whole of society" approach to national security.

To address these challenges, NATO emphasizes the preservation of its technological edge through initiatives such as the Defence Innovation Accelerator for the North Atlantic (DIANA). By fostering cooperation and investment in emerging and disruptive technologies, NATO aims to maintain a credible defence posture in the face of these evolving threats.

In summary, technological advances are redefining NATO's deterrence and defence, requiring new technology strategies and greater collaborative innovation. As the Alliance navigates this dynamic environment, a thriving,



Top: NATO Exercise NORTHERN CHALLENGE 2023. Led by the Icelandic Coast Guard, the exercise aims to deliver the most modernized explosive ordnance disposal and improvised explosive device disposal.
Bottom: NATO's Counter Unmanned Aircraft Systems (C-UAS) Technical Interoperability Exercise 2023 (TIE23). Photos by NCI Agency

integrated NATO science and technology ecosystem is paramount to ensuring peace and security in an increasingly complex world.

2 Driving Force Behind Technological Progress

Technological progress, the catalyst for our future, is shaped by a diverse array of dynamic forces that intersect to shape the trajectory of innovation in our modern world.

The rapid pace of innovation in the civilian sector, coupled with increasing investments in defence technology by NATO member states, propels technological progress. The dual-use nature of many technologies accelerates this progress, as civilian innovations find applications in military contexts.

Moreover, human curiosity and a desire to innovate inspire scientists, engineers, and inventors to push the boundaries of what is achievable. These characteristics, coupled with the relentless pursuit of knowledge and the quest for improvement, are intrinsic to the human spirit and drive breakthroughs that shape our future.



Dr Bryan Wells © NATO STO

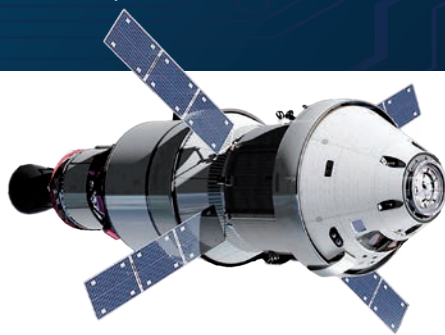
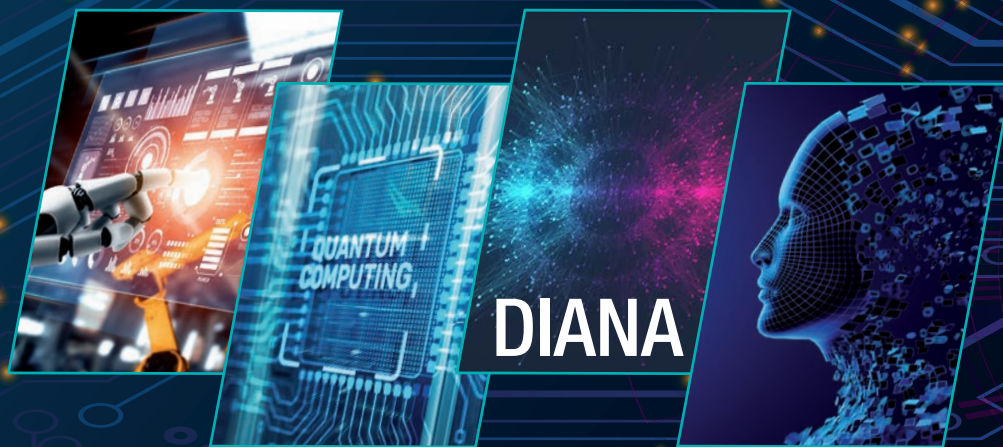
In the complex landscape of defence and security, the NATO Science and Technology Organization (STO) stands as a beacon of collaboration and innovation. Established as a subsidiary body of NATO, the STO serves a crucial role in meeting the collective scientific and technological needs of the Alliance, its member states, and partners. With over 5,000 scientists and engineers hailing from more than 40 countries, the STO boasts the world's largest research network dedicated to defence and security issues. Through its collaborative efforts, the STO facilitates the pooling of resources, expertise and knowledge, empowering NATO to maintain its technological and military edge in the face of evolving threats. Under the guidance of the Science and Technology Board and the leadership of the NATO Chief Scientist, the STO operates with precision and efficiency, ensuring that scientific advancements translate into capabilities for NATO and its Allies. As we delve into the intricacies of defence technology, understanding the role of the STO is essential, as it embodies the spirit of cooperation and innovation that underpins NATO's strength and resilience.

The NATO Science and Technology Organization at a Glance



The year 2024 marks a **pivotal juncture** in the evolution of military technology, as we stand on the precipice of the **seventh-generation military revolution**.

<https://www.diana.nato.int/>



3 Major Technological Trends Shaping our Security Environment

The security environment is undergoing a profound transformation influenced by major technological trends that intersect with geopolitical realities, ushering NATO into a new era of strategic adaptation and innovation.

Economic incentives also play an important role in driving technological progress. The promise of competitive advantage, economic growth, job creation and market dominance motivates companies to invest in cutting-edge technologies across many sectors, including defence. New operational domains such as space and cyber are opening opportunities for technological innovation to address these latest requirements.

Furthermore, public opinion can influence technology investment priorities. For example, challenges such as climate change, urbanization, and healthcare disparities can drive demand for innovative solutions, prompting governments, businesses, and civil society organizations to collaborate and leverage technology for positive change.

In conclusion, a complex interplay of strategic, economic, societal, operational and human factors will influence technological progress. Understanding and harnessing these driving forces is essential for navigating the ever-changing landscape of technological advancement and leveraging its transformative power for the betterment of safe and secure societies.

Key technological trends include AI and machine learning, cyber defence capabilities, autonomous systems, quantum computing, and space-based assets. These technologies introduce new domains of warfare and alter the dynamics of power projection and deterrence. Their integration into military strategies enhances the effectiveness of defence mechanisms and introduces new operational concepts.

At the heart of this transformation lies the fusion of strategic imperatives, innovation endeavours, and emerging technological trends, which collectively shape NATO's approach to emerging challenges. Global shifts, such as the evolving contours of the new NATO Strategic Concept and geopolitical tensions in regions such as Ukraine, provide guidance for security and investment priorities in cutting-edge technologies to maintain NATO's competitive edge.

In addition, biotechnologies will be disruptive in the near to medium term, especially if we consider the possibilities for human capabilities across physiological, cognitive and social domains.

Ethical considerations and climate resilience also guide NATO's trajectory, highlighting the importance of moral frameworks in guiding technological development and utilization. The nexus between climate change and security underscores the imperative of building resilience against environmental risks, with technological innovations playing a crucial role in addressing climate-related security challenges.

Countering mistrust in scientific advancements and enhancing resilience against diverse threats remain a cornerstone of NATO's strategic preparedness. Transparency, accountability and effective communication strategies are essential for overcoming barriers to the adoption and implementation of emerging technologies. Technological innovations enable adaptive responses and bolster resilience across a range of security challenges.

In navigating the intricacies between geopolitics and technology, NATO stands at the forefront of innovation and adaptation. By embracing strategic investment, fostering innovation ecosystems, and addressing the multifaceted drivers of technological change, NATO ensures its resilience and relevance in an ever-evolving world. As the Alliance charts its course into the future, the fusion of strategic vision, technological prowess and ethical imperatives will continue to shape its approach to emerging security challenges.

Above
DIANA has a network of more than 200 affiliated accelerator sites and test centres across NATO member countries.





ENABLING A MULTI-DOMAIN FUTURE

4 NATO's Readiness for AI Transformation

NATO is actively preparing for the transformative potential of AI through a comprehensive strategy aimed at fostering innovation, enhancing understanding, and encouraging adoption among member states and within the organization itself.

NATO actively embraces AI transformation. This includes investing in research and development, fostering partnerships with industry, and establishing frameworks for the ethical use of AI in military operations. However, the successful integration of AI into NATO's operations requires continuous adaptation and the development of new doctrines and training programmes to leverage AI capabilities fully.

The approval of an AI strategy in 2021 marked a significant milestone, emphasizing the importance of responsible use and the protection of NATO's AI technologies. The principles included in the strategy contribute to ongoing international deliberations on setting norms for AI adoption. NATO has also established a Data and Artificial Intelligence Review Board that is guiding Allies in AI adoption and usage, with a key focus on building trust, especially among operational end-users.

Recent studies, such as the one completed by the STO as part of the von Kármán Horizon Scanning Strategic Initiative, underscore the need for organizational and cultural changes, effective data and network manage-

ment, and trusted human-machine interaction to realize the benefits of AI. These findings emphasize the need for NATO to adapt its processes, structures and mind-set to take full advantage of the technology's potential for various military capabilities, including AI's role in enhancing decision-making speed and accuracy, optimizing resource allocation, and providing predictive analytics for military threat assessment and operational planning.

In conclusion, a comprehensive strategy, investment in research and development, and efforts to adapt organizational culture demonstrate NATO's desire for AI transformation. By embracing responsible use principles, fostering innovation ecosystems, and prioritizing trust-building measures, NATO is poised to leverage AI's transformative potential to enhance its deterrence and defence capabilities in the evolving security landscape.

5 AI Support for Evolving Concepts such as Multi-Domain Operations

AI significantly supports multi-domain operations (MDO) by providing enhanced data analysis and decision support across the land, air, sea, cyberspace, and space domains. AI algorithms process information from diverse sources in real-time, enabling coordinated responses and optimizing resource allocation.

This facilitates a more integrated approach to operations, breaking down silos between different military branches and domains.

NATO's Digital Transformation Initiative is pivotal in enabling MDO by ensuring that people, processes and technology are prepared to harness the full potential of digital technologies. This comprehensive endeavour aims to adapt NATO's command and control structures, foster a culture of innovation, and secure sustained political support to safeguard the Alliance's future security and stability.



AI-generated graphic



Previous, from left

Norwegian Army Border Guard, photo by Ole-Sverre Haugli, Norwegian Armed Forces; Standing NATO Maritime Group One, photo by S. Dzioba, NATO; a U.S. Navy F/A-18 Super Hornet on the flight deck of the USS Gerald R. Ford; cyber security, photo by Swedish Armed Forces; hurricane viewed from space, Shutterstock

"The integration and operation alongside emerging technologies will be critical for maintaining strategic superiority."

The integration of AI can guarantee adaptation interoperability and heightened situational awareness, accelerating data-driven decision-making, while enhancing NATO's strategic advantage and operational effectiveness by enabling coordinated military actions across the land, sea, air, cyber, and space domains. Using synthetic environments to test operational effects and enhance situational awareness ensures the adaptability and the readiness of the Alliance in the face of evolving military challenges.

Moreover, NATO Allied Command Transformation is the primary lead and support provider for digital transformation efforts, which require comprehensive transformation, to accommodate vast data management and mitigate any risks connected to the legacy communication and information systems. It is instrumental in delivering a secure and scalable cloud environment — the digital backbone — that underpins MDO and facilitates universal connectivity and data transport across domains.

Collaboration among NATO Allies is paramount in this transformative journey. Standardized processes, policies for automation, and new mechanisms for cooperation are needed to streamline efforts and prioritize transformation goals. Additionally, education and training are essential to equip personnel



Counter-drone technology.
Photo by NATO

with advanced digital expertise and foster a culture of innovation.

In conclusion, NATO's Digital Transformation is not merely about adopting technology; it signifies a comprehensive revolution that embraces the future of warfare. By uniting Allies, harnessing technological advancements and fostering a culture of innovation, NATO stands poised to fortify its position as a formidable force in increasingly digital environments.

6 Impact of AI Adoption on Organizational Culture

The adoption of AI within organizations, particularly in the context of NATO, has profound implications for organizational culture, necessitating a shift in mind-set, practices and priorities.



A meeting with Dr Wells (right) at STO. Photo by STO

Trust is paramount for the successful adoption of AI-enabled systems within NATO. Stakeholders, including users, decision-makers, planners, policymakers and the general public, must have confidence in the reliability, explainability, robustness, and security of AI systems. This trust is cultivated through exposure, education and experience, with the essential investment of resources over time to ensure appropriate governance through regulations and principles of responsible use, while ensuring legal and ethical compliance.

For NATO, the role of culture represents a particularly salient factor given the Alliance's multinational character. This is an important interoperability consideration, as warfighter trust in AI may not be the same across nations that have different attitudes about the use of such technologies, potentially leading to differences in AI adoption across the Alliance. In addition, this can challenge NATO's approach when dealing with potential adversarial state actors that have a different view on the responsible use of AI. Openly communicating with users about the potential risks, limitations and uncertainties associated with the use of AI technology can help manage expectations, and being transparent about the potential challenges will foster organizational trust. Furthermore, users should receive continual education and training to keep pace with the rapidly changing technology developments and understand how to interact with AI.



I2D2

Four overarching qualities will define the technological landscape of 2044: **intelligence, interconnectedness, decentralization, and digitalization.**



Above
Norwegian Manoeuvre Air Defence. Photo by
Ole-Sverre Haugli, Norwegian Armed Forces

In conclusion, while AI holds significant potential to enhance military activities, including targeting; intelligence, surveillance and reconnaissance; predictive maintenance; and decision-making, its adoption within NATO requires careful consideration of trust, security, adaptation, workforce readiness, and ethical considerations. By addressing these factors, NATO can navigate the challenges and opportunities presented by AI adoption while fostering a culture that embraces innovation, accountability and responsible use.

7 Technology in 2044: A Twenty-Year Outlook

Predicting the exact state of technology in 2044 is challenging due to the exponential pace of innovation. However, it is likely that AI, quantum computing, space technologies and biotechnologies will have matured significantly, offering unprecedented capabilities in data processing, communication and surveillance. These advancements could lead to more autonomous systems in defence, enhanced

cyber resilience, and novel deterrence strategies, potentially transforming the nature of warfare and international security dynamics.

The year 2024 marks a pivotal juncture in the evolution of military technology, as we stand on the precipice of the seventh-generation military revolution. While historically, technology has shaped the subjective nature of the battlespace, the objective nature of human conflict remains fundamentally unchanged. However, with the advent of increasingly autonomous and AI-driven systems, the very essence of warfare is undergoing a paradigm shift. This revolution is underpinned by four overarching qualities that will define the technological landscape of the future: intelligence, interconnectedness, decentralization, and digitalization (I2D2).

→ **Intelligent Technologies:** AI-driven autonomous systems will emerge as central to future conflicts, with the capability for independent decision-making and intricate human-machine teaming. These systems will revolutionize strategic planning support, ac-

celerating decision speeds to unprecedented levels and reshaping the traditional OODA (observe, orient, decide, act) loop.

→ **Interconnected Systems:** Extensive networks spanning virtual, biological, and physical domains will facilitate seamless communication and collaboration among sensors, organizations and autonomous agents. Technologies such as blockchain and quantum key distribution will ensure trusted interactions and information exchange, giving rise to innovative ecosystems such as smart cities.

→ **Decentralized Infrastructure:** Ubiquitous distributed sensing, storage and computation will empower military forces with enhanced situational awareness and decision-making capabilities across diverse operational domains. This decentralized architecture will enable large-scale data processing and exploitation, fundamentally altering the dynamics of military operations.



→ **Digital Fusion:** The convergence of biological, physical and information domains will blur the boundaries between synthetic realities and physical environments. Digitally integrated technologies will enable precision warfare through advanced sensors, analytics and directed energy weapons, revolutionizing the nature of conflict engagement.

In addition to these overarching qualities, specific military capability development trends will emerge.

→ **Intelligent Autonomous Action:** AI-enabled autonomous systems will increasingly supplant human forces, driving the evolution of intelligent battle networks and autonomous vehicles. Rapid advancements in decision-making algorithms will redefine the nature of conflict engagement.

→ **Cognitive Dominance:** Agile C4ISR (command, control, communications, computers intelligence, surveillance and reconnaissance) battle networks will become targets themselves, leading to increased reliance on secure communication and advanced sensor capabilities. Quantum technologies will revolutionize data collection and processing, enhancing decision dominance and material design.

→ **Expanded Domains:** Space, cyberspace, and information spheres will become integral components of future conflicts, demanding multi-domain operational strategies and counter-domain capabilities. AI and quantum technologies will enable human enhancement and chemical-biological countermeasures.

→ **Precision Warfare:** Digitization and miniaturization will drive the development of precision strikes and effects-oriented capabilities, while exposing new vulnerabilities. Directed energy weapons and hypersonic technologies will redefine the dynamics of modern warfare.



In conclusion, the technological landscape of 2044 promises a future in which intelligence, connectivity and decentralization redefine the nature of conflict. As military forces adapt to these changes, the integration and operation alongside emerging technologies will be critical for maintaining strategic superiority and ensuring operational effectiveness in an increasingly complex and interconnected world.

Conclusion

As we look ahead to the next two decades, it becomes evident that new technologies present NATO with a dual-edged sword of opportunities and risks. On the one hand, these advancements offer unprecedented opportunities for NATO to maintain its technological superiority and enhance the effectiveness of its operations. Embracing emerging technologies can empower NATO forces with innovative capabilities, enabling them to adapt to evolving threats and challenges in the modern security landscape.

On the other hand, alongside these opportunities come significant risks. The proliferation of new technologies raises concerns that potential adversaries and strategic competitors may exploit them in ways that defy ethical, legal and moral norms. This poses a formidable challenge for NATO, necessitating a smart approach in order to navigate these risks effectively.

To address these challenges, NATO must remain vigilant and proactive in its technology adoption and utilization. This requires not only investing in cutting-edge technologies but also developing robust frameworks for ethical, legal and moral considerations. By fostering a culture of responsible innovation and prioritizing the protection of shared values and principles, NATO can mitigate the risks posed by new technologies while maximizing their potential benefits.

The journey ahead for NATO will be defined by its ability to harness the opportunities presented by new technologies while effectively managing the associated risks. By staying true to its core values and leveraging technology as a force for good, NATO can continue to uphold its mission of safeguarding security and promoting stability in an ever-changing world. ✦

Dr Bryan Wells has three major responsibilities. First, he serves as Chair of the NATO Science and Technology Board (STB). Second, he serves as the senior scientific advisor to NATO leadership, ensuring that appropriate and timely S&T-based advice is provided to NATO senior decision makers. Finally, he leads the Office of the Chief Scientist at NATO Headquarters.

REFERENCES

- 1 NATO: "NATO's Science and Technology Trends Report 2023-2043". Available at: https://www.nato.int/cps/en/natohq/news_213088.htm?selectedLocale=en
- 2 NATO STO (Science and Technology Organization): "NATO Chief Scientist Reports". Available at: <https://www.sto.nato.int/Pages/NATO-Chief-Scientist-Reports.aspx>
- 3 RAND Corporation: "The Next Era of Geopolitics: The Coming Age of Artificial Intelligence". Available at: https://www.rand.org/pubs/research_reports/RRA2662-1.html
- 4 Asia Pacific Defence Reporter: "SIPRI: NATO – A New Need for Some Old Ideas". Available at: <https://asia-pacificdefencereporter.com/sipri-nato-a-new-need-for-some-old-ideas/>
- 5 Stockholm International Peace Research Institute: "NATO: A New Need for Some Old Ideas". Available at: <https://www.sipri.org/commentary/essay/2024/nato-new-need-some-old-ideas>
- 6 Eurasia Review: "NATO: A New Need for Some Old Ideas – Analysis". Available at: <https://www.eurasiareview.com/28032024-nato-a-new-need-for-some-old-ideas-analysis/>
- 7 NATO Parliamentary Assembly: "Defence Committee Launches 2024 Agenda: United States-focused Advanced Defence Technologies and Capabilities Top the Agenda". Available at: <https://www.nato-pa.int/news/defence-committee-launches-2024-agenda-united-states-focused-advanced-defence-technologies-and-capabilities-top-the-agenda>
- 8 MENAFN: "The Dawn of AI In Defense: Transforming Military Strategy". Available at: <https://menafn.com/1108064670/The-Dawn-Of-AI-In-Defense-Transforming-Military-Strategy>
- 9 The Hague Centre for Strategic Studies (HCSS): "TAG Transatlantic Compact 2024". Available at: <https://hcss.nl/report/tag-transatlantic-compact-2024/>
- 10 ISSUU: "NITECH10". Available at: <https://issuu.com/globalmediapartners/docs/nitech10>
- 11 MENAFN: "The Dawn of AI In Defense: Transforming Military Strategy". Available at: <https://menafn.com/1108064670/The-Dawn-Of-AI-In-Defense-Transforming-Military-Strategy>
- 12 TRADOC Mad Scientist Blog: "Rise of Artificial Intelligence: Implications to the Fielded Force". Available at: <https://madsicblog.tradoc.army.mil/485-rise-of-artificial-intelligence-implications-to-the-fielded-force/>
- 13 NATO Allied Command Transformation: "ACT Strategic Foresight Work". Available at: <https://www.act.nato.int/activities/allied-command-transformation-strategic-foresight-work/>
- 14 The Sunday Guardian Live: "AI on the Battlefield". Available at: <https://sundayguardianlive.com/opinion/ai-on-battlefield>
- 15 Information Age: "How AI will shift the security landscape in 2024". Available at: <https://www.information-age.com/how-ai-will-shift-the-security-landscape-in-2024-123509870/>
- 16 Royal United Services Institute (RUSI): "Reimagining Geopolitics in the Age of AI". Available at: <https://rusi.org/explore-our-research/publications/commentary/reimagining-geopolitics-age-ai>



INTERVIEW

I N T E R V I E W

NATO'S FIRST MACHINE-LEARNING TOOL: AI FELIX

“If Ray Kurzweil's prediction is correct, before 2030, humans and AI will merge into a super-intelligence and thus reach the next stage of human evolution. Whatever happens: remember that today's AI is the worst you'll ever use!”





Recently, the Joint Warfare Centre Public Affairs Officer Ms Inci Kucukaksoy interviewed **Mr Simon Purton** and **Dr Arnau Pons** to discuss an exciting and timely addition to NATO's toolbox: AI FELIX. Simon Purton is the Capability Requirements Section Head at Headquarters Supreme Allied Commander Transformation (HQ SACT) in Norfolk, Virginia. He is a mathematician with an avid interest in machine learning. His HQ SACT colleague Dr Arnau Pons is an AI Product Manager and Operations Research Analyst. His background is in aeronautics and astronautics.

JWC: Simon, in 2019 you wrote an article for The Three Swords called "Learning about Learning Machines." What has happened since then?

Purton: When I wrote the article, I wanted to capture some of the basic concepts about learning machines. Plus, I wanted the reader to understand the difference between how humans make decisions and how decisions may get made otherwise — it's in this aspect that artificial intelligence has some advantages over us. However, I still maintain that while machines have some advantages, that does not make them superior decision-makers compared with people. When I was writing the article, I was also proposing to HQ SACT leadership that they fund an artificial intelligence experiment. I couldn't really get any traction at the time, so I submitted a proposal as part of the ACT Innovation Challenge. The proposal won.

Pons: Simon describes himself as one of the parents of AI FELIX, which is the name of the bundle of AI applications we have in HQ SACT.

Purton: I refer to myself as one of the parents, because there were a few of us involved in bringing AI FELIX into being. A team effort.

JWC: You said you couldn't get any traction with your leadership. Why was that?

Purton: As we are NATO's Strategic Command for transformation, our leadership's scale of ambition is very large. The proposal was not very large. In fact it was quite modest. I wanted to experiment with AI to automate some of the



very important, but very repetitive work that some of our staff have to do here. The proposal wasn't about winning wars or delivering new wonder weapons. It was about fixing some of the knowledge management issues that we all have. And it was focused on something called the Command Read Board.


JWC: Can you explain the Command Read Board to our readers who may not be familiar with the term?

Pons: Just about every command has some point of entry for incoming correspondence. In HQ SACT, that is called the Command Read Board. It's a function that ingests reports,

personal letters, taskings from NATO HQ... anything formal.

Purton: We did a podcast on this. I learned that for two people in our command — and across the NATO Command Structure for around 40 people — their daily job was to read incoming correspondence, to upload the file into our document repository, add metadata, and determine if there were any tasks. And if necessary, they created a new entry in our tasking system for review by our executives' committee. All this needed to be done for 100 to 200 documents a day, every day. If we had a holiday and Europe didn't, then they would have twice as much work after returning from





"We have built an AI that leverages the knowledge and experience of humans to help them in their daily work by making it faster — but more importantly, the work is more meaningful."

their day off. A very, very important job, but also very repetitive work.

Pons: By the end of 2019, we had automated this job. Removed humans from being "in the loop" and put them "on the loop," reviewing the recommendations of the computer models.

JWC: And you achieved this by harnessing AI?

Pons: Yes, absolutely. The tool has an understanding of the directives that we use and we developed a model of that, but we also trained it on around 20,000 pieces of incoming correspondence, because sometimes a person reads a document and makes a judgement that the directive doesn't cover. So the AI learned its own way of judging incoming documents. We put our tool up against people to determine how good it was. It's no worse than people at making judgements on what a document is and who should read it, and it is much better at populating the metadata fields because it can do that very quickly. With AI FELIX, we achieved an 80%-time reduction in processing the daily incoming correspondence.

JWC: What are these metadata fields that need populating for every entry?

Pons: They are the data you have to enter, such

as title and author, classification, keywords and topics. They are also the data our search engines use to find documents. We took our AI tool and ran that on the entire back catalogue and brought all the documents in the archive up to the same level with their metadata. And now our regular search tools are much more effective because our metadata is better.

JWC: And this is "AI FELIX"?

Pons: Yes. The two people that Simon mentioned who were working on our Command Read Board? One of those was Yeoman First Class Felix. We named the tool after him. This is the human side of the AI FELIX story, and the core of our mission. AI FELIX stands for "Artificial Intelligence Front End Learning Information Execution." We have built an AI that leverages the knowledge and experience of humans to help them in their daily work by making it faster — but more importantly, the work is more meaningful.

Purton: The Command Read Board was a starting point. Automating the ingestion of incoming correspondence was one part of our vision for artificial intelligence. It was an example of how AI could support a small process and release staff from menial tasks to allow them to focus on more important things.

So less of "what is this document?" and rather more of "what should this command do about this document?" However, we always had bigger ideas. We wanted not just to automate staff work, but to create a digital army of staff officers. That was the next step. We were working on digitizing the knowledge base and then we figured that every staff officer could have a digital assistant to support them in their work.

JWC: And is this the AIDA project I have heard about?

Pons: No, AIDA comes later. First, we digitized every single file in our entire public library. I should clarify that we have public and private folders. If you put something in your public folder, then you are sharing that with everyone in your organization. If you put something in your public folder, anyone [in NATO] can see that. We used artificial intelligence to put all these public files into a massive database. Simon calls it the "Knowledge Universe." Everything in it is positioned relative to everything else by similarity.

Currently, the Knowledge Universe has around 600,000 things in it. And that's not just documents; it's people. It reads your job description and you can add your interests and skills. And it's also our taskers. If you search for something, it goes to that part of



the Knowledge Universe and it shows you the documents, the people and the tasks.

JWC: So it's like a super search function?

Pons: Search is part of it, but more importantly it uses a recommender function, so if someone uploaded a file somewhere that was of interest to you, the tool brings that to your attention. It's like Netflix — if you watch a lot of Arnold Schwarzenegger movies, it starts recommending Sylvester Stallone movies, or Jean-Claude van Damme. And if you read the article and like it, then the Knowledge Universe refines its model of what it thinks you want to see.

The next time a document that you might want to see is uploaded, it will inform you. So the artificial intelligence keeps track of every user's interests. I think we have around 600 users at the moment, so it's juggling little AI versions of all those people in its memory.

JWC: So to sum it up: you basically automated the Command Read Board and created a Netflix-style file recommender for all of HQ SACT's staff?

Purton: AI FELIX is running in HQ SACT, Supreme Headquarters Allied Powers Europe, Allied Air Command, Joint Force Command Norfolk... And by the end of 2024, it will be integrated with the new roll-out of a staff officer's basic knowledge management toolset. It should be in the hands of over 15,000 staff across the NATO Command Structure.

JWC: That is an impressive feat.

Purton: And it is not even the best part yet. I had been getting AI FELIX going, but Arnau really started going exponential! We unleashed the AI tool across the enterprise, which led to our cataloging of all of the files — oh, and I know what people are going to think: "Need To Know!" AI FELIX respects the need-to-know principle. It cannot show you something to which you shouldn't have access. This is akin to a law of physics in our universe. Anyway, as I was saying: Arnau wanted to really push the envelope. Tell them about AIDA!

Pons: So searching is fine, and recommendations are fine. But why search? Why not engage

in a discussion? Why not ask for the answer to your question? AIDA has a large language model (LLM) that leverages NATO domain knowledge to provide answers to NATO questions in different languages. We utilize retrieval-augmented generation (RAG) in order for the LLM to extract the relevant context to your question. This tool resides on the NATO classified network and draws from hundreds of thousands of documents across different security classifications.

NATO produces hundreds of documents every day and its document repositories contain millions of documents, so it is impossible for a person to always find the right information. With AIDA, users can query this vast knowledge universe and obtain relevant answers that include the citations to the references used to produce the response. This ensures traceability of the responses and reduces the risk of LLM "hallucinations."

Our next step is to expand AIDA's functionality by coupling it with AI agents that can conduct tasks such as producing PowerPoint presentations, writing documents by following specific templates, querying internal data-

HOW AI WILL SHAPE OUR PROFESSIONAL LANDSCAPE

➔ Automating Repetitive Tasks:

AI will take over mundane, repetitive tasks, freeing up human workers to focus on more creative, strategic, and value-added activities.

➔ Enhancing Decision-Making:

AI-driven analytics will provide data-driven insights for better decision-making. Whether in finance, marketing, or operations, AI will sift through vast datasets to identify patterns and trends. Predictive models will guide strategic choices, risk assessments, and resource allocation.

➔ Personalized Experiences:

AI will tailor experiences for employees and customers alike. Chat bots will handle queries, while recommendation engines will suggest relevant content. In human resources, AI can personalize learning paths, career development, and performance feedback.

➔ Collaboration with AI:

Humans and AI will collaborate seamlessly. Imagine brainstorming sessions with AI-generated ideas, followed by human refinement. AI-powered virtual assistants will schedule meetings, manage calendars, and even draft emails.

➔ Upskilling and Reskilling:

As AI automates certain tasks, workers will need to acquire new skills. Organizations will invest in upskilling and reskilling programmes. Learning platforms will adapt to individual needs, suggesting relevant courses based on career goals.

➔ Ethical Considerations:

AI will force us to grapple with ethical dilemmas, such as, how do we ensure fairness, transparency, and accountability in AI systems?

➔ Remote Work and Flexibility:

AI-powered tools will facilitate remote work. Virtual collaboration platforms, AI-driven project management, and automated workflows will enable seamless remote collaboration.

➔ Healthcare and Well-Being:

AI will enhance employee well-being. Wearables will track health metrics, AI chat bots will provide mental health support, and personalized wellness plans will become common.

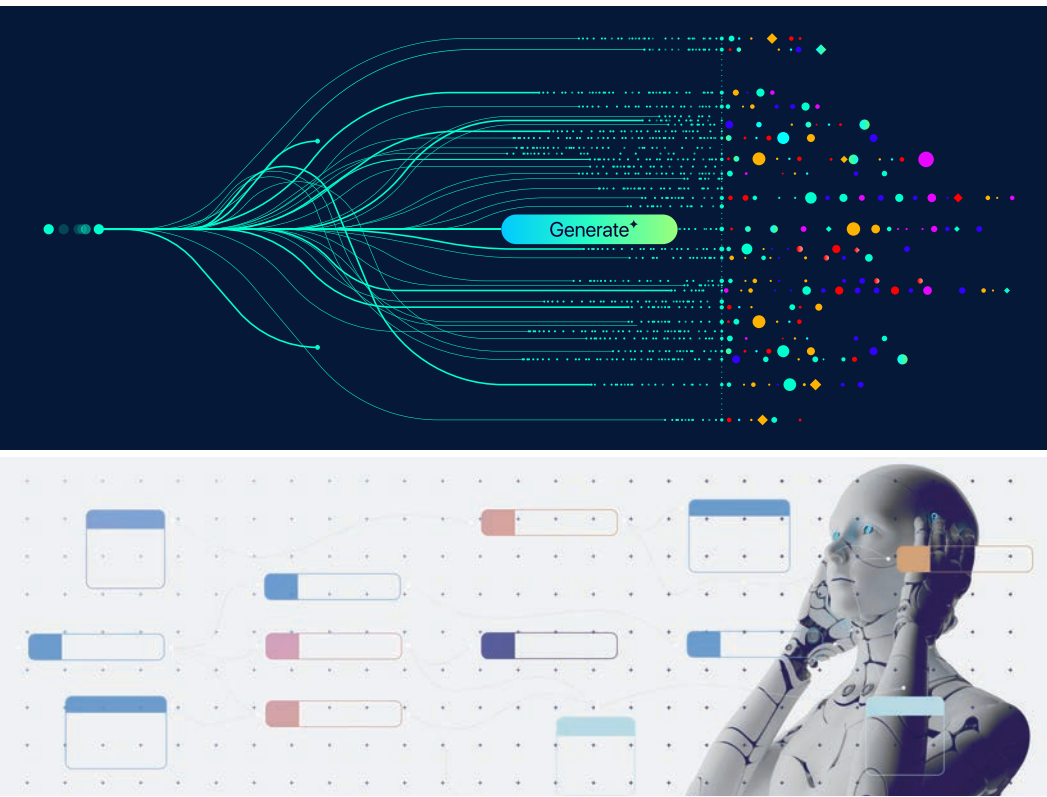
➔ Supply Chain Optimization:

AI will optimize supply chains, predicting demand fluctuations, managing inventory, and ensuring timely deliveries.

➔ Creativity and Innovation:

Contrary to fears of AI stifling creativity, it will actually amplify it. AI will accelerate innovation by automating research, simulations, and design iterations.





bases, and interacting with other NATO tools.

JWC: What does AI mean for our future, and for the future of NATO in particular?

Pons: Ideologically, I am a "techno-optimist." I am eager to leverage the benefits of AI. So yes, there will be drones conducting warfare autonomously in the near future, but I do not see [the artificial superintelligence] Skynet from the "Terminator" films taking over humanity. There are also very important concerns about job displacements and impact on society due to a wave of automation powered by AI. As it occurred in past technological waves, our jobs will evolve and adapt to these incredible new AI tools that we will have at our disposal.

Hopefully, we will use AI to make our work more meaningful by focusing more on adding value rather than performing manual tasks. The goal is to exploit our potential by doing what we do best and letting the machines do the work that can be automated. Exercising our judgment, understanding a completely new scenario by connecting the dots with our experience, unleashing our ingenious creativity — those are the skills at which we excel as humans.

It would be too cliché at this point to ask an LLM to summarize the most consequential trends in the field of AI. But actually, LLMs will struggle with the exponential nature of this technology since it is trained with human data. As humans, we are infamously bad at seeing exponential trends and making accurate projections over time. However, human imagination is boundless and incredibly creative, so let's use imagination to envision our future enabled by AI. In the short term, large language models will gradually converge in accuracy and quality as they are mostly trained on the same data (the Open Internet). This will lead to a commoditization of LLMs, which will combine with another key trend: open-source models catching up and democratizing AI space. With ever more powerful open-source models, defence organizations will have more flexibility to leverage LLMs in secure enclaves that maintain the privacy of information. This has indeed been our approach to AIDA at ACT.

JWC: So what's next?

Pons: Artificial intelligence agents. With LLMs we can now speak to computers using natural

language. However, LLMs can provide much more than written responses; they can code, they can interface with other applications, they can reason and devise an action plan taking multiple steps using different tools to complete a task. That's the point when we'll be able to ask an AI agent to use our data, external applications and open-source information to book our upcoming business trip, write a strategic point paper, create a personalized training course, or draft a plan.

Looking further, as LLMs and AI agents get better, more accurate, and more consistent, we will be able to delegate more tasks to them and use agents as personal executive assistants. Every staff officer will head a team of multiple digital agents to conduct specific tasks, and those agents in turn will work collaboratively to succeed.

For instance, one digital agent will conduct research on a topic using multiple sources, another will draft a presentation for decision-makers, another will fact check the presentation, another will red-team the conclusions, share with colleagues to incorporate their comments (including emailing them and applying their inputs), and finally doing your review before submission. This personal executive assistant will have intimate knowledge of how you want tasks to be done, when to act, and how to prepare you in anticipation of incoming work, so that you can confidently delegate tasks on a regular basis.

The ultimate goal is to automate menial tasks, augment your intelligence and unleash your creativity. If you're a fan of the "Ironman" comics and the movies, you see how Tony Stark works with his AI, J.A.R.V.I.S. Jarvis does a lot of heavy lifting, but Tony Stark is providing the direction and the inspiration.

If [U.S. computer scientist and inventor] Ray Kurzweil's prediction is correct, before 2030 we will reach general artificial intelligence, meaning that humans and AI will merge into a super-intelligence and thus reach the next stage of human evolution. Speculations on what could happen after that may seem to belong more in the realm of science fiction, but 19th-century readers thought the ideas of Jules Verne would always remain fiction, too... Whatever happens: remember that today's AI is the worst you'll ever use! ✦

ON THE COVER

Photo by Yrjan Johansen

JOINT WARFARE CENTRE

2030

TRANSFORMATION
PROGRAMME



"THE JOINT WARFARE CENTRE SITS ON THE CAMPAIGNING CONTINUUM AND DELIVERS DETERRENCE FOR THE ALLIANCE."

by Colonel Kevin Rafferty

British Army

Deputy Chief of Staff

Exercise, Training and Innovation Directorate

NATO Joint Warfare Centre

Introduction

At the NATO Summit in Brussels in June 2021, former NATO Secretary General Jens Stoltenberg stated that NATO 2030 is "about making sure our Alliance remains ready today to face tomorrow's challenges." Since then, the Russian full-scale invasion of Ukraine delivered a shock to the geo-strategic security environment, resulting in a paradigm shift for Euro-Atlantic security and the global rules-based international order. This event has proven to be a catalyst for the Alliance to transform to meet the geo-strategic security environment.

At the political level, the Alliance has grown to 32 members with the accession of Sweden and Finland. At the strategic level, Allied Command Operations (ACO) advances towards its certification as a strategic warfighting headquarters on Exercise STEADFAST DETERRENCE 2025. At the operational level, the NATO Response Force (NRF) has transformed into the Allied Reaction Force

(ARF), which was certified during Exercise STEADFAST DETERRENCE 2024. The ARF recently deployed to the Western Balkans for further training and to support the NATO-led Kosovo Force.

The transformation across the entire Alliance has resulted in the development of the new family of plans and New Force Model to meet the evolving requirements of the Defence and Deterrence of the Euro-Atlantic Area (DDA). It is an exciting time to be in NATO and the Joint Warfare Centre (JWC), with the political ends, supported by the economic means, to transform the military ways.

These changes have resulted in a profound shift in the JWC's strategic mind-set to deliver meaningful and sustainable change and have provided added impetus to our activities in support of the NATO 2030 agenda.

As the nexus between Allied Command Operations (ACO) and Allied Com-

mand Transformation (ACT), the JWC finds itself well positioned. ACO, the "warfighters," set the requirements to ensure that NATO can "fight tonight," complemented by ACT, who are leading the development of the "fight tomorrow" capabilities.

The JWC acts as a transformational hub between ACO and ACT, supporting the operationalization of the "fight tomorrow" concepts and blending them with the "fight tonight" requirements to support the Alliance's continual evolution and help maintain its warfare advantage. The demand from the warfighters is generally for greater realism, which has been implemented to an unprecedented degree within the new STEADFAST exercise series.

But what does this mean for the JWC, and how does the JWC transform to meet the NATO 2030 and beyond requirements? How will this deliver tangible changes to the JWC's outputs in the short, medium and longer term?



ACO "fight tonight," warfighters, short- to medium-term, conceptually "the war," exercises and training

JOINT WARFARE CENTRE

The nexus between the Strategic Commands operationalizing concepts; implementing warfighter requirements

Warfare development, medium- to long-term, conceptually "a war," ACT "fight tomorrow"





Above
Colonel Rafferty, the author, during NATO Exercise STEADFAST DUEL 2024, where he served as the Chief of the Exercise Control team, which involved more than 700 personnel. Photo by Tore Ellingsen

To answer some of these questions, and to establish a baseline understanding, the JWC established an inclusive "Fit for Future" Team.

Transformation Journey

Transformation has been a recurring theme for NATO as it adjusts to the evolving threats and challenges of our time. Similarly, the JWC adjusts and evolves in accordance with the requirements of both ACO and ACT. It does this through focusing on continuous improvement, lessons learned and a forward-looking way of working.

Our future horizon scanning approach, in advance of the NATO 2030 Agenda, led to the publication of the JWC Future Exercise Support Capability Study in 2021, and led us to prioritize future change initiatives and create our dedicated JWC Fit for Future Team.

The study produced three key outputs: describing both the capabilities and the capacity challenges of the JWC, it proposed actions for incremental improvements to exercise delivery outcomes, and identified internal and external improvements aimed at exercise delivery.

The Fit for Future Team set about translating the study into tangible short- to medium-term activities that directly improved the

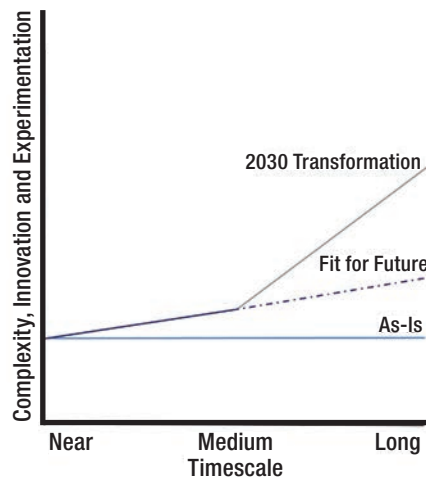
efficiency and effectiveness of JWC-delivered exercises as well as supporting ACT to operationalize the NATO Warfighting Capstone Concept (NWCC) and the Warfare Development Agenda (WDA). In addition to coordinating and providing greater understanding across the JWC, the principal outputs led to the prioritization of a list of change projects and initiatives

aligned to specific exercises and the formulation of more strategic future organizational thinking. Fit for Future provided the baseline understanding for the JWC to focus on immediate, near- to medium-term change improvements. Furthermore, it enabled the JWC to develop its thinking on longer-term (2028–2030 and beyond) transformation imperatives.

WITH A VIEW to supporting NATO 2030 and the Strategic Commands' (SC) analysis, the JWC 2030 Transformation Programme set about defining the JWC's vision, purpose and outputs in support of and informing the SCs four key requirement areas (KRAs): digital backbone; readiness; enabling and employment capabilities; and military thinking and command.

NATO's 2030 agenda and the SCs KRAs provide clear guidance and help to define a roadmap for the JWC's 2030 Transformation Programme, speaking directly to the JWC's training, exercise and warfare development roles. They reinforce the JWC's contribution to NATO's deterrence architecture as well as its readiness and resilience.

Alongside collective training and exercises, warfare development provides a focus for future innovation, experimentation and concept development. This directly supports



ACT and aligns with SACEUR's guidance for exercise designers to incorporate new ideas and media into training.

The ambition of NATO 2030 enables the JWC to focus on transforming future collective training and exercises and warfare development outputs, whilst also ensuring the JWC has the appropriate operating model to deliver them. Aligning with ACT's initiatives to that end, the JWC's 2030 Transformation Programme will systematically consider the JWC's future vision, purpose and outputs and the underpinning workforce, organizational structure, processes, infrastructure and technology requirements.

ONE OF THE KEY levers to enable this work is our recruitment of Project-Linked NATO International Civilians (PLNs). PLNs provide fresh thinking and expertise to augment the existing workforce and will help to sustain and support the JWC's transformation to support the "fight tomorrow" requirements. Using the military levels of war as analogy, the PLNs will be employed at the operational level, linking the strategic direction of ACT and ACO, and aligning it with the tactical-level outputs of the JWC in terms of collective training and exercises and warfare development.

An additional layer of complexity is the

"The JWC adjusts and evolves in accordance with the requirements of both ACO and ACT."

need to design, develop, test, and integrate new ways of working to deliver the JWC's future outputs. To do this, one might envision the PLNs having one foot in the branches, their body in the programme development area, and the other foot in the strategic space.

Fundamental is their understanding of the JWC's current outputs, their ability to synthesize the strategic direction of future requirements, and their capability to design, develop, and define new ways of working and output delivery mechanisms.

Providing the evidence for the future operating model of the JWC, including its workforce balance, structural change, new and improved processes, infrastructure require-

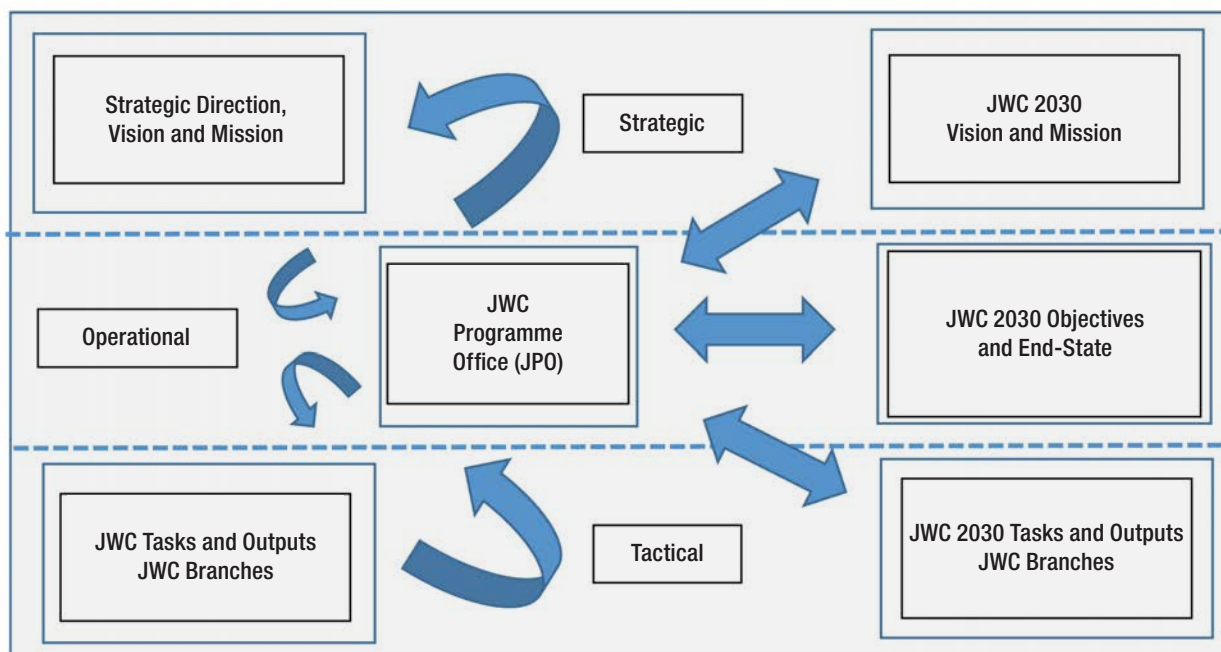
ments and technological maturity levels, is an undertaking that requires the commitment and contributions of the entire JWC One Team.

From a system design perspective, the PLNs, working with the existing workforce, support the JWC 2030 Transformation Programme, operating predominantly from the middle tranche, supporting the strategic and tactical/task-orientated work streams.

The integration, coordination and alignment to the future vision, purpose and outputs of JWC 2030 and beyond is managed and overseen by a central JWC Programme Office (JPO) (see the graphic below).

Conclusion

In conclusion, embracing NATO 2030 is not just a strategic imperative for the JWC — it is a pathway to reinforcing our relevance and operational effectiveness. By focusing on innovation, resilience and adaptability, we will shape the future of the JWC and NATO's warfare advantage. We will take on the challenges with a strong commitment to building a safer and more secure world for future generations. Together, we can seize the opportunities of NATO 2030 and chart a course towards a bright future for the entire Alliance. ✦



Above
PLN support to military levels of warfare

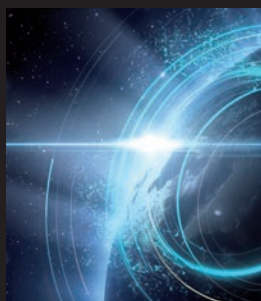
EMBRACING JWC 2030

The Joint Warfare Centre (JWC) has established the JWC 2030 Transformation Programme to ensure the JWC remains aligned to the NATO 2030 agenda, and continues to be forward-thinking, resilient and effective, in an era defined by rapid technological advancement, geopolitical shifts and evolving security threats. Throughout its history, the JWC has strived to improve and to fulfil its motto of "making NATO better." Similar initiatives have been implemented here since 2013, resulting in the Centre's first organizational culture programme and first climate survey in 2014, its matrix structure in 2015, and its first continuous improvement survey in 2020. NATO 2030 signals a new era for the JWC, introducing its most comprehensive change management programme to date.

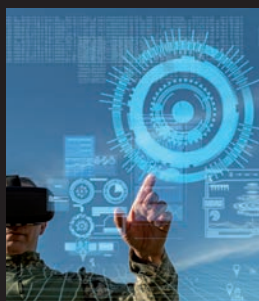
JOINT WARFARE CENTRE'S CAPABILITY DEVELOPMENT FOCUS AREAS



Wargaming



Multi-Domain Operations



Digital Transformation



Strategic-Level Exercises



Readiness

THE IMPERATIVE FOR CHANGE

For the JWC, embracing change is not just an operational necessity, it is also about thriving in an increasingly dynamic and unpredictable environment. Rapid technological advancements, hybrid warfare tactics, and geopolitical shifts demand that we adapt proactively to ensure our relevance and effectiveness in delivering collective training and exercises (CT&E) and support NATO's warfare advantage.



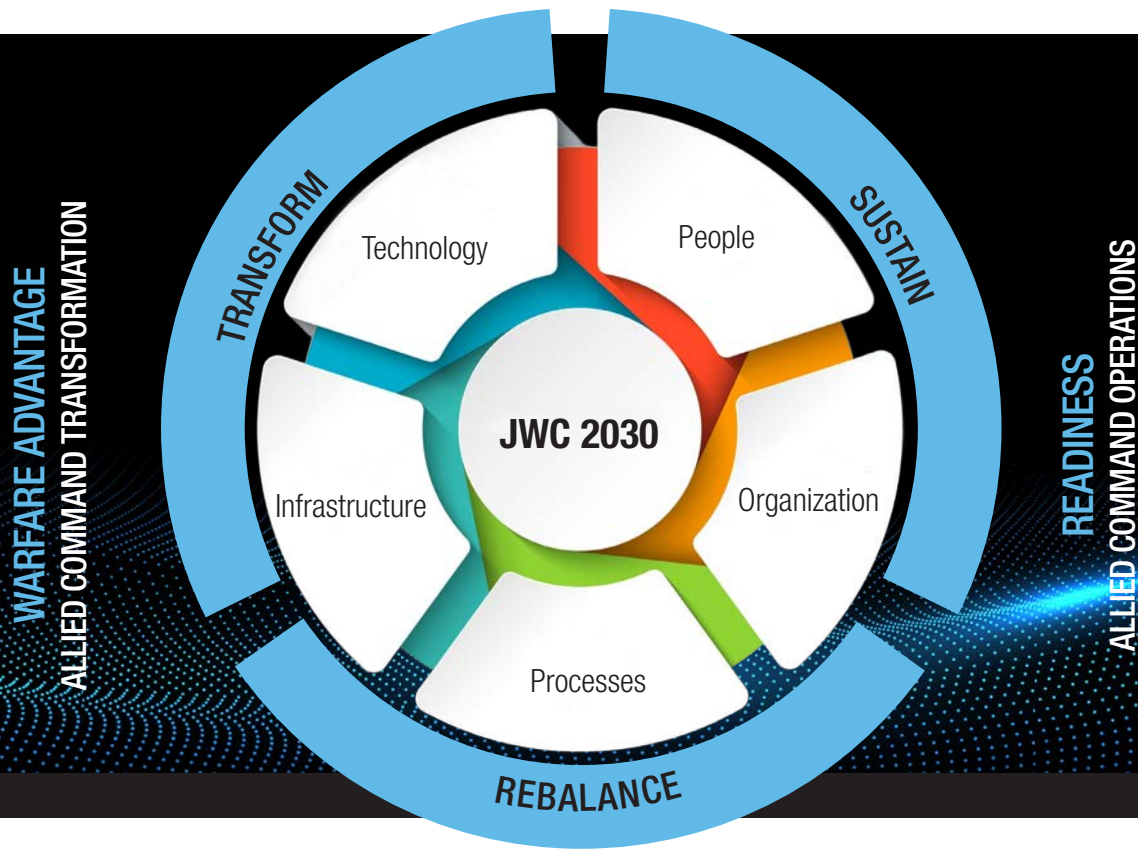
STAYING AHEAD OF THE CURVE

Embracing NATO 2030 offers the JWC a unique opportunity to position ourselves as leaders in warfare concept advancement and CT&E provision. By tapping into cutting-edge technology, enhancing our interoperability and partnerships, and fostering strategic agility, we can deliver more realistic and impactful exercises that directly contribute to NATO readiness. From cyber warfare simulations to multi-domain operational scenarios, embracing NATO 2030 enables us to push the boundaries of innovation and ensure our effectiveness for the future.

BUILDING A CULTURE OF INNOVATION

At the heart of embracing NATO 2030 lies the need to foster a culture of innovation within the JWC. This means encouraging experimentation, collaboration, and knowledge-sharing among staff members, empowering them to think creatively and adapt quickly to changing circumstances. By implementing a mind-set of continuous improvement, we can unleash the full potential of our organization and drive positive change that benefits not only the JWC but the entire NATO community.





Above
JWC 2030 Transformation Programme imperatives (Sustain, Rebalance and Transform) and "enablers"

"As Financial Controller, I am committed to ensuring the JWC's financial practices align with the NATO 2030 ambition. Our 'Sustain – Rebalance – Transform' journey is vital for providing the resources and oversight needed to support the JWC's evolving role within the Alliance.

NATO 2030 presents both challenges and opportunities, and it is our responsibility not only to adapt but to excel in this dynamic environment. A key part of this is transforming the way we work to make us more agile and improve our ability to scale. By modernizing financial processes and embracing new technologies, we can streamline operations and respond more effectively to emerging needs. This transformation will support the development of cutting-edge capabilities, strategic-level exercises, and readiness initiatives that are central to our collective defence.

Effective financial management is essential to ensuring the JWC remains innovative, adaptable, and responsive to NATO's requirements. It is an exciting time to be part of NATO, and I am proud to contribute to this transformative effort."

"By modernizing financial processes and embracing new technologies, we can streamline operations and respond more effectively to emerging needs."

Helena Potter
Financial Controller
NATO Joint Warfare Centre





Colonel Rüdiger Schönrade
Deputy Chief of Staff, Support
NATO Joint Warfare Centre

"Transforming the JWC to meet the Alliance's demands of 2030 and beyond needs an analysis of the underpinning workforce, infrastructure and technology requirements. The JWC has developed a number of highly technical networks and processes for the simulation and global coordination of its exercise activity, resulting in unique requirements. As NATO transforms, the speed and complexity of exercise activity must be supported by ever more capable technical equipment, people and more complex networks. The digital backbone of the JWC needs to be developed, thus supporting one of the Strategic Commands' Key Requirement Areas.

In addition, we have to consider the JWC's requirement to construct and build office and exercise space adaptable to future ways of delivering exercises. With the recent drive for distributed and remote working options as well as with upcoming technical requirements to support future exercises, the JWC's Support Directorate must ensure incremental adaptation of the JWC 2030 Transformation Programme findings."

"As NATO transforms,
the speed and complexity
of exercise activity must
be supported by ever
more capable technical
equipment, people and
more complex networks."

"We need to balance
supporting NATO's effort of
increasing readiness today
with the long-term aim
of keeping our
warfare advantage."

"The NATO 2030 agenda aims to make the Alliance stronger and ready for the future. Our JWC 2030 Transformation Programme supports this aim. We will identify, define and implement change initiatives focused on people, organization, processes, infrastructure and technology. We need to balance supporting NATO's effort of increasing readiness today with the long-term aim of keeping our warfare advantage.

To get the most out of our Transformation Programme, we stand to benefit from a holistic view of how Allied Command Transformation (ACT) will transform in the future. As the Director of Management, I think it is very important to make sure we sustain and deliver our programme of work, whilst we rebalance and transform to ensure we are fit for the future. With the security environment changing at speed, we need to stay vigilant, adaptive and connected to ACT changes."

Colonel Petter Bjørge
Director of Management
NATO Joint Warfare Centre



I N T E R V I E W

For this issue of The Three Swords, we interviewed four JWC staff members who fully embrace NATO 2030 through their work: Lieutenant Colonel Tony Lancashire, Head of the Content Branch in the JWC's Exercise Production Division; Lieutenant Colonel Julie Ann Janson, Military Assistant to the JWC Deputy Commander and Chief of Staff (DCOM/COS); Wing Commander Timothy Monk, Head of the Resources, Planning and Analysis Branch; and Mr Paul Sewell, the JWC's specialist for organizational development and culture.



Tony Lancashire
Exercise Production



Julie Ann Janson
DCOM/COS Office



Timothy Monk
Resources, Planning and Analysis



Paul Sewell
Organizational Development

What does NATO 2030 mean for the JWC? And how do you feel being a part of this process?

Tony Lancashire: We commenced our NATO 2030 journey with Fit for Future (F3), which was designed to coordinate all the change initiatives that the JWC is facing over the next few years and to enable a coherent sustainable response in the short to medium term. F3 is nested under our JWC 2030 Transformation Programme and directly contributes to NATO 2030. Our 2030 Transformation Programme is designed to cap-

ture some of the big changes facing JWC as a result of the NATO 2030 ambition. F3 not only commenced exercise delivery improvements, it also informed our thinking and placed our culture and our values at its core.

With understanding from our time focusing on F3, we recognize NATO 2030 to be much more wide-reaching in scale and scope, spanning change initiatives in training delivery, processes, structure, workforce, and communication and information systems and infrastructure. The intent of our JWC 2030 Transformation Programme is to bring together all the varied change activity in one place,

providing greater visibility and granularity so that the Command Group can make decisions on the future direction of travel with a greater understanding of how change will impact all aspects of the organization and the people who work here.

Julie Ann Janson: We face numerous global dilemmas impacting NATO. NATO 2030 is essential for addressing these challenges, alongside rapidly evolving technology and shifting geopolitical dynamics. Proactive identification of future challenges and opportunities is crucial for military success. Given the Russian ag-



gression in Ukraine, NATO cannot afford to be reactive. The JWC 2030 Transformation Programme is the JWC's contribution to NATO 2030, providing tangible deterrence in various ways. These efforts must align with strategic and operational requirements in our complex global environment. I find these focused initiatives particularly fulfilling as they offer long-term strategic impact and require navigating complex problem sets. While maintaining excellence in our current tasks, the JWC must also remain adaptable to increasingly demanding requirements. By enhancing the NATO Command and Force Structures, the JWC directly contributes to NATO's readiness and deterrence, giving me a strong sense of purpose in improving NATO's capacity and capability.

Timothy Monk: NATO 2030 feels different to some of the previous change programmes in which I have been involved. Rather than a purely internal focus, it offers an opportunity to be a part of something much bigger for the Alliance. The JWC can be at the leading edge of transformation and help to inform the future, not only in collective training but also in the way that NATO evolves to face future threats. This tour at the JWC will be my last in a 40-year military career, so to be closely involved in establishing a secure future for the next generation of NATO personnel is a real privilege.

What is changing?

Tony Lancashire: With a deteriorating global geopolitical picture, the challenges NATO faces are changing significantly and consequently the "ask" on the JWC is transformational. The desire from the frontline commands is for more realistic training, delivered in a more demanding, sustained environment that better reflects real-world situations and utilizes real-world plans. Initiatives such as 24/7 exercising, greater use of free play, training at the strategic level and the employment of real plans have the potential to shift the JWC's focus from validating processes towards testing outcomes. Aligning with major U.S. and other national exercises and incorporating multi-domain operations into JWC training brings further challenges. Of course, changing the JWC output



Above
Colonel Rafferty and Colonel Michael Biankowski, Acting Director of Management at the time, during preparations for the ACT Chief of Staff town hall meeting, July 16, 2024. Photo by JWC PAO

has implications for our internal processes and how we structure and support our workforce, all of which has to be carefully considered and deconflicted to ensure the organization is properly configured and resourced to meet future demands.

Julie Ann Janson: Most of the requirements I have seen come down to a common theme: a desire for greater realism in education, training and exercises. This is completely understandable in the current geopolitical environment, and I agree that this should be a priority focus for NATO. However, I have come to realize that not all of these adaptations require massive change. For example, the JWC already provides a large amount of "free play" and the integration of real-world plans in our exercises. Therefore, we must be careful to avoid change for the sake of change. Innovation is about useful novelty, with an emphasis on "useful." In order to effectively and efficiently adapt to emerging requirements, we must collaborate with our partners and training audiences to articulate what is already working and what truly needs to change. We must keep what works, so that we can spend limited time and resources on making the most impactful and realistic changes.

Timothy Monk: NATO has a long history of adapting to the changing world around it. The end of the Cold War, expansion of the Alliance, out-of-area operations and the two Russian invasions of Ukraine are all challenges requiring different responses. That NATO can adapt so readily is one of the Alliance's main strengths. Now as 32 nations, it is as important as ever that we are ready to face threats together and can work together seamlessly. The JWC has a major role to play in enabling that, and we must ensure that we are configured to support our colleagues in HQs across NATO to meet the challenges we face.

Paul Sewell: We are fortunate to have a workforce with, collectively, hundreds of years of experience. However, much of this experience is locked away because of the way we divide ourselves in our organizations. We see this in our structures and we find it equally in the other typical in/out-group dynamics that divide us, such as national culture, service, gender, generational differences, and so on. Therefore, our mind-set shift should focus on being better at connecting across all of these divides and seeing the value of the broad diversity in our staff.





Is the JWC 2030 Transformation Programme a learning process?

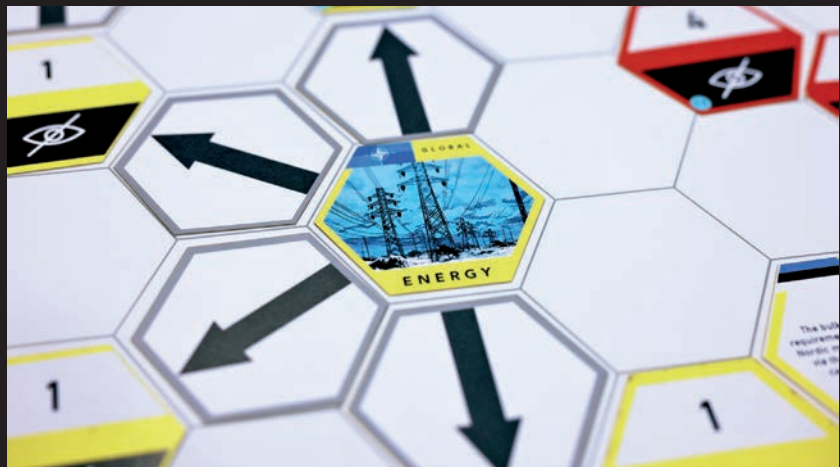
Timothy Monk: Definitely. We are being asked to operate differently, expand into new areas and deliver capabilities and concepts that NATO has not used before. There will inevitably be things that don't work or projects that do not add the value we had hoped. By learning from these experiences, we can refine other projects and focus on initiatives that add the most value and are genuinely transformative.

Julie Ann Janson: Organizational change, particularly at this scale, is always a learning process, and it can be difficult. Yet the cross-talk that emerges from this kind of effort is invaluable in that it builds understanding, breaks down stovepipes, and leads to greater efficiency and novel solutions. When members of the workforce engage with those outside their specialty, they benefit from fresh perspective and ideas. Studies have repeatedly shown that solutions developed with diverse viewpoints are more effective and innovative.

Paul Sewell: Definitely. Which is exactly the reason why I am excited to be a part of this initiative. Consider the challenge: delivering to our programme of work whilst at the same time having a firm focus on the future. The lessons will always be there for us to learn, but we need the eyes to see them as well as the time to reflect upon them. ✦

Right, from top

Part of the playing board of STEADFAST FOXTROT wargame developed by the JWC's wargaming branch; a JWC 2030 Programme brief by the Change Management team; JWC-directed wargame Exercise STEADFAST FOXTROT 2024, for which the JWC designed a medical wargame to test NATO's medical evacuation and medical logistics processes and capabilities. Photos by JWC PAO, Tore Ellingsen and NATO Joint Support and Enabling Command (JSEC)



Have you experienced key moments at the Joint Warfare Centre (JWC) that made you proud of serving here for NATO?



"I arrived here back in 1994, to what was then the Joint Headquarters North. Seven nations were represented there. Now, working at the JWC with its staff from 17 member states – and counting – and with 32 national flags flying over our compound, I find it remarkable how far we have come in the Alliance."

**Brandi Perry, NATO International Civilian,
Staff Assistant to the JWC Commander**



"For me, the delivery of an exercise is the culminating point for the JWC and I am thrilled to be a part of this amazing and unique organization. The amount of people with different skillsets, the diversity, and the focus on innovation – everything comes together in the delivery of high-value training and development of warfighting concepts to make NATO better."

**Lieutenant Colonel Marian Cernescu, Romanian Army,
JWC Exercise Planner**



"I've had key moments at the JWC that made me proud to serve NATO, especially in exercise travel support. Contributing to seamless collaboration among partner nations during critical exercises underscored the vital role of effective travel logistics in achieving NATO's mission."

**Warrant Officer Joseph Mansfield,
Royal Canadian Air Force, JWC Travel Officer**



"The JWC Scenario Branch contributes greatly to NATO's readiness in the changing global security environment by reflecting the challenges of modern warfare in exercise scenarios. I am very proud to contribute as a member of the JWC Scenario Branch alongside highly experienced personnel."

**Major Imren Kalinbacak, Turkish Air Force
JWC Staff Officer Joint Planning**



"I feel very fortunate to have been able to support Exercise Control during exercise delivery at the JWC in previous years. It's a great learning opportunity, which is helpful in my day-to-day job, and a chance to work with people and teams I don't work with on a daily basis."

**Hildegunn Sivertsen, NATO International Civilian,
JWC Finance Assistant**



"The flag raising ceremony when Sweden became a NATO member, one year after Finland joined the Alliance, is something I will remember for the rest of my life. For the first time in 500 years, all Nordic countries are joined in a defence alliance, and NATO grew by two more countries that are experts in Arctic warfare."

**Major Elisabeth Eikeland, Royal Norwegian Air Force
JWC Deputy Public Affairs Officer**



"On September 11, 2023, the U.S. contingent planned a small ceremony to commemorate the terrorist attack of September 11, 2001. We invited the entire JWC community, and I was profoundly moved by how many people attended. It was a visceral reminder that NATO came to our aid when we needed it most – the only time Article 5 has been invoked. This moment so clearly articulated that NATO is not about money, but about people. There is no greater sacrifice than sending mothers, fathers, sons, and daughters into harm's way because another country has been attacked. I am eternally grateful for NATO and I truly believe that we are stronger together."

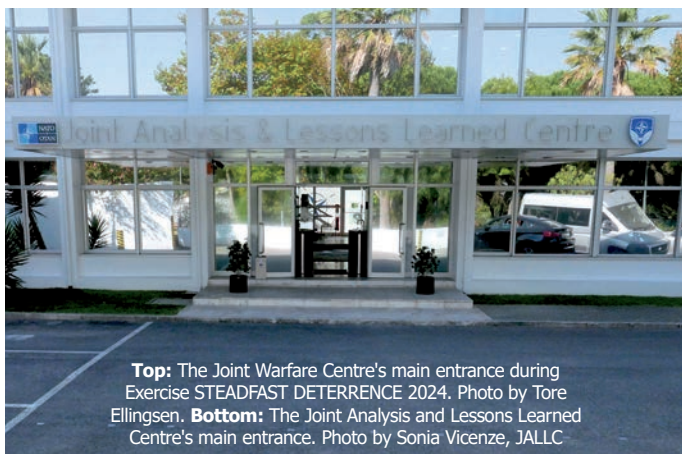
**Lieutenant Colonel Julie Ann Janson, U.S. Air Force
Military Assistant to
JWC Deputy Commander and Chief of Staff**

"If there is one attitude more dangerous than to assume that a future war will be just like the last one, it is to imagine that it will be so utterly different that we can afford to ignore all the lessons of the last one."

— Air Marshall Sir John Slessor



Looking Back to Leap Forward: **LESSONS FOR NATO 2030**



Top: The Joint Warfare Centre's main entrance during Exercise STEADFAST DETERRENCE 2024. Photo by Tore Ellingsen. **Bottom:** The Joint Analysis and Lessons Learned Centre's main entrance. Photo by Sonia Vicenze, JALLC

by **Andrew Eden**
NATO International Civilian
Lessons Learned Analyst
Lessons Learned Branch
NATO Joint Warfare Centre

I am in Lisbon in mid-April, sipping coffee in the Portuguese sunshine and enjoying a *pastel de nata*. These famous cakes were first produced centuries ago by the monks of the Jerónimos Monastery in Belém, a district of Lisbon. In those days, monasteries starched the monks' habits with egg whites. This in turn fuelled innovation: monasteries and convents developed many recipes for sweet treats such as the *pastel de nata* to use up the surplus egg yolks. What began from religious sartorial tradition and economic necessity resulted in one of the most recognizable modern-day icons of Portuguese culture and became a powerful driver of tourism.

I cannot help but ponder this example of an innovative use of resources, as I am in Lisbon for the 2024 NATO Lessons Learned Conference at the Joint Analysis and Lessons Learned Centre (JALLC).





"The man who adapts faster, wins this war; in the face of superior forces, we must be smarter."
— *Stanislav Haider*



Above, clockwise: Live online addresses from Ukraine's Deputy Minister of Defence, Mr Stanislav Haider; and NATO Assistant Secretary General for Operations, Mr Tom Goffus; Major General Constantin-Adrian Ciolponea, SACT Representative in Europe, speaking during the 2024 NATO Lessons Learned Conference. Photos by JALLC

Our main focus this year is on NATO 2030 — a subject that would be unthinkable to discuss without considering the backdrop of events in Ukraine and the Middle East. We are discussing how best to leverage lessons to ensure that we are fit for the future, and innovation will be at the heart of this endeavour.

Over the past few days, we have heard about the progress of NATO's exercise, training, education and evaluation functional services capability development, including initiatives to leverage machine learning to accelerate information exploitation.

We also heard from Ukraine's lessons learned capability: a small but highly focused, agile and creative team who have been leading their armed forces' adaptations to Russian aggression in the past years. Most remarkably, they are a civilian non-profit organization. Through innovation programmes such as DIANA (Defence Innovation Accelerator for the North Atlantic), NATO 2030 and the

Science and Technology Organization's long-term mission to foster military and academic collaboration, NATO is exploring enhanced exploitation of technology, including artificial intelligence and machine learning.

While these present opportunities, there is still room for correction and improvement to support operations within the ethical framework that NATO demands. The potential for applying AI and machine learning to knowledge management is immense; but we are still some way from a flawless environment we can truly trust to replace human insight.

Lessons learned (LL) and information and knowledge management (IKM) are inextricably linked: most often, LL are seen as a subset of the IKM constellation of sources of data, information and knowledge that sustain and grow an organization. IKM can be defined as the exploitation of information to support organizational growth, while LL may be described as a more deliberate change manage-

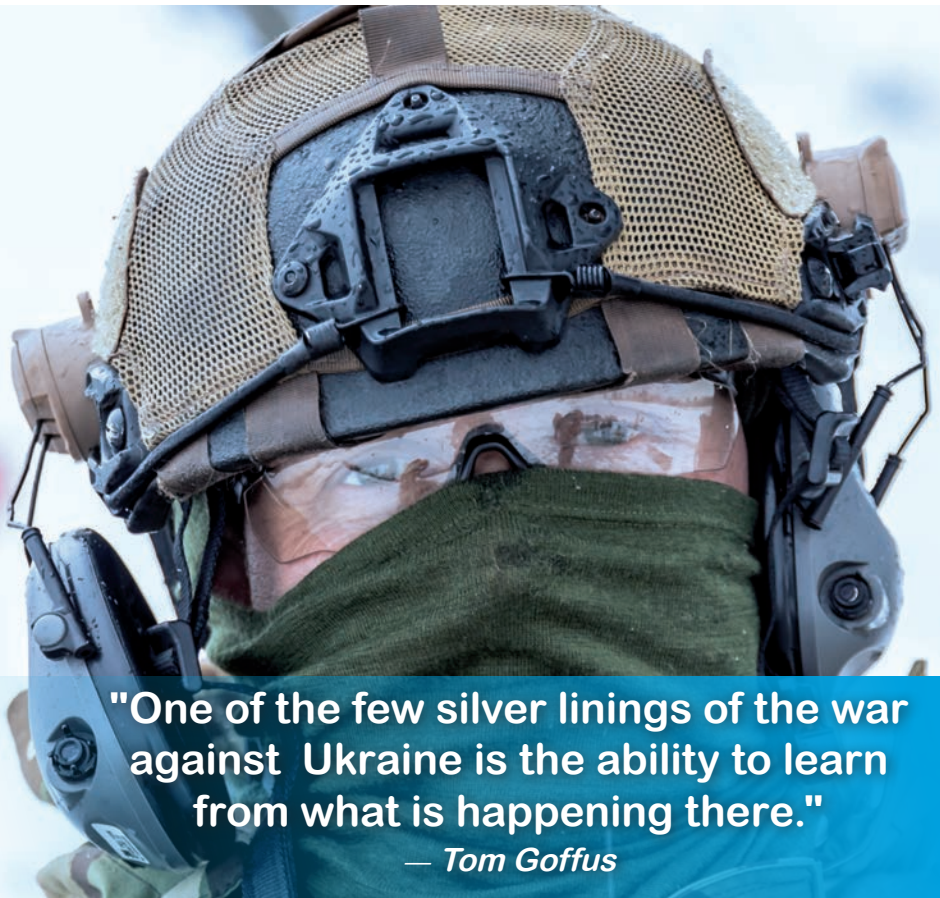
ment process supporting a double-loop learning process.

A key enabler for this is organizational culture, which should nurture an open-minded approach to reflection and learning, resource innovation, and experimentation. While these are luxuries in light of today's operational pressure, they are probably more important than ever. Our Ukrainian colleagues have demonstrated the art of the possible in this respect, under unimaginable circumstances.

RISK IS DEFINED as the outcome of uncertainty, and effective knowledge management can help mitigate risk by identifying the gaps in knowledge that create this uncertainty. A lessons learned process allows us to collate alternatives of practice to provide opportunities or options for the organization.

Given the wide range of exercise practice that the Joint Warfare Centre (JWC) is currently experiencing, such options present





"One of the few silver linings of the war against Ukraine is the ability to learn from what is happening there."

— Tom Goffus

Above: A Ukrainian soldier, training with the Norwegian Home Guard, in Trøndelag, Norway. Photo by Kristian Kapelrud, Norwegian Armed Forces

great potential value. The challenge for our staff is to capture the relevant knowledge and to manage it, which includes identifying and archiving obsolescent practice in order to remain agile and proactive.

Used wisely, a lessons learned capacity allows an organization to reflect on performance and make adaptations. The aim of the lessons learned process is to enable "validated justifications for amending the existing way of doing things," (Ref: AJP-3B). As NATO Senior Mentor Lieutenant General Leonardo di Marco (Ret.) stressed while briefing JWC staff on multi-domain operations early this year: "words have meaning" and this definition is no different. The formal LL process amends doctrine where current practice warrants it. It may not, however, address poor application of doctrine, errors, or departures from standard, whether planned or not.

In the recent context of rapid exercise expansion and modification, exacerbated

by fast-moving real-life events (which have continuously driven adaptations of exercise plans), identifying what is the standard and what is the exception becomes harder. We see many examples of good practice, innovations, exploitations of favourable circumstances and, in particular, overcoming seemingly insurmountable challenges, but more often than not, we find ourselves with a product or process quite removed from the CAX/CPX envisaged in Bi-SC Directive 075-003. And this, I believe, is the strength of the JWC and a strong quality of NATO: the ability to adapt and get it done. It is also the core strength of our Ukrainian colleagues' learning capacity.

THROUGHOUT MY MANY years involved in the NATO LL process, I have managed knowledge via NATO's various document and data management systems. For lessons learned in particular, we have used the LL Management Tool, the JWC Observation Collection Tool,

the NATO LL Database, and the NATO LL Portal. Each has built on the merits of its predecessors, but the human factors of managing change and applying analysis to make decisions remain essential. The capacity and organizational longevity of these human factors present significant challenges in all large, multinational organizations — and especially in those that rotate much of their staff every three years. While our evolving tools will always play a key supporting role, the role of the NATO staff member in driving our organizational learning will remain essential and decisive.

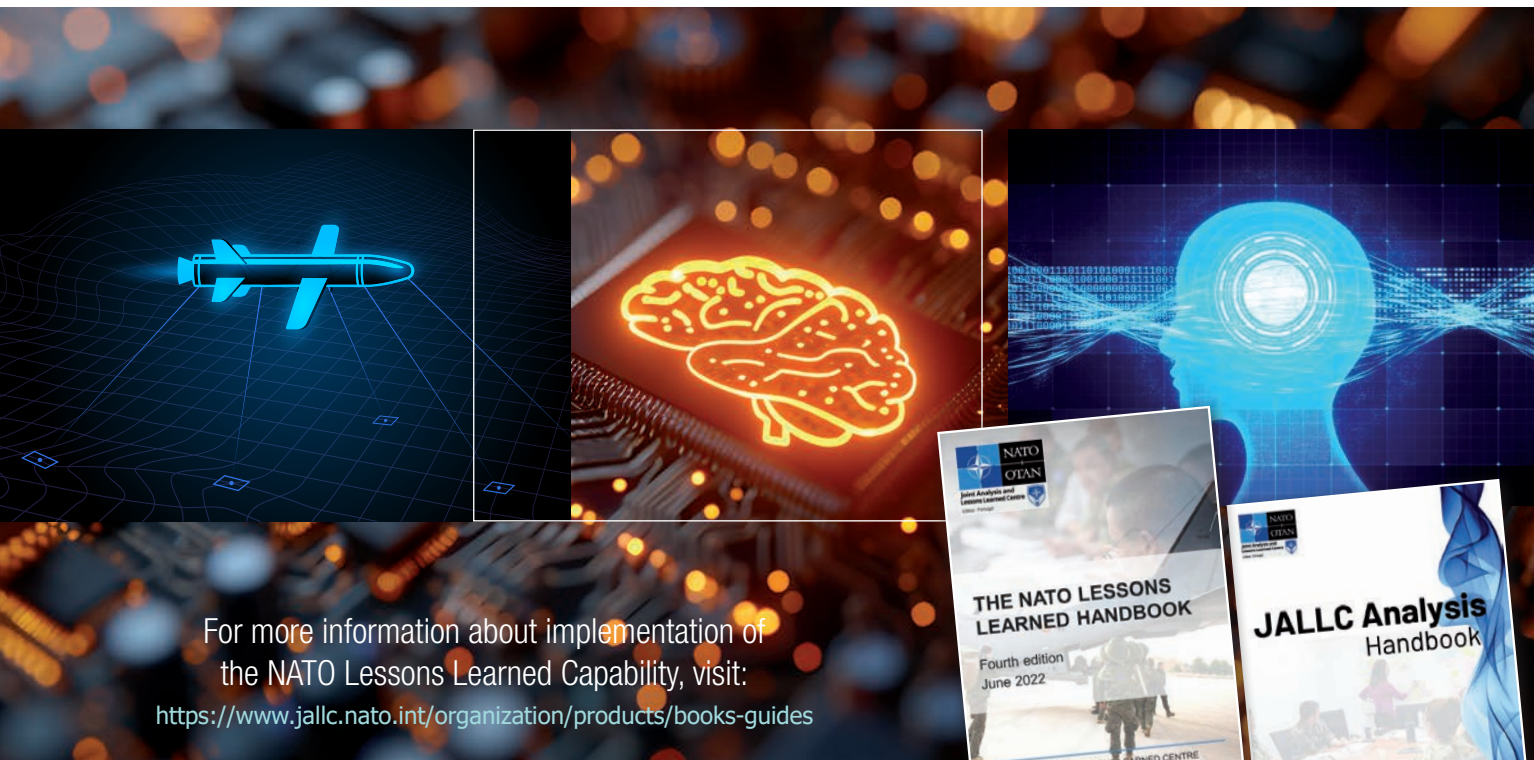
Reflecting on previous practice changes the way we think in several ways, not all of which are helpful. As our JALLC colleagues Jackie Eaton and Helena Worthington explained at the JWC's pilot Analysis Workshop, our first impression or piece of information about a fact or situation, however erroneous, can dominate our attitude despite subsequent arguments and evidence to the contrary.

The term "first impressions last" has proven surprisingly accurate in terms of human perception, and this is decisive terrain in cognitive warfare. It is also a key factor in lesson learning, where our challenge is shifting individuals from the comfort of routine practice, or a stovepiped approach to the detriment of wider effort, often through a painful process of error admission and reflection, into the light of a new and improved practice. Our challenge is discerning between error driven by ad hoc adaptations and error driven by enduring process faults: understanding what to correct, and learning the right lesson.

Returning to double-loop learning, we should consider how we learn and how we innovate. Often learning and innovation result from a collision of circumstances, sponsored by necessity. As the saying goes, luck is when preparedness meets opportunity. Effective knowledge management should allow us to make critical and timely connections and produce innovative results.

In the near future, artificial intelligence will enhance our ability to make innovative connections and find the best solutions, by virtue of the immense power of scanning our bodies of knowledge. What will be critical is the role of experienced and discerning analysts,





"In today's battlespace trench warfare and human-wave infantry attacks share battlespace with drone technology, social media exploitation and cognitive warfare."

operators and leaders to identify the value and to optimize resourcing, execution and promulgation for maximum effect. Our warfighters are critical in identifying opportunities and threats, and contributing those observations into our body of knowledge.

We can also leverage supporting elements of the NATO enterprise: as the Deputy Chief of Staff of Supreme Headquarters Allied Powers Europe's Partnerships Directorate, Rear Admiral Gunnstein Bruåsdal, said at the Allied Command Operations IO/NGO conference in Geneva, "Centres of Excellence have a great deal of specific expertise that we should use much more than we do."

These centres resemble focus think tanks that have the expertise, cognitive space and time to focus on niche, key areas of the application of military art and science.

For example, the NATO Stability Policing Centre of Excellence conducts ambitious research to develop NATO's approach to cultural property protection, spoiler threats in the context of peacekeeping, and law enforcement intelligence applications in the peri-military context. The JWC has actively supported this work with analysis capacity, applying a collegiate approach to making the wider NATO enterprise better.

We can also revisit our past for key observations. As I have mentioned in previous articles, Royal Air Force Air Marshall Sir John Slessor noted in the early years of the Cold War: "If there is one attitude more dangerous than to assume that a future war will be just like the last one, it is to imagine that it will be so utterly different that we can afford to ignore all the lessons of the last one."

The Russo-Ukrainian war is a robust example in which the grotesque manifestations of modern conflict, including trench warfare and human-wave infantry attacks, share battlespace with drone technology, social media exploitation and cognitive warfare. Our challenge is to manage the vast and increasing body of knowledge while scanning the horizon for opportunities and unimaginable threats to give us an advantage and to cement our resilience. And as the Air Marshall suggests, at the same time we cannot lose sight of our foundational practices and basic soldiering skills.

At this year's NATO LL Conference, as we mark NATO's diamond anniversary, the then Commander of the Joint Analysis and Lessons Learned Centre, Commodore Fernando Artilheiro, observed: "We have kept our people safe by constantly evolving."

As the bakers of Belém demonstrated with the *pastel de nata*, agile adaptation is essential to survival and prosperity not just in the immediate term, but as a legacy for our future generations. ✦

UNLOCKING THE POTENTIAL OF PROBLEM-BASED COACHING



by **Major Joshua Marano**
United States Marine Corps
Land Operations and Plans Advisor
Transformation Delivery Division
NATO Joint Warfare Centre

and **Lieutenant Colonel Jens Janis**
German Army
JOPGLWS Lead Planner
Transformation Delivery Division
NATO Joint Warfare Centre

The Joint Operations Planning Group Leaders Workshop (JOPGLWS) represents a hallmark of military excellence within NATO, transforming theoretical doctrine into practical skills essential for current and future leaders. This article delves into the profound impacts and ongoing evolution of this programme, offering insights into its past achievements, future direction, and practical applications of sophisticated methodologies that ensure NATO forces maintain an intelligent advantage in operational planning and decision-making.

A Quick Review of Where We've Been

In 2021, the NATO Joint Warfare Centre's Transformation Delivery Division initiated the JOPGLWS to address specific gaps in crisis response planning observed during the JWC-directed exercises. Since its launch, the workshop has significantly boosted planning capabilities across NATO. More than 25 sessions have been conducted, tailored to the needs of equally as many different cross-echelon headquarters (HQs), while training more than 350 NATO officers in a focus on organizational management, the NATO operations planning process,



and operational environment understanding through practical exercises. The workshop has evolved to become an essential part of military planning, integrating feedback, and adapting to the changing demands across the Alliance.

How We Have Changed to Empower NATO's Collaborative Culture

If we are convinced of one thing, it is that the strength of the Alliance comes from the ability of its diverse people to work together towards a shared purpose. We take our role seriously in facilitating a cross-echelon connecting file for NATO planners and decision-makers. We also believe in modelling the skill of listening to reflective feedback to enact intelligent change.

Historically, our facilitators primarily travelled abroad to individual HQs, where the sessions, although welcomed and successful, lacked the collaborative learning environment with other HQs that many desired. Recent on-site sessions at the JWC have enhanced facilitator flexibility and participant focus.

Participants noted that traveling to the JWC allowed them to fully immerse themselves in the experience, engaging deeply with the JWC team and their cross-echelon counter-

parts. Participants also noted benefits from the collaborative knowledge-sharing atmosphere, where experienced planners and HQ personnel exchange insights and refine their approach to a shared set of complex military operations. Like many in-person experiences across NATO, the ice breakers and coffee breaks between scheduled sessions facilitate countless networking and problem-solving interactions that cannot be replicated in other settings.

Rising feedback, growing NATO exercises, and constrained schedules necessitated a critical reassessment and restructuring of our approach. While individual stand-alone sessions are still planned and provided on a case-by-case basis (e.g. cooperation with the Baltic Defence College), our new exercise-specific model aligns more purposefully with the JWC's mission and programme of work in support of NATO's operational-level exercises.

To formalize our feedback methods, we also recently implemented a new survey programme with the following intent:

→ **Purpose.** The JWC Advisory Team (AT) offers an efficient process to capture comprehensive feedback from all JOPGLWS stakeholders, ensuring that the content and

methods employed undergo continuous collaborative review and updates to meet our evolving environment and challenges.

→ **Method.** This is twofold: (1) in partnership with the JWC's Organizational Development and Culture Specialist, the JWC AT provides universally accessible, unclassified surveys. These surveys can be accessed via any device, thereby broadening the spectrum of feedback while maintaining controlled oversight. (2) Through meticulous analysis, the JWC AT generate actionable insights and adapt our strategies to meet the dynamic needs of planners and leaders across the Alliance.

→ **Future State.** The JWC AT remains committed to transparency and improvement by providing periodic, substantial updates on the progress and evolving state of the workshop to all stakeholders. Our vision is to foster a culture of ongoing development that empowers our planners and leaders at every level within the Alliance.

All these changes aim to receive input from and facilitate the success of the warfighting HQs — our primary focus.

Below

NATO Exercise STEADFAST DAGGER 2024 JOPGLWS participants work through joint synchronization issues with JWC facilitators during a battle rhythm exercise. Photos by JWC PAO

HOW TEAMS WIN: UNIFIED ACTION FROM DIVERGENT THINKING



Teams require a wide array of experienced input, since being an expert in one domain does not automatically make someone an expert in other domains.
(Zull, 2002)

Divergence promotes and accelerates **creativity** needed in **team development**.
(Baer, 2015)

The **craziest and most divergent ideas** often provide the **greatest breakthroughs**. They require **unified team action** to **change industries, save lives, and win wars**.
(Bahcall, 2019)





Facilitators use survey feedback to discuss and modify content for the upcoming workshop for STEADFAST DETERRENCE 2025 and STEADFAST DUEL 2025. Photo by JWC PAO

The JOPGLWS Facilitators: A Paradigm Shift From Advisor to Coach

The JOPGLWS facilitators, who are mainly members of the JWC's Advisory Team, carefully define their roles, shifting from advisors to coaches. The facilitators are not "keepers of wisdom" or "sages on stages," but rather foster an environment where all participants can contribute to and benefit from shared expertise and practical solutions. This is why we all strive to focus on the following traits: supportive, interested, actively listening, perceptive, aware, self-aware, attentive, retentive, collaborative, and resourceful.¹

Perhaps upon reading this list, you feel that some traits are missing? What about our military experience, combat leadership roles, or domain expertise? While there is nothing wrong with such qualities, we find them to be secondary (at best) in a workshop facilitator. We find that experts can often be problematic as facilitators because they are so certain that they are right, and may therefore fail to treat collaboration and the opinions of others with the appropriate attention and respect.² The most meaningful interactions come not from

"We believe in modelling the skill of listening to reflective feedback to enact intelligent change."

us telling others how to do their jobs, or in boasting of our own self-declared expertise, but by listening to others' issues to help unlock their potential through the proven techniques and perspectives we offer.³

Much like neither of the authors would want anyone coming into our homes and telling us how to parent our children, we are certain that none of our planning peers would appreciate it if we came into their HQs dispensing job advice. However, if confronted with a parenting challenge, both authors would value a trusted colleague or coach who would listen and offer a fresh perspective to

help overcome difficult behaviours and problems. Perhaps this research-based quote from coaching pioneer Sir John Whitmore sums up our facilitators' perspective best:

"Interest holds the attention; perhaps we need to learn to be interested in others. When we really do listen to someone, or when someone really listens to us, how appreciated it is... Obsession with our own thoughts and opinions and the compulsion to talk, particularly if one is placed in any kind of advisory role, are strong. It has been said that since we were given two ears and one mouth, we should listen twice as much as we speak. Perhaps the hardest thing a coach has to learn to do is to shut up!"⁴

As strong advocates for incorporating external feedback and coaching to maximize team performance, we apply this approach in our relationship, reflections, and practices while leading the JOPGLWS.

Participant-Centred, Problem-Based Sessions

Understanding the facilitator's role helps to highlight the unique benefits of the JOPGLWS.



Before presenting our workshop model, it's crucial to grasp the foundational, research-based principles it builds upon.

1. Military learning environments are often founded on rigid instruction from subject matter experts with the goal of completing well-defined procedural tasks. This often leads to predictable, inflexible and risk-averse actions.⁵
2. Facilitators and learning participants must align to the precept that all are equally valued and should engage in an interpersonal experience so that their learning can be successful and lasting.⁶
3. Organizations and their individuals are often hampered in efforts to learn and change due to habit-based bias. Such procedure-based habits train individuals to be risk-averse and hesitant to embrace necessary changes while simultaneously discouraging a true learning environment.⁷
4. Project-based and problem-based facilitation methods aid transformative learning by forcing participants to take more ownership through intentional collaboration.⁸
5. Participant-centred, experiential learning improves performance in the following areas: interaction, interest, engagement, challenge, and competency.⁹
6. Learning the practical application of complex theories is best achieved through active-learning methodologies that focus on participants' engagement with the content.¹⁰



Above
The authors, Lieutenant Colonel Janis (left) and Major Marano at the STEADFAST DAGGER 2024 JOPGLWS. Photo by JWC PAO

7. Experiential, participant-centred learning is preferred for increasing proficiency and retention of low-frequency, high-risk scenarios.¹¹
8. Thoughtfully designed shattering moments that force learners to struggle with difficulties and failures improve overall retention and learning by revealing blind spots and biases.¹²

From this insight, our team developed a simple and progressive design:

- **Shattering Moments:** We introduce practical exercises (PEs) and guided discussion moments in which participants are given difficult problems, to help uncover blind spots and biases and to coach through creative and critical thinking techniques.
- **Doctrinal Foundations:** We offer a framework and resources to establish a doctrine-informed, subject-matter baseline.
- **Planning Models:** We give examples from real-world operations and/or JWC exercises.
- **Facilitated Applications:** We coach participants through problem-based, collaborative PEs.
- **Continuous Feedback:** We provide peer-to-peer and facilitator feedback on participants' guided discussions and PE back-briefs throughout the workshop.

Beyond Doctrine: Putting Tools in the Practitioner's Hands

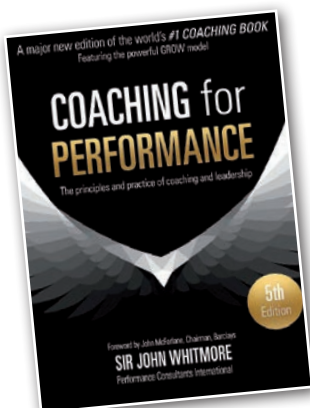
The JOPGLWS is designed to be a dynamic forum that is distinct from typical academic courses such as the Comprehensive Operational Planning Course (COPC). Instead of needlessly modelling itself as a "mini-COPC," the workshop focuses on practical application, specifically on how to use techniques and processes that best accomplish a given planning task. Participants are encouraged to share personal experiences and insights from different planning process steps, incorporating both their own practices and those observed at their HQs.

Additionally, every NATO planner must admit that our doctrine and other publications do not provide every useful tool that a practitioner needs. Our facilitators challenge participants to balance their necessary doctrinal foundation with critical and creative thinking as they tackle the problems and barriers presented to themselves and their decision-makers.

While the JOPGLWS continues expanding its reach and depth across NATO, however, it takes more than skilled facilitators and eager planning participants to enact intelligent change or empower successful decision-making for the warfighter. This also requires the engaged presence of another group.



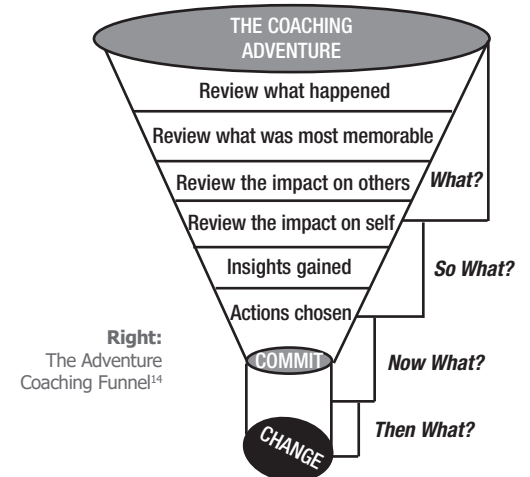
MORE TO EXPLORE



Embedding Collaborative Culture

	Told	Told and shown	Told, shown and experienced
Recall after three weeks	70%	72%	85%
Recall after three months	10%	32%	65%

Left:
We do not learn well by simply being told or even shown by others; we learn best by doing together.¹³



The Senior Leader's Role: Stop, Collaborate and Listen

In a recent workshop, a senior leader actively engaged with his team to examine their HQ's planning processes and transitions between the J5, J35, and J33. The team acknowledged a critical gap: the absence of a standard operating procedure or instruction (SOP/SOI) and a key battle rhythm (BR) event to manage this crucial transition effectively.

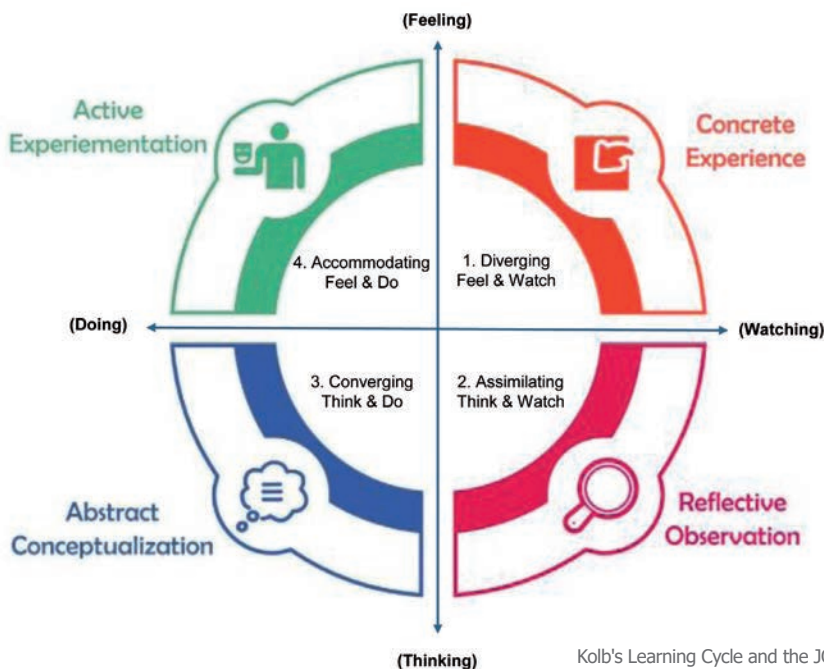
Through a 30-minute practical exercise, the facilitators and participants collaboratively developed a framework for the missing SOP/SOI and BR event. This session was characterized by insightful questioning and strategic facilitation, allowing the team to address a real

and immediate challenge within their HQ operations. Impressed, the senior leader praised the facilitators not only for their questioning techniques but for their ability to facilitate without relying on existing SOPs/SOIs. He highlighted their skill in eliciting diverse viewpoints and fostering a collaborative environment to produce a viable solution for a shared organizational need. Following this successful workshop, during a subsequent exercise at the JWC, the leader shared with the author a printed copy of the newly created SOP/SOI and BR event, illustrating the practical impact of the workshop.

This scenario exemplifies what we define

as an "adventure" in professional development: a process marked by the exploration of new ideas and the collaborative tackling of risks to achieve remarkable and sustainable organizational change.¹⁵ The Adventure Coaching Funnel above is a visual representation of this dynamic approach to facilitating meaningful and lasting change within an organization.

The engagement of the senior leader had a significant impact on the effectiveness of the specific iteration of the workshop referenced in this section. The leader in focus not only prioritized scheduling the JOPGLWS for his team but also showed a deep commitment to



Graphic: <https://www.simplypsychology.org/learning-kolb.html>

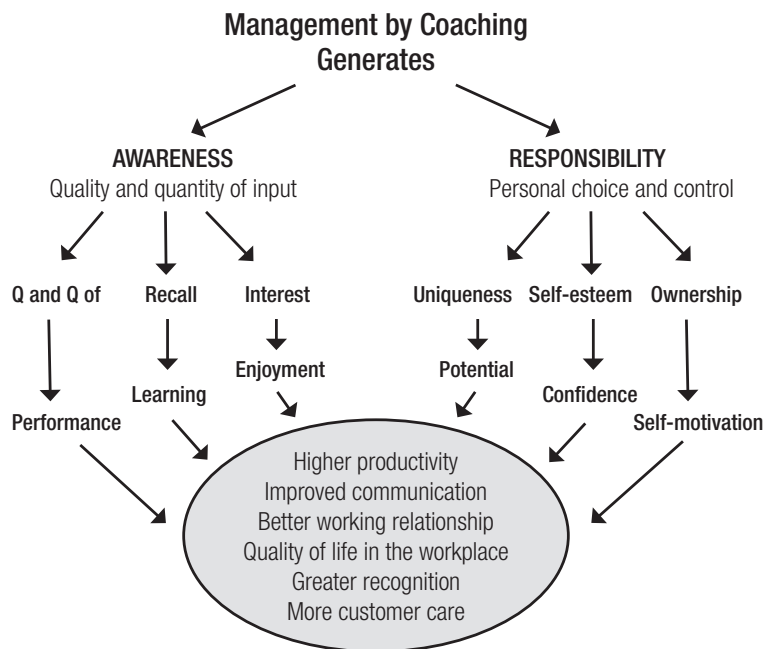
Kolb's Learning Cycle and the JOPGLWS:
How we create space for this full cycle of learning in each session



"Learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience."

— David Kolb
Experiential Learning Theory, 1984





Above:

Advantages generated by incorporating external coaching into a team or organization¹⁶

his staff and their processes. He recognized the value of the methodologies we presented and actively participated, ensuring accountability and presence when it was crucial. Before his participation, however, came an often overlooked (but critical) step, as he made sure that the appropriate attendees were present at the workshop (e.g. JOPG or tactical-level planning group leaders and deputies, dedicated syndicate leaders and deputies, key cross-functional OPG planners, individuals with a deep understanding of their own HQ's planning principles, minimum rank of OF-3). This preparation ensured that the workshop was interactive and built on a shared foundation of operational-level planning knowledge and experience. His decision to incorporate our experienced external facilitators and coaches into his HQ team led to multiple benefits evident in the outcomes described in the "Management by Coaching" image above.

Developing Our Future Together

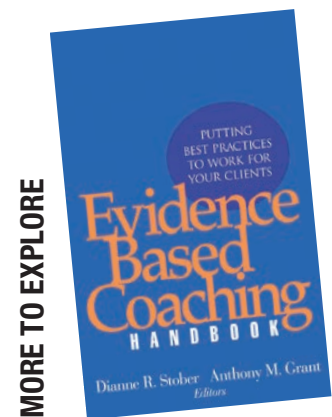
The comprehensive and collaborative approach offered in the JOPGLWS goes beyond practical learning and development. We equip leaders

with the necessary tools to excel in crisis response planning, while also preparing them to lead with confidence and strategic acumen in the dynamic and complex landscape of military operations. Through JOPGLWS, the JWC is nurturing a cadre of planners across NATO who are not only adept at handling current challenges, but also visionary in anticipating and preparing for the future.

If you wish to learn more about the workshop, please email us at Joshua.Marano@jwc.nato.int and Jens.Janis@jwc.nato.int. As we continuously develop our content and delivery of the workshop, we offer the following survey for candid feedback from all participants, senior leaders, and facilitators who have experienced our workshop. Scan the QR code below or follow the link to access the survey. ✦



<https://www.surveymonkey.com/r/H23S9QS>



MORE TO EXPLORE

ENDNOTES

- Whitmore, J. (2009). Coaching for performance: Growing people, performance and purpose: The principles and practice of coaching and leadership (4th ed.). Nicholas Brealey Publishing.
- Ibid.
- Ibid.
- Ibid.
- Marano, J. (2018). Student-centred learning need in military culture.
- Minter, M. K. (2011). Learner-centered (lci) vs. teacher-centered (tci) instruction: A classroom management perspective. *American Journal of Business Education*, 4(5), 55-62. doi:10.19030/ajbe.v4i5.4225
- Voon, V., Derbyshire, K., Rück, C., Irvine, M. A., Worbe, Y., Enander, J., Schreiber, L. R. N., Gillan, C., Fineburg, N. A., Sahakian, B. J., Robbins, T. W., Harrison, N. A., Wood, J., Daw, N. D., Dayan, P., Grant, J. E., & Bullmore, E. T. (2014). Disorders of compulsivity: A common bias towards learning habits. *Molecular Psychiatry*, 20(3), 345-352. doi:10.1038/mp.2014.44
- Dole, S., Bloom, L., & Kowalske, K. (2015). Transforming pedagogy: Changing perspectives from teacher-centered to learner-centered. *Interdisciplinary Journal of Problem-Based Learning*, 10(1). doi:10.7771/1541-5015.1538
- Konak, A., Clark, T. K., & Nasereddin, M. (2013). Using Kolb's experiential learning cycle to improve student learning in virtual computer laboratories. *Computers & Education*, 72, 11-22. doi:10.1016/j.compedu.2013.10.013
- Sesen, B. A., & Tarhan, L. (2011). Active-learning versus teacher-centered instruction for learning acids and bases. *Research in Science & Technological Education*, 29(2), 205-226. doi:10.1080/02635143.2011.581630
- Saraswat, A., Bach, J., Watson, W. D., Elliott, J. O., & Dominguez, E. P. (2017). A pilot study examining experiential learning vs didactic education of abdominal compartment syndrome. *The American Journal of Surgery*, 214(2), 358-364. doi:10.1016/j.amjsurg.2016.07.011
- Bjork, R. A., & Bjork, E. L. (2020). Desirable difficulties in theory and practice. *Journal of Applied Research in Memory and Cognition*, 9(4), 475-479. <https://doi.org/10.1016/j.jarmac.2020.09.003>
- Goldvarg, D., Mathews, P. A., & Perel, N. (2018). Professional coaching competencies: The complete guide. Executive College Press.
- Ibid.
- Oxford University Press. (2023). Oxford English dictionary: Adventure. OED. <https://www.oed.com/>
- Stober, D. R., & Grant, A. (2006). Evidence Based Coaching Handbook: Putting Best Practices to Work for Your Clients. John Wiley & Sons, Inc.



ARF



THE EXERCISE THAT LAUNCHED
NATO's ALLIED REACTION FORCE:



STEADFAST **DETERRENCE 2024**



Background

The world has undergone dramatic changes since October 15, 2003 — the year NATO launched the NATO Response Force (NRF). Commissioned at the 2002 Prague Summit, the NRF was designed to meet the Alliance's requirement for a highly capable joint multinational force consisting of land, maritime and air elements, able to react in a very short time. The NRF's roles included deployment as a show of force and solidarity to deter aggression; as a stand-alone force for Article 5 or non-Article 5 operations, and as an initial entry force for a larger formation.¹

In 2003, it was the era of counter-insurgency operations outside of NATO's borders: the Alliance's main priority was Afghanistan, and global terrorism was considered the main threat to be addressed. As threats evolved, so did NATO's capabilities and interoperable forces in order to meet the changing threat landscape. The 2007 cyber-attack campaign against Estonia, and ensuing disinformation and hybrid attacks in Europe during this time, were amongst the first indicators that European security was becoming the Alliance's new centre of gravity. In March 2014 NATO suspended all practical cooperation with Russia in response to Russia's illegal and illegitimate annexation of Crimea. The Alliance recognized cyberspace as a domain of operations in 2016, and space in 2019, alongside the traditional domains of land, sea and air.

NATO approved the Concept for the Deterrence and Defence of the Euro-Atlantic Area (DDA) in 2020 to strengthen its deterrence and defence posture and increase readiness in all five domains. In his 2021 Annual Report, former NATO Secretary General Jens Stoltenberg stated that NATO today faced the most complex security environment since the end of the Cold War.² That same year, Allied Chiefs of Defence developed the Warfighting Capstone Concept (NWCC), which provided a 20-year vision for the development of the Alliance's military instrument of power.

Previous, clockwise:

The JWC's Advisory Team; Colonel Kevin Rafferty, the JWC's Deputy Chief of Staff Exercises, Training and Innovation; an Opposing Forces briefing; members of the NRDC-ITA training audience; the Norwegian Response Cell. Photos by Tore Ellingsen

From early 2022, NATO's founding principle of collective defence was at the top of the agenda as Russia launched its full-scale invasion of Ukraine. That same year, NATO published its new Strategic Concept, "arguably the most important NATO document produced in a decade."³ At the Madrid Summit in 2022, the Allies agreed on a new force model guiding the design of NATO's future high-readiness forces.

In the words of Admiral Rob Bauer, the Chair of the NATO Military Committee, the new NATO Force Model would produce "well over 300,000 troops at high readiness across our Alliance. This will be a combination of in-place forces and strategic reinforcements." The majority of these, he explained, would be based in their home countries and available to NATO commanders, under the Supreme Allied Commander Europe (SACEUR).⁴

When NATO leaders met in Vilnius in 2023, they decided to take steps to further strengthen NATO's deterrence and collective security. Stoltenberg said, "Over the past two days, we took major decisions to adapt our Alliance for the future. We agreed NATO's most detailed and robust defence plans since the Cold War."⁵

Amongst the steps decided at the Vilnius Summit was the formation of the multi-domain Allied Reaction Force (ARF). As well as enhancing the speed and agility of the NATO Response Force, the ARF would distinctly support NATO's evolving multi-domain approach as a dynamic new resource and "provide more options to respond swiftly to threats and crises in all directions."⁶

NATO launched the ARF on July 1, 2024, under the lead of NATO Rapid Deployable Corps Italy (NRDC-ITA). As part of the new NATO Force Model, the ARF replaced both the NRF, and its spearhead, the Very High Readiness Joint Task Force (VJTf), which was created in 2016 involving 5,000 troops, including land, air and maritime elements, along with special operations forces, which meant it was more "joint" than multi-domain.

The ARF, as such, is the Alliance's most forward-looking quick reaction capability yet, while supporting NATO's core tasks that were firmly set in the past: deterrence and defence; crisis prevention and management; and cooperative security.

THE BIRTH OF THE ARF

2016

NATO establishes multinational battlegroups in Estonia, Latvia, Lithuania and Poland, and a multinational framework brigade in Romania; launches the Very High Readiness Joint Task Force (VJTf) and a new Cyber Operations Centre

2018 BRUSSELS SUMMIT

NATO adopts a Readiness Initiative and updates its command structure by establishing Joint Force Command Norfolk in the United States and Joint Support and Enabling Command in Germany

2019

Allied Chiefs of Defence develop a new threat-based NATO Military Strategy

2020

NATO adopts the Concept for the Deterrence and Defence of the Euro-Atlantic Area (DDA)

2021

Allied Chiefs of Defence develop the Warfighting Capstone Concept (NWCC)

2022 MADRID SUMMIT

NATO agrees on a new NATO Force Model

2023 VILNIUS SUMMIT

NATO welcomes Finland; establishes the NATO-Ukraine Council; puts in place a new generation of regional defence plans; agrees on the creation of a new multi-domain Allied Reaction Force (ARF)

2024

NATO welcomes Sweden; launches the ARF

2024 WASHINGTON SUMMIT

NATO agrees on establishing a new NATO Integrated Cyber Defence Centre, as well as NATO Security Assistance and Training for Ukraine in Germany and the NATO-Ukraine Joint Analysis, Training and Education Centre in Poland

What JWC Is For

The Joint Warfare Centre (JWC) has been operating for more than two decades and continues to set the benchmark for NATO's collective training at the operational and strategic levels. From May 21 to 30, 2024, the Centre executed





The Joint Warfare Centre fulfils a critical role as the primary venue for designing, developing and delivering NATO's largest and most complex command post exercises at the strategic and operational levels.



Above, clockwise

Commander Sveinung Wersland, from the JWC's Advisory Team; an exercise simulated press conference that aimed to enable the training audience to deliver information effects in a highly complex simulation environment; Lieutenant Colonel Julie Ann Janson working as a member of the Lower Control (LOCON) organization; a meeting of the Nordic countries' response cell representatives; Lieutenant Colonel Bergit Johanssen, the Chief of the Norwegian Response Cell. Photos by Tore Ellingsen

NATO's first major exercise for the ARF, called STEADFAST DETERRENCE 2024 (STDC24). The exercise was the final step in certifying the NATO Rapid Deployable Corps Italy (NRDC-ITA) as the Alliance's first ARF Headquarters.

The main objective of the exercise was to prepare the ARF for its two key roles: (1) supporting crisis prevention, (2) bolstering NATO's deterrence posture. In addition to the ARF's certification heralding a new era for the Allied forces, STEADFAST DETERRENCE 2024 also supported Supreme Headquarters Allied Powers Europe's (SHAPE) transition to a strategic warfighting headquarters, which will enable the Supreme Allied Commander Europe (SACEUR) to direct operations across SHAPE's entire area of responsibility more effectively and efficiently.

STDC24, which took more than 12 months to plan and develop, reflected the increase in exercise ambition while implementing the new exercise planning process based

on the revised Bi-SC Directive 075-003 Collective Training and Exercises under the lead of SHAPE. This unique exercise brought together more than 900 military and civilian personnel from NATO, Allied countries, and partner organizations in response to a simulated, highly complex crisis in the North and the Arctic region, enabled by the JWC's 360-Degree Multi-Domain Setting.

"Exercise STEADFAST DETERRENCE 2024 has demonstrated NATO's rapid ability to transform political guidance to establish the Allied Reaction Force into reality," said Major General Roger Lane (Ret.), the JWC's Senior Exercise Control (EXCON) Advisor. "Its ability to deploy a force, capable of a broad spectrum of military tasks, provides NATO with more options to deter aggression and enhance its capability to defend, should it be necessary."

During the exercise, the JWC hosted the EXCON organization, which included a variety of response cells replicating the strategic,

operational, and tactical levels, augmented by multiple organizations ranging from NATO Command and Force Structure headquarters and civilian agencies to NATO centres of excellence and representatives from Norway, Sweden, Finland, and Denmark. EXCON Forward teams, meanwhile, were deployed to SHAPE and Allied Maritime Command (MARCOM).

"Focusing on the Nordic region and co-operating alongside Sweden and Finland added new perspective and issues for the ARF and NATO to consider," said Lieutenant Colonel Bergit Johanssen, the Chief of the Norwegian Response Cell.

"Exercise STEADFAST DETERRENCE 2024 has been eye-opening for us," said Major General Jez Bennett, the NRDC-ITA Deputy Commander at the time of execution. "Ranging from the strategic to the tactical levels, the exercise has really challenged us but also given us a mechanism to hone our new skills in an innovative and inclusive way. Working closely



with air, maritime, special operations forces, cyber and space colleagues, we have come out of the exercise as a single strong, capable team." He added: "We are now confident in our ability to take on this high-readiness, wide-ranging ARF role from July 1, 2024, and we are very excited at the prospect of continuing to work together as a single multi-domain, multi-national team on exercises and on operations."

The structural adaptation of NATO continues as the concept of multi-domain operations (MDO) takes the ever-increasing capabilities to new heights. MDO is today the symbol of a transformed NATO, just as the NRF was at its inception. It underpins every military advancement and innovation in NATO, including the ARF. Overall, STEADFAST DETERRENCE 2024 was yet another

demonstration of the JWC's crucial role in transforming NATO and further strengthening the Alliance. It innovatively exercised NRDC-ITA's ability to lead as the first NATO ARF Headquarters and emphasized the Alliance's cohesion and dedication to a solid and durable deterrence and defence posture in its 75th anniversary year. ✦

Article by Inci Kucukaksoy,
JWC Public Affairs Office (PAO) • Photos by
Tore Ellingsen, Norwegian Home Guard PAO



Endnotes

- 1 Prague Summit Declaration, https://www.nato.int/cps/en/natohq/official_texts_19552.htm
- 2 NATO Secretary General's Annual Report 2021, https://www.nato.int/cps/en/natohq/opinions_193590.htm?selectedLocale=en
- 3 Interview: Oana Lungescu, former NATO Spokesperson, The Three Swords, https://www.jwc.nato.int/application/files/1516/7092/3280/Interview_Oana_Lungescu2022DEC.pdf
- 4 A New Era of Collective Defence, Admiral Rob Bauer, <https://www.jwc.nato.int/application/files/3016/9893/0880/ADMBauer.pdf>
- 5 2023 NATO Summit, <https://www.nato.int/cps/en/natohq/216570.htm>
- 6 Vilnius Summit Communique, https://www.nato.int/cps/en/natohq/official_texts_217320.htm?selectedLocale=en

THE SPACE DOMAIN IN EXERCISE STEADFAST DETERRENCE 2024

by **Commander Victor Bastien-Thiry**
French Navy
Space Subject Matter Expert
Transformation Delivery Division
NATO Joint Warfare Centre

SPACE HAS BECOME an essential domain for military operations, offering critical support for communication, navigation, intelligence, and counter-space capabilities. Satellites facilitate secure communication links, provide near real-time imagery, and enhance the accuracy of weapon systems. Operating effectively in space is crucial for strategic superiority and the success of military missions. Planned and directed by the Joint Warfare Centre (JWC), STEADFAST DETERRENCE 2024 was NATO's first major joint exercise designed to certify NATO Rapid Deployable Corps Italy (NRDC-ITA) as the newly created Allied Reaction Force (ARF) HQ, and increase NATO's readiness to deter aggression by adversaries. The exercise also provided an opportunity to continue to integrate space capabilities into NATO operations.





Exercises such as STEADFAST DETERRENCE 2024 address the challenges posed by anti-satellite weapons, jammers and the involvement of commercial companies in conflicts.



NATO relies on space coordination elements (SpCE) across the NATO Force Structure to provide commanders and their staff with experts who integrate space into the planning process. They are responsible for ensuring that Alliance headquarters gain situational awareness of the space domain. For Exercise STEADFAST DETERRENCE 2024, Major Domenico Musone from NRDC-ITA was in charge of the first ARF HQ Space Coordinator Element. He coordinated with the NATO Space Centre in Ramstein, Germany, which provided support for space actions and capabilities.

NATO Space Centre is the hub for data, products and services related to space. Among others, it provides position, navigation and timing (PNT) jamming modelling, satellite reconnaissance advance notices, precision dilution of position reports and space weather reports. The NATO Space Centre is under the Combined Force Space Component Command (CFSCC) umbrella. As Commander Al-

lied Air Command (AIRCOM), General James Hecker is also the head of the CFSCC. In the exercise, he provided direction and guidance for the space chain of command.

Since the summer of 2023, the JWC has also enlisted a space subject matter expert (SME). He links up with the space community, bridges real world and exercises, and supports throughout the exercise planning process.

A key aspect of the exercise was the ARF HQ's willingness to address space within a multi-domain approach. Multi-domain operations (MDO) are the coordinated application of combat power across all domains, converging on the adversary simultaneously and providing a multiplying effect greater than the sum of these efforts. By integrating capabilities in the air, land, sea, space, and cyberspace domains, NATO enhances combat effectiveness and complicates the enemy's decision-making by forcing them to consider all domains simultaneously. Exercise STEADFAST DETERRENCE

2024 played a pivotal role in preparing the ARF to conduct such operations. The space SMEs from various NATO entities on the Exercise Control team drew expertise from SHAPE, the NATO Space Centre, the JWC and the recently accredited Space Centre of Excellence. The Opposing Forces Cell simulated the reactions of an adversary with full-range space capabilities.

As space becomes increasingly congested, NATO must stay ahead of emerging threats such as anti-satellite (ASAT) weapons, space debris and SATCOM and PNT jammers that can negatively affect both civilian infrastructure and the ARF command and control. Exercise STEADFAST DETERRENCE 2024 included scenarios that addressed these threats. The exercise introduced developmental technologies that are being fielded by NATO adversaries, such as lasers capable of inflicting sustained damage to orbital assets, and nuclear-propelled satellites.

As the space capabilities of states and non-state actors expand, the JWC increasingly integrates space operations into its exercises to enhance the Alliance's readiness and resilience against new types of threats. Exercises such as STEADFAST DETERRENCE 2024 address the challenges posed by anti-satellite weapons, jammers and the involvement of commercial companies in conflicts.

The Russo-Ukrainian war demonstrates how space capabilities can affect our ability to conduct operations. By including space capabilities in these exercises, NATO enhances its preparedness for future conflicts, underscores the importance of international cooperation in safeguarding space and demonstrates its commitment to maintaining superiority. ✦



The Space Cell for NATO Exercise STEADFAST DUEL 2024.
Photo by JWC PAO

JOINT WARFARE CENTRE

EXERCISE REPORT



NATO's LARGEST COMPUTER-ASSISTED COMMAND POST EXERCISE OF THE YEAR: **STEADFAST** **DUEL 2024**

Article by Inci Kucukaksoy, JWC Public Affairs Office •
Photos by Tore Ellingsen, Norwegian Home Guard Public Affairs Office





Above, from left
Different patches from cyber and space teams, Slovenian Response Cell;
Exercise Control (EXCON) briefing; EXCON staff.

STDU24

STEADFAST DUEL 2024, NATO's largest computer-assisted command post exercise (CAX/CPX) of the year, concluded on October 31 at the Joint Warfare Centre (JWC) and 11 other locations across Europe. Scheduled by Supreme Headquarters Allied Powers Europe (SHAPE) and directed by the JWC, NATO's capstone CAX/CPX of the year focused on the Article 5 defence of NATO territory and the delivery of multi-domain operations at the strategic, operational and higher tactical levels.

The 10-day exercise aimed to test the Alliance's ability to respond rapidly and effectively to a range of threats, from traditional warfare to cyberattacks and hybrid threats.

"Exercise STEADFAST DUEL 2024 further strengthened NATO's multi-domain capabilities, encompassing the full range of military operations, including the cyberspace and space domains," said Major General Ruprecht von Butler, Commander JWC and Exercise Director. "By preparing exercise participants for multi-domain operations at the strategic and operational levels, the JWC is instrumental to NATO's

ability to fight and win, while exercising key elements of NATO's deterrence strategy."

Approximately 5,000 military and civilian staff participated in STEADFAST DUEL 2024 to enhance NATO's operational readiness, multi-domain capabilities and combined interoperability. 27 NATO Command and Force Structure headquarters, including Allied Joint Force Command Naples (JFC Naples) and NATO Allied Air Command (AIRCOM) as the primary exercise participants, military and civilian personnel from national entities, international and non-governmental organizations were involved in the exercise.

A highlight of STEADFAST DUEL 2024 were the Headquarters Supreme Allied Commander Transformation (HQ SACT)-led experimentation activities, focusing on the Layered Resilience Concept (which aims to enhance military resilience and its interdependencies with civil resilience), cyber risk management, countering weapons of mass destruction, and signals intelligence support.

During the exercise, a number of distinguished visitors were present at the JWC to observe the exercise first-hand and liaise with the JWC leadership: Admiral Sir Keith Edward Blount, Royal Navy, NATO's Deputy Supreme Allied Commander Europe; General Markus Laubenthal, German Army, Chief of Staff SHAPE; and Lieutenant General Sean C. Bernabe, Deputy Commanding General of U.S.

Army Europe and Africa. Additionally, Lieutenant General Hubert Cottureau, French Army, Vice Chief of Staff SHAPE served as the SHAPE Response Cell Chief during the exercise.

The JWC played a pivotal role in planning and executing STEADFAST DUEL 2024. Operational since 2003, the JWC is dedicated to providing realistic and challenging training scenarios to NATO forces. By leveraging cutting-edge technology and advanced simulation tools, the JWC ensures that NATO's military forces are prepared to meet future challenges.

Colonel Kevin Rafferty, the JWC's Deputy Chief of Staff Exercises, Training and Innovation and the Chief of the Exercise Control, explained that STEADFAST DUEL 2024 provided a great training venue that strengthened NATO forces' ability to deter and defeat a peer-level adversary across all domains and levels of conflict.

Colonel Rafferty said: "The scale, scope, and complexity of the STEADFAST series of exercises, which are multi-domain by design, continue to evolve to meet the strategic security environment. Although the JWC has just delivered Exercise STEADFAST DUEL 2024, we have Exercise STEADFAST DAGGER 2024 three weeks from now, and we have planning teams deployed and preparing Exercise STEADFAST DETERRENCE 2025."

Next year's Exercise STEADFAST DETERRENCE is to be executed in May.

Previous, clockwise:

The Higher Control Cell; the Turkish Response Cell; General Markus Laubenthal (left), SHAPE Chief of Staff, during his visit to the EXCON; Joris Steeg, JWC CAX operator; JWC Commander Major General Ruprecht von Butler (middle) with JWC Deputy Commander/Chief of Staff Brigadier General Raymond L. Adams (left) and Colonel Michel Vibholm, the STDU24 lead planner.



"STEADFAST DUEL 2024 is the premier NATO exercise that trains headquarters from the strategic to the higher tactical levels in the art of contemporary warfare against peer adversaries. The headquarters are immersed in a rich, realistic and challenging simulation from which they must create knowledge and understanding in order to make good, timely decisions, thereby maintaining a warfighting advantage and enhancing the readiness of the Alliance."

– Major General Roger Lane (Ret.),
STDU24 Exercise Control Senior Advisor

Major General Ruprecht von Butler,
Commander JWC and Exercise Director,
observing the exercise with the EXCON staff



Major General Ruprecht von Butler briefing
General Markus Laubenthal, Chief of Staff SHAPE



"No organization, outside of the U.S., plans, prepares and executes training events of the scale and complexity of those delivered by the JWC. During STEADFAST DUEL 2024, we have provided one of the richest and most realistic training environments devised."

– Phil Draper,
JWC CAX Branch Head

The arrival of
EXCON augmentee staff
from across NATO and
Allied nations at the JWC



Within STEADFAST DUEL 2024 Lower Control, 700 personnel simulated the actions, coordination and decisions for the headquarters commanding over 500,000 personnel, with all the associated platforms and personnel representing all NATO capabilities in a multi-domain environment.

Members of the French Response Cell





Admiral Sir Keith Edward Blount KCB OBE (left), Deputy Supreme Allied Commander Europe, receiving a wargame presentation during his tour of the JWC



Major General Ruprecht von Butler speaking to the EXCON staff

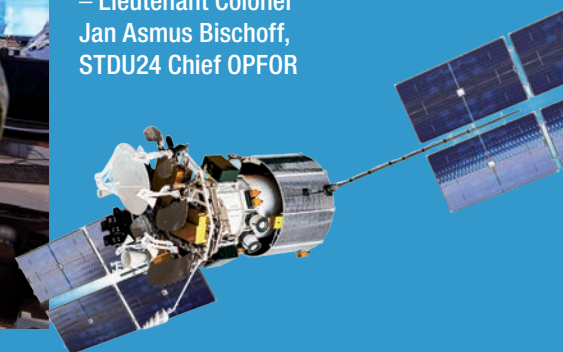


Lieutenant General Sean C. Bernabe, Deputy Commanding General of U.S. Army Europe and Africa

Media Simulation's road-to-war video presentation prior to the start of exercise

"In every JWC-directed exercise, the Opposing Forces (OPFOR) Cell is responsible for simulating a credible and challenging adversary. For STEADFAST DUEL 2024, the OPFOR Cell is triggering the training audiences' decision-making by posing operational-level challenges through adversary actions, while at the same contributing to depicting a coherent and realistic exercise environment. This realism would not be possible without the team of experts in the OPFOR Cell from all over NATO, representing all domains."

– Lieutenant Colonel Jan Asmus Bischoff, STDU24 Chief OPFOR



STEADFAST DUEL 2024 aimed to strengthen NATO space operations. Access to space and space-enabled technology not only benefits defence organizations but contributes significantly to our way of life in areas such as transportation infrastructure, navigation systems, emergency services communications, and financial markets.

E X C L U S I V E



THE CASE FOR C2 CAPABILITY LIFECYCLE GOVERNANCE

Strengthening NATO's **Command and Control**

by **Major Ralph Dekker**
Royal Netherlands Air Force
NATO Command and Control
Centre of Excellence (NATO C2COE)

Photo by Torbjørn Kjosvold,
Norwegian Armed Forces



AS A STAFF OFFICER at the NATO Command and Control Centre of Excellence (NATO C2COE), Major Ralph Dekker of the Royal Netherlands Air Force is intimately familiar with the critical role that command and control (C2) plays in the planning and execution of operations and exercises. It is the glue that binds our forces, enabling effective decision-making and coordination. C2 is not just a set of processes, procedures and technologies — it is an essential capability that requires deliberate governance.

Since March 2021, the NATO C2COE has been a member of the Research Task Group (RTG) Human Factors and Medicine (HFM) 342 on C2 Capability Lifecycle Governance. This RTG is composed of scientists from Australia, Canada, Sweden, and the United Kingdom. All of them are renowned experts in the field of C2 and work within their nations' defence research organizations, often closely linked with the armed forces of their respective countries. Being well connected within NATO, the NATO C2COE can act as a bridge to translate scientific ideas into information that operators, leaders, and governance bodies within NATO and partner nations can use.

One of NATO's strengths is the diversity of its members and partners and the capabilities they can bring to the coalition. Optimal use of these military and non-military capabilities is dependent on effective C2. Therefore, NATO and partners must develop their C2 capabilities with timely integration in mind, and this requires cooperation between NATO, NATO commands, nations, functional branches and services to understand how C2 systems can be integrated via formal and informal command and control relationships. On behalf of the HFM 342, Major Ralph Dekker will argue in this article why treating C2 as a capability and governing it over its lifecycle is essential to make C2 fit for purpose for national and international collaboration and cooperation.

Major Dekker will also explain why the absence of C2 capability lifecycle governance is an important challenge, what still needs to be done to effectively govern C2, and why more effort is important.

NATO's Current C2 Improvement Initiatives

There are currently several initiatives that, entirely or in part, aim to improve C2 within NATO across different time horizons. The overarching longer-term initiative is the NATO Warfighting Capstone Concept (NWCC). It contributes to the Alliance's efforts to strengthen its deterrence and defence posture and offers a vision in support of maintaining and developing NATO's decisive military advantage by continuously adapting the military instrument of power.

The NWCC outlines five warfare development imperatives: cognitive superiority, layered resilience, influence and power projection, cross-domain command, and integrated multi-domain defence. These imperatives aim

to guide NATO's military thinking, organization, and action across multiple domains.

The Cross-Domain Command Concept (CDCC) will be the main driver for C2 change within NATO to facilitate effective multi-domain operations (MDO). The purpose of the CDCC is orchestration for success and to offer a long-term conceptual perspective on C2, aiming at 2040. In the near term, NATO has also developed its Alliance Concept for MDO. Approved in March 2023, the document provides a roadmap for implementation of MDO by 2030, including MDO C2.

"NATO as a warfighting system" is also a near-term development and implementation initiative. It is led by Supreme Headquarters

Allied Powers Europe (SHAPE), with the full involvement of the NATO Command Structure, the newly established Allied Reaction Force Headquarters, parts of the NATO Force Structure and various other entities.

Aside from these initiatives, there is NATO's digital transformation and the Federated Mission Networking (FMN) concept, with the vision for day-zero interoperable forces made available for missions by NATO countries, NATO and partners.

These programmes do not solely aim to enhance C2, but they do affect C2 development. Additionally, there are efforts to develop C2 within NATO countries, within doctrine, and in NATO's training and exercises.



It can be challenging to grasp how initiatives such as FMN, digital transformation, MDO and CDCC are interlinked. The greatest challenge, however, lies in transforming these concepts into practical use within NATO. There will be hurdles to overcome in the course of implementation, and there may be details that the concept developers have missed. But who governs and solves these issues?

Challenges of C2 Capability

Indeed, there are challenges with C2. The Research Task Group (RTG) was motivated by the observation that efforts to transform C2 have only been partly sufficient so far. C2 practice has remained very similar to what it was more than 20 years ago. Technological, doctrinal, and conceptual changes have certainly occurred, but few, if any, truly substantive transformation efforts have yielded appreciable results.

To capture the challenges in one sentence: the problem with fixing C2 is the C2 you are trying to fix — and sometimes the C2 of those trying to fix it. I strongly favour this phrase because it shows that there are multiple challenges. One of the RTG's aims is to apply a scientific approach to improving and implementing C2 change programmes.

Scientifically, the heart of the challenges is encapsulated in Conway's Law, which originated in the software development world but which has since found validity in all contexts involving design. Conway's Law states that a design will always reflect the communication patterns of the design team. In C2 design, it is usually the same system — or some sub-part of it, often at a particular echelon — that seeks to implement change. However, when stovepipes, rigid hierarchy and rival power centres are already present in the system, the design process will only reproduce these same un-agile elements. Thus, the "C2 physician" is usually unable to heal themselves.

When external participants are brought



A Viking amphibious vehicle carrying U.S. Marines disembarks a Dutch landing craft near Sandstrand, Norway, during Exercise COLD RESPONSE 2022. Photo by NATO

in, for example scientists, they may themselves be organized according to scientific stovepipes (psychology, sociology, engineering, computer science, mathematics) and therefore fail to engage with C2 as a sociotechnical system. The capability development process that enhances military forces can also be stovepiped and bureaucratic, and so fail to account for the human dimension, which is fundamental to C2. Additionally, we should not underestimate the significant role that military culture, with its long history of heroes and myths, plays in reinforcing traditional ways of doing business.

In light of all these factors, it becomes understandable why C2 change programmes, as a key part of governance, often end up reproducing the same system or suppressing the shoots of change that a new programme might have successfully sprouted.

What Is C2 Capability Lifecycle Governance?

Our analysis of C2 challenges and review of change initiatives has led us to the conclusion that NATO needs C2 capability lifecycle governance. But what, precisely, is that? To define this term clearly, the RTG reviewed how all the separate terms — C2, capability, life cycle, and governance — are understood and applied in NATO and other settings. This provided a framework for understanding how all these terms are interconnected, based upon which we wrote a preliminary definition.

C2 is considered the overarching joint function within NATO, and agile C2 is seen as a fundamental requirement in dealing with complex, uncertain and rapidly changing environments. However, C2 can also be treated as a capability. Whereas a capability represents the means to achieve specific military effects, joint functions are about how these capabilities are employed cohesively across different services and domains in joint operations. Both perspectives are needed. It is important to note that one does not develop a joint function; one develops joint capability. Hence, improving C2 as a capability will improve C2 as a joint function.

"Agile C2 is seen as a fundamental requirement in dealing with complex, uncertain and rapidly changing environments."





"A design will always reflect the communication patterns of the design team. In C2 design, it is usually the same system."



Leopard 2A4M tank live fire, Latvia. Photo by NATO



Capability refers to being able to do something — more precisely by utilizing combinations of resources in processes to achieve outcomes. The NATO Allied Joint Doctrine (AJP-01) describes C2 capability as "a dynamic and adaptive sociotechnical system configured to design and execute multi-domain operations through the comprehensive approach. Its purpose is to provide focus for individuals and organizations so that they may integrate and maximize their resources and activities to achieve the objectives."

The term *lifecycle* aligns with the ISO/IEC 15288 standard, which provides a common process framework covering the lifecycle of human-made systems. The basic premise is that capabilities are formed over time through capability development endeavours consisting of a combination of projects. One challenge for these endeavours is to keep up with and adapt to the ever-changing geopolitical and technological context.

In addition, the ISO/IEC 15288 standard is primarily focused on technological systems, and is not a lifecycle model for organizations or human capital. This is why we argue that there is a need to also take a lifecycle perspective for non-technological and sociotechnical systems.

"It is important to note that one does not develop a joint function; one develops joint capability."

Governance emphasizes long-term strategic oversight and policy-setting across the network of public bodies, corporations and other entities engaged in an endeavour. The term encompasses both formal regulations and informal guidelines. NATO's guidelines for good governance aim to foster professionalism and mitigate corruption risks, but are not sufficient for C2 capability lifecycle governance. Governance uses a pluralistic approach that includes not only the public sector but also

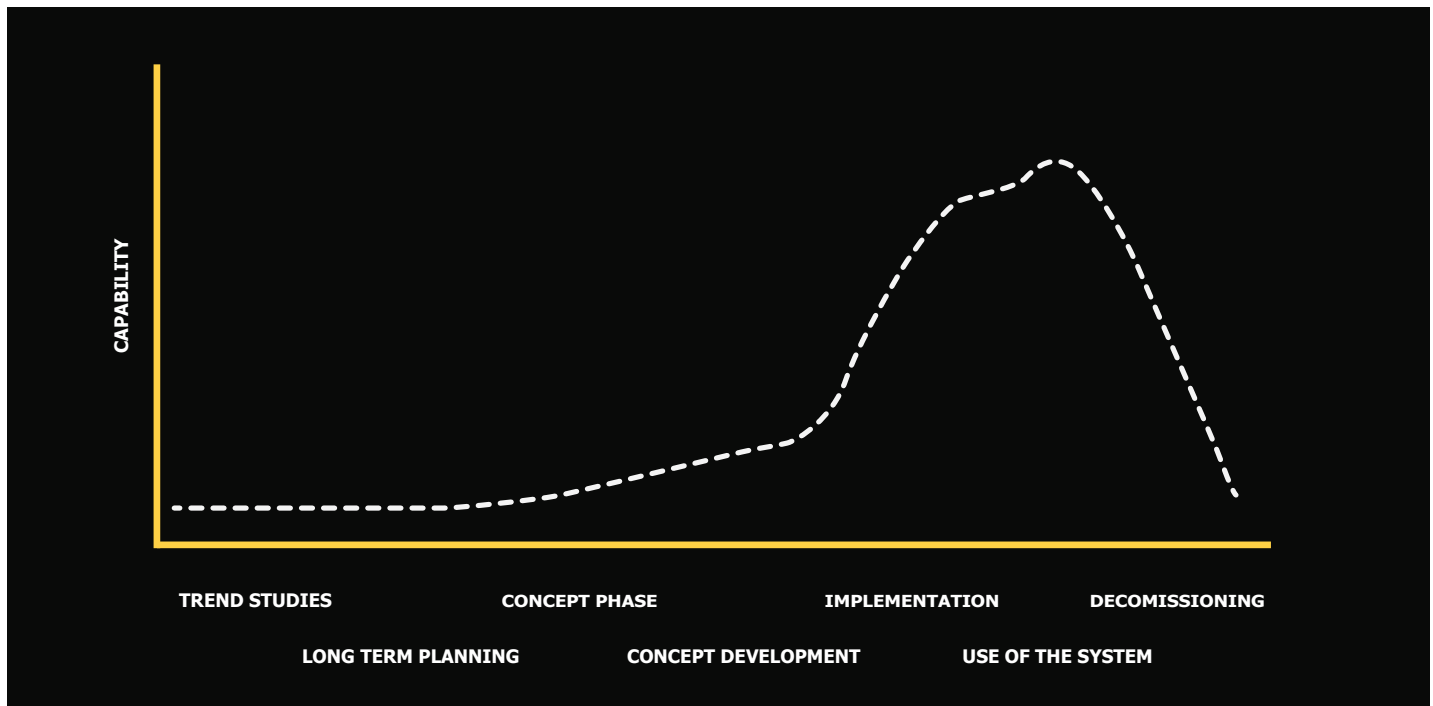
the private sector, non-profit organizations, and various social groups including voluntary public organizations. It focuses on inter-organizational network formation and the importance of trust for flexibility. Many actors and stakeholders are outside of the military chain of command and can make decisions without considering NATO decisions. Combining all these terms leads to a working definition for C2 capability lifecycle governance:

Command and control capability lifecycle governance is the systematic approach for overseeing and managing the development, deployment, and maintenance and evolution of command and control capability over time within an inter-organizational networked military context.

This governance enables C2 capability alignment with strategic objectives, operational needs, and regulatory standards throughout the C2 capability lifecycle, adapting to dynamic

Exercising civil-military cooperation during NORDIC RESPONSE 2024. Photo by Stian Olberg, DSB





Above

Illustration of a hypothetical, generic capability development process alongside its corresponding capability level curve.
@ NATO C2COE

geopolitical and technological environments. C2 capability lifecycle governance is not only about technology and the military organizations; it always starts as a sociotechnical system and thus revolves around people. C2 capability governance should remain aligned with existing guides for good governance.

Benefits of Governing C2 as a Capability

- **Governing C2 as a capability will allow development of C2 that meets the demands of the future security environment (FSE).** We expect the FSE to feature intense conflict across a wide range of domains in complex and uncertain operational environments, which will require flexible, adaptive, multi-domain C2. Therefore, C2 development by stovepiped service branches is not an effective means to achieve multi-domain C2, both nationally and in a multinational context.
- **Governing C2 as a capability will foster a cross-service multi-domain C2 culture.** Each service or branch maintaining its own C2 development reflects the traditional culture of militar-

ies, which has thwarted C2 transformation. Creating a whole-of-military C2 governance structure can promote a culture in which agile, multi-domain C2 is valued. Governance will facilitate the balancing of multiple valid perspectives on C2 in a way that is challenging for disparate organizations to achieve. This approach promotes a willingness to accept different C2 perspectives.

- **Governing C2 as a capability will drive transformations needed to make C2 fit-for-purpose for complex environments.** It is hard to see how NATO could achieve the required C2 capability using traditional C2 approaches. Treating C2 as a governed capability would channel necessary resources and institutional support to C2 transformation. As a governed capability, integration of C2 across service branches and allies, including civilian bodies, can achieve multi-domain C2. The top-down direction provided by effective governance, with necessary authority, will help overcome some of the obstacles to C2 transformation.

In summary, governing C2 as a capability will support NATO in overcoming many social,

organizational, bureaucratic, and other obstacles that thwart organizational change.

What Could C2 Capability Lifecycle Governance Look Like?

C2 is more than a technical function; it is a capability that shapes military outcomes. By recognizing this and treating C2 capability from a sociotechnical perspective, NATO can improve C2 governance and elevate its C2 practice. C2 governance is not bureaucratic red tape, but rather an investment in our operational success. As we face rapidly evolving and increasingly complex security challenges, we ought to empower our forces by treating C2 as the vital capability it truly is.

Creating a code of best practice for C2 capability lifecycle governance is a work in progress. The RTG's first step towards this is the production of a set of principles and high-level guidance for how NATO and its members could begin journey towards governing C2 as a capability. The principles promote a culture that values agility and innovation, an inclusive process for balancing the perspectives of all C2



"C2 is more than a technical function; it is a capability that shapes military outcomes."



Above, from left: A Turkish naval aviator conducts helicopter-submarine winch exercise during DYNAMIC MANTA 2024, photo by NATO; exercising total defence during NORDIC RESPONSE 2024, photo by Stian Olberg, DSB; a Swedish Marine stands on the deck of a fast assault boat during NORDIC RESPONSE 2024, photo by NATO

stakeholders, and a flexible organization that can govern C2 capability development across all time horizons.

C2 governance requires the balancing of multiple valid perspectives on C2 in a way that is challenging for disparate organizations to achieve. Therefore, we require an agreement on what C2 is and how best to govern it. C2 capability lifecycle governance further needs to promote continuous evaluation. There need to be mechanisms to regularly assess C2 effectiveness and adapt as needed.

Finally, investment in human capital is critical. This includes developing leaders who understand both the art of war and the science of governance. C2 capability governance will require educated, motivated individuals across a wide range of disciplines, fostered by a training and education system capable of producing C2 experts.

Call to Action

Having described why we need C2 capability lifecycle governance and what it could look like, we need to ensure implementation. How can we achieve this, and avoid ending up with nothing but a great study report?

There is still much work to do. We need to establish a NATO guide of best practice for C2 capability lifecycle management in order to standardize C2 governance practices across member nations. We need to determine where and how to apply governance and how this interconnects. And in this case, "we" does

not merely refer to the RTG-342: I refer to the ecosystem needed to implement and further develop C2 capability lifecycle governance, including NATO Allied Command Operations, NATO Allied Command Transformation, the NATO Force Structure and the Allies. This aligns with the Washington Summit Declaration, which called for further strengthening of NATO C2.

We at the NATO C2 COE recommend closer engagement with relevant stakeholder groups across participating nations, including identifying those who might assume C2 governance roles. Framing the concept of C2 capability lifecycle governance and understanding the interdependencies of its components could enable input on what should be included in a code or guideline for C2 capability lifecycle governance. By sharing insights and best practices, we can collectively enhance C2 effectiveness. Remember, C2 is not just a process — it is our lifeline on the battlefield. The era we live in and the future we face demand good C2 capability lifecycle governance in order to provide decisive military advantage. ✦

Major Ralph Dekker is a Dutch Air Force officer. Following a tour at the Royal Military Academy, he joined NATO Joint Force Command Brunssum as a J7 training officer. Since 2019, Major Dekker has been working for the NATO C2 COE on various topics, including the development of the MDO demonstrator, MDO and C2 development within ACO, and as a member of the NATO Science and Technology Organization (STO) Research Task Group HFM 342 on C2 lifecycle governance.



The author expresses his gratitude to his fellow RTG members for their valuable contributions to the article and for providing the excellent opportunity to be part of and collaborate with such a remarkable team. Special thanks on behalf of the RTG go to Dr Peter Houghton, Defence Science Technology Laboratory, UK. He has been at the forefront of this study and is a true C2 inspiration for all.

The RTG members are:

Dr Per Wikberg (Chair RTG), Swedish Defence Research Agency; Dr David Bryant, Defence Research and Development Canada; Dr Paul Gaertner, Defence Science & Technology Group, Australia; Ms Magdalena Granåsen, Swedish Defence Research Agency; Dr Jim Hill, Defence Science Technology Laboratory, UK; Dr Marie-Eve Jobidon, Defence Research and Development Canada; Dr Alexander Kalloniatis, Defence Science and Technology Group, Australia

References

The article is based on the work of the RTG. Individual chapters have been and will be presented at the International Command and Control Research and Technology Symposium (ICCRTS). NATO C2COE has published and will publish further results. The RTG has also presented and will present outcomes during NATO C2COE's annual seminar.

The RTG-342 final report is expected to be published by December 2024 on the NATO STO website.

Participants in Exercise NORDIC RESPONSE 2024 study a map.
Photo by Ingvid Ekrol, Norwegian Armed Forces

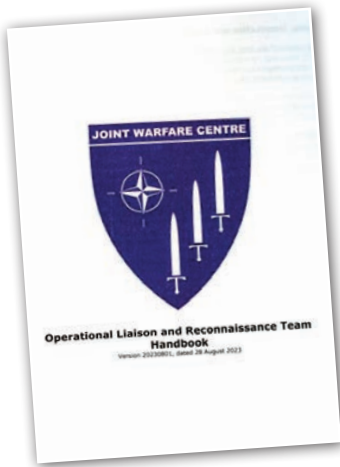


HOW TO PREPARE AND DEPLOY OPERATIONAL LIAISON AND RECONNAISSANCE TEAMS

by **Commander Cornelis van der Klaauw**
Royal Netherlands Navy
Subject Matter Expert,
Strategic Communications
and Information Operations
Transformation Delivery Division
NATO Joint Warfare Centre

DURING MOST OF THE EXERCISES the Joint Warfare Centre (JWC) has directed in recent years, an Operational Liaison and Reconnaissance Team (OLRT) was part of the training audience. As a member of the JWC Advisory Team, I have observed and advised a number of these OLRTs deployed to the JWC or elsewhere. There is no doctrine on preparing and conducting an OLRT, and I have observed different approaches leading to different outcomes; some of the teams faced significant challenges on the way, and in some cases, there was room for improvement. Although we determined good practices and lessons identified, many of them could have been captured better in order to share them with the wider NATO community of interest. This article aims to share such good practices and lessons identified to support the optimization of OLRT preparation and performance.





Above
The JWC OLRT Handbook

As mentioned, there is no OLRT-related doctrine, but that does not mean that there is no information on the subject. For example, there is the Allied Command Operations Joint Task Force (JTF) Standing Operating Procedure (SOP) 001 and several related SOPs. Various NATO databases contain a number of documents and presentations on the subject.

One of the documents I found was a 2015 article in *The Three Swords*, "Key Observations from High-Performing Operational Liaison and Reconnaissance Teams" by Lieutenant Colonel Charles Kurz (Ret.). This article, together with lessons identified and good practices from exercises and real-world activities, was the basis for the development of the JWC OLRT Handbook, which was finalized and approved in 2023.

In this article, I will provide a general description of an OLRT, its mission and concept, followed by a closer look at its possible composition as well as tasks and responsibilities. Nevertheless, the focus of the article will be on practical information as was used for the development of the JWC OLRT Handbook.

Before we can discuss composition, tasks and responsibilities of an OLRT, we need a clear understanding of what an OLRT is. Although there is no definition, several descriptions cover the same important aspects. Based on this we can describe an OLRT as "a very high-readiness, cross-functional team allowing the operational commander to gather situational awareness early in the planning process." Also, that it "enables rapid establishment of liaisons and reconnaissance in an area designated as a possible future theatre of operations and provides advice on contingency

planning and operational issues, ranging from but not limited to force composition, logistics, and command and control."

The mission of the OLRT is to answer requests for information (RFIs) from the Joint Operations Planning Group (JOPG) by gathering data from a wide range of sources populating the political, military, economic, social, information, and infrastructure (PMESII) domains. The OLRT assess, analyse, comment on, and relay the refined information, answering the JOPG RFIs as part of the deliberate crisis response planning (CRP) process.

The OLRT are the eyes and ears of the operational commander in a potential theatre providing the "ground truth" that will assist in directing the operational-level planning towards viable, practical and realistic options for any potential future NATO deployment. Deployment, redeployment, tasking, and defining the responsibilities of an OLRT need careful consideration. One factor to consider is the limited time an OLRT has to stand up, deploy, and become operational, upon which the team also needs to establish initial contacts and build trust with relevant actors.

It is important that the commander provide direction and guidance through a personal briefing to the OLRT. Not only does this express the commander's support to the OLRT and their mission, it also helps to focus the

OLRT on what the commander requires and expects from the mission of the OLRT. Finally, it gives the OLRT the opportunity to ask the commander for clarification when required.

NOW I WOULD LIKE TO expand on the possible composition, tasks and responsibilities of an OLRT. An OLRT is a mission-configurable grouping, and in order to remain flexible, such a team will never be of a pre-determined size. An OLRT could be composed of only a few people equipped with a satellite phone, although a larger group of 20 to 50 people is more common. Only in the most unusual circumstances is the team likely to be any larger.

The staffing of the OLRT is a task for the entire headquarters, including its designated Joint Logistics Support Group (JLSG). Every position in the OLRT must have at least two people, the primary and secondary person, appointed to a position. The OLRT should be staffed with an appropriate level of command, ideally a one-star flag officer, to liaise with high-level political and military authorities.

The OLRT normally consists of two teams: the core team and the base team. The core team is a flexible, scalable, and cohesive team ready to deploy on short notice. The base team is a pool of trained and deployable personnel with specific expertise, able to deploy with the OLRT when required.

Below
A simulated OLRT training in Türkiye in preparation for NATO Exercise STEADFAST DAGGER 2024, March 13, 2024. Photo by Multinational Joint Warfare Centre PAO





Left

Key leader engagement during the simulated OLRT deployment training in Türkiye, March 13, 2024, in preparation for NATO Exercise STEADFAST DAGGER 2024. Photo by Multinational Joint Warfare Centre PAO

GENERIC ASPECTS RELEVANT FOR AN OLRT DEPLOYMENT

Personnel issues: legal status, national requirements, administrative aspects and family support;

Strategic situation: the PMESII and ASCOPE (area, structures, capabilities, organizations, people, events) domains; a strategic update, including key historical and cultural events, weather, geography and terrain;

Military situation: maritime, air, land, cyberspace, space, information, but also factions, paramilitary, and their asymmetric capabilities;

Threat assessment: security assessment and risks, security procedures, information security, security classifications and counter-intelligence;

Health and safety: basic medical knowledge, required vaccinations, medical protection, mine awareness, countering improvised explosive devices (C-IED) awareness and chemical, biological, radiological and nuclear (CBRN) training;

Financial aspects: reimbursement of shared and national costs, personal expenditures, and regulations for the use of credit cards and cash.

In addition to these generic aspects, OLRT training and education needs to cover a number of more practical aspects:

→ Being able and authorized to drive in various types of terrain/difficult urban environments; advanced driving and basic mechanics; being familiar and effective with small arms, including grouping, firing from different positions, contact drills and car drills; gaining awareness of the risks and being capable of avoiding and surviving capture;

Although this is not always captured fully in a job description, it is important that the nominated OLRT members possess a high degree of personal initiative; they must be proactive and self-directing, able to translate a commander's intent into action, and capable of working long, non-standard hours under difficult conditions. In addition, their English language proficiency must be outstanding.

The primary task of the OLRT is to provide first-hand situational awareness and answer requests for information from the Joint Operations Planning Group. They do so mainly through reconnaissance and liaison activities. The entities they liaise with are host nation authorities and other relevant governmental and civilian organizations that can have an impact on future NATO operations.

As mentioned earlier in the introduction, this article will focus on practical information, lessons identified, and good practices from exercises and real-world activities. Although there are multiple aspects to consider, I will narrow my focus on the following topics: preparation of an OLRT, the required expertise

and competences, and conduct and processing of engagements. It will come as no surprise to the reader when I state that good preparation is the basis for a successful OLRT. However, what precisely constitutes "good preparation"?

THE TRAINING AND PREPARATION of an OLRT is a continuous and time-consuming process that requires sufficient funding and resources. The three basic OLRT training planning phases are:

→ **Phase A.** Basic individual and educational training, mainly consisting of academic sessions to create a common understanding of the different roles, responsibilities and functions within and related to an OLRT;

→ **Phase B.** Pre-deployment preparation, consisting of a four- to five-day training event focused on the rehearsal of procedures and engagement activities;

→ **Phase C.** Final preparation of an OLRT through the execution of an exercise and related rehearsals. This should preferably be synchronized with the Joint Operations Planning Group training and take place prior to the crisis response planning.



→ Gaining knowledge and experience in conducting engagements; preparation, conduct and reporting; behavioural and cultural awareness and working with interpreters; preparation for interaction with the media; improving media awareness and interview techniques; eliciting information through tactical indirect questioning;

→ Basic ability to conduct accurate assessments and analysis of other nation's security forces, including their willingness and combat power; knowing how to manage and add value to information through critical thinking; knowledge on the classification of documents and carefully balancing the principles of need-to-know and need-to-share.

Taking a closer look at the expertise and competences required of an OLRT member, it is clear that the base team should consist of the required joint functions, advisors and domain expertise, based on the tasks defined for a specific OLRT deployment. Besides these individuals chosen for the tasks at hand, there is also a need for additional expertise and support, for example from CIS, logistics and sustainment, drivers, interpreters and, where available, specific civilian experts.

All these staff do not only need functional expertise but also a good understanding of the processes, instructions, and direction and guidance they have received. Furthermore, they need to be aware of the area and situational circumstances of a potential deployment and possess related language skills and cultural expertise.

To round off this article, I shall expand on some more practical aspects, lessons identified, and good practices derived from exercises and real-world activities. More specifically, I will focus on the preparation, conduct and processing of engagements, starting with definitions of engagements activities that can take place within the context of an OLRT.

AN ENGAGEMENT WITHIN the military context is any form of human interaction aimed at delivering influential messages in support of the overall campaign objectives. The engagement may have an impact on perception, attitude and behaviour, and should therefore be consistent, culturally sensitive, credible, adaptive, balanced, and pragmatic. Engage-

"A military engagement within the context of an OLRT should be consistent, culturally sensitive, credible, adaptive, balanced, and pragmatic."



Above
A simulated key leader engagement during the STEADFAST DAGGER 2024 OLRT training.
Photo by Multinational Joint Warfare Centre PAO

ments can be deliberate or dynamic, and the planning and execution of such engagements will vary according to their type. A deliberate engagement is a planned and anticipated personal interaction designed to create a specific outcome. Dynamic engagements are unanticipated encounters for which there has been no specific planning. The ability to exploit deliberate and especially dynamic engagements depends heavily on training and experience.

An engagement is generally a two-way communication activity in which actors aim to achieve specific goals. There are a number of principles to keep in mind for an efficient and effective engagement. Firstly, an engagement must be consistent, meaning words and ac-

tions should be aligned. Closely related to this is credibility, trust, and openness — but at the same time awareness of operational security. Furthermore, an engagement must take into account local customs, beliefs and appropriate ways of communicating. Finally, the engager needs to find a balance between achieving the desired effect and listening to and understanding the engagee's point of view. This requires from the engager the capability to think critically and use reasonable judgement to deal with ambiguity, accept prudent risk, and quickly adjust to evolving situations. All this means that engagement approaches must be realistic and pragmatic.

Key leader engagements (KLE) are engagements between NATO military leaders and the key decision-makers of approved audiences. These engagements have a defined goal, for example influencing local leaders. KLE is a planned and anticipated personal interaction designed to create a specific effect. An engagement between a NATO military leader and someone who does not belong to a NATO-approved audience is by definition not a KLE but "just" an engagement. Furthermore, regular interactions between key leaders and other headquarters within the NATO Command Structure are considered routine chain-of-command activities and not KLE.

Strategic engagements are those that are conducted at the strategic level to influence specific non-military instruments of power, in pursuit of strategic objectives. At the operational level, strategic engagement will normally be conducted by the commander, or in exceptional cases delegated to the deputy commander. Strategic engagements are not delegated below joint force command level.

The approach to managing engagements will largely depend on the structure of the HQ and the expertise and number of personnel involved in the process.

Three elements are needed to ensure an efficient and effective engagement process:

→ **Engagement strategy:** sets the long-term aim for engagement activities. It may be broken down into specific areas or groups of areas and should direct who will engage and with whom. An engagement strategy should be nested within the engagement strategy of higher HQs.





Above

A simulated key leader engagement during the simulated OLRT deployment training in Türkiye, in preparation for NATO Exercise STEADFAST DAGGER 2024, March 13, 2024.
Photo by Multinational Joint Warfare Centre PAO

An OLRT is a high-readiness, cross-functional and mission-configurable group of select people acting as the ears, eyes and voice of the operational commander and providing the ground truth for a possible future NATO deployment.

→ **Engagement plan:** provides more detail on the delivery of the engagement strategy. It may give a desired time period based on aspects such as the desired frequency of engagement, the date of the last engagement and current events.

→ **Engagement matrix:** provides a spreadsheet overview of the timing of future engagements as well as records of what has happened previously and when.

Although no two engagements will be the same, a common approach should precede and follow each engagement event. An engagement may be instigated reactively or proactively; for example, it may result from an invitation, or it might be brought about more proactively by following up an engagement opportunity recommended by the staff, or originating from the engagement plan.

To establish successful engagement activities, one must consider a number of aspects. Engagements need to be: "**Pre-planned;** the subjects to be discussed during the engagement should be part of an overall plan.

Effects-based; the engagement need to have a purpose tied to objectives and messaging derived from the StratCom framework. **Targeted;** individuals selected for engagement and the personnel chosen to engage should be carefully selected based on abilities, interests, access and influence. **Integrated and coordinated;** engagements must be undertaken as a 'whole of enterprise' function involving multiple functions and capabilities. **One-on-one;** engagements should be conducted one-on-one but preferably face-to-face. **Pro-active and forward-looking;** engagement planners should seek opportunities both in and beyond the planning horizon. **Networked;** it is essential that all engagement activities are synchronised." (NATO Engagement Handbook, September 2017)

The above indicates that preparing, conducting, and assessing an engagement is a complex task that requires specific knowledge and expertise. No one person is able to provide all this knowledge alone. Engagement planning requires input from and coordination of the entire staff, particularly special advisors such

as the legal advisor (LEGAD) and political advisors (POLAD), but also from specific functions and capabilities such as strategic communications (StratCom) and civil-military cooperation (CIMIC).

As a start, the POLAD need to provide an in-depth pre-deployment briefing to the entire OLRT, addressing the overall political situation and pointing out the political sensitivities of the developing crisis that can affect the success of a NATO mission. The briefing should also provide additional information about the political organizations and important political actors, with a special focus on their stance towards NATO and a possible future NATO deployment. The POLAD may join the OLRT deployment, but more realistically, they will be available for the OLRT as reach-back. Finally, the POLAD can help establish contact with diplomatic authorities in the host nation.

Cooperation with a lead diplomatic authority in the host nation would greatly assist the OLRT by providing briefings, contacts, and approved secure means to store classified documents and communications equipment. Although there is most likely no need to de-



ploy the POLAD because reach-back will suffice; this is decidedly different for the LEGAD. The preferred option is that one LEGAD stay with the headquarters and support the JOPG, while another LEGAD deploys with the OLRT.

The LEGAD can provide on-the-spot legal advice, technical guidance, advocacy, and other legal support while ensuring compliance with NATO guidance and Alliance obligations. In this context, the deployed LEGAD should be prepared with draft versions of potential host nation support arrangements, intelligence-sharing agreements, and other documents required for coordination with the host nation.

Furthermore, this LEGAD can advise on issues arising from the deployment, such as the applicability of the law of armed conflict, criminal jurisdiction and the use of force. Finally, it is unlikely that a status of forces agreement (SOFA) is in place during the OLRT deployment. This will have a significant impact on the legal status of the OLRT members. Without a SOFA, it is not always readily apparent which laws govern the deployed members of the OLRT.

The StratCom function is responsible for providing advice and recommendations on effects, objectives and the coherence of the engagement activities. Within StratCom, information operations (Info Ops) will serve as the advising and coordinating section for all activities that affect the information environment and engagements. The StratCom framework is the primary tool to provide direction and guidance for the planning and execution of engagements, ensuring a consistent approach to them. The OLRT preparation phase provides a good opportunity to start the development of an initial StratCom framework, including key messages and themes preferably based on existing higher-level StratCom frameworks.

NATO's decision-making process requires close interaction between military and civil actors on various levels. A military aspect may affect civil actors and vice versa. Therefore, CIMIC should be part of the OLRT to establish and maintain close coordination with civil organizations and government officials. The information gained by CIMIC must be shared within the OLRT as well as with the JOPG, and it must be available to all other branches of the HQ to ensure the civil-military factors are considered during the planning



The author, right, with one of the JWC's former legal advisors. Photo by Tore Ellingsen

process and integrated into operational plans. Besides this, CIMIC is the function to initiate and support civil-military interaction (CMI) activities before and during the deployment of the OLRT.

Conclusion

It is generally understood that good preparation is the key to success, and this certainly applies to the deployment of an OLRT. But what does such OLRT preparation entail? In this article I have pointed out the need to capture and share the best practices and lessons identified, especially because there is no doctrine or a clear definition of an OLRT.

Using a description developed from the available information and combining this with the mission of an OLRT provided in JTF SOP 001, we can say that an OLRT is a high-readiness, cross-functional and mission-configurable group of select people acting as the ears, eyes and voice of the operational commander and providing the ground truth for a possible future NATO deployment. There should be an appropriate level of command, ideally a one-star flag officer, to liaise with high-level authorities.

The mission of an OLRT is to answer requests for information from the JOPG by gathering the required information from a wide range of sources. The OLRT must assess, analyse and comment on this information be-

fore relaying the outcomes to the JOPG. Before the deployment of an OLRT, the team's task and mandate need to be absolutely clear. In this context it is important that the operational commander provide their direction and guidance to the OLRT through a personal briefing.

Furthermore, this article has outlined the ways to prepare an OLRT including the need for proper resources, funding and realistic timelines, the required expertise and competences of the OLRT members, and the preparation, conduct and process of different forms of engagements in the military context.

Finally, I have described a number of special advisors and specific functions required in an OLRT and the best way to integrate and deploy LEGAD, POLAD, StratCom and CIMIC, including the latter's role in civil-military interaction activities. ✦

References

- 1 Key Observations from High-Performing Operational Liaison and Reconnaissance Teams. Lieutenant Colonel Charles Kurz (Ret.) in *The Three Swords*, Issue 28, May 2015. jwc.nato.int/images/stories/threeswords/OLRT.pdf
- 2 The Allied Joint Publication for Information Operations (AJP-10.1); Edition A. <https://nso.nato.int/nso/nsdd/main/standards/ap-details/2925/EN>
- 3 JWC's Operational Liaison and Reconnaissance Team Handbook, published on August 28, 2023
- 4 JTF HQ SOP 001 Operational Liaison And Reconnaissance Team (OLRT)



ALL EYES ON THE NORTH

HOW RUSSIAN NARRATIVES SPREAD FROM UKRAINE TO THE ARCTIC



by **Hope Carr**

Information Warfare Expert and
Senior Reserve Public Affairs Advisor
to the Canadian Armed Forces

and **Dr Cameron Carlson**

Dean for the College of Business
and Security Management
University of Alaska Fairbanks



When Russia began its term as Arctic Council chair in May 2021, there was an air of scepticism in the seven other Arctic countries regarding the potential impact of Russia at the helm of the Council.¹ Even though Russia had outwardly worked to maintain an atmosphere of Arctic collaboration, its messaging and its actions had already started to contradict each other. Despite the evolving national security agenda of Russia in the Arctic — marked by intensified development, military expansion, and regional exercises involving the People's Republic of China (PRC) — tensions stayed remarkably subdued, with the overarching Arctic narrative remaining static. That narrative evaporated on February 24, 2022, when Russia began its full-scale invasion of Ukraine. Any hopes regarding regional Arctic collaboration gave way to greater concerns of European stability as NATO and its member states became focal points in countering Russia's escalatory behaviour.

Russia's Oz

As in the past, Russia's actions only make up part of its overall strategy, with narratives and active measures² taking centre stage in the global information environment. Relying on the country's well-used information warfare playbook, Russia attempted to explain the invasion as a move to "de-Nazify" and demilitarize Ukraine in order to prevent the genocide of Russian-speaking people.³ Those assertions have fallen flat, as Russia's claims of genocide were determined to be completely unfounded, and the war has dragged on.

As overt an active measure this appears to have been, it has done little to serve as a helpful narrative for justification on either the world stage, or for internal purposes. Polls in late 2023 by the polling agency Russian Field and the independent Russian sociological research organization Levada Center suggested a "solid majority" of Russians "oppose a potential second wave of mobilization" and show a preference for peace talks over the continuation of the war. Levada states that a drop from 53% to 39% in definitive support for the war suggests "conformism rather than active support for the war."⁴

As the invasion has continued through to 2024, the global audience has been able to look behind the curtain of Putin's Oz⁵ and observe some of the contradictions and falsehoods in Russia's narratives. Russia has remained vigilant in its historical revisionism and its use of central narratives around Western expansionism and Russia as a victim.⁶ Despite the exposure and global dissection of Russian information manipulation, there are no indications Russia is throwing away its playbook. Further, with Sweden and Finland becoming NATO members, Putin's dialogue and Russian narratives are spreading beyond the borders of Ukraine, weaving their way into other areas where Russian and NATO interests collide.

The Arctic

Following the full-scale invasion of Ukraine, those narratives became highly relevant in the evolving Arctic domain. Russia has always

portrayed itself as a "reliable and responsible" Arctic leader and partner, publicly acknowledging the region to be a "zone of peace and cooperation."⁷ The key Russian narrative suggests there are "no problems requiring a military solution" in the Arctic as it is a "territory for dialogue."⁸ That narrative remained consistent, as Russia downplayed the potential of regional military action as part of its activities within the information battlespace.

In stark contrast to its having downplayed the potential for military action, however, Russia "expanded and modernized" existing military installations and constructed new facilities across the Arctic region.⁹ Russia's full-scale invasion of Ukraine tilted the power balance, leaving all Russian interests — and particularly those in the Arctic — at risk of being implicated in greater Russian posturing. This placed the Arctic as a focal point within Russia's evolving great power competition agenda, making it an active measure in and of itself.

In March 2022, the newly minted Arctic 7 (Canada, Denmark, Finland, Iceland, Norway, Sweden, and the United States) announced their decision to "temporarily pause" Arctic Council cooperation with Russia.¹⁰ While some programmes that did not include Russia resumed, the May 2023 Arctic Council Meeting, a restrained online event, marked the transition of the Chair of the Council from Russia to Norway. Despite this important handover, future programmes remain on hold as Norway looks forward for opportunities to resume the efforts of its working groups despite the cessation of political contact with Russia.¹¹

"The inclusion of Sweden and Finland not only strengthens NATO overall and provides critical collective security for the two states, but it also fortifies NATO's Arctic strategy."





A CF-18 fighter during Operation SPRING FORWARD in the sub-Arctic region of Canada. Photo by Cpl Kevin McMillan, Canadian Forces Combat Camera

► "For Moscow, no topic is off-limits to counter perceived threats to greater Russian interests and undermine NATO legitimacy."

As Russia is the largest Arctic state, Russian Ambassador to the United States Anatoly Antonov has maintained that any decisions taken by the Arctic Council in Russia's absence "will be illegal" and "violate the consensus principle."¹² However, that narrative carries little weight in the international Arctic community. As early as August 2022, NATO dropped all pretence around Arctic collaboration with Russia when former Secretary General Jens Stoltenberg reminded journalists, in a joint press conference with Canadian Prime Minister Trudeau, that "the High North is strategically important for Euro-Atlantic security"¹³ as the "shortest path to North America for Russian missiles and bombers would be over the North Pole."¹⁴

Even before Council members distanced themselves from Russia, Putin's Arctic narrative seemed to have started to fracture. This fracturing accelerated as his traditional Arctic partners began to coalesce around NATO. Russia's Arctic development, which at one time had highlighted the region as a "zone of cooperation," was no more. It has now focused on extra-regional states and associations, with

Russia opening the Arctic to "cooperation with all interested partners" in a bid to find new Arctic allies. This disjointed narrative, nested within new Russian revisionism, has taken on even greater importance with Finland and Sweden joining NATO, making seven of the eight Arctic countries NATO member states.

As Russia increases its hybrid activities in the High North¹⁵ and focuses its active measures and disinformation on anti-NATO narratives, Russian Navy Chief Admiral Nikolai Yevmenov announced, during a shadow Arctic Forum in December 2023, that Russia would be pushing to expand its Arctic boundary in response to "the expansion of NATO and the aggressive policy of the collective West towards Russia."¹⁶

The push for more territory is nothing new for Russia. However, the timing and nesting of the announcement within anti-NATO and NATO expansion narratives foreshadows the growing impact of the war in Ukraine and the importance of the Arctic in Russia's information warfare and military posturing.

As complicated as Russian Arctic narratives and realities have now become, Russia's

growing dependence on the People's Republic of China (PRC) only increases information obscurity. This obscurity plays out in numerous ways. The PRC and Russia very visibly conducted joint military exercises off the coast of Alaska's Aleutian Island chain in both 2022 and 2023, underscoring efforts to solidify their partnership within the Arctic.

For the PRC, such explicit support of Russia runs the risk of fostering mistrust in the countries, relationships and ventures in which China has invested within the Arctic.¹⁷ While the PRC has indicated that "all countries deserve respect for their sovereignty and territorial integrity,"¹⁸ it has also continued to support Russian disinformation and to malign the West and NATO as a primary cause of the Russo-Ukrainian war. Similarly, China simultaneously notes that it is "extremely concerned" about the harm to civilians in Ukraine as it continues to support Russia with resources to sustain the war. As Russia becomes more reliant on the PRC for support and the PRC becomes a substantial beneficiary of Russia's energy resources, the relationship between the two countries grows ever more complex.





The Arctic region, once primarily known for its harsh climate and remote landscapes, now stands as a pivotal area for global interests encompassing geopolitics, climate conservation, resource accessibility, and security concerns.

An Expanding NATO

Prior to Russia's invasion of Ukraine, public support within Finland and Sweden for NATO membership was relatively low.¹⁹ Russia's full-scale attack on Ukraine in February 2022 swung the position of the formerly unaligned Nordic countries, with both now fully recognized as NATO member states. Former Finnish ambassador to Russia René Nyberg from the think tank Carnegie Endowment for

International Peace suggests that the accession of Sweden and Finland to NATO may be "the most significant collateral damage incurred by Russia's invasion of Ukraine yet."²⁰

The two countries' paths to membership were not easy, however, due to an intense campaign of Russian disinformation and misdirection. Russia has historically opposed NATO's expansion, viewing it as a direct threat to Russia's security and sphere of influence. Since April 2022, Russia has conducted directed information warfare campaigns to influence and grow false narratives in Sweden, Finland, and NATO countries in an effort to undermine support for the two countries' accessions.²¹

These narratives have been provocative and, in most cases, focused on polarizing topics across multiple languages. A February 2023

Soufan Center IntelBrief on Russian disinformation suggests that misleading and heavily targeted disinformation campaigns directed at Sweden from several global locations have focused on immigration, Islamophobia, and conspiracy theories that suggest Sweden is an "inhospitable and racist country" and that NATO, run by the "global cabal," favours only the "Swedish elite."

Other high-profile campaigns have focused on Sweden's and Finland's supposed inability to secure energy for their populations and businesses. These campaigns involve central figures as well as decentralized influencers and bots, with even President Putin and other Russian government officials commenting on the United States' supposed role in creating energy insecurity for the countries.

Above, clockwise

During his maiden trip as NATO Secretary General, Mark Rutte, visited Kyiv on October 3, 2024, and met with the President of Ukraine, Volodymyr Zelenskyy (photo by NATO). Finnish and Swedish marines in Northern Norway during Exercise NORDIC RESPONSE 2024 (photo by NATO); Exercise SAPIN POLAIRE (photo by Cpl Dominic Duchesne-Beaulieu); official letters of application to join NATO from Finland and Sweden, May 18, 2022 (photo by NATO).





Above

NATO Secretary General Mark Rutte lays a wreath at the Wall of Remembrance of the Fallen for Ukraine, October 3, 2024. Photo by NATO

The inclusion of Sweden and Finland not only strengthens NATO overall and provides critical collective security for the two states, but it also fortifies NATO's Arctic strategy by creating a more unified stance among the Arctic countries, thereby expanding the Alliance's strategic reach and operational capabilities in this increasingly contested region.²²

As the war continues, Arctic narratives will persist as a means to validate Russian anti-NATO pomposity, and to justify Russia's own escalatory behaviour in Ukraine and beyond. The information environment, as a key tool in the execution of Russia's foreign and national policy actions, will be critical in these efforts. For Moscow, no topic is off-limits to counter perceived threats to greater Russian interests and undermine NATO legitimacy. Consequently, all eyes should be on the Arctic as we attempt to understand the region's place as an emerging battlespace in Russia's post-Ukraine invasion narrative. ✦

Hope Carr is a recognized information warfare expert who, since 2008, has supported the delivery of a complex information environment in more than 100 global military exercises. Her research includes work on strategic communications within insurgencies and the role of information warfare in military operations. Ms Carr is also a senior officer in the Canadian Army Reserves, where she serves as the Senior Reserve Public Affairs Advisor to the Canadian Armed Forces.

Dr Cameron Carlson serves as Dean for the College of Business and Security Management and is the founding director emeritus for the Center of Arctic Security and Resilience at the University of Alaska Fairbanks. He retired as a lieutenant colonel from the U.S. Army in 2006 after 25 years on active duty and has authored and co-authored numerous articles on the Arctic region, specific to defence and human/climate security-related issues as well as homeland defence and security.

Endnotes

- 1 U.S. Elizabeth Wishnick and Cameron Carlson, "The Russian invasion of Ukraine freezes Moscow's Arctic ambitions." *Journal of Indo-Pacific Affairs* 5, no. 6 (2022): 50-65, The Russian Invasion of Ukraine Freezes Moscow's Arctic Ambitions
- 2 Aktivnye meropriyatiya, "active measures," was a term used by the Soviet Union (USSR) from the 1950s onward to describe a gamut of covert and deniable political influence and subversion operations, including (but not limited to) the establishment of front organizations, the backing of friendly political movements, the orchestration of domestic unrest and the spread of disinformation. <https://www.marshallcenter.org/en/publications/security-insights/active-measures-russias-covert-geopolitical-operations-0>
- 3 Christian Perez, "Information Warfare in Russia's War

in Ukraine." August 22, 2022. <https://foreignpolicy.com/2022/08/22/information-warfare-in-russias-war-in-ukraine/>

- 4 Vladimir Milov, "How Strong is Russian Public Support for the Invasion of the Ukraine," Atlantic Council, January 9, 2024, <https://www.atlanticcouncil.org/blogs/ukrainealert/how-strong-is-russian-public-support-for-the-invasion-of-ukraine-2>
- 5 In the 1939 film "The Wizard of Oz", based on L. Frank Baum's children's novel "The Wonderful Wizard of Oz", the Wizard is known as a powerful being who rules the Land of Oz. Later in the story the supposed immortal is revealed to be an ordinary man hiding behind a curtain and projecting an image of his face to visitors.
- 6 U.S. Department of State, "Russia's Top Five Persistent Disinformation Narratives: Fact Sheet" January 20th, 2022 <https://www.state.gov/russias-top-five-persistent-disinformation-narratives>.
- 7 Vladimir Putin, "Prime Minister Vladimir Putin addresses the international forum 'The Arctic: Territory of Dialogue,' Russian Press release, 2010, archive. government.ru/eng/docs/12304/print/
- 8 Ibid.
- 9 Malte Humpert, "From Ukraine to the Arctic: Russia's Capabilities in the Region and the War's Impact on the North." *High North News*, September 22, 2022. <https://www.highnorthnews.com/en/ukraine-arctic-russias-capabilities-region-and-wars-impact-north>.
- 10 Arctic Council, "Joint Statement on Arctic Council Cooperation Following Russia's Invasion of Ukraine," Joint Statement from Canada, the Kingdom of Denmark, Finland, Iceland, Norway, Sweden, and the United States, Joint Statement on Arctic Council Cooperation Following Russia's Invasion of Ukraine — United States Department of State
- 11 Arctic Council. "Three Months into the Norwegian Chairship: A Status Update with SAO Chair Morten Høglund." August 31, 2023. <https://arctic-council.org/news/three-months-into-the-norwegian-chairship-a-status-update-with-sao-chair-morten-hoglund/>.
- 12 TASS. "Russian Ambassador to US Warns Arctic Council against Making Decisions without Moscow." June 8, 2022. <https://tass.com/politics/1462561>.
- 13 NATO. "Joint Press Conference with NATO Secretary General Jens Stoltenberg and the Prime Minister of Canada, Justin Trudeau." NATO. August 26, 2022. https://www.nato.int/cps/en/natohq/opinions_206908.htm.
- 14 Ibid.
- 15 Colin Wall and Njord Wegge, "The Russian Arctic Threat," CSIS, January 25, 2023, The Russian Arctic Threat: Consequences of the Ukraine War (csis.org)
- 16 Brendan Cole, "Russia Just Laid Claim to More Arctic Territory," *Newsweek*, December 11, 2023, Russia Just Laid Claim to More Arctic Territory (newsweek.com)
- 17 Chuan Chen. "China-Russia Arctic Cooperation in the Context of a Divided Arctic." The Arctic Institute — Center for Circumpolar Security Studies, April 4, 2023. <https://www.thearcticinstitute.org/china-russia-arctic-cooperation-context-divided-arctic/>.
- 18 Council on Foreign Relations, "The Future of China and China-U.S. Relations: A Conversation with Liu Jianchao." January 9, 2024. <https://www.cfr.org/event/future-china-and-china-us-relations-conversation-liu-jianchao>.
- 19 Tuomas Forsberg, "Finland and Sweden's Road to NATO." *Current history* 122, no. 842 (2023): 89-94.
- 20 René Nyberg, "Russian Collateral Damage: Finland and Sweden's Accession to NATO." June 10, 2022. <https://carnegeieendowment.org/politika/88096>.
- 21 Soufan Center, "IntelBrief: Disinformation Narratives Related to Sweden and Finland's NATO Applications," February 2023, IntelBrief: Disinformation Narratives Related to Sweden and Finland's NATO Applications — The Soufan Center
- 22 Lee Mottola. NATO's Arctic Command: A Case for the Expansion of NATO's Mission in the High North, January 17, 2023. <https://www.thearcticinstitute.org/nato-arctic-command-case-expansion-nato-mission-high-north/>.

E X C L U S I V E

GENDER PERSPECTIVE

A Fundamental Tool in Ensuring Geopolitical, National and Individual Security

by **Lieutenant Colonel Lena P. Kvarving, PhD**
Norwegian Air Force
Nordic Centre for Gender in Military Operations

and **Julia Dalman**
Legal Analyst
Nordic Centre for Gender in Military Operations

➤ **NEW RESEARCH CONFIRMS** that the systematic subordination of women underlies all institutions, with wide-ranging implications for global security and development. Actors in the security sector are growing more aware of this through education on women, peace and security and gender perspectives. There has never been a more vital time to face the problems and implement solutions.

THE U.S. DEPARTMENT of Defense has financed a comprehensive empirical investigation that verifies how the subordination of women degrades national security and stability. The result can be found in the book "The First Political Order: How Sex Shapes Governance and National Security Worldwide."¹ This extensive research confirms the vital need for public institutions and organizations to have an agenda on women, peace and security (WPS), and for gender perspectives to permeate the security sector and foreign policy. It also serves as a timely reminder of the seriousness of these matters,

particularly for anyone who may be under the impression that NATO's focus on the women, peace and security agenda; gender perspective; and equality is some kind of politically correct fluff that may safely be ignored.

Instead, it turns out that the things that matter most to the peoples of the world, such as good governance and democracy, economic prosperity, peace, health, security, and environmental preservation are rooted in the character of male/female relations. The study by Hudson, Bowen and Nielson also shows that steps against laws, customs, and practices that disadvantage women produce positive outcomes for both women and men. The research basically offers a

new paradigm for understanding insecurity, instability, autocracy and violence, and it explains what the international community can do to promote more equitable relations between men and women and, thereby, security and peace.²

The recognition that gender inequality has a negative effect on international peace and security also lies at the heart of the WPS agenda.³ The research strikingly demonstrates that female subordination is destructive not only to the women within a society, but to the entire society in which they live.

One of the authors of the study, Valerie Hudson, a University Distinguished Professor and holder of the George H.W. Bush Chair at





Above
Midwifery students in Afghanistan, 2010; photo by Eric Kanalstein, UN. According to the UN Women website, the oppression that Afghan women and girls have been experiencing since August 2021 is unmatched in terms of scale and generational impact, with only 1% of women feeling they have influence in their communities.

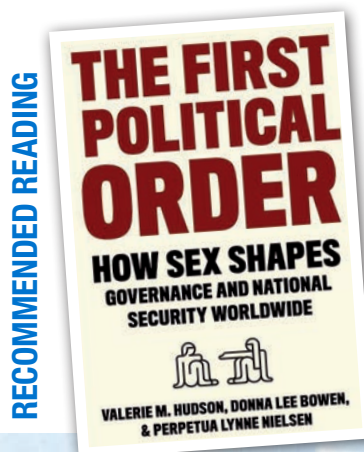
the Bush School of Government and Public Service at Texas A&M University, stated at the launch of the book that, "What you do to your women you do to your nation state. And so, if you decide to curse your women, we argue that you will curse your nation state as well."

To name an example: since 2021, the Taliban have viciously curtailed women's rights and freedoms, leaving no areas of Afghan society untouched. Their comprehensive and draconian decrees have banned women and girls from public spaces such as parks and restaurants, implemented strict dress codes along with male chaperone requirements, and denied women and girls access to education and jobs. UN experts have described the Taliban's treatment of women as "severe discrimination that may amount to gender persecution — a crime against humanity — and be characterized as gender apartheid."⁴ Afghanistan is a failing state on many levels, lacking resources, revenues, reserves and resilience.⁵

Gender inequality perseveres worldwide, and women and girls in every country across the globe struggle with its impact and effects.⁶ As the number of conflicts across the world has reached an all-time high, the situation is particularly harrowing.⁷ Experience evidences how gender inequality exacerbates in times of armed conflict, demonstrating how gender inequality prevails across a continuum of time and space. Inherently, conflicts and crises have gendered aspects, whether as a direct or indirect result of existing gender norms, bias and inequality, or as the result of gendered strategies. The war in Ukraine is a current and telling case in point. The Nordic Centre for Gender in Military Operations (NCGM), where both authors of this article work, is particularly knowledgeable on this aspect of the Russo-Ukrainian war.

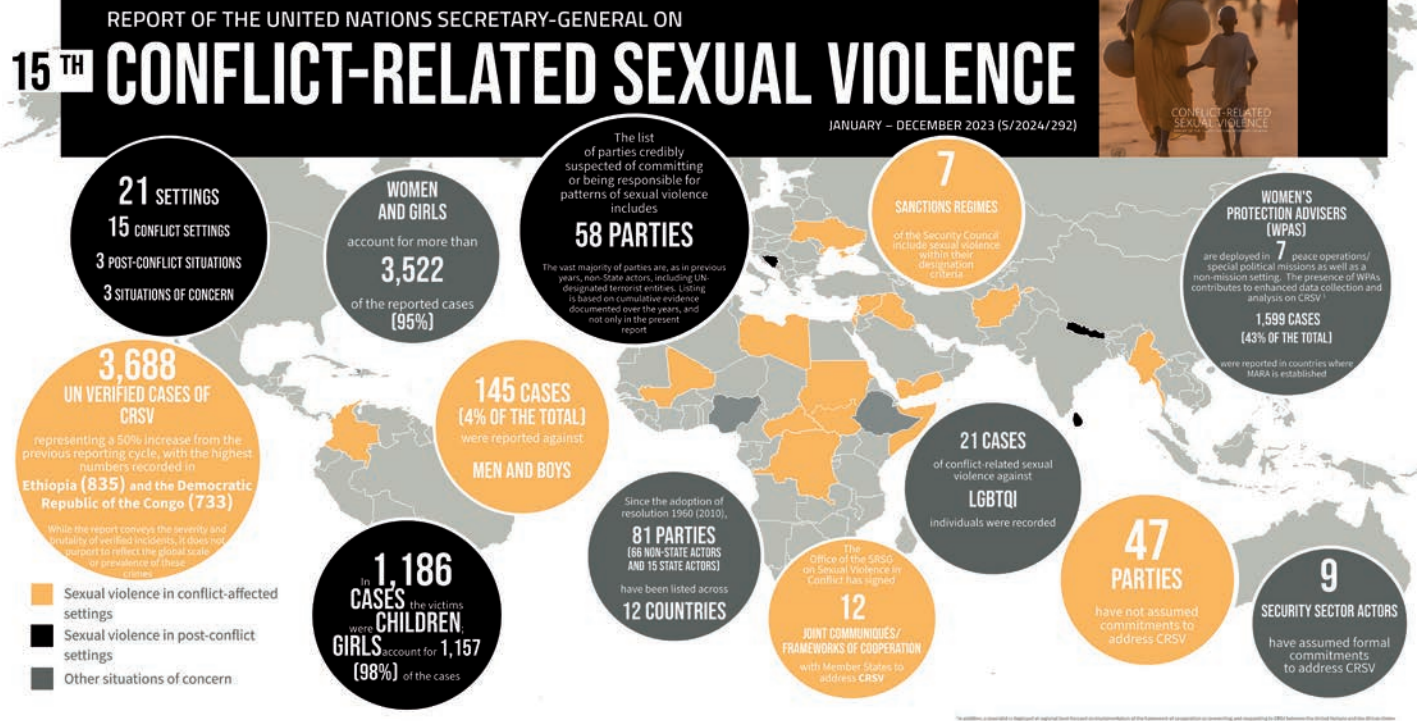
First published in 2023, and updated in 2024, NCGM's analysis of the conflict's gendered aspects elaborates on how both Ukraine and Russia utilize gender perspective in their strategic communication, albeit in different ways. Ukraine has emphasized the alleged Russian use of sexual violence against Ukrainian women and girls, the bombing of maternity wards and women's participation in the defence of Ukraine.⁸ Russia, meanwhile, portrays Western policies on gender equality, democracy and human rights as a threat to traditional values and as a root cause of the supposed decline of the West.⁹ The conflict is an acute example of how gender dynamics play out in war, how this aspect is at times ignored and at times instrumentalized, and how it always has implications at the tactical, operational and strategic levels.

The NCGM analysis concludes that women, men, girls and boys are affected differently by the conflict, and affect it differently in turn. It also concludes that the conflict has exacerbated some gender norms and roles, and altered others, and that narratives and understandings of gender are used strategically by both parties in the war; often connected to the underlying values of equality, human rights, democracy and the rule of law.



Below
Kyiv Maternity Hospital, March 2022. Pregnant women had to spend nights in the basement, seeking shelter from ongoing shelling. Photo by UN Women, Serhii Korovainyi.





Above

The outbreak and escalation of conflict exposes civilians to heightened levels of conflict-related sexual violence (CRSV), as pointed out in the 2023 annual report of the UN Secretary General. NATO condemns all acts of CRSV and is committed within its mandate to prevent and respond to this horrific crime. Infographic © UN

So what does this mean for the NATO Alliance? NATO has embraced the WPS agenda and the realization that crisis, conflict and war affect women, men, girls and boys differently. NATO recognizes that their roles, rights, expectations and situations will vary in different nations, organizations, cultures and contexts and is therefore committed to implementing the WPS agenda and integrating gender perspectives in all core tasks, and across missions, operations and activities.¹⁰

As former NATO Secretary General Jens Stoltenberg expressed at the Women Political Leaders Summit in June 2021:

"NATO has a robust policy on Women, Peace and Security including with gender advisors in military missions. We are gradually increasing the number of women in the military and also in political leadership roles. We know that when we bring different perspectives to the debate, we simply make better decisions (...) And we are strengthening our training on human rights and the protection of

"The things that matter most to the peoples of the world, such as good governance and democracy, economic prosperity, peace, health, security, and environmental preservation are rooted in the character of male/female relations."

civilians, also in partner countries. Finally, we are learning to recognise how security threats affect women and men differently. This way, we can shape solutions that will serve everyone. At our Summit, leaders endorsed NATO's new policy on conflict-related sexual violence. Ensuring we do everything we can to prevent and respond to these heinous crimes. They also agreed to continue to advance gender equality and integrate gender perspectives in all that we do. So you can count on NATO's continued commitment to strengthen the role of women in leadership."¹¹

Significantly, the NATO Strategic Concept (2022) and NATO Policy on WPS (2024) commit the Alliance to implementing WPS and gender perspectives across core tasks and in operations, missions and activities. These are much-anticipated undertakings that are complemented by Allied Joint Publications, policies at the level of the North Atlantic Committee, a Bi-Strategic Command directive and various documents at command level.





Above

Lieutenant Colonel Lena Kvarving, the author, discussing the cooperation between the NCGM and the JWC with the JWC's gender focal points, November 22, 2023. Photo by JWC PAO

Collectively, these documents serve as guideposts for NATO's implementation of WPS and integration of gender perspectives.

In this regard, gender analysis,¹² gender perspective¹³ and gender mainstreaming¹⁴ are the key NATO-recognized tools in seeing through this implementation. These tools are reinforced by an organizational structure in which commanders maintain overall responsibility, but are advised and supported by gender advisors (GENADs) and gender focal points (GFPs). As gender perspective has cross-functional relevance, its successful implementation requires a systematic approach across all levels of organizations and military service branches.

Being equally relevant across all three dimensions (human, physical, informational) and all five domains (land, air, sea, space, cyberspace) of warfare, as well as in the synchronization of non-military activities with civilian actors, gender perspective has a natural place in multi-domain operations and their development and implementation in the Alliance.

While NATO's commitment to the WPS agenda and gender perspective has been fortified during the past years, the translation of policy into practice must be strengthened further. We can see progress in several areas, but these efforts are still often met with resistance. There can be reluctance to acquire knowledge on the

subject, as it appears to challenge traditional masculine culture, bias and privileges, combined with insufficient leadership on the topic.¹⁵ As leaders and commanders are the main drivers for the implementation, leadership commitment is vital in successfully institutionalizing gender perspectives within an organization.

So what does this demand of the leadership? Apart from the obvious, such as a plan and resources, leaders need to take a organizational change approach in order to harness the transformative potential of the WPS agenda.

Leadership needs a cultural map of the organization — in order to stake out the direction in which they want to go, they need to know where they are. Additionally, there is a need to create psychological safety for change, with safe places to learn and train. It is important to include the learners in the process, and to have a network of change agents and good role models. There is a need for expertise and changes to structure and functions to support the change. Furthermore, a reward and discipline system is needed. And as always, there will be a need to carry out proper evaluations and redirect efforts where necessary.¹⁶

Mainstreaming a gender perspective across doctrine, policy and procedure is also imperative for its institutionalization in the organization and throughout the planning, execution and evaluation phases of NATO operations, missions and activities. More specifically, gender perspective must be implemented in doctrine, procedures and manuals to support its influence on decision-making and the actual mission. This also creates an imperative for integrating gender perspective in military education, training and exercises, to ensure that we train as we fight and fight as we train.

Collective training and exercises are essential to developing the skill sets of military personnel to prepare them for the tasks and challenges they may face. Training for the gendered aspects of conflict is no different. The Nordic Centre for Gender in Military Operations considers the Joint Warfare Centre (JWC) a valuable partner in ensuring that the WPS agenda and gender perspective are part

At the **2024 Washington Summit**, NATO endorsed an updated Women, Peace and Security (WPS) Policy, which will enhance the integration of gender perspectives across all of NATO's activities and structures, and advance gender equality within the Alliance, enabling NATO to respond better to broader security challenges.

The new policy outlines **four strategic objectives**: to strengthen gender-responsive leadership and accountability; to increase women's participation at all levels, including decision-making and leadership; to prevent threats that have a disproportionate impact on women and girls; and to protect women and girls against gender-based violence. It recognizes the close linkages between NATO's WPS and Human Security agendas, notably in the area of conflict-related sexual violence, as highlighted during the ongoing war in Ukraine.

For the first time, the policy references new and emerging challenges such as gendered disinformation, technology-facilitated gender-based violence, and the gender dimensions of climate change and artificial intelligence.



The Nordic Centre for Gender in Military Operations (NCGM) is an international military organization with more than a decade of experience in implementing the women, peace and security (WPS) agenda and gender perspective in operations, missions and activities. As an expert centre, NATO Department Head for the Gender in Military Operations discipline, and NATO-accredited education and training facility, NCGM provides education and training, concept development and subject matter expertise on WPS and gender perspective in military operations, enabling NATO and other military actors to increase operational effectiveness and implement the WPS agenda.

NCGM was founded in 2012 by the Nordic Defence Cooperation countries Denmark, Finland, Iceland, Norway and Sweden. Since then, the Netherlands, Canada and Australia have joined the Centre.



In Brief

Endnotes

- Hudson, V., Bowen, D. L. and Nielson, P. L. (2020) *The First Political Order — How Sex Shapes Governance and National Security Worldwide*. New York: Columbia University Press.
- This article's reference to the research is based on the summary written by Cindy Zhou, edited by Sandra Yin. Sources: Center for Reproductive Rights; International Security; National Academies; "The First Political Order: How Sex Shapes Governance and National Security Worldwide," by Valerie M. Hudson, Donna Lee Bowen, and Perpetua Lynne Nielsen; UNICEF; UN Women: <https://www.wilsoncenter.org/event/first-political-order-how-sex-shapes-governance-and-national-security-worldwide-book-launch>
- UN Security Council Resolution 1325 (2000) S/RES/1325.
- <https://www.ohchr.org/en/news/2023/09/special-rapporteur-human-rights-council-systematic-and-institutionalised>
- <https://www.iiss.org/en/online-analysis/online-analysis/2022/01/afghanistans-state-failure-and-the-problem-of-humanitarian-containment/>
- International Committee of the Red Cross (ICRC), *Gendered Impacts of Armed Conflict and Implications for International Humanitarian Law*, ICRC, Geneva, June 2022, p 4.
- Uppsala Conflict Data Program, accessed March 22, 2024.
- NCGM Thematic Analysis: The use of Gender Perspective on the Conflict in Ukraine (June 2023), available < https://www.forsvarsmakten.se/siteassets/english/swedint/engelska/swedint/nordic-centre-for-gender-in-military-operations/thematic-analysis_ukraine_ncgm_june23.pdf > accessed March 22, 2023, p 12-13.
- Ibid, p 11-12.
- NATO Strategic Concept (2022) para 5; NATO Allied Joint Publication, *Allied Joint Doctrine*, (2022) para 3-44.
- NATO Secretary General Jens Stoltenberg: https://www.nato.int/cps/en/natohq/opinions_185443.htm
- Gender analysis is the systematic gathering and examination of information on gender differences and on social relations between men and women in order to identify and understand inequalities based on gender. NATO Agreed term.
- Gender perspective is the ability to detect if and when men, women, boys and girls are being affected differently by a situation due to their gender. NATO Agreed term.
- Gender mainstreaming is defined as a strategy used to achieve gender equality by assessing the implications for women and men of any planned action, in all areas and at all levels, in order to assure that the concerns and experiences of both sexes are taken into account. NATO Agreed term.
- Kvarving, L. P. (2019) *Gender Perspectives in the Armed Forces and Military Operations: An Uphill Battle — Cultural, structural and functional factors that prevent or promote implementation of UNSCR 1325 in the Norwegian Armed Forces and NATO*. Oslo: University of Oslo
- Hofstede, G.H., and Hofstede, G.J. (2005). *Cultures and Organizations: Software of the Mind*. (Revised and expanded 2nd ed.). New York: McGraw-Hill and: Schein, E.H. (2004). *Organisational Culture and Leadership* (3rd ed.). San Francisco: Jossey-Bass.
- Bi-SC Directive 040-001 (2021) para 2-1, 2-2, 2-3.

of the planning and execution of exercises, just as it would be in real operations. The partnership with the JWC has demonstrated how important it is to integrate gender perspective in the early phases of planning, to ensure it is not overlooked or a mere afterthought in execution.

The proper implementation of gender perspective allows for the exercise to play out different real-life scenarios, making it possible to progress gender-responsive leadership, develop accurate gender analysis, prevent and mitigate conflict-related sexual violence and sexual exploitation and abuse (SEA), mitigate negative gendered impact of crises, conflicts and war and to promote equality, peace and security — on an individual, organizational, societal and geopolitical level.

With the Alliance's increased focus on deterrence and defence, how gender perspectives play out in crises and conflicts in the Euro-Atlantic area must form a part of education, training, exercises as well as lessons learned, so that we can learn from the mistakes of the past.

To create that robustness and generate real change, NATO recommends the presence of a full-time gender advisor (GENAD) in command groups, supported by a network of gender focal points (GFP) in dual roles in the rest of the organization.¹⁷ In this regard, NCGM plays a crucial role in providing education and training. NCGM delivers NATO-approved three-week GENAD courses and four-day GFP courses. To support the training of national and NATO staff, personnel may also attend the NATO-approved two-week Gen-

der Train the Trainer course. Furthermore, NCGM supports leadership in honouring the commitment of NATO and its member states through a transformational change approach, by offering annual commanding officers seminars at the OF-5 level and key leader seminars at the OF-6 to OF-9 levels on gender and WPS.

Professor Hudson et al. have clearly demonstrated that gender perspective is a fundamental tool in ensuring geopolitical, national and individual security, and NATO has instructed the organization to act on this insight. While some may still harbour reluctance or doubts as to the need for gender perspectives in the military, research proves that this perspective is a necessity to reach the desired end state of peace, security and stability within NATO and worldwide. As this end state appears in such peril due to current geopolitical developments, it has never been more vital for organizations, leaders and individuals to dedicate themselves to this change. ✦

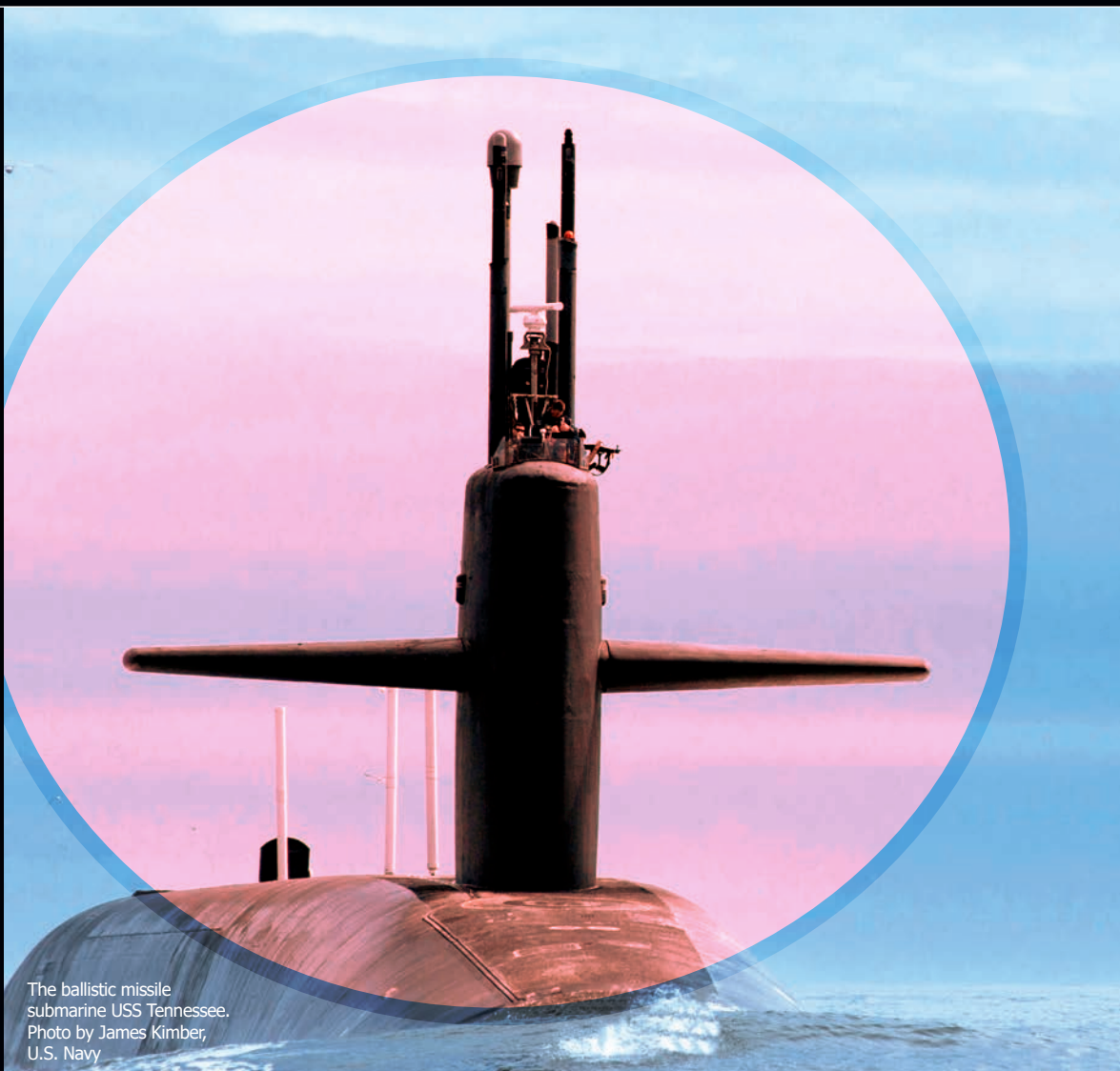
Lieutenant Colonel Lena P. Kvarving, PhD, is currently Officer in Command of the Education and Training Department at the Nordic Centre for Gender in Military Operations. She has extensive international experience in the field of WPS and gender in military operations and organizations.

Julia Dalman is an international lawyer specialized in international human rights law and international humanitarian law with two master's degrees in law from Lund University. She currently serves as the Legal Analyst at the Nordic Centre for Gender in Military Operations.



O P I N I O N

NUCLEAR DETERRENCE



The ballistic missile submarine USS Tennessee.
Photo by James Kimber,
U.S. Navy

PART II

by **Wiesław Gozdziwicz**
NATO International Civilian
Assistant Legal Advisor
NATO Joint Warfare Centre



This is the second article in a series about nuclear deterrence. The first article appeared in Issue 39 of *The Three Swords*. Scan the QR to read it online.

DESPITE THEIR differences, the nuclear deterrence doctrines of the United Kingdom and France have at least one point in common: due to the limited number of nuclear warheads in the countries' arsenals, it is difficult to speak of "tactical" nuclear weapons or their "tactical" use. While some means of delivery will have a "tactical range," nuclear weapons are a strategic pillar of security for both countries. However, the British approach more closely resembles that of the U.S. and its concept of "non-strategic" or "sub-strategic" use of nuclear weapons, not necessarily in response to a nuclear attack or the imminent threat of

such an attack, although the UK is showing signs of slowly departing from the doctrine. More details on this follow below, in the section on British nuclear doctrine.

France's Nuclear Doctrine

France pursues a policy of "strict sufficiency," according to which France keeps its nuclear arsenal at the lowest possible level in relation to the strategic context. In his 2020 defence and deterrence speech,¹ President Emmanuel Macron stressed France's commitment to disarmament as conducive to global stability and security, and cited the country's unique track record of irreversibly abandoning the land-based



nuclear component and reducing the nuclear arsenal to below 300 warheads. France's position is to reject any form of nuclear arms race and keep its nuclear deterrence at the level of "strict sufficiency."

The aim of French nuclear doctrine is to limit the role of deterrence to extreme circumstances of self-defence, although France reserves the right to use nuclear weapons first in a conflict. In particular, Macron stated in his 2020 speech that France is prepared to carry out a "unique and one-time-only" limited nuclear strike, in order to demonstrate to the aggressor that "the nature of the conflict has changed" and to restore the effectiveness of nuclear deterrence, i.e. to make potential adversaries aware that France is ready to use the nuclear weapons argument.

France's concept of the "final warning" is to threaten an adversary who may have underestimated the country's determination to defend its vital interests, or misjudged the limits of those interests, with one limited strike on military targets. Formed in the 1970s, the concept of the final warning is a compromise between the need to avoid the all-or-nothing dilemma and the rejection of the concept of flexible response — neither option was considered reliable enough.

A final warning cannot be repeated, so if the opponent were to persist, there would be a massive blow. The "final warning" concept is still considered relevant in the new strategic context, given that a potential adversary (especially a regional one) may be more likely to misjudge France's determination to protect its vital interests than the Soviet Union would have been during the Cold War. It is characteristic for France to consider every nuclear weapons asset "strategic." The point is that any use of nuclear weapons would constitute a seismic shift in a conflict and would therefore have strategic implications.

A similar logic increasingly seems to be used in NATO circles, and the UK no longer uses the term "sub-strategic" to refer to nuclear weapons. As stated in the 2022 NATO Strategic Concept, "the circumstances in which NATO may be forced to use nuclear weapons are extremely distant. Any use of nuclear weapons against NATO would fundamentally change the nature of the conflict."²

Unlike the U.S. and the UK, France declares a nuclear response not so much to specif-

ic types of threats, but to any aggression against its vital interests, regardless of the means employed. This reflects a different concept of deterrence, and in particular the balance between certainty and uncertainty: Washington and London are precise about the circumstances that would cross a vital threshold (namely the use of weapons of mass destruction), but they do not specify the response to this threshold being crossed. Paris does not specify the exact threshold ("vital interests"), but clearly defines the response (the use of nuclear weapons).

The United Kingdom's Nuclear Doctrine

Compared to the other countries in NATO's "nuclear trinity," the UK's nuclear weapons capabilities are by far the most modest, not only in the number of nuclear charges possessed, but also in the potential means of their delivery.

Since 1969, the United Kingdom has delivered its nuclear deterrence through nuclear-powered submarines (SSBN), and four Vanguard-class vessels are currently in service,

of which at least one is on patrol at any given time as part of the Continuous at Sea Deterrent (CASD) programme. The UK maintains the minimum nuclear cargo necessary to ensure a credible and effective deterrence against nuclear-weapon states, but since 1994 it has not kept any specific facility or state on the list of targets for a potential nuclear strike. Hence, it is assumed that the "notice to fire" time (i.e. from the order to use nuclear weapons to the launch of missiles) for British Vanguard-class submarines is currently the two to three days necessary to program targets, but if the level of readiness is raised, this time can be reduced to minutes.

Nuclear deterrence remains an important part of defence cooperation between the UK and the U.S. and includes a policy of deterrence, warhead safety, security and advanced manufacturing technologies (UK submarines have U.S. Trident missiles on board). This co-operation helps to reduce the cost of developing and maintaining the countries' independent nuclear arsenals.

The UK also cooperates with France on nuclear issues, within the framework of the 2010 Teutates Treaty,³ under which the two countries share research facilities and cooperate on technology.

The UK's nuclear weapons are operationally independent and only the Prime Minister can authorize their use. This ensures that political control is maintained at all times. The use of nuclear weapons by the UK is only considered in extreme circumstances of self-defence, including in defence of NATO Allies. Although the UK underlines its determination to use nuclear weapons, it deliberately leaves some indeterminacy as to when, how and to what extent nuclear weapons will be used, and the policy of this ambiguity is permanent.

The UK does not publicize information on operational stocks or dislocation of warheads and missiles. This ambiguity is intended to complicate the calculations of potential aggressors, reducing the risk of any deliberate use of nuclear weapons by an adversary seeking to gain the advantage of a first nuclear strike. But this ambiguity may also result from the fact that the UK does not de facto possess "tactical" (non-strategic) nuclear weapons and in this respect would have to rely on the weapons provided by the U.S.; there is no official data on the number of U.S. nuclear weapons stored on British territory.

Each UK Vanguard Class submarine is armed with Trident II D5 missiles.



Photo by Thomas Gooley, U.S. Navy





"A final warning
cannot be repeated,
so if the opponent were
to persist,
there would be a
massive blow."

Above
ASMP-A missile on a Dassault Rafale fighter aircraft.
©SIRPAAir

The UK does not intend to use, nor does it threaten to use, nuclear weapons against any non-nuclear-weapon state that is a party to the Non-Proliferation Treaty (NPT) and that fulfils its obligations under that treaty. However, the UK reserves the right to review this position if a future threat from weapons of mass destruction (chemical/biological) or from new destructive (disruptive) technologies with similar effects necessitates this. This is a difference between the UK and the U.S. position (specifying the scope of threats and not specifying the type of response) and France's approach (leaving undefined the type of threat and specifying the scope of response).

However, here too we will find a certain inaccuracy in the UK doctrine, because "France and Great Britain, the only European nuclear powers, have stated that they cannot imagine circumstances in which the threat to the vital interests of one would not endanger the vital interests of the other."⁴ Thus, we can see the slow

evolution of the UK doctrine of nuclear deterrence, manifested by a departure from the concept of "sub-strategic" use of nuclear weapons and referring to "vital interests" in a way that is compatible with French nuclear doctrine.

Russia's Nuclear Doctrine

Russia differs from the Allied countries in both its transparency and its "appetite" for the use of tactical nuclear weapons, and in this case, we can actually speak of tactical nuclear weapons and tactical use, for several reasons.

Firstly, the number of tactical nuclear warheads and their means of delivery, including the infamous 9M729, may prompt Russian commanders to use them as simply one of the available options to paralyse the target. Secondly, the disproportion in the arsenals of tactical nuclear weapons between Russia and the U.S. may lead Russian commanders to conclude that they have an advantage for which the U.S. cannot compensate without nuclear escalation

to the level of use of strategic nuclear weapons. Thirdly, innovative means of carrying non-strategic nuclear charges, such as hypersonic missiles or supercavitation⁵ torpedoes, may create an impression within Russia that its opponents would be unable to prevent or defend against a nuclear strike Russia carries out by such means, causing Russian commanders to speculate on a "first-strike advantage."

The same impression of a significant first-strike advantage could arise within Russia simply due to the U.S. withdrawing non-strategic nuclear charges from its arsenals (landmines, artillery shells, anti-aircraft/anti-ballistic missiles with nuclear warheads, nuclear depth charges, torpedoes with nuclear warheads).

It should be mentioned that already in 1993, Russia became the first country to depart from the Soviet-era obligation not to use nuclear weapons, although at that time Russia's new stance was still intended as a deterrent rather than intending to introduce the threat of a nuclear surprise or pre-emptive strike.



The Russian national security concept issued in 1997 allowed the use of nuclear weapons in case of a threat to the existence of the Russian Federation as an independent sovereign state. Russia's military doctrine published in 2000 extended the circumstances in which the country may use nuclear weapons, including in response to attacks with weapons of mass destruction against Russia or its allies, as well as in response to "large-scale aggression using conventional weapons in situations critical to the national security of the Russian Federation."⁶

At the same time, the doctrine stated that Russia would not use nuclear weapons against parties to the NPT that do not possess nuclear weapons, except in case of an invasion or other attack on the Russian Federation, its territory, its armed forces or other troops, its allies or a state to which it has security obligations. Thus, a conventional invasion of Russia or its allies could be met with a nuclear response.

In 2020, Russian president Vladimir Putin issued an executive order entitled "Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence." It states, among other things, that Russia's policy on nuclear deterrence is defensive, aimed at maintaining the potential of nuclear forces at a level sufficient for nuclear deterrence. The order further states that Russian nuclear deterrence policy guarantees the protection of the national sovereignty and territorial integrity of the state and deterrence of a potential opponent against aggression against Russia or its allies. In the event of an armed conflict, Russia would seek to prevent the escalation of hostilities and to terminate them under conditions acceptable to Russia or its allies.

According to this executive order, Russia treats nuclear weapons only as a means of deterrence, and their use as a last resort and coercive measure. However, some analysts assess that this means that Russia may threaten

to escalate to the use of nuclear weapons as a way to stop a conflict threatening the existence of the state.⁷ The Russian doctrine specifies the following as threats that Russia intends to counter with nuclear deterrence:

1. the establishment by a potential adversary of groupings of general-purpose forces with nuclear weapons in the territories of states neighbouring the Russian Federation and its allies and in adjacent waters;
2. the deployment by states that consider the Russian Federation to be a potential adversary, of missile defence systems and means, medium- and short-range cruise and ballistic missiles, non-nuclear precision and hypersonic weapons, unmanned aerial strike aircraft and energy weapons;
3. the development and deployment of missile defence and strike systems in space;
4. the possession by states of nuclear weapons and/or other weapons of mass destruction which may be used against the Russian Federation and/or its allies, as well as the means of delivery of such weapons;
5. uncontrolled proliferation of nuclear weapons, their means of delivery, technology and equipment for their manufacture;
6. the deployment of nuclear weapons and their means of delivery in the territories of non-nuclear-weapon states.

In the context of the latter, Poland's conclusion of the Nuclear Sharing Agreement with the U.S. would automatically include facilities used to store nuclear ammunition in the list of targets for a potential Russian nuclear strike.

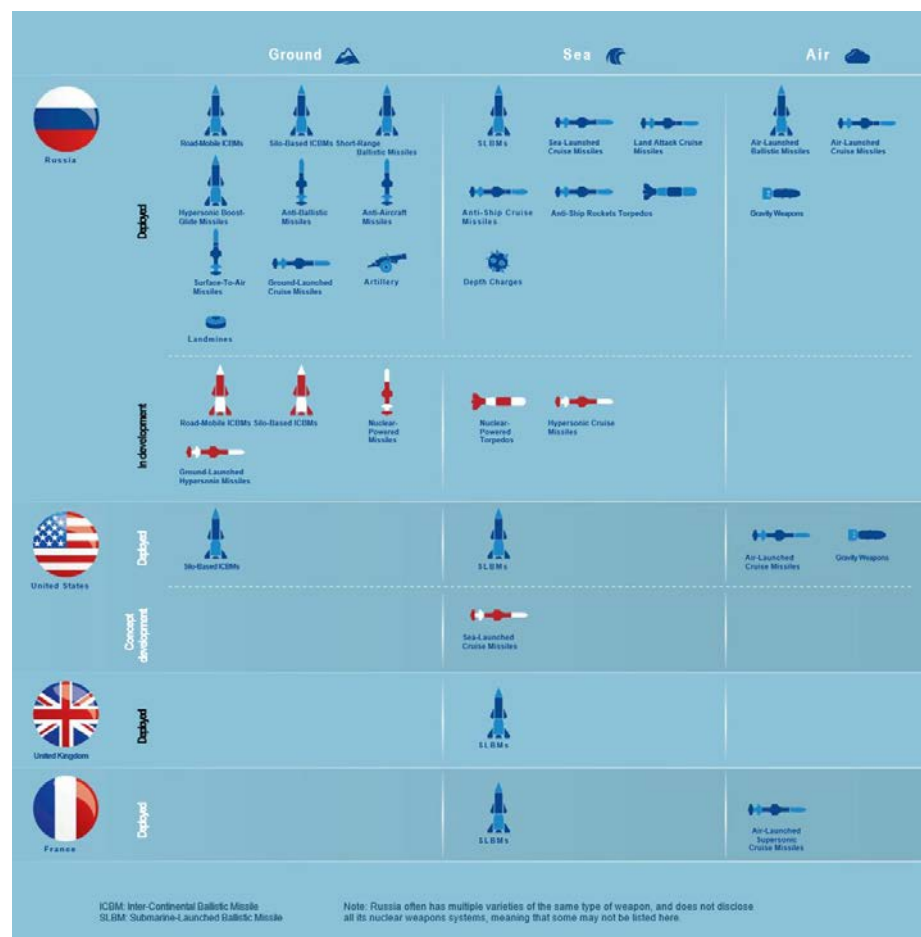
The Russian Federation lists the following conditions for determining its possible use of nuclear weapons:

1. the arrival of reliable data on the launch of ballistic missiles attacking the territory of the Russian Federation and/or its allies;
2. the use of nuclear weapons or other weapons of mass destruction by an adversary against the Russian Federation and/or its allies;
3. an attack by the enemy on critical governmental or military facilities of the Russian Federation, the disruption of which would weaken the capabilities of nuclear forces;
4. aggression against the Russian Federation with conventional weapons when the very existence of the state is threatened.

Below

NATO's assessment of nuclear threat.

Source: <https://www.gov.uk/government/publications/uk-nuclear-deterrence-factsheet>



Russia thus reserves the right to use nuclear weapons in response to the use of nuclear weapons and other weapons of mass destruction against itself or its allies, as well as in the event of aggression against Russia with conventional weapons, when the existence of the state as such is threatened (similar wording was used in the 1996 Advisory Opinion of the International Court of Justice on the legality of the threat of the use or use of nuclear weapons).⁸ The decision to use nuclear weapons is made only by the President of the Russian Federation, but the implementation of such a decision was entrusted to the General Staff.

The Russian Ministry of National Defence does not disclose to what level the President's decision can be used to delegate the power to use nuclear weapons. It is presumed that in the field of tactical nuclear weapons, such powers may be delegated to the division level, which would actually make tactical nuclear weapons tactical *sensu stricto* and allow their tactical use. Such a presumption coincides with the assessments of some analysts that low-power nuclear charges can actually be recognized in the Russian doctrine as an alternative to conventional means of destruction of so-called high-payoff targets, to achieve a significant tactical/operational advantage or to prevent penetration of the territory of the Russian Federation.

Which, in turn, brings us to the main question about Russian doctrine: does Russia have a strategy of "de-escalation"?

At first glance, the answer is yes, since the overriding goal of nuclear deterrence is officially to "prevent the escalation of the conflict and end it on terms acceptable to Russia and/or its allies." That is, if Russia suffers a serious defeat, it will use nuclear weapons to ensure that the attacker ends the aggression and returns to the status quo ante or perhaps even a slightly more favourable situation for Russia (taking into account possible compensation for aggression).

However, the situation is not so simple. The president's executive order emphasizes deterrence, not de-escalation. The calculation seems to be as follows: if Russia's opponent knows in advance that their advantage in the area of conventional capabilities, instead of guaranteeing victory, will trigger a nuclear response and thus undermine the legitimacy of the attack, then the opponent will refrain from using force at all. In other words, de-escalation

(to the extent that the term applies) is not a war strategy, but rather a deterrence tool. It is not a tool for waging war, it is supposed to prevent war. But is it possible to make such an assumption uncritically?

The U.S. Nuclear Posture Review (NPR) of 2018 took the view that Russia had adopted an "escalation to de-escalate" strategy and concluded that Russia was wrong to believe that the threat of nuclear escalation, or the actual first use of nuclear weapons, would serve to "de-escalate" the conflict on terms favourable to Russia. This view underscores the NPR's recommendations to the United States to develop a new low-power non-strategic weapon that would provide the U.S. with a credible response capability, thereby ensuring that the Russian leadership makes no mistake about the consequences of a limited first use of nuclear weapons.

If we were to take at face value (which I am far from doing) the content of the Russian policy of nuclear deterrence, the probability of using tactical nuclear weapons against Ukraine in the current war is small. Whether this is truly the case is probably known to the "sole ruler" of Russia, who is also the only one to decide on the use of nuclear weapons.

In turn, the restrictions allegedly imposed by the U.S. on the Ukrainian authorities on the use of U.S. weapon systems to attack targets located deep in Russian territory may have their basis in the U.S. interpretation of the Russian nuclear doctrine ("escalation for de-escalation"). Perhaps the U.S. is concerned that such a strike by Ukraine, especially on "critical government or military facilities, the disruption of which would weaken the capabilities of nuclear forces" could result in the use of tactical nuclear weapons, not necessarily against Ukraine itself, but against a U.S. military installation, this being the state that enabled Ukraine to carry out such an attack by providing it with the necessary weapon systems.

Paradoxically, however, Russia's aggression against Ukraine has, in my opinion, removed the risk of Russia using tactical nuclear weapons against NATO or one of the member states. The Russian doctrine of "escalation for the purpose of de-escalation" would have a chance of success only if, by means of a tactical nuclear strike or actions preceding such an attack, Russia were to weaken or even break the unity of the Alliance. Then such a strike could have a shock-and-awe effect, encouraging

member states to try to de-escalate in order to prevent nuclear strikes on further targets, thus making it difficult or even impossible to achieve unanimity in the North Atlantic Council.

However, Russia's aggression has had the opposite effect, probably surprising Putin and the Russian authorities: consolidation, strengthening solidarity within the Alliance and hardening its unity and indivisibility. In the current circumstances, Russia must reckon with the fact that "escalation for the purpose of de-escalation" will not work, and an act of aggression against any of the Allies will provoke an adequate response under Article 5 of the Washington Treaty. Therefore, while Putin may have a greater tolerance of risk ("risk appetite") in relation to a potential escalation against Ukraine, it is unlikely he would be willing to accept a similar risk in his actions against NATO. ✦


Author's update, November 2024:

On November 19, 2024, President Putin approved an update to the Russian nuclear deterrence doctrine. It now states that Russia may also consider the use of non-strategic nuclear weapons in response to "armed aggression against the Russian Federation by any non-nuclear state with the participation or support of a nuclear state." However, at the time of press, the official text of the presidential decree has yet to be published by Russian authorities.

Endnotes

- 1 <https://www.elysee.fr/en/emmanuel-macron/2020/02/07/speech-of-the-president-of-the-republic-on-the-defense-and-deterrence-strategy>
- 2 https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf,
- 3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228571/7975.pdf
- 4 Global Britain in a Competitive Age: The Integrated Review of Security, Defence, Development and Foreign Policy, p. 77
- 5 A submerged, i.e. underwater, torpedo experiences skin friction drag that reduces the speed at which it travels. By lowering the water pressure behind the torpedo, a bubble of vapour is formed around the torpedo that reduces drag and lets the projectile travel at higher speed.
- 6 <https://www.nti.org/analysis/articles/russias-2000-military-doctrine/>
- 7 <https://vcdnp.org/russia-clarifies-its-nuclear-deterrence-policy/>
- 8 <https://www.icj-cij.org/en/case/95>

SPOTLIGHT

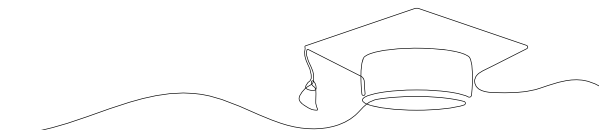


Allied Command Transformation's Professional Doctorate Programme harnesses NATO's cognitive power by enabling staff members to expand their expertise through doctoral research that addresses a knowledge gap of significant relevance to the Alliance's mission.

The topics shape new ideas and explore pathways to achieve the objectives of the NATO Warfighting Capstone Concept and its implementation via the Warfare Development Agenda and Warfare Development Imperatives.

These doctorates build NATO's capacity to inform and influence future capability development and experimentation, with great potential to initiate and lead long-term change.

Warfare is evolving at an unprecedented pace. But NATO is not only keeping up with this pace – we are setting it, by investing in the development of our individual and collective cognitive superiority.



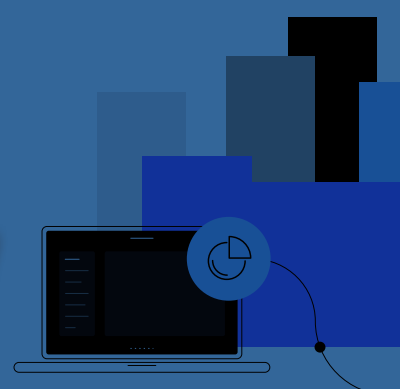
IN A BUSY AND VERSATILE training organization such as the Joint Warfare Centre (JWC), it's perhaps not surprising that the staff members are very much accustomed to multitasking. In addition to fulfilling various roles in the course of daily business, many pursue further education that contributes to the organization's growth and innovation through specialized knowledge and research skills.

This collection of brief interviews introduces the eight¹ JWC staff members who are presently enrolled in Allied Command Transformation's (ACT) online professional doctoral programme, administered by Cardiff Metropolitan University in the United Kingdom.

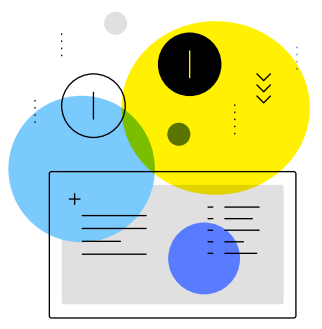
The programme, which spans three to five years, affords NATO ACT military and civilian staff an opportunity for professional educational development focusing on a variety of warfighting themes and operational art. Following the selection process led by the Supreme Allied Commander Transformation, candidates become doctoral researchers in parallel to performing their duties within their organizations.

Learning individuals are key in transforming an organization into a learning organization, as their efforts and mindsets foster an environment conducive to growth and innovation. The JWC doctoral researchers, with diverse expertise such as special operations, media simulation and quality assurance, are doing their part to ensure that not only the JWC, but all of NATO, is a learning organization. ✦

A Place to Learn, Inspire, and Grow



¹ The programme may involve more staff members at the time of publication.

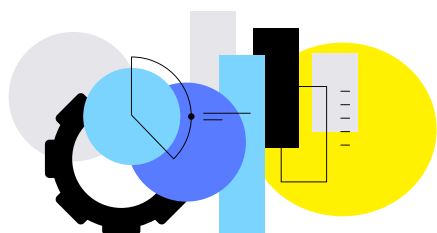


Robert Scheider
NATO International Civilian
Training Event Development Analyst
NATO Joint Warfare Centre

"My research project is entitled 'Improvement of Joint Command Post Exercises for NATO Headquarters through Development, Resourcing, and Assessment of SMART¹ Training Objectives.' I am collecting data through literature reviews, surveys, interviews, focus groups, and observations on how NATO staffs currently define, implement, and assess the achievement of training objectives and how these processes can be improved. I will collaborate with other practitioners to develop goals for 'ideal' processes and develop action plans to improve training objective development, resourcing, and assessment and reporting processes and bring them closer to the 'ideal' state. My research complements other initiatives within NATO designed to increase the quality and value of exercises and ultimately make NATO staffs and headquarters better through exercises."

¹ Specific, Measurable, Achievable, Realistic, and Time-related

TRAINING OBJECTIVES



OPERATIONAL-LEVEL RESILIENCE



Lieutenant Colonel Jeroen H.J. van Mill
Royal Netherlands Army
Capability Integration Staff Officer
NATO Joint Warfare Centre

"My research topic is NATO operational-level resilience training provision improvement (RTPI). Former NATO Secretary General Jens Stoltenberg emphasized the importance of Alliance resilience at the GLOBSEC Forum 2020: 'In fact, resilience is in NATO's DNA. Article Three of the Washington Treaty places a duty on Allies to become more resilient (...). That is why boosting resilience is a key task for the future.' The development of the Layered Resilience Concept (LRC) and the reinforcement of resilience training in exercises are focus areas of the Layered Resilience Warfare Development Imperative of HQ SACT's Warfare Development Agenda, in line with the NATO Warfighting Capstone Concept agreed by the NATO chiefs of defence. This research seeks to understand how the delivery of resilience training in operational-level NATO exercises can be improved to support the implementation of the LRC and create a more resilient military instrument of power. I aim to achieve this by explaining resilience concept development and comparing to other transformational frameworks for resilience integration and implementation, and further by exploring operationalization to improve RTPI from a practitioner-level perspective and exploring the use of wargaming to improve the training and exercise construct. The JWC's Resilience Training in Operational-Level Exercises Working Group acts as a sounding board for the integration of transformational activities."

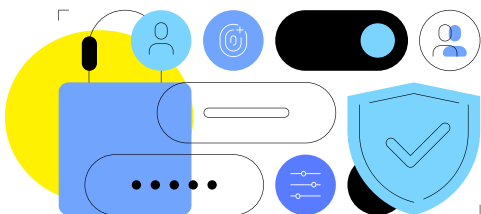


CYBER RISK MANAGEMENT



Peter M. Hutson
NATO International Civilian
Capability Integration and Experimentation Analyst
NATO Joint Warfare Centre

"My research is on challenges of cyber risk management in Alliance operations and missions ('cyber risk-to-mission'). Central to the rationale of studying cyber risk in NATO is the need to continue to explore and understand the inextricable linkages and phenomena between cyberspace and Alliance security that now permeate its three core tasks of deterrence and defence, crisis prevention and management, and cooperative security. While the cyberspace domain is a relatively new battleground for the Alliance, NATO's security strategies, operational plans, and decision-making processes are increasingly informed and influenced by the calculus of cyber threats and risks associated with the domain. Emphasizing the cyber practitioner role in assessing and managing cyber risk to better support Alliance operations, the research objectives are to: (1) explore the militarization of cyberspace and its impact on NATO; (2) investigate the adaptation of cyber risk management practices (including from industry) to support mission requirements in NATO operations; (3) develop a cyber risk-to-mission framework suitable for multinational operations. This research aims to contribute both to domain knowledge and best practice in this constantly evolving field."



NARRATIVE DATA



Andrew Eden
NATO International Civilian
Lessons Learned Analyst
NATO Joint Warfare Centre

"My research seeks to enhance the way we can exploit lessons and other sources of narrative data by using emerging technology to enhance our knowledge management and organizational learning. The JWC, and indeed all headquarters and agencies within the NATO enterprise, produce and consume large amounts of narrative, text-based data, such as first impression reports, meeting minutes, lessons identified and scenario material. Accessing and managing this data, and gaining timely and accurate outputs, which subscribe to the principles of information and knowledge management, can be enhanced to accelerate exploitation, to reduce the requirement for data adaptation through staff work, and to increase traceability. From a lessons learned process perspective, some of the main challenges for organizational change include the paucity of analytical and staff resources, the volume of available data, the velocity of its production, and its usability. The 'speed of relevance' has increased significantly, and our supporting tools need to be super-charged to meet it and sustain it for the foreseeable future."

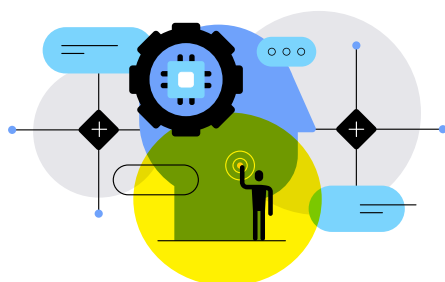


DECISION-MAKING



Lieutenant Colonel Phillip Madsen
United States Army
Advisor on Special Operations,
NATO Joint Warfare Centre

"My research topic is decision-making and commitment with imperfect information under political and time pressure in a multinational military environment. My research is inspired by former Lead Senior Mentor General Karl-Heinz Lather's question that he asked in Issue 31 of *The Three Swords* (2017): 'What about training the commanders as well, not only staff?' My experience as an advisor/trainer on the JWC's Advisory Team has thoroughly informed my research. As a Special Forces field-grade officer and doctoral candidate, I find both the philosophical approach to learning in the context of operational-level leadership and the concept of 'leaders-as-learners' fascinating. The question of how to accomplish General Lather's vision of training leaders has the potential to inform many of the 21 NATO 2030 transformation initiatives that are on the JWC's agenda. Surveying learning models from academia, military, business, and sports, informed by NATO's current practitioners, has the potential to be very beneficial to the JWC's ongoing transformation initiatives."



Jonathan Kerr
NATO International Civilian
Technical Manager
NATO Joint Warfare Centre



"My research project is 'Organizational Culture and Change Management in NATO: A Comprehensive Analysis and Strategic Framework' to enable the JWC to deliver strategic- and operational-level exercises in 2030. The NATO 2030 agenda aims to prepare the Alliance for success in an increasingly complex, contested and connected battlespace across all levels of operation. The JWC will be a key enabler to delivering 'multi-domain-trained' headquarters in this environment. To achieve this transformational step change, the JWC must be prepared and trained to embrace the paradigm shift associated with delivering its current programme in tandem with developing its people, integrating its data, and redesigning its processes, products and services. All to deliver unprecedented exercise realism across the full spectrum of strategic- and operational-level warfare. This research will shape the JWC's 2030 transformation strategy. It will investigate the current state of the JWC's organizational culture and explore the factors influencing innovation and change management. It will propose a strategic framework to guide the change to a more agile approach to exercise delivery. In order to achieve this, we must educate our personnel and shift our mindset, integrating innovation into all that we do. This work is intrinsically linked to the Exercise, Training and Innovation Directorate's transformation workstream and its Project-Linked NATO International Civilian staff, combining academic rigour with practical application."

CHANGE MANAGEMENT



RISK MANAGEMENT



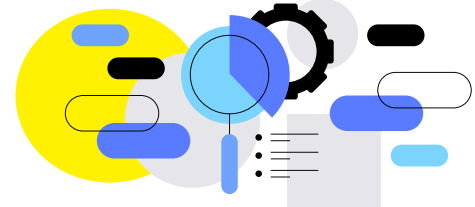
Lieutenant Colonel Bjørn-Erik Solli
Norwegian Special Operations Command
Advisor on Special Operations
NATO Joint Warfare Centre

"One of the things everyone in NATO has in common, regardless of their functional area and hierarchical placement, is the need to understand, assess and communicate risk. My research project examines risk management in NATO's military operations through the lens of contemporary risk science. I hope to identify areas of best practice and areas of potential improvement in how we collectively deal with risk in military operations. The research investigates areas of alignment and divergence between NATO doctrine and risk science, how risk management activities are included in NATO's operational planning process and mid-term decision-making cycle, and how risk is understood, assessed, communicated, and acted upon within NATO headquarters. This research contributes to the JWC's vision as a transformational hub for training and warfare development. Based on the preliminary research, I have supported headquarters in getting more 'so what' out of their risk analysis during our exercises, I have contributed to the writing of a NATO centre of excellence publication and lectured on risk and risk management for leaders of planning groups. Ultimately, I hope to provide a constructive and thoroughly developed foundation for improving our ability to rationally take risk on behalf of the citizens of the Alliance countries."



Laura DuBois
NATO International Civilian
Exercise Information Environment Manager
NATO Joint Warfare Centre

"My research examines modern Russian information threats and their impact on NATO and its member states. It emphasizes Russia's systematic exploitation of the information environment to achieve strategic objectives, including garnering domestic and international support, disrupting its adversaries' decision-making, and manipulating global narratives. This analysis provides actionable insights to enhance the JWC's capacity to replicate complex and dynamic information environments in its training exercises. The Media Simulation team at the JWC is responsible for designing and implementing the media and information components of NATO exercises, including the simulation of adversarial information campaigns. By integrating a nuanced understanding of Russian information tactics informed by research — particularly Russia's adaptation following its full-scale invasion of Ukraine — our simulations will present NATO forces with more highly realistic and adaptive information environments. These efforts aim to prepare Alliance personnel to recognize, counter, and adapt to sophisticated information threats. This research aligns with NATO's strategic emphasis on cognitive resilience as a critical component of modern warfare. By improving the accuracy and relevance of simulated adversarial information environments, this work supports NATO's overarching objectives to strengthen decision-making processes, enhance Alliance cohesion, and ensure readiness in the face of increasingly contested information landscapes."



INFORMATION THREATS



NATO COMMUNICATIONS AND INFORMATION AGENCY

THE OUTSOURCING IMPERATIVE

by Manisha Parmar
Head of Capability Development
NATO Communications and
Information Agency

AT THE JUNE 2021 NATO Summit in Brussels, Belgium, the Allies agreed the NATO 2030 agenda,¹ which set a higher level of ambition to ensure the Alliance remains strong and on the forefront in an age of increased global competition.

The NATO 2030 agenda includes nine proposals ranging from deeper political coordination, improved resilience and the preservation of our technological edge, to continued strategy growth and NATO investments. Given the integral role of cyber security across technical, procedural and people aspects, and cyberspace's establishment as a distinct operational domain in 2016,² cyber security, with its cross-cutting nature, is highly likely to be included in every proposal within the agenda.

The NATO Communications and Information Agency (NCIA), as NATO's cyber and information technology (IT) provider, is a key enabler in delivering the ambitions of the NATO 2030 agenda. The Agency has been closely tracking the 2030 initiatives and expects a high volume of activity to realize member states' ambitions.

The Agency's NATO Cyber Security Centre (NCSC) is NATO's provider for cyber security services. The NCSC, which monitors and defends NATO networks and supports NATO cyberspace operations, predicts a notable uptick in the demand for services given the integral part cyberspace plays within multi-

domain operations (MDO). MDO refers to the "push for NATO to orchestrate military activities across all operating domains and environments. These actions are synchronized with non-military activities and enable the Alliance to create desired outcomes at the right time and place."³ Cyber security and cyberspace are enablers to all of NATO's kinetic domains, including air, land, sea and space, which, in combination, enable MDO.

Given the anticipated growth in demand and the need to build on current capacity, the NCIA has expanded its outsourcing strategy in order to support NATO's ambitions and deliver the most effective and efficient solutions against the NATO 2030 priorities. Subsequently, the NCSC considers outsourcing a key enabler to ensure both the successful delivery of services and support to project design and implementation activities.

While outsourcing cyber security services is nothing new for the NCSC, where the delivery of services was at one point shared with industry,⁴ the outsourcing partnership model needs to be reconsidered to weigh the relevant advantages and disadvantages, including effectiveness, cost and risk. These benefits and limitations depend on the nature of the service, and the NCSC recognizes there is no one-size-fits-all solution for the delivery of NATO cyber security services.

THERE ARE THREE COMMON models for leveraging outsourcing and various fund-

ing vehicles for procuring industry support. The three outsourcing models are: 1) NATO-owned, contractor-operated (NOCO); 2) contractor-owned, contractor-operated (COCO); and 3) contractor-owned and NATO-operated (CONO). The last possible permutation, "NATO-owned, NATO-operated" (NONO), refers to a completely insourced approach.

NOCO MODELS RELY ON industry to provide a level of effort for operations and maintenance (O&M) support, whereby NATO has opted to own the resources associated with the service. These resources can include hardware and/or software (licenses). Given the explicit desire for NATO to retain ownership, it is highly likely that the service operates (partially or fully) within a classified domain to ensure the positive control of any equipment processing classified data and to allow NATO to perform destruction of this equipment autonomously, without the need to return artefacts to the industry partner. Industry partners that work alongside NATO subject matter experts (SMEs) would need to be security-cleared personnel. Whether these partners work on-site with NATO would depend on the service delivery model and the classification of the material being handled.

In contrast, **COCO MODELS** also rely on a level-of-effort support to O&M, but allow the third-party ownership of resources providing NATO services. This means that equipment can be on or off premises, depending on the classification of data. This model offsets the risk of



equipment ownership (e.g. equipment failure) to the contractor rather than having the risk lying with NATO. In the COCO model, NATO personnel may not be involved at all, as the service may be fully outsourced (e.g. reverse malware engineering). NATO staff may still be involved if the service is only partially outsourced (e.g. incident handling and management).

Lastly, the **CONO MODEL** is the least likely to be leveraged, as there are limited reasons why NATO would need to explicitly operate a service, but would need third-party ownership of the supporting resources. One example could be the delivery of a service that cannot easily be transcribed into a service level agreement (SLA) due to the unpredictable nature of the service consumption. This could apply to support to Allied operations and missions in which a command cannot foresee potential surges in service delivery due to changing operational tempos in theatre.

AS AN ORGANIZATION funded by 32 states, the NATO acquisition and procurement process is tightly regulated to ensure a fair and non-biased competition across incumbents from NATO Allies. While the process is in place to ensure transparency and cost effectiveness, it can, however, cause long lead times until industry award and/or overly descriptive requirements. These may lead to reduced flexibility once a contract is awarded, and thus change management and request processes can become expensive.

To ensure the tenets of transparency and fairness are always upheld, while aiming to streamline the process to retain a competitive

edge, NCIA developed the Cyber Security Services Framework (CSSF), established in 2023.⁵

The CSSF includes categories aligned to the NOCO, COCO or CONO models and while it currently only has two industry participants (one from Croatia and another from Belgium), the NCSC is looking to grow participation in the CSSF to re-compete the framework in 2025.

Given the diverse landscape of cyber security and the cyberspace domain, and the growing ambition introduced by Allied states via the NATO 2030 agenda and other initiatives, the NCSC will, now more than ever, need to access industry expertise and state-of-the-art technologies through faster and more agile methods. A call for participation will be issued in 2025 when the CSSF is reviewed.

In addition to these industry partnerships, the NCSC relies heavily on a footprint of interim workforce to work alongside NCSC SMEs and deliver both services and service uplifts (via projects) to NCIA. This interim workforce talent is garnered through the Advisory and Assistance Services (AAS) Framework,⁶ which was signed with various companies to provide NCIA with top talent and experts for interim opportunities and short-term activities. The AAS Framework augments capacity also in line with the NOCO, COCO and CONO models, and stipulates lean turnaround time from issue of a statement of work (SOW) to industry response, which promotes and amplifies the pool of skilled and cleared personnel available to NCIA.

Lastly, the NATO Industry Cyber Partnership (NICP),⁷ which celebrates its 10-year

anniversary in 2024, aims to accelerate cyber information sharing amongst the NCSC and the NATO Allies, to identify threats faster and, most importantly, mitigate these threats in a timely and coordinated fashion. The NICP has participation from a range of industry providers and is a community of professionals exchanging information in a dynamic format. While it is not a classic model of outsourcing (and does not align with the NOCO, COCO and CONO models), it is an example of a collaborative environment between NCIA and NATO states' industry to promote the sharing of knowledge and strengthen ties between NATO and industry.

BY LEVERAGING EXISTING vehicles and, increasingly, new mechanisms and opportunities resulting from NCIA engagement with industry, the NCSC will expand its access to industry cyber experts and noticeably increase the outsourcing of its service delivery and uplifts in coming years. By doing so, the NCSC is optimally positioned to deliver on national expectations, achieving NATO's ambitions while diversifying the workforce and allowing NATO funding to flow back into the Alliance states to ensure industry benefit. ↗

Endnotes

- 1 North Atlantic Treaty Organization, "NATO 2030", fact sheet, 11 March 2023 https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/2106-factsheet-nato2030-en.pdf
- 2 North Atlantic Treaty Organization, "Warsaw Summit Key Decisions", fact sheet, February 2017. https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2017_02/20170206_1702-factsheet-warsaw-summit-key-en.pdf
- 3 Allied Command Transformation, "Multi-Domain Operations in NATO—Explained", articles, 5 October 2023. <https://www.act.nato.int/article/mdo-in-nato-explained/>
- 4 Leonardo Company, "Leonardo Signs Contract with NATO to Extend Cyber Defence Partnership," press release, 13 February 2019. <https://www.leonardo.com/en/press-release-detail/-/detail/leonardo-signs-contract-with-nato-to-extend-cyber-defence-partnership>
- 5 NATO Communications and Information Agency, "NATO Agency Signs Important Cyber Security Agreements," newsroom article, 1 February 2023. <https://www.ncia.nato.int/about-us/newsroom/nato-agency-signs-important-cyber-security-agreements.html>
- 6 NATO Communications and Information Agency, "NCI Agency Speeds up Contractor Recruitment," newsroom article, 18 October 2018. <https://www.ncia.nato.int/about-us/newsroom/nci-agency-speeds-up-contractor-recruitment.html>
- 7 NATO Communications and Information Agency, "NATO Industry Cyber Partnership," partnerships, accessed on 21 March 2023. <https://www.ncia.nato.int/business/partnerships/nato-industry-cyber-partnership.html>



NCIA's Enterprise Service Operations Centre (ESOC) in Mons, Belgium, monitors, responds to, and reports any service degradations or outages of NATO's networks. The ESOC keeps NATO connected. Photo by NCIA

A FIELD STUDY ON OPERATION FRESHMAN

ON JUNE 13, Joint Warfare Centre (JWC) leadership and 90 staff members conducted a field study in the area of Helleland in Eigersund Municipality in the south-western Norwegian county of Rogaland, where the JWC is located. The event was supported by the Norwegian Naval Basic Training Centre Harald Haarfagre, which is based at Madla, Stavanger, near the JWC.

The field study focused on the British-led Operation Freshman, the first Allied glider-borne raid of the Second World War. The campaign, which took place from late 1942 to mid-1944, was part of the heavy water campaign in Norway, aimed at preventing Third Reich from obtaining sufficient quantities of heavy water for their likely programme to develop atomic weapons.

While the campaign was ultimately successful, Operation Freshman ended in calamity on October 19, 1942: due to adverse weather conditions and technical issues, the two gliders and one of the towing bomber aircraft, which had set out from Scotland to bring British commandos to the Vemork hydroelectric power plant in Telemark, crashed in the Norwegian county of Rogaland, resulting in the loss of 41 lives.

Colonel Nicolas Tachon, the JWC's Head of Transformation Delivery Division and the lead planner of the event, said that the study of events from military history helps develop a better understanding of the operational art of war. The insights gained from such efforts may support the JWC to develop training for future NATO operations.

This field study also allowed staff to reflect on the sacrifices both the United Kingdom and Norway made during the campaign. The study of Operation Freshman was actively supported by Scottish-born guest lecturer Dr Bruce Tocher, who is currently writing a book about it.

The two-hour excursion on two crash sites concluded with a remembrance ceremony at Slettebø, a site in Rogaland where Third Reich troops executed the few survivors of the glider, which had crashed on Bjenkafjellet. Lars Aarseth, the Chaplain of the Norwegian Home

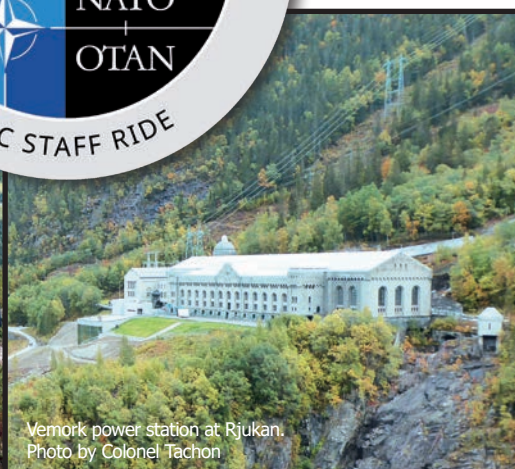
Guard, opened the ceremony with a prayer. This was followed by a wreath-laying ceremony presided over by Major General Piotr Malinowski, the then Commander JWC, and Iselin Grøsfjeld Skogen, Chair of the Committee for Health, Culture and Child Care Services at Eigersund Municipality. Leif Broch, Eigersund liaison for public relations and veterans' affairs, delivered an address on behalf of the municipality.

During the remembrance ceremony, Major General Malinowski said, "Not all soldiers come home to their loved ones. But they pay this price so that their compatriots may live. For this we not only owe them our gratitude and respect; we also owe it to them to learn from the past and strive for improvement, always. To avoid war where possible and be ready to fight when we must."

Major General Malinowski stressed that he was both proud and humbled to serve as part of the NATO Alliance, which resulted from countries having witnessed the destruction of the Second World War. "I can think of no better way to honour these men than to ensure that the JWC carries forward every piece of knowledge we can glean from their heroic effort, utilizing the insights in exercises. The wreath we lay down symbolizes our eternal respect for the fallen heroes," he added. ✦



Colonel Tachon (middle) and JWC staff at Bjenkafjellet



Vemork power station at Rjukan. Photo by Colonel Tachon



Staff members returning from the excursion



Photos by JWC PAO and Yrjan Johansen



Operation Freshman memorial at Slettebo



Iselin Grøsfjeld Skogen



Leif Broch



Dr Bruce Tocher

CHRONOLOGY

Events of the heavy water campaign in Norway, 1942–1944

JULY 1942

The British War Cabinet decides to destroy the heavy water production facilities at the Norsk Hydro plant at Vemork, Norway.

18 OCTOBER 1942

Operation Grouse: five Norwegian special operations executive agents parachute near Vemork.

19 NOVEMBER 1942

Operation Freshman: 41 men from the Commonwealth are killed both in the crashes of their aircraft in Rogaland and in subsequent executions.

27–28 FEBRUARY 1943

Operation Gunnerside: successful destruction of heavy water production facility at Vemork by nine Norwegian special operations executive agents.

20 FEBRUARY 1944

The Norwegian resistance sinks the ferry Hydro on the lake Tinnsjø near Rudsgrend, destroying the remaining heavy water stocks, which had been bound for Germany.



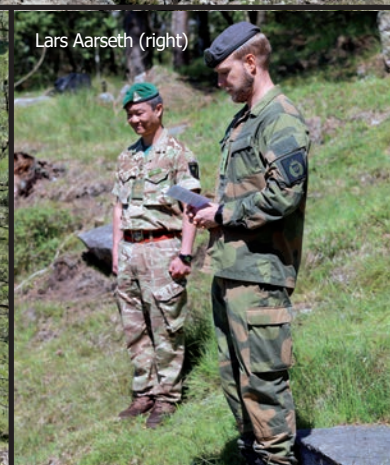
One of the two teams of the field study led by Colonel Tachon



Bjenkafjellet crash site



Remembrance ceremony at Slettebo



Lars Aarseth (right)



Photo by Tore Ellingsen

A Feast for the Eyes and Ears: The 3rd Guard Company at the JWC

His Majesty the King's 3rd Guard Company performed a spectacular 15-minute demonstration at the JWC on May 29. The 3rd Guard Company consists of nearly 100 Norwegian conscripts. They represent both the Norwegian Armed Forces and Norway, and serve as ambassadors of His Majesty the King's Guard. The world-renowned 3rd Guard Company has performed in Norway and abroad for more than 60 years, and participated in international military tattoos. The

drill was performed before a large audience of civilian and military personnel at the JWC. Following the visit to the JWC, the 3rd Guard Company performed in the new NATO Allied nations of Finland and Sweden to celebrate the cooperation between the Nordic countries.



Lt Col Daniel A. Hayes, U.S. Air Force 426th Air Base Squadron incoming Commander, right, accepts command from Col Valarie A. Long, 423d Air Base Group Commander, during the change of command ceremony at the Jättå Military Compound, June 17, 2024.

Photo by Senior Airman Jason W. Cochran,
U.S. Air Force



NEED
TO
KNOW

JWC Collaborates with University of Stavanger to Explore Resilience

ON AUGUST 30, 2024, the Joint Warfare Centre's (JWC) Transformation Delivery Division (TDD) held a deep dive event with University of Stavanger (UiS) faculty members specialized in risk management and public security to increase awareness on resilience and strategic thinking. The event was the culmination of a week-long internal training for the TDD staff, but it was also open to all other JWC personnel.

Today national and collective resilience is among the most critical enablers in NATO's collective defence. Discussions during the event underscored that partnerships between the military, government organizations, international organizations, industry, and academia are crucial for advancing civil preparedness and response in peace, crisis and conflict.

NATO defines resilience as "the individual and collective capacity to prepare for, resist, respond to and quickly recover from shocks and disruptions, and to ensure the continuity of the Alliance's activities."

At the operational and strategic levels, the JWC primarily focuses on the Layered Resilience Concept, which considers military and civil resilience as two layers necessary to support the military instrument of power.

The deep dive included lectures by the UiS faculty members, who are renowned experts

in the field of public security, as well as a presentation on the Layered Resilience Concept by Lieutenant Colonel Jeroen van Mill.

The event concluded with facilitated discussions covering topics such as crisis prevention and management, cooperative security, and the key role of civil-military cooperation in addressing contemporary security challenges. "The movement toward resiliency is a process and will not be done overnight," van Mill said, adding: "Building a resilient organization is a complex, cross-functional, 'one team' endeavour, which needs the cross-disciplinary efforts of people inside and outside our organization."

Van Mill underlined that the collaborative effort between the JWC and UiS was a step forward in establishing a network of resilience-focused experts, researchers and practitioners in Norway.

"This has been a great and highly engaging learning experience. We learned from the faculty, but we also helped them to get a better understanding of NATO's military resilience concept, how the JWC supports it, and its strategic relevance to our collective security. Resilience requires a whole-of-government approach, but it also helps increase our interoperability since it strengthens the partnership between our nations," he added.

Among the UiS representatives in attendance were Associate Professor Dr Claudia Morsut, who gave a lecture on resilience in complex multinational organizations such as the UN and EU; and professor and former Norwegian Armed Forces officer Dr Bjørn Ivar Kruke, who gave a lecture on emergency preparedness. Additionally, Professor Sissel H. Jore delivered presentations during the event and participated in the discussions. At the conclusion of the deep dive, Dr Kruke said: "The Joint Warfare Centre has a huge body of competence for operationalizing the difficult resilience concept into an applicable framework for NATO."



From left: Dr Kruke, Dr Morsut, Professor Jore and Lt Col van Mill. Photo by JWC PAO





Located in Stavanger, Norway, the Joint Warfare Centre (JWC) is a community of around 1,100 people, counting both staff and their families. The JWC serves as both a **warfare centre** and as the **premier collective training establishment** of the **NATO Alliance** at the **operational and strategic** levels. The JWC welcomed 40 new staff and their families to the organization on August 22, 2024.



Photo by JWC PAO



Brigadier General Raymond L. Adams addressing the JWC staff. Photo by JWC PAO

ORGANIZATIONAL VALUES ASSESSMENT

change initiatives, which enable us to fully support ACT's Warfare Development Agenda and ACO's operational readiness and deterrence posture."

Brigadier General Adams then highlighted culture as a vital element of the JWC 2030 Transformation Programme. He explained that the JWC's new initiative, Organizational Values Assessment (OVA), focuses on both culture and people, supporting the JWC's continuous improvement as part of the overarching 2030 Transformation Programme. "This programme element will help us better understand our internal values, behaviours and perceptions, all of which are critical to our success," Brigadier General Adams said.

He underlined that OVA would set the right foundation for JWC's short-, medium- and long-term transformation, and help ensure a team-oriented mission success. "Why are we doing all this? Because we need to ensure that the JWC remains resilient, forward-thinking and ready for the future. We are at a critical moment in the history of NATO and this is our collective effort to make the JWC an even better place to work, to grow, and to excel."

BASED ON THE NATO 2030 ambition, which focuses on making NATO even stronger, the Joint Warfare Centre (JWC) has embarked upon its own transformation journey, led by the JWC Programme Office. The effort to implement numerous change initiatives within the organization, bundled under the name JWC 2030 Transformation Programme, receives fresh momentum through the arrival of Brigadier General Raymond L. Adams, the JWC's new Deputy Commander and Chief of Staff. During an all-hands call on October 2, 2024, Brigadier General Adams highlighted change initia-

tives and culture. The Transformation Programme seeks to ensure that the JWC remains fit for the future and continues to serve NATO as the transformational hub between Allied Command Operations (ACO) and Allied Command Transformation (ACT) — a dual mission that enables converting new concepts into outputs that enhance NATO's readiness and maintain its warfare advantage.

"The JWC is invested and committed to NATO 2030. The vehicle for this is the JWC 2030 Transformation Programme," Brigadier General Adams said. "It will identify, define, and implement



DON'T MISS OUT!

The Three Swords Preview

Issue 41 of The Three Swords will be out in the autumn of 2025, with a special feature about the history of the Joint Warfare Centre's hometown, Stavanger — one of Norway's oldest cities. Stavanger was a growing urban centre at the start of the 12th century, shortly after the end of the Viking Age. Its official founding year is counted as 1125, when the Stavanger Cathedral was completed. This means that Stavanger will celebrate its 900-year anniversary in 2025!



From top: Ina Meer Sommer; Fabian Junge; saiko3p, Shutterstock



The NATO Budget Committee visits the JWC

THE NATO BUDGET Committee visited the Joint Warfare Centre (JWC) on May 7 and 8, 2024, to learn more about the JWC's mission and discuss the Centre's impact on NATO common funding and future capability development. Ms Helena Potter, the JWC's Financial Controller and Head of Budget and Finance Office, said: "Through innovative training methodologies and cutting-edge simulation technologies, we are dedicated to enhancing the readiness and interoperability of NATO forces, working hand in hand with Allied Command Operations and Allied Command Transformation. We prepare the next generation of NATO forces through realistic and challenging exercises; we instil in them the mindset and skills necessary to respond swiftly and decisively to emerging threats and for the 'fight tonight.'"

"Your support in approving our budgets enables us to conduct these exercises with the highest standards of excellence and effectiveness," Ms Potter added.

Following the mission brief and introduction to the JWC's budget and contracting processes, the Budget Committee paid a visit to the recently modernized In-Rock Facility.

Here, Colonel Kevin Rafferty, the JWC's Deputy Chief of Staff (DCOS) Exercises, Training and Innovation (ET&I), together with his staff, provided the committee representatives updated information on a wide array of topics, including the JWC's new exercise series, STEADFAST DETERRENCE, STEADFAST DUEL and STEADFAST DAGGER; recent advances in modelling and simulation capabilities, NATO's new force model, and the new organi-

zational change programme. Colonel Rafferty explained: "There has been a paradigm shift to the new STEADFAST series of exercises. Over the previous 18 months, the exercises have been redesigned to meet the requirements of the Supreme Allied Commander Europe for increased realism. They are larger in scale and are firmly nested between the operational and strategic levels; providing the opportunity to the NATO Command and NATO Force Structures to refine their plans and directives, and increase their readiness."

During their visit, NATO's top budget officials from 18 NATO member countries were also updated on the real-life support to exercises, workforce, and ongoing and future infrastructure improvement projects as well as the JWC's efforts in advancing warfare development. The latter included a presentation on wargaming by the JWC's Wargaming Branch.

At the conclusion of the visit, Mr Torgrim Alterskjær, Section Chief Budget and Disbursing, said: "This was a tremendous opportunity to meet and interact with the Budget Committee representatives. This visit could not have been accomplished without the joint efforts of the JWC staff."

Alterskjær added: "We covered so many topics that are vital to the success of our mission and future capabilities. The visit also contributed to the Budget Committee's understanding of the breadth of our mission and main activities. Some people may think of Stavanger as expensive, but the JWC is indeed the best training location, from a cost perspective, for operational-level command post exercises."



NATO Budget Committee representatives observing a wargame demonstration. Photo by JWC PAO



Mr Torgrim Alterskjær. Photo by JWC PAO

SVALBARD SURVIVOR



From left
© Svalbard Skimaraton, 2023;
the author after the 2022 race,
photo provided by the author



A Ski Marathon in LONGYEARBYEN

by **Martin Chohan**
Exercise Production Division
NATO Joint Warfare Centre

Below
The Svalbard Skimaraton track



EVERY YEAR, MILLIONS of tourists from all over the globe flock to Norway to see its stunning landscapes. I myself have been lucky in that my work has taken me to Norway nine times so far, including for a tour of duty at the Joint Warfare Centre (JWC) and for arctic warfare training. But like so many of Norway's tourist visitors, I had never made it all the way to the fabled archipelago of Svalbard. To remedy that, I signed up for the Svalbard Skimarathon in November 2022, a 42.2-kilometre classic-style cross-country ski race.

Svalbard

With a name derived from the Old Norse "sval" ("cold") and "barð" ("ridge"), Svalbard is an archipelago in the Arctic Ocean between the 74th

and 81st parallel north. It boasts an interesting history: the North Pole is only 1,000 kilometres away, and the 1920 Svalbard Treaty allows anyone to live and work there regardless of citizenship. According to the Treaty, Svalbard may not be used for "warlike purposes."

From Stavanger, where the JWC is located, it takes approximately a full day to reach the capital of Svalbard, Longyearbyen. The Coal Miners' Cabins in Nybyen, a 25-minute walk south from the town centre, offer a great compromise between cost and comfort, and have a decent bar and restaurant. The money I saved by lodging there, I invested in the adventures below.

Training

I had never classic-raced more than 20 kilometres, so I took advantage of discounted lessons



at the JWC's annual week-long winter leave event. Before and after this trip, I spent nearly every weekend from January to April in Sirdal, a skiing destination about a 100 kilometres from the city of Stavanger. I would leave for Sirdal at 05:30 on Saturday and Sunday mornings, to be first in the tracks before the crowds arrived. I endured various conditions ranging from extreme wind and cold to sun, rain, ice and slush. Whilst it was very challenging at times, I had to prepare for whatever Svalbard would throw at me. After each session, I visited Kvæven Kafé, where Rune, who served behind the counter until last year, would serve me a well-earned waffle and coffee. Experimenting with kit and waxes, I racked up 300 kilometres on skis and 24 hours in gyms prior to race day.

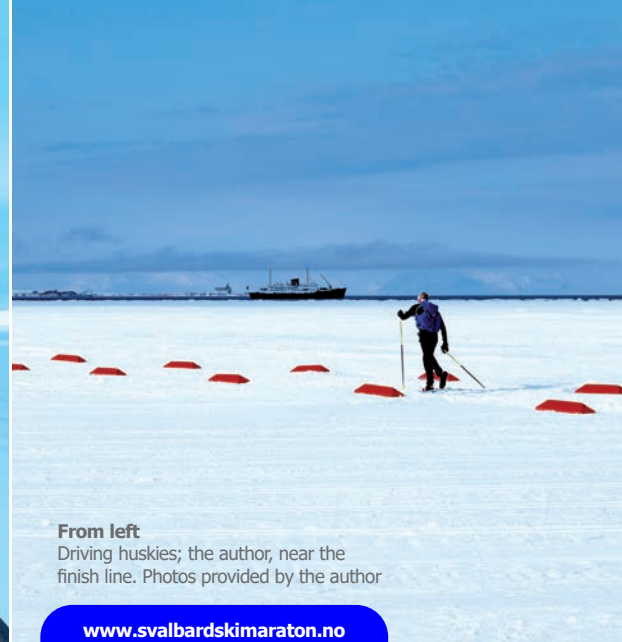
The Race

The day before the race, athletes gathered in a gym, where ski waxing experts from Swix, a Norwegian manufacturer of winter sports equipment, advised on wax selection and application. Getting this wrong can lead to increased fatigue and longer race times, so time spent getting it right is well worth it.

On the race day, in brilliant sunshine and negative two degrees Celsius, around 300 apprehensive racers assembled. In the minutes before the start, shivering hands made final adjustments to skis, pole straps and rucksacks.¹ Everyone was friendly, but focused — we were all keen to begin. Meanwhile, in the blue sky above, Svalbard's governor was conducting recon from a helicopter, satisfying himself that no polar bears would reduce the field of competitors. At 09:00, the starting official fired his pistol — we were off!

Like human trains, we pulled out of the 16 start lanes, which soon narrowed to two — it was a scene of organized chaos! As we established our rhythms under the watchful eyes of rifle-toting marshals on bear watch,² it was hard not to be distracted by the scenic route, which combs Adventfjord's north and east shores. I discovered downhill were my strength; I could overtake many people at a time (due to a strong Telemark ski background, I am not easily unsettled or thrown off balance by high speeds). I did all right on uphill slopes too, but on the flats, I was very average.

At 26 kilometres, I had to dig deep to find more mental resolve. At 38 kilometres, the cramps in my quadriceps and triceps were



From left

Driving huskies; the author, near the finish line. Photos provided by the author

www.svalbardskimaraton.no
<https://www.visitsvalbard.com/>

unbearable, but relieved with isotonic gels, stretching, and positive thoughts about Scottish single malt (from my hipflask) at the finish.

The final two kilometres, now into an icy headwind, went quickly. Crossing the finish line felt sensational — I definitely felt I'd earned my medal! As the only competitor from the JWC, and one of only two male British skiers, I posted a time of 3 hours and 30 minutes (add 15 minutes for wax/drink station stops). I was pretty pleased, shaving 25 minutes off the predicted time for my age group (I'm in my early 50s), though some very fit, proficient and mainly Scandinavian skiers in their 50s and 60s achieved times under three hours.

That evening after prize-giving, everyone enjoyed a banquet of soup, reindeer stew and chocolate cake, all washed down with Danish beer. The times of the fastest male and female racers (both Norwegian) were 1 hour and 59 minutes, and 2 hours and 8 minutes, respectively; the slowest racer to finish took 5 hours and 58 minutes. Of 371 racers, 256 finished.

Activity Recommendations

My spouse accompanied me to Svalbard. We booked a day's dogsledding. Guides assign you six dogs (chosen from 112), and you have to find them, lead them from their kennel to the sled, and then harness, mush and feed them (after receiving instructions, of course). Included was a visit to 1,000-year-old underground ice caves in which we were given hot turmat (Norwegian MREs for hikers) and *solbærsaft* (blackcurrant squash) by the light of our head lamps. The guides regaled us with tales of polar bear attacks (would one be waiting at the cave entrance on our exit?) and Arc-

tic living. In contrast to snowmobiling, there is something special about viewing this incredible scenery and wildlife accompanied only by the sounds of paws and rails on snow.

A snowmobile safari sees you driving through incredibly flat and wide valleys, Adventdalen and Sassendalen, bordered by characteristic flat-topped mountains, black rock and coal contrasting vividly with the snow. Our safari ended at Tempelfjorden, 50 kilometres away. Frequent stops allow photo opportunities: seals, walrus, birds and Svalbard reindeer, a species unique to the islands.

If you prefer a more relaxed way of viewing, book a boat trip through pack ice to Billefjord (we saw a polar bear there). Longyearbyen has much to offer: visitors can explore museums, sample locally brewed beers at the "northernmost pub in the world," shop for the ultimate in cold weather clothing, or just relax in restaurants and cafés.

Conclusion

Svalbard is a worthy destination, but pick your season carefully. The sun doesn't set from 20 April to 22 August, but conservation rules mean hiking over sensitive tundra is forbidden. Due to its location and ruggedness, many activities on Svalbard have minimum age requirements, usually starting at 10–14 years. Check out www.visitsvalbard.com for more information. ✦

Endnotes

- 1 It is mandatory to carry safety equipment and spare clothing at the Svalbard Skimaraton.
- 2 Anywhere outside of "town" is polar bear territory, so all trips require armed guides.



Introducing our new Portfolio Section, where we highlight the diverse talents of our staff, from photography to coaching and more.

“I'M NOT A PROFESSIONAL PHOTOGRAPHER; I'M A PROFESSIONAL BEGINNER.”

JOSÉ NEVES is the Joint Warfare Centre (JWC) Communication and Information Systems Services Team Leader. Outside of work, he pursues an inspiring passion in the diverse landscapes in Norway, especially, surrounding the JWC in southwestern Norway: José captures birds. Well, not with nets and cages, but with his camera. We sat down with him to find out more about this pastime and what it has taught him about the natural beauty of our planet.

José, tell us something about how you became interested in birds.

I grew up in a mountainous landscape similar to that of Norway. As a child, I developed a fascination with the environment around me. Each discovery of a new species created in me a sense of belonging, but also of admiration and respect. Over the years, I gained knowledge about birds: their names, sounds, flight patterns, behaviours, favourite foods, preferred locations to perch and nest, how to distinguish male and female, and so on. Coming to Norway gave me the opportunity to fulfill an old dream: documenting biodiversity, especially birds, with which we have the privilege of sharing this planet. Having joined international and local groups, such as Bird Life Norge, dedicated to protecting the environment and biodiversity, I now feel a strong sense of responsibility to do my part to help preserve the species that still exist.



What motivates you to pursue photography?

I'm not a professional photographer; I'm a "professional beginner" who entered this fantastic world of photography about three years ago. I had no prior knowledge of photography whatsoever. My goal is to share the beauty and wonder of the natural world with others, to inspire a deeper appreciation for the environment, and to foster a sense of stewardship for the planet and all its inhabitants.

What inspired you to shoot landscapes and wildlife, especially birds?

Since my teenage years, I have avidly watched all these amazing documentaries on TV about the natural world. Often, these are about remote places and exotic species. I have always dreamed of doing something similar, but documenting the wildlife and natural world that surrounds me where I live. As for wildlife photography, birds hold a special fascination for me. They embody freedom, grace and resilience. Whether it is the vibrant plumage, the majestic flight of an eagle, or the delicate balance of a bird hovering in mid-air, each bird is a masterpiece of evolution.

My passion for shooting landscapes and wildlife, particularly birds, came from a deep appreciation for the beauty and diversity of the natural world. Nature has always been a constant source of inspiration for me, with its breathtaking scenery and fascinating creatures. And Norway offers all that. We are surrounded by beautiful species of birds, mammals, insects, plants... We just need to go out and enjoy.

How do you prepare for a wildlife photo shoot?

Photographing birds presents unique challenges and rewards. It requires patience, observation, and an understanding of their behaviour and habitats. But when you manage to capture that perfect moment — the glint in their eye,





Norwegian white-tailed eagle
© José Neves

while waiting for some action, I peacefully fall into a deep sleep. Nothing compares to capturing a once-in-a-lifetime moment — the perfect sunrise over a misty lake, the elusive wildlife. These moments are ephemeral and precious, and being able to freeze them in time is incredibly rewarding.

In your view, what makes a "winning" image? Is there any stand-out shoot for you?

I remember, a long time ago during a World IT Conference, someone on stage shared her achievements in teaching a computer how to "read" photos. The one she used as an example was a family photo in which a young boy was receiving a present from his mother. The computer was able to describe it as such.

What the computer was not able to "read" was the emotion on people's faces and the story the picture told. The mother gave the present to the boy to celebrate his recovery from cancer after a long battle. The joy on their faces also spoke of the tears they had cried.

Photography, at its core, is about storytelling. Quite often that story occurs when a photographer "makes a photo," rather than taking a photo. A "winning" image, in my view, is one that effectively communicates a compelling story, evokes an emotional response, and demonstrates technical excellence. There's no single definition of a winning image. ✦

the spread of their wings, or the subtle movement of their feathers — it's incredibly rewarding. Here's how I typically prepare:

Research: I start by researching the location and the species of wildlife I hope to photograph. Understanding the subject helps me anticipate their movements and capture more compelling shots.

Scouting: If possible, I visit the location beforehand to scout potential shooting spots, identify good vantage points, and familiarize myself with the terrain. Wildlife photography can be unpredictable, so whenever possible, I have backup plans in place in case my original location or subject doesn't pan out.

Gear check: I carefully inspect and prepare all my camera gear, ensuring everything is clean, fully charged, and in working order.

Pack essentials: In addition to camera gear, I always pack essential items such as water, coffee, snacks, appropriate clothing for the weather and terrain, insect repellent, and a first-aid kit.

Timing and weather: Early mornings and late afternoons often provide the best

lighting conditions, while overcast days can offer softer, more diffuse light that is ideal for certain subjects.

Respect wildlife: Behave ethically out there. Prioritize the welfare of wildlife and respect their natural behaviour. Maintain a safe distance to avoid disturbing or stressing the animals. Patience is key.

Tell us about your best experiences.

Overall, the best experiences as a photographer are those that allow me to connect with the world on a deeper level, to share my passion with others, and to make a positive impact, however small, through my photos. Photography has taken me to some incredible places I might never have discovered otherwise. Whether it's hiking through rugged mountains, trekking through dense forests, or sailing to an island, each adventure has been an opportunity to immerse myself in the beauty of nature and capture its essence through my lens.

Nature has the power to heal you in ways you can't imagine. There are occasions where,



European shag, photographed in Norway
© José Neves

READINESS AND WARFIGHTING

NATO's largest computer-assisted command post exercise of the year, STEADFAST DUEL 2024, focused on the Article 5 defence of NATO territory and the delivery of multi-domain operations at the strategic, operational, and higher tactical levels. (pp. 64–67)



Norwegian soldier standing guard at the Joint Warfare Centre during STEADFAST DUEL 2024. Photo by Tore Ellingsen

#WEARENATO



Scan the QR code with your mobile device to visit **www.jwc.nato.int** and learn more.

The Joint Warfare Centre is NATO's training focal point for full-spectrum joint operational- and strategic-level warfare.