



THE MAGAZINE OF THE JOINT WARFARE CENTRE

THE THREE SWORDS

STAVANGER – NORWAY

SPECIAL 20TH ANNIVERSARY ISSUE



CELEBRATING 20 YEARS
NATO JOINT WARFARE CENTRE

EXCLUSIVE
A NEW ERA OF
COLLECTIVE DEFENCE

BY ADMIRAL ROB BAUER,
CHAIR OF THE NATO MILITARY COMMITTEE



ON THE COVER

Celebrating 20 Years: The evolution of the Joint Warfare Centre over the past 20 years illustrated through photos, offering some historical context to our mission within NATO.

BACK COVER

The Joint Warfare Centre's One Team marks the 20th anniversary of the Centre's inauguration in 2003 with a group photo taken on August 18, 2023.

ACKNOWLEDGMENTS

Eleonora Russell, Public Affairs and Strategic Communications (StratCom) Advisor to the Chair of the NATO Military Committee; Lara Ronayne Casimiro, Public Affairs and StratCom Assistant to NATO International Military Staff; Jay Paxton, Chief Public Affairs Officer, Headquarters Supreme Allied Commander Transformation; Colonel Richard "Chris" Hyde, SHAPE Chief Public Affairs Officer



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October 2023
Issue No. 39

“As a war is raging on the doorstep of the Alliance, with a constant evolution of courses of action and warfighting techniques on both sides, the JWC does not merely repeat the same type of training to evaluate the execution of standardized staff processes. Instead, the Centre continuously adjusts its scenario development to the new realities of high-intensity warfighting.” (pp. 46-52)

Colonel Nicolas Tachon, French Army
Head of the Transformation Delivery Division
NATO Joint Warfare Centre



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EDITOR'S LETTER



DEAR READER,

It has now been 20 years since the NATO Joint Warfare Centre (JWC) was established on October 23, 2003, in Norway. This is a moment for our team in Stavanger to pause and pay tribute to the special achievements and capabilities of this unique NATO establishment. The Prague Summit in November 2002 – NATO's first summit of the 21st century – fundamentally transformed the Alliance and paved the way for the new military command structure consisting of Allied Command Operations and Allied Command Transformation.

Since then, the security environment has changed dramatically. The war in Ukraine points to the fundamental importance of collective defence and the preservation of peace and security – NATO's raison d'être as set forth in the preamble to the North Atlantic Treaty, now signed by 31 Allies. In this shifting security, NATO aims to further strengthen its deterrence and defence posture, and the JWC's mission is coming into ever-sharper focus.

As NATO's premier centre for full-spectrum joint operational- and strategic-level warfare, the JWC has been at the forefront of shaping the way NATO trains for the future. Readiness demands training. And training is at the heart of NATO's readiness. It is for this reason that the JWC's exercises are getting ever more relevant and growing both in scale and complexity.

With STEADFAST JUPITER 2023, NATO's largest command post exercise in modern warfare, the JWC executed a very complex undertaking in NATO in recent history. The exercise tested NATO's responsiveness, command and control, and defence posture in a highly challenging multi-threat environment, based on a simulated Article-5 scenario. Moreover, our new exercise series in 2024 is to ensure that our great Alliance is better geared towards the new challenges posed by "strategic competition, pervasive instability and recurrent shocks," as stated in the Strategic Concept.

We open this issue with forewords from the Norwegian Minister of Defence, the Supreme Allied Commander Transformation and the Supreme Allied Commander Europe, together with a special contribution from Admiral Rob Bauer, the Chair of the NATO Military Committee. Since its inception, the JWC has been a unique organization, and the article dedicated to our history is packed with information, both looking back and looking ahead. In addition, you will find articles on the JWC's exercises and warfare development efforts as well as its unique culture of inclusion and communication, which underpins all of our efforts.

We hope you will enjoy this issue's other special features, such as our look at the game-changing concept of cognitive warfare. We would like to thank all of our authors, without whom this special edition would not have been possible.

We look forward with great excitement to the next 20 years.

Lieutenant Colonel Stefan Kühling
German Army
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THE THREE SWORDS MAGAZINE

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THE THREE SWORDS is the Joint Warfare Centre's authorized journal published twice a year 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.

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Major General Piotr Malinowski

Polish Army Commander Joint Warfare Centre

"A NEW NORTHERN LIGHT FOR OUR ALLIANCE." It has been 20 years since Admiral Edmund P. Giambastiani, Jr. (Retired), NATO's first Supreme Allied Commander Transformation, described the Joint Warfare Centre (JWC) in these words at its inauguration ceremony. This, in my opinion, is the most memorable interpretation of the JWC's mission: The awe-inspiring northern lights or the aurora borealis are born from volatility and violent eruptions, but result in a magnificent display that brings light into the darkness. Similarly, the JWC was established in a volatile, ever-changing world that had erupted into conflict, to illuminate the heretofore unknown and make NATO better through training and innovation.

Today the JWC remains a unique organization focused on making NATO better by delivering high-intensity and high-value training at the operational and strategic levels, as well as warfare development to keep and hone our military edge.

It is continual self-evaluation and innovation that is a constant for the JWC: In that spirit, we strive for better training. We adapt. We develop. We actively focus on warfare development to ensure that NATO is best equipped to address evolving threats and challenges.

There is no better example than STEADFAST JUPITER 2023 — NATO's largest computer-assisted exercise/command post exercise (CAX/CPX), which has expanded our concept of what a CAX/CPX can offer in terms of training.

Much has changed over the years and our exercise and training architecture has evolved to reflect these changes. I am excited to lead on this path with our new series of exercises to prepare NATO for the future: STEADFAST DETERRENCE, STEADFAST DUEL and STEADFAST DAGGER. Additionally, there is STEADFAST FOXTROT, a wargame that serves as a great example of the JWC's out-of-the-box thinking.

As Secretary General Jens Stoltenberg stated in May of this year



with regard to war returning to Europe: "We will train and exercise more together, place more forces on higher readiness through our New Force Model, and strengthen our Command-and-Control structure — the backbone of our Alliance."

The Alliance itself can only be as good as its training. As NATO's premier training establishment at the operational and strategic levels, the JWC is determined to ensure that NATO forces are well-trained and ready to meet all the requirements of the Alliance, providing 360-degree protection of NATO territory in an era of increased uncertainty.

The past 20 years have been a time of rapid global change, and the past decade even more so. The key is that NATO is ready and ever adapting: The Alliance will always firmly respond to any deterioration of our security environment, strengthening our deterrence and collective defence to prevent conflict and

preserve peace.

Through its operational- and strategic-level collective training and its warfare development efforts, the JWC continues to test Allied forces' readiness and push the envelope in all warfare domains: air, land, maritime, cyberspace and space.

The JWC is home to a diverse, flexible, creative and innovative workforce. The Centre's broad record of achievement is an output of its One Team, who ensures every day that the Centre remains fit for the future in the continuously changing, challenging, and competitive security environment we face.

In closing, I would like to acknowledge the friendship and support provided by our Norwegian partners. I greatly appreciate Norway's outstanding host nation support for the JWC, built on trust, close cooperation and open dialogue. We are all proud to serve NATO here in Stavanger, ensuring our common security for present and future generations.

Together, we make NATO better. ✦

H.E. Bjørn Arild Gram

Minister of Defence Norway

THE ESTABLISHMENT OF the Joint Warfare Centre (JWC) in 2003 coincided with the emergence of threats from outside of NATO's traditional area. These threats changed the Alliance's approach to security. The JWC responded and adapted to these challenges and made a substantial contribution to prepare both the Alliance and Allied forces for the challenges.

NATO faces a broad spectrum of challenges and threats. In Europe, the threshold for the use of military force has been lowered. Hybrid threats challenge how we traditionally think about peace, conflict and war. The Russian attack of Ukraine in 2014 heralded the return of interstate military conflict to the Euro-Atlantic area. February 24, 2022, will be remembered as a watershed moment. With the Russian attack on Ukraine, we have a full-scale war in Europe.

President Putin expected our resolve to weaken in the face of an energy crisis, high electricity prices and rising costs of living. But he was wrong. We have not allowed these threats and challenges to undermine Alliance cohesion and resolve. On the contrary, the Alliance has risen to the challenges and stands united to defend and protect all Allies.

We are dealing with a Russia that is very different from the Russia we hoped would emerge with the dissolution of the Soviet Union. Rather than emerging as a partner for NATO, Russia has taken a path that sets it further apart from the West and the community of democracies.

The major changes in our security environment were triggered by Russia's illegal aggression against Ukraine. The regime in Moscow launched a full-scale invasion of a peaceful neighbouring country, violating the UN Charter and the rules-based international order. The world before this attack is not the same as the world we now face. Rus-



sia is asserting itself as a major power, based on spheres of influence. Recent developments represent a resurfacing of state-based threats with the potential to threaten European and transatlantic security. Supporting Ukraine will involve considerable costs, and it will extend over many years. However, the cost of failing to support Ukraine would be far higher.

Norway remains committed to the principles underpinning European security, including that each country has the inherent right to choose its own security arrangements. Norway reaffirms its unwavering support for the independence, sovereignty, and territorial integrity of Ukraine within its internationally recognized borders.

We are fully committed to the mutual defence clause and security guarantees in NATO. We will defend every inch of NATO territory based on NATO's collective defence guarantees. We will defend Alliance territory as we will defend ourselves. Norway has already expanded its force contributions in Eastern Europe.

What capabilities do we need to counter threats today and in the future? NATO's most important task is to defend our democracies, our freedom, and our prosperity. The JWC plays a key role in enabling NATO to carry out this task. NATO has strengthened its deterrence and defence posture. The Alliance must continue to strengthen its collective defence and deterrence capabilities. Allied Command Transformation (ACT), and within it the JWC, is leading the efforts in adapting NATO to a new security environment. It is imperative that ACT continues to play a key role in the continuous evolution of NATO.

With Putin's war, there is a new urgency facing the Alliance. I am confident that ACT and the JWC will do what needs to be done in the years ahead. ✦

“NATO's most important task is to defend **our democracies**, **our freedom**, and **our prosperity**. The JWC plays a key role in enabling NATO to carry out this task.”



Above

H.E. Bjørn Arild Gram, the Norwegian Minister of Defence, paid a visit to the JWC on January 10, 2023. The Minister was warmly welcomed to the Centre by Major General Piotr Malinowski, Commander JWC. Photo by JWC PAO



General Philippe Lavigne

French Air and Space Force Supreme Allied Commander Transformation

FOR ALLIED COMMAND Transformation (ACT), 2023 has been a year of celebration as well as an opportunity to look to our past and, more importantly, to our future. The Joint Warfare Centre (JWC) is of course a major part of that story and I am honoured to have this opportunity to add my congratulations on this momentous occasion, as the Centre celebrates 20 years in Norway.

We all understand how different our world is today from what it was in 2003. Our security environment has never been as fast-changing or as unpredictable as it is now. Russia's barbaric invasion of Ukraine has brought back images we thought belonged only in history books, but has also brought into sharp relief the challenges a defensive Alliance like NATO faces, as it seeks to provide the security necessary to ensuring our one billion fellow citizens can live in peace and security.

The future operational environment requires new kinds of forces and capabilities so that NATO can continue to deter and defend, irrespective of threat or challenge. The Joint Warfare Centre has for 20 years now provided an environment where collective training at the operational and strategic levels enables preparedness and effectiveness.

That mission has grown more challenging and more complex, but I am entirely confident that the JWC stands ready to take into account new threats and emerging challenges as it continues to train NATO forces and headquarters. Its robust exercise programme is a clear and visible



demonstration of our ability to maintain the very highest level of readiness, the cornerstone of the Alliance's credible deterrence.

As it has throughout its history, the JWC will continue to do so by researching and implementing new tools while improving existing ones, including for instance modelling and simulation technologies and scenarios to help NATO forces develop, experiment and train together. It will continue to be NATO's main provider of multi-domain, realistic and challenging command post exercises at the operational and strategic levels. Without it, NATO's military instrument of power would not be as strong, as innovative or as resilient as it is today and needs to be tomorrow.

Finally, just as ACT embodies the transatlantic link, the JWC has long provided the strong connective tissue uniting both sides of NATO's military structure, providing all of us with a place where the best ideas or innovations from across the Alliance can be

tried out to ensure we can collectively maintain our edge.

The truth is we have little choice. The Alliance's challenges are too numerous and too serious. We must continue to work better together. The JWC is, and will continue to be, a vital part of those efforts.

Congratulations as we pause to celebrate your many achievements over the past 20 years and best wishes for the next 20, as we get ready to celebrate NATO's 75th anniversary next year!

That is how we will continue to win as a team! ✦

“Just as ACT embodies the transatlantic link, the JWC has long provided the strong connective tissue **uniting both sides of NATO's military structure**, providing all of us with a place where the **best ideas or innovations** from across the Alliance can be tried out.”



General Christopher G. Cavoli

U.S. Army
Supreme Allied Commander Europe

THIS YEAR MARKS the 20th anniversary of the Joint Warfare Centre (JWC). Since its inception, the JWC has been a source of excellence for its superior command, Allied Command Transformation (ACT) and for Allied Command Operations (ACO). Located on the coast of Norway, the JWC was founded on the bedrock of NATO's shared values.

This is an unprecedented time for Euro-Atlantic security. Russia's illegal, unprovoked, and brutal invasion of Ukraine has upended many aspects of European security. It also has forced us to reprioritize collective territorial defence and NATO readiness.

As part of our strategic framework for Deterrence and Defence of the Euro-Atlantic Area, our exercise programme will be modernized and focused on current adversaries. We will also prioritize readiness. Trained, ready, and interoperable forces are essential to deterring, and if required, defending Alliance territory in the future.

As a first-rate warfare centre, the JWC plays a key role in keeping NATO's combat edge. The Centre provides strategic- and operational-



level training, and advanced modelling and simulation systems. In ACO, the JWC is recognized for its expertise in major NATO computer-assisted command post exercises and provides cutting-edge facilities for implementing transformational activities, doctrine, and testing new concepts.

The JWC also promotes innovation and helps explore new ideas to address present and future challenges. As such, the JWC is one of NATO's key instruments in transformation, both militarily and institutionally.

Today, the Centre is the bridge between Allied Command Transformation and Allied Command Operations. By training NATO command and force structure headquarters, the Centre directly contributes to NATO's ability to conduct joint warfare.

Over the past 20 years, the JWC has reflected the evolution of the Alliance and I know the JWC will continue to be at the forefront of higher headquarters training, warfare

development, strategic thinking, and innovation.

Congratulations on your 20th anniversary! ✦



“As a **first-rate warfare centre**, the JWC plays a key role in keeping **NATO's combat edge.**”



NATO Chiefs of Defence meeting,
May 10, 2023. Photo by NATO



Admiral Rob Bauer.
Photo by NATO



NATO flag raised on
board Finnish vessel
MHC Vahterpää.
Photo by NATO

“ **Collective defence** is truly a task for the **collective**. It requires a collective effort by all nations, to fulfil their pledges and ensure **NATO is ready to deter and defend** as and when required.”



EXCLUSIVE

A NEW ERA OF COLLECTIVE DEFENCE

by ADMIRAL ROB BAUER

Chair of the NATO Military Committee

O **N FEBRUARY 24, 2022**, when Russian troops and tanks rolled across the Ukrainian border and launched a full-scale invasion, Russia violated Ukraine's territorial integrity, its sovereignty and the rights of its people to self-determine, and ushered in a new era of collective defence. Not just for Ukraine. Not just for NATO and its Allies, but for all free democracies around the world. With this one decision, the course of world history changed, the foundations of the rules-based international order were shaken and war returned to Europe.



FOR MORE THAN 20 MONTHS now, Moscow has sought to bring death and destruction to the heart of Europe, attempting to destroy Ukraine and divide NATO. President Putin predicted that his "Special Military Operation" would take Kyiv in a few days and control Ukraine in a few weeks. Many observers believed Ukraine had little hope to hold out against a full-out assault from Russia. With nearly five times as many military personnel as Ukraine, a defence budget eleven times larger, an economy almost eight times larger, and significantly better military capabilities, Russia's victory seemed inevitable. However, President Putin made two strategic mistakes: he underestimated Ukraine's determination and NATO's unity. Very much like David facing down Goliath, the Ukrainians have astounded the world with their unwavering determination, remarkable strength and whole-of-society resilience.

As NATO's new Strategic Concept makes clear, Russia is the most significant and direct threat to Allies' security and to peace and stability in the Euro-Atlantic area. This

has not always been the case. For more than 20 years after the Cold War, NATO and its Allies tried to build a good relationship with Russia and establish a balanced form of cooperation. In 1994, Russia became the first country to be designated a "Partner for Peace" by NATO. Over the years, NATO and Russia worked together on issues ranging from counter-narcotics and counter-terrorism to submarine rescue and civil emergency planning — even during periods of NATO enlargement. However, since March 2014, in response to Russia's illegal and illegitimate annexation of Crimea, NATO suspended all practical cooperation with Russia. Since the 2022 Madrid Summit, NATO no longer considers Russia to be a partner.

NATO's Collective Defence: The Road So Far

For many years, now, NATO and its Allies have been monitoring Russia's use of violence and intimidation; its attempts to re-establish spheres of influence; its weaponization of migration,

food and energy; and its complete disregard for the sovereignty of other nations, using conventional, cyber and hybrid means to destabilize them, and even illegally annex territory. Faced with this pattern of aggressive behaviour, the NATO Military Authorities recognized the need to improve NATO's collective defence across the Alliance's territory and domains.

In 2016, NATO Allies established four multinational battlegroups in Estonia, Latvia, Lithuania and Poland, and a multinational framework brigade in Romania. Additionally, Allies boosted the NATO Response Force, with a Spearhead Force of 5,000 troops, the Very High Readiness Joint Task Force (VJTF), which is able to react within days to threats from any direction. The Alliance also strengthened its cyber defences by setting up a new Cyber Operations Centre, bolstering its cyber resilience, integrating national cyber capabilities into NATO missions and operations, and by establishing new Counter Hybrid Support Teams.

Then, at the 2018 Brussels Summit, Allies adopted a Readiness Initiative to enhance their

Below from left: British Jackal 2 armoured vehicle demonstrating combat readiness of the battlegroups in Lithuania and Poland; NATO multinational battlegroup Estonia; NATO multinational battlegroup Poland; a German Rheinmetall KZO drone used for training the NATO battlegroup in Lithuania; a close-up on a battlegroup badge. Photos by NATO



#WeAreNATO #StrongerTogether #DeterandDefend





Above: (Left to right) General Christopher G. Cavoli, Supreme Allied Commander Europe; Admiral Rob Bauer, Chair of the NATO Military Committee, and General Philippe Lavigne, Supreme Allied Commander Transformation, at the NATO Chiefs of Defence meeting, May 10, 2023. Photo by NATO

ability to reinforce across the Alliance. They agreed a major update of the NATO Command Structure, with more than 1,200 additional personnel and two new commands — Joint Forces Command Norfolk in the United States and Joint Support and Enabling Command in Germany — to ensure our forces can move quickly across the Atlantic and within Europe.

At the same time, the NATO Military Authorities started developing an overarching strategy for both our current and our future collective defence. In 2019, Allied Chiefs of Defence established a new threat-based NATO Military Strategy, which helped set out NATO's military priorities and approach to current and future threats in a more unpredictable world as well as deal with the consequences of a changed security environment. This spurred the Alliance's shift from reacting to crises to deterring crises. This was followed in 2020 by the Concept for the Deterrence and Defence of the Euro-Atlantic Area (DDA): a strategy for the short to medium term that enables Allies to rapidly strengthen NATO's deterrence and defence posture, in all domains, in a coherent and purpose-driven manner to counter two threats, Russia and terrorist groups.

Subsequently, in 2021, Allied Chiefs of Defence developed the Warfighting Capstone Concept (NWCC): a strategy for the long term, which provides a 20-year vision for the devel-

opment of the Alliance's military instrument of power and sets out a realistic path forward to turn that vision into reality. NATO deliberately developed these two strategies almost in parallel to ensure a coherence across planning for the "now" and planning for the future.

The fact that these strategies were in place enabled NATO to scale up its posture on the eastern flank very quickly after the start of Russia's invasion of Ukraine. Within hours, NATO had activated its defence plans from the Baltic to the Black Sea, putting 40,000 troops under NATO command, backed by significant air and maritime capabilities.

New Regional Plans: Across Allied Territory and Domains

When I started my term as Chair of the NATO Military Committee in June 2021, the shift from crisis management to collective defence was already well underway. The DDA was being operationalized into plans for peacetime, times of crisis and times of conflict. This included the revision of the Alliance's Graduated Response Plans and the development of Regional Plans, which were presented last July at the NATO Summit in Vilnius. These geographically specific plans describe how NATO will defend key and relevant places within our Alliance against the two previously mentioned threats described

in the Strategic Concept and the 2019 NATO Military Strategy: Russia and terrorist groups.

These are the most comprehensive defence plans NATO has had since the end of the Cold War. Not only do they integrate national defence plans and NATO defence plans to an unprecedented level; they also provide a much more precise demand signal from NATO and will shape our armed forces for decades to come. The plans are divided by region:

- the north, the Atlantic and European Arctic, under Joint Force Command Norfolk;
- the centre, covering the Baltic region and central Europe, under Joint Force Command Brunssum;
- and the south, covering the Mediterranean and Black Sea, under Joint Force Command Naples.

These Regional Plans are accompanied by Force Structure Requirements, which set out objective, threat-based capabilities targets for nations. This means that Allies now know precisely what assets or capabilities in all domains — maritime, land, air, space and cyber — are required of them in a crisis scenario, including where and what to deploy, and what their tasks would be. Furthermore, these Regional Plans require a new NATO Force Model, which will 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 high-readiness forces will be based in their home countries and available to NATO commanders, under the Supreme Allied Commander Europe.

We are also adapting the NATO Command Structure to ensure that NATO is sufficiently agile, resilient and staffed to execute these plans. This will improve our ability to conduct exercises, to manage NATO's posture in peacetime and in the transition to crisis and conflict, and to undertake command and control for the full spectrum of missions, including large-scale multi-domain operations for collective defence, throughout the new geography of our Alliance, especially with Finland's accession, and soon with Sweden's. These plans move us from an Alliance optimized for out-of-area contingency operations to an Alliance fit for the purpose of large-scale operations in defence of all Allied territory.



As seen with the conflict in Ukraine, NATO must be able to move and fight at a moment's notice, in all domains and in all geographical areas. Time is no longer on our side. This is the fundamental change between crisis management and collective defence: it is not we, but our adversary who determines the timeline.

The war in Ukraine has shown us that we are on the right track with our strategies. Nevertheless, we are actively accelerating their implementation. Now we must focus our efforts on the execution of these plans. At our annual Military Committee Conference, last month in Oslo, the NATO Chiefs of Defence discussed the next steps, namely the different requirements to ensure these plans can be executed in a timely and realistic manner. This will require recruiting more people, more training and exercising; rebuilding stocks, increasing production capacity and formations; buying equipment; and planning defence investments. These requirements will be fed into NATO's Defence Planning Process and divided up amongst NATO nations. Needless to say, collective defence is truly a task for the collective. It requires a collective effort by all nations, to fulfil their pledges and ensure NATO is ready to deter and defend as and when required.

War in Ukraine: Stark Lessons for the Future

Many experts agree that Russia's war against Ukraine has fundamentally changed the rules of modern warfare. There is a myriad of lessons to be identified and learned, including on data integration, national resilience, sustainable logistics, and the implementation of multi-domain operations.

Under the leadership of President Zelenskyy and Chief of Defence General Zaluzhnyi, Ukrainian soldiers have been demonstrating practical and tactical brilliance,



Above: Ukrainian President Volodymyr Zelenskyy, at the Vilnius Summit, shaking hands with NATO Secretary General Jens Stoltenberg, July 12, 2023. Photo by NATO

outthinking and outmanoeuvring their opponents as well as finding creative and innovative ways of leveraging technology. The ability of the Ukrainian Armed Forces to integrate new weaponry and technology in their operational procedures has been unparalleled. Their ability to innovate has been a big contributor to their success. Not only have the Ukrainian Armed Forces been making use of their limited resources in brilliant, creative and innovative ways, but they have also integrated AI in areas such as command and control, counter-insurgency and offensive strategies. It has allowed them to plan and execute targeted attacks with surgical precision, minimizing the risk to civilians and reducing collateral damage.

Technology has proven important, but its application is changing. The successful use of modified weapons has highlighted the value of initiative and creative problem solving by soldiers at the tactical level. For example, Ukrainian forces have been converting commercial drones to carry grenades for kinetic strikes, which have proven dramatically effective. Additionally, reports indicate that Ukrainian Forces have modified a variety of common grenades for air delivery as well as converted grenades

into bombs by adding attachments, including 3D-printed fins and other parts.

The Ukrainians are also harnessing the potential of AI to create a truly networked battlefield in which data moves at the speed of light to connect not only sensors to shooters, but also the totality of deployed forces and platforms. They achieve this, for example, by using automated unit management systems such as **Delta**. This is a military information system for decision support and situational awareness — to plan operations and combat missions, coordinate between units and exchange of information on the location of enemy forces. Another example is the automation of certain control tasks, through systems such as **Nettle**, which allows the Ukrainian Armed Forces at the level of battalion, company, platoon to combine the means of reconnaissance, control, and fire damage of various units into a single information field.

Alternatively, chat bots such as **eEnemy** can be turned into useful tools. eEnemy collects all reports about the movement of Russian occupiers and enemy equipment and quickly transfers them to Ukrainian units so they can track the invaders and strike their positions as effectively as possible. The software **Kropyva** allows commanders to enter target coordinates into a tablet, and then the direction of firing and the distance to the target are calculated automatically. Reminiscent of an "artillery Uber,"

Below, from left: AS-90 howitzers lined up ready to fire, photo by NATO; Ukraine effectively uses AI to target Russian forces, illustration by Shutterstock; NATO instructors training Ukrainian soldiers on the use of the NLAW anti-tank guided missile system, photo by NATO.



“Time is no longer on our side. This is the fundamental change between crisis management and collective defence: it is not we, but our adversary who determines the timeline.”

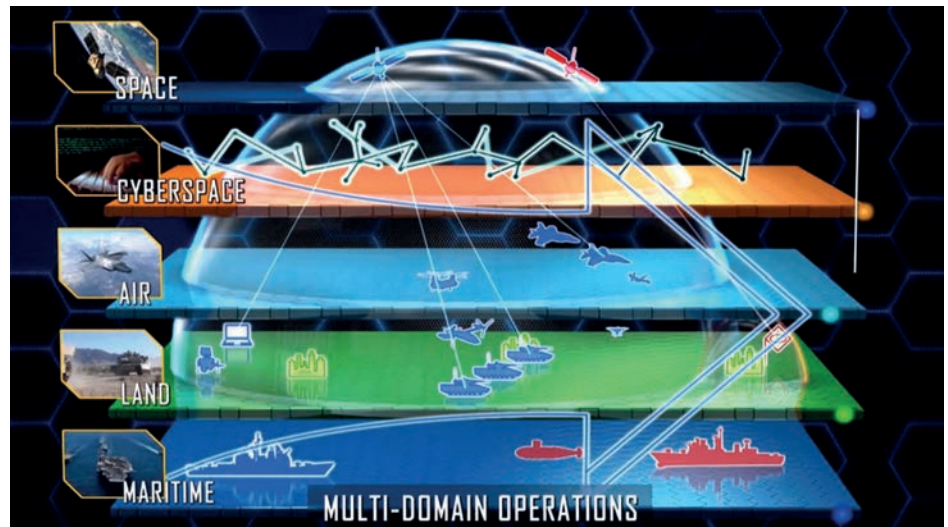
this system assigns targets to the nearest artillery battery or missile launcher.

One of the lessons that has become apparent from the war in Ukraine is the need for greater investment in existing or new capabilities to ensure command and control systems that allow for rapid assessments and reactions. Data has become a strategic resource. The combination of quick data exchanges and mission command is essential to maintaining the strategic upper hand, especially in times of conflict. This means that we need to ensure all our systems are able to connect and exchange data, but above all that our commanders, across domains, are able to access refined data to make quick and informed decisions.

Another key lesson has been scale, which has demonstrated the necessity to increase production capacity in our defence industries for capabilities and stockpiles. In the recent past, we in Europe have often focused on a limited amount of equipment with the highest possible quality, leaving aside considerations on quantities. While we must obviously keep our technological edge, we should carefully consider how to balance quantity and quality in some areas. We must strike a balance between high quantities of lower-tech weaponry and low quantities of high-tech weaponry.

The war has also demonstrated the importance of sustainable, flexible and effective logistics — from supplying frontline troops or providing medical support to rapidly repairing or modifying systems and equipment.

Military mobility remains critical to reacting to any threat and achieving operational superiority. We must seek innovative solutions to assure continuity between operational, in-service and production logistics in new scenarios, and in new ways. Finally, the diversity of equipment provided to Ukraine has also been a test of the extent and limitations of interoperability and standardization.



Graphic by U.S. Army Training Support Center

Scale, Speed, Flexibility and a Multi-Domain Approach

In order to allow for a wide range of effects to be delivered, you need scale, speed and flexibility. But for a maximum scheme of manoeuvres, you need multiple domains. Multi-domain operations orchestrate and synchronize military activities with non-military activities, across all domains and environments, to enable commanders to deliver converging effects. This requires our Alliance to re-think warfighting and warfare development in the short, medium and long term to maintain its military credibility.

Back in 2021, the NATO Military Committee tasked the two Strategic Commands to develop an initial concept for multi-domain operations that integrates Allied thinking about how forces work together at the speed and scale of modern operations. Since then, NATO has been working with Allies to consider the meaning of multi-domain operations for NATO and their implications for Allied forces. This can only be achieved through cul-

tural change and a shift in mind-set, by NATO and its Allies, moving from a traditional joint approach to one that is more widely focused across all five operational domains.

To do so, NATO will optimize its multi-domain operations by:

- leveraging experiences and current efforts through improved interconnectivity and broader collaboration;
- improving decision-making through the increased sharing, exchange, exploitation and appreciation of data;
- remaining competitive across domains;
- incorporating the cyber and space domains in all planning and activities;
- and finally by achieving seamless command and control across all domains and levels.





SCAN ME

“In order to allow for a wide range of effects to be delivered, you need scale, speed and flexibility. But for a maximum scheme of manoeuvres, you need multiple domains.”



Above from left:

British Air Force Eurofighter Typhoons; Exercise GRIFFIN SHOCK 2023; Standing NATO Maritime Group 1 during a passing exercise with USS Kearsarge and USS Arlington, photos by NATO. Artist’s illustration of cyberspace and space domains, Shutterstock.

**Collective Defence:
A Task for the Collective**

Thankfully, the NATO Warfighting Capstone Concept and the Concept for the Deterrence and Defence of the Euro-Atlantic Area provide the conceptual and operational frameworks for the Alliance’s multi-domain operations. Both concepts were developed to be complimentary and aim to ensure that the military instrument of power remains relevant and meets the requirements of the Alliance, now and in the future. The DDA through its work strands, namely the planning and force model, sets the foundation for a multi-domain architecture in peace, crisis and conflict. The NWCC offers mechanisms for the comprehensive developments required to achieve future military capabilities.

Recognizing digital transformation as fundamental to the success of multi-domain operations, NATO endorsed a Digital Transformation Implementation Strategy to underpin its ability to conduct multi-domain operations, drive interoperability across all domains, enhance situational awareness and political consultation, and employ data-driven decision-making. This will encompass three fundamental pillars — people, processes and technology — designed to align crosscutting efforts and provide a digital-ready workforce, agile and digitally enabled processes as well as advanced technological solutions.

For almost 75 years, NATO has always made sure to not only adapt to a changing security environment, but also sustain an operational advantage. In an era of multi-domain and 360-degree threats, NATO must have the capacity and capabilities to act decisively at any time, in any domain, in every geographic area.

In this new era of collective defence, leaders from the military, from industry and from academia need to work side by side to harness innovation for the good of the Alliance. Once again, collective defence is a task for the collective. The responsibility for freedom does not only fall on the shoulders of those in uniform, but requires a concerted effort from the public and private sectors.

NATO’s new DIANA (Defence Innovation Accelerator for the North Atlantic) network will concentrate on emerging and disruptive technologies that NATO has identified as priorities, including artificial intelligence, big-data processing, quantum-enabled technologies, autonomy, biotechnology, novel materials and space.

In June 2023, NATO launched the first call for proposals to develop dual-use technologies to solve problems in three areas: energy resilience, sensing and surveillance, and secure information sharing. Embracing technology can only enhance our effectiveness and make our Alliance stronger, faster and smarter.

Additionally, we will work to fully incorporate space and cyberspace capabilities and threats into our military planning and develop the ability to not only fuse information from all domains and environments, but also optimize multi-domain activity between military and non-military actors towards a unified outcome. The results of this coordinated approach across the five operational domains will further sharpen the physical, virtual and cognitive effects dimensions.

As the DDA family of plans is put into practice and the new Force Model is implemented, the Alliance is building new, enhanced training and exercises for collective defence. Our approach to multi-domain operations will continuously evolve and be tested. As important as our military plans are, they are not set in stone. They are living documents that will be updated as threats and technologies evolve.

NATO is undergoing unprecedented change at an unprecedented pace. But our resolve to protect the one billion citizens that live on Allied soil remains unwavering. Every day, we build on the strong ties between Allies and harness the centuries of military expertise that we all possess. As a defensive Alliance, NATO continues to send an unmistakable message to any potential aggressor: We are united. We are resolute. But above all, we are stronger together. ✦



Host Nation Home Guard soldier.
Photo by JWC PAO.

OUR HISTORY

20

YEARS OF

THE JOINT WARFARE CENTRE

NATO's Footprint in the North

by *Inci Kucukaksoy*
NATO International Civilian
Public Affairs Officer
NATO Joint Warfare Centre



"The Joint Warfare Centre is not the typical NATO peacetime headquarters that we associate with the Alliance. It provides a unique warfare capability that will help NATO's joint and combined warfighters meet the challenges of today and anticipate the challenges of the future."

Admiral Edmund P. Giambastiani, Jr. (Retired)
NATO's first Supreme Allied Commander Transformation
Speaking on the occasion of the Joint Warfare Centre's activation in Stavanger, Norway,
October 23, 2003

ON OCTOBER 23, 2003, the Norwegian Minister of Defence, NATO's first Supreme Allied Commander Transformation (SACT), the Supreme Allied Commander Europe (SACEUR), and military representatives across the Alliance arrived in Stavanger to celebrate the activation of NATO's new training establishment: the Joint Warfare Centre (JWC). "This is the new NATO that we will need in the 21st century," declared Admiral Edmund P. Giambastiani, Jr. (Retired), the first SACT. "Keeping our focus on delivering products today, not years from now, is exactly why the activation of the Joint Warfare Centre is so important for NATO. Let the spirit of innovation become a new northern light for our Alliance here in Stavanger." Lieutenant General Thorstein Skiaker (Retired), who previously led NATO Kosovo Force 5 (KFOR 5), was appointed as the first Director of the JWC.



Introduction

The terrorist attacks against the United States on September 11, 2001, changed the world forever: Within less than 24 hours of the attack, NATO invoked Article 5 of the Washington Treaty for the first time. "Transformation" was the key word at the Prague Summit in 2002, providing the foundation for one of the biggest changes in NATO's command and control structures. The aim was to become "leaner, more efficient, effective and deployable." NATO leaders agreed to create a NATO Response Force (NRF), saying that this "tech-

nologically advanced, flexible, deployable, interoperable and sustainable force including land, sea, and air elements ready to move quickly to wherever needed" would be the main catalyst for transforming the Alliance's military capabilities.

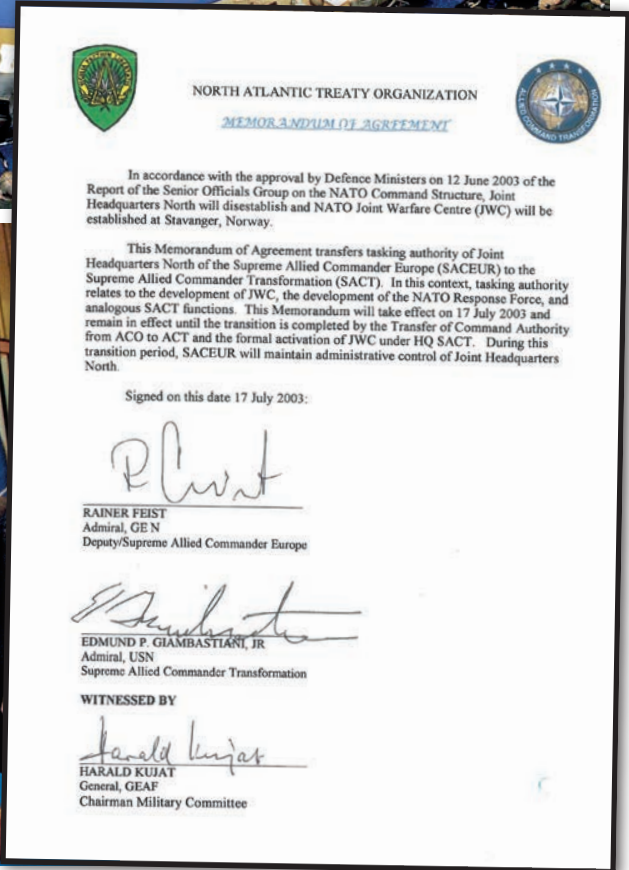
Soon after, Allied Command Europe (ACE) and Allied Command Atlantic (ACLANT), which were both established at the onset of the 1950s, were deactivated. Replacing them were the two new strategic commands, which reflected the fundamental

This is a new version of an article published in the JWC's "History Book 2022." It was amended both for clarity and to reflect changes since October 2022. The articles in this section include previously published photographs.





2003



Above, clockwise: The Tribute in Light memorial in New York City, photo by Denise Gould; the opening session of the 2002 Prague Summit, photo by NATO; the Transfer of Tasking Authority and the signature ceremony of the Transfer of Tasking Authority from SACEUR to SACT on July 17, 2003, with Admiral Giambastiani Jr.; General Harald Kujat (Retired), centre, the former Chairman of the NATO Military Committee, and Admiral Rainer Feist (1945–2007), then Deputy Supreme Allied Commander Europe, photo by Alf Ove Hansen. **Left:** The JWC's activation ceremony, from back to front, General Sir Jack Devereil (Retired), former Commander Allied Forces North; General James Jones (Retired), former SACEUR; Kristin Krohn Devold, the then Norwegian Minister of Defence; Admiral Giambastiani, Jr. and Lieutenant General Thorstein Skiaker. Photo by JWC PAO

shift in NATO: Allied Command Operations (ACO) would be responsible for all military operations, while Allied Command Transformation (ACT) would be responsible for leading continuous transformation.

On June 19, 2003, the Headquarters Supreme Allied Commander Transformation (HQ SACT) was established with Admiral Edmund P. Giambastiani, Jr. (Retired) appointed as the first SACT. Under HQ SACT, NATO stood up three subordinate centres (commonly known as the "Triple J"):

- The JWC in Stavanger, Norway
- The Joint Force Training Centre (JFTC) in Bydgoszcz, Poland
- The Joint Analysis and Lessons Learned Centre (JALLC) in Lisbon, Portugal

During this time, the JFTC and the JALLC were subordinate to the JWC and all three were directly associated with two of the five NATO transformational processes provided in the NATO Military Committee document MC 324/1, dated May 16, 2003. These were:

(1) training and education, (2) joint and combined concept development, experimentation, assessment, and doctrine. With the addition of the lessons learned, the Triple J had a highly significant role to play in supporting NATO's military transformation.

The Early Years

The sense of innovation and great achievements, so aptly expressed by Admiral Giambastiani, Jr. on the JWC's establishment, accompanied the organization in the following two decades.





Above, clockwise: The JWC is the third NATO establishment to inhabit Mount Jättå in Stavanger, succeeding Headquarters North (1994–2000) and Joint Headquarters North (2000–2003); Lieutenant General Thorstein Skiaker (Retired), the JWC's first Director; a bird's-eye view of the JWC's Ulnes interim training facility; the late Major General James Short (1950–2022), who served first as the JWC Chief of Staff and, subsequently, as the Director. Photos by JWC PAO

The JWC's original mission was focused on (1) planning and executing the mission rehearsal training for NATO's operational-level commanders and staff before their deployment to Afghanistan as part of the International Security Assistance Force (ISAF), and (2) training the Alliance's newly established, highly ready and joint multinational force, NRF. The JWC was also tasked with advancing military transformation through experimentation, doctrine development, and lessons learned.

A former Norwegian naval hub in Ulnes, approximately 15 kilometres north of Jättå, was chosen to provide the interim location for the JWC's exercises and training events.

The JWC's first exercise took place in February 2004 for the NRF, with Allied Forces Southern Europe (AFSOUTH) based in Naples, Italy, as its first training audience. The vignette-driven exercise, dubbed Operation STAVANGER, was followed by ALLIED ACTION 2004. This was the first NRF certification exercise, which tested the activation of NATO's first Deployable Joint Task Force Headquarters (DJTF HQ) concept. The exercise was based on a fictitious scenario called JEWELLERY — the first of many developed by the JWC in the years to come.

NATO established ISAF at the request of the Afghan authorities in 2001. Under the

UN mandate, the purpose of ISAF was to contribute to the reconstruction and development of Afghanistan. It lasted from August 2003 to December 2014 and aimed to "develop new Afghan security forces and enable Afghan authorities to provide effective security across the country in order to create an environment conducive to the functioning of democratic institutions and the establishment of the rule of law."

The JWC's first ISAF mission rehearsal training was conducted in June 2004 for ISAF VI, led by Eurocorps. To replicate a realistic exercise environment, the training was supported by near real-time operational information and data collected from the ISAF Headquarters in





Above: The signing of the Memorandum of Agreement with Norway, June 21, 2006: Anne-Grete Strøm-Erichsen, the then Norwegian Minister of Defence, and the late Air Marshal Peter B. Walker CB CBE (1949–2015), the former Director of the JWC. Photo by Per Arne Juvang

Kabul, Afghanistan, a few weeks prior to the training event.

On June 28, 2004, NATO heads of state and government agreed to support a request from the Iraqi Interim Government to help train Iraqi security forces in accordance with UN Resolution 1546. By August 2004, the initial NATO Training Implementation Mission Advance Party, which also included personnel

from the JWC, arrived in Baghdad, Iraq. Soon thereafter, the mission was renamed the NATO Training Mission-Iraq (NTM-I) and placed under the umbrella of the Multinational Security Transition Command-Iraq (MNSTC-I). In November 2004, the JWC hosted the first iteration of the Iraqi Key Leader Training (IKLT) for senior members of the Iraqi Ministry of Defence and Iraqi Ministry of the Interior, which served

as a pilot project for the follow-on training held in March 2005.

In 2005, the JWC started planning for NATO's STEADFAST series of exercises. The fictitious ZORAN SEA CRISIS scenario was developed, providing a comprehensive background for all three STEADFAST exercises conducted in 2006. This same year, at the 2006 Riga Summit, the NRF was declared fully operational and the JWC also achieved its full operational capability.

On June 21, 2006, the JWC reached another milestone by signing a new memorandum of agreement with its host nation partners. With this ceremony, the Joint Headquarters North was officially disestablished.

Throughout the early part of the decade, the JWC's exercise and simulation architecture continued to evolve: By 2008, the JWC programme of work encompassed three major NRF certification exercises per year within the bounds of the STEADFAST series — one exercise for each joint force command, in addition to the biannual ISAF pre-deployment training events. The JWC launched a new training scenario in 2008: CERASIA, a NATO out-of-area scenario, which allowed training audiences to exercise crisis management operations and a comprehensive approach.

In 2009, NATO restructured ISAF to face up to the expansion of military operations

Below and right: ISAF mission rehearsal training event at the JWC's Ulsnes Interim Training Facility: the arriving ISAF training audience greeted by the former JWC Chief of Staff, Brigadier General Philip Ruhlman (Retired), at Sola Military Airport, February 11, 2006. Photos by JWC PAO





to the whole of Afghanistan. NATO's new combatant command, named Headquarters ISAF Joint Command, would be responsible for executing the full spectrum of tactical operations throughout the country. The JWC expanded its training model accordingly, which resulted in its first in-theatre exercise in Kabul in October 2009. The next year, the JWC started conducting the Individual Augmentee Pre-Deployment Training (IAPDT) for those who were unable to attend the ISAF mission rehearsal training.

The JWC's programme of work in the early years also included the ENABLER experimentation series, designed and hosted by the JWC from 2007 to 2009.

In the period between 2004 and 2012, the JWC hosted all exercises and training events at Ulsnes. However, the facility infrastructure and equipment needed modernization, which necessitated two major capability uplifts, one in 2006 and another in 2009. Under the leadership of HQ SACT, the JWC had started to develop a capability package for a new training facility as early as 2004. Built on 13,390 square metres of land and funded by NATO, the five-storey building was a milestone for the JWC: it cost almost 100 million euros and was equipped with cutting-edge automated information systems infrastructure and virtualization technology. The foundation stone for the new training facility was laid on October 23, 2008.

On October 19, 2011, the JWC concluded its final Iraqi Key Leader Training course. In total, 256 Iraqi key leaders participated in the training programme, which involved mentoring and assisting the Iraqi security forces in defence institution building, training and education. Through this course, the JWC was a key part of the international effort to help Iraq establish effective and accountable security forces.



Left, clockwise: The JWC's training audience during ISAF training event, March 29, 2010; CAX operators during Exercise STEADFAST JOIST 2008; a lecture during an Iraqi Key Leader Training Event; Lieutenant General Wolfgang Korte (Retired), the then Commander JWC, addressing the Iraqi security forces, February 24, 2010. Photos by JWC PAO
Right, clockwise: The construction of the JWC's training facility, October 26, 2007. Photo by Hugo Bergsaker; a bird's-eye view of the JWC premises in 2015; the road to the JWC's training facility; Norway's Minister of Defence at the time, Anne-Grete Strøm-Erichsen, presiding over the foundation stone laying ceremony on October 23, 2008. Photos by JWC PAO

2007





Above and right: His Majesty King Harald V of Norway visited the JWC during NATO Exercise STEADFAST JOIST 2012 and was welcomed by Major General Jean-Fred Berger (Retired), the then Commander JWC; the Exercise Control during Exercise STEADFAST JOIST 2012. Photos by JWC PAO

NATO's Only Establishment Named After Modern Warfare

On May 14, 2012, His Majesty King Harald V of Norway paid a visit to the JWC during STEADFAST JOIST 2012, the very first exercise held at the Centre's new training facility. That same year, the JWC initiated an extensive interdisciplinary mission analysis. A process dubbed "2014 and Beyond" focused on the Centre's future strategic direction and how it could retool to best support NATO, managing escalating expectations on exercises.

A prominent fixture of the JWC's mission was its work on advancing warfare through doctrine, experimentation and les-

sons learned; the JWC was NATO's only "warfare centre" focusing on operationalizing warfare development. In April 2013, the JWC held the very first NATO-wide Warfare Development Conference. The aim was to explore how NATO and partner nations could improve and disseminate doctrine development throughout the Alliance. During this time, HQ SACT assumed the overall responsibility for all exercises, collective training, and military education from SHAPE.

In 2012, the SKOLKAN scenario was exercised for the first time during the JWC-directed STEADFAST JUNCTURE 2012. Developed by the JWC over a period of two years, SKOLKAN marked a revolutionary change to

the way NATO conducted exercises. The first version of the scenario was aimed at testing an Article-5 operation in the Baltic Sea region, involving both fictitious countries and real NATO nations. Meanwhile, two groundbreaking programmes, namely the Smart Defence Initiative and the Connected Forces Initiative (CFI), were introduced to achieve the "NATO Forces 2020" goal, which highlighted, amongst other things, the shift to smaller, more agile forces and their interoperability. The JWC contributed to the CFI through large-scale NRF exercises as the Alliance continued its transition from a heavy military footprint in Afghanistan to a renewed focus on collective defence and military mobility.

Below and right: The JWC's SKOLKAN scenario team; Lieutenant General Erhard Buehler (Retired) (middle), the then JWC Commander, the former SACEUR, General Philip Breedlove (Retired) (right), and a JWC staff member discussing the JWC's Opposing Forces (OPFOR) capability, June 19, 2014. Photos by JWC PAO





well as a series of defensive exercises focusing on collective defence and crisis management. In line with its focus on mobility, NATO created the Very High Readiness Joint Task Force for the NRF, rendering several thousand rotating troops ready to deploy on short notice, particularly within Europe.

In October 2013, the JWC started planning for the command post exercise (CPX) portion of TRIDENT JUNCTURE 2015, which involved two phases, the CPX and the live exercise (LIVEX). Based on the JWC's new non-Article 5 training scenario, SOROTAN, the CPX was designed to address some of the most important security challenges of modern warfare, including hybrid threats, combining both military and non-military aspects, such as disinformation and cyber attacks. The exercise involved more than 4,000 military and civilian personnel for the CPX and more than 36,000 for the LIVEX.

Below: Major General Reinhard Wolski (Retired), then JWC Commander, welcomed NATO Secretary General Jens Stoltenberg to the JWC during Exercise TRIDENT JUNCTURE 2015 on October 12, 2015. Photo by JWC PAO



Above, from top: The JWC staff participating in an ISAF mission rehearsal training event at Grafenwoehr Training Area, Germany, December 8, 2012; the Joint Multinational Simulation Centre, which hosted the joint U.S.-led UNIFIED ENDEAVOR and JWC-directed ISAF training events. Photos by JWC PAO

On June 13, 2014, the JWC concluded its decade-long pre-deployment training for ISAF. At its height, the ISAF mission oversaw more than 130,000 troops from 51 NATO member and partner nations. To date, ISAF remains the biggest coalition in NATO's history, which the JWC supported both through its mission rehearsal training events and, in later years, by co-directing four-tier UNIFIED ENDEAVOR/ISAF training events with its U.S. training partners.

Russia's illegal annexation of Ukraine's sovereign territory on March 18, 2014, fundamentally challenged the vision of a Europe whole, free and at peace, violating international law, treaties and norms as reflected in Secretary General Jens Stoltenberg's 2014 Annual Report. To address the Russian aggression, NATO laid out its new Readiness Action Plan at the 2014 Wales Summit, which included the "Assurance Measures" comprising a series of land, sea and air activities in Central and Eastern Europe, as





From top: NATO Exercises TRIDENT JUNCTURE 2015 CPX, TRIDENT JAGUAR 2015, TRIDENT JAVELIN 2017. Photos by JWC PAO



2018



Above: Major General Andrzej Reudowicz (Retired), the former JWC Commander, speaking during the command post exercise portion of NATO Exercise TRIDENT JUNCTURE 2018. Photo by JWC PAO

During this time, the Centre implemented a new trial organization based upon delivery and support structures. The aim of the new matrix organization was to realign the JWC's structure with its dynamic training programme, making it possible to plan more than four exercises per year. Worth noting as a distinguishing feature is that the JWC initiated its One Team programme in 2013, which would be the first human capital initiative within NATO focused on empowering its staff. The project manager said the programme aimed to "capture and baseline our organization's personality, understand the process of culture-shaping, to acknowledge and nurture the organization traits that are great so that we can purposefully select and shape the ones that might be holding us back from even higher levels of performance."

TRIDENT JAVELIN 2017, which was the first CPX in many years where the majority of the NATO Command Structure trained together in a complex Article-5 major joint operation-plus scenario, encompassed high-intensity warfare against a realistic peer competitor across all domains and in contested environments.

The JWC celebrated its 15th anniversary in Stavanger in 2018. NATO's highlight of the year was the LIVEX/CPX TRIDENT JUNCTURE 2018 — then recognized as the Alliance's biggest exercise in recent years. The LIVEX part involved more than 50,000 mili-

tary and civilian personnel from 31 NATO and partner countries, in addition to the 250 aircraft, 65 vessels, and up to 10,000 vehicles both in Norway and in the neighbouring areas of the North Atlantic and the Baltic Sea. Directed by the JWC, the CPX part of TRIDENT JUNCTURE 2018 took place from November 14 to 22 at nine different exercise locations throughout Europe, including Italy, Norway, Belgium,

Germany, and on board the Italian ship Etna. Close to 3,500 military and civilian personnel participated in the CPX to train and certify Allied Joint Force Command Naples to assume the operational command of the NRF in 2019.

Managing 360-degree Exercise Delivery

Defensive in nature, NATO exercises focus on collective defence and deterrence, improved interoperability, and higher state of readiness around the 360-degree approach to security. To be fit for purpose, it is necessary to continue to study today's volatile and increasingly complex geostrategic environment and be prepared through capability development, experimentation, doctrine and exercises, lessons learned and analysis. The exercises directed by the JWC as well as warfare development activities continue to offer unique opportunities to make NATO better by making the Alliance forces more ready and more interoperable.

In 2019, the JWC conducted one of NATO's largest and most complex CAX/CPXs until then: TRIDENT JUPITER 2019-1. This exercise ran from November 4 to 14 at ten locations across Europe, including aboard the USS Mount Whitney and the Spanish ship Castilla. More than 3,000 civilian and military

Below: The JWC EXCON Forward team during NATO Exercise TRIDENT JUPITER 2019-1. Photo by USS Mount Whitney





From top: Vice Admiral Jan C. Kaack, the former Commander JWC, during Exercise STEADFAST JACKAL 2019; a lecture during the JWC's One Team programme in 2019, photos by JWC PAO; NATO Military Committee at the JWC, March 3, 2020. Photo by Tommy Ellingsen



2020

personnel participated in the exercise to test and evaluate the land, maritime, air, and special operations component commands of NRF20. The exercise successfully demonstrated the Alliance's deterrence and defence capabilities as well as the Allies' shared commitment to the security of Europe.

During this time, the JWC continued with its professional development and organizational culture programmes and developed a powerful vision that will lead it into the future. On February 11, 2020, less than a month before the NATO Military Committee's annual visit to ACT, which was hosted by the JWC, the Centre's current vision was launched:

"The Joint Warfare Centre drives the delivery of collective training and warfare development at the operational and strategic levels of warfare. We are NATO's trusted advisor bridging 'Operations' and 'Transformation,' underpinning NATO readiness and future capability development. The Joint Warfare Centre attracts and develops the most capable staff, both permanent and augmented, based on a reputation for excellence built on a culture of professionalism, curiosity, innovation and cooperation."

As part of this vision, today's Continuous Improvement Programme (then named Vision 2025) aims to institutionalize an organizational culture committed to change. The programme is designed to allow the staff to develop short- and long-term goals based on the JWC's four project lines: Collective Training and Exercises, Warfare Development, Organization, and Professional Development. Activities include an annual survey, which provides an opportunity for all staff to contribute to the future development of the Centre.



Above: The JWC staff developing the Centre's wargaming design capability, October 22, 2020. Photo by JWC PAO

The year 2020 would be very unusual, full of unexpected events and challenges. The COVID-19 pandemic had a major impact on military exercises due to public health measures, serious restrictions on travel, and mandatory quarantine. Consequently, in 2020, many NATO exercises were changed, reduced in size, or cancelled. The crisis helped harness the community aspect of the Centre's One Team as well as online collaboration, both internally and externally.

Despite the shift to remote working, including online conferencing and meetings, the JWC maintained business continuity, introduced new capabilities to better serve NATO, and continued to maintain excellent relations

with local authorities throughout the pandemic. In April 2020, the JWC announced the establishment of a new position within its organizational structure: the Command Senior Enlisted Leader (CSEL), to serve as the Commander's principal advisor on matters affecting the Centre's non-commissioned officers (NCOs) and to lead NCO professional development programmes at the JWC.

Although the year was defined by many fundamental changes stimulated by the pandemic, the Centre continued to innovate and extend the scope of its training enterprise. The execution phase of the JWC's new wargaming design capability was initiated in June. The aim was to complement the JWC's large-scale CPXs by expanding on the wide spectrum of political, military, economic, social, infrastructure, information variables, and sharpening decision-making skills.

In June 2020, the NATO Secretary General Jens Stoltenberg initiated NATO 2030 to ensure that the Alliance would remain strong militarily and become even stronger politically. The JWC concluded the year with Exercise STEADFAST JUPITER-JACKAL 2020, NATO's largest CPX that year and a resounding success despite the challenges brought on by the global pandemic. Executed in the form of a battle staff exercise based on the JWC's then new scenario FIKSO, it provided unique training opportunities for NRF21.



Left: The JWC's former and current Command Senior Enlisted Leaders (from left) Senior Chief Petty Officer Lars Raabe (April 2020–June 2022) and Senior Chief Warrant Officer Andrzej Woltmann (August 2022–present)





Above, clockwise: NATO Exercise STEADFAST JUPITER-JACKAL 2020 after-action review; the execution phase of the WISE AEGIS wargame; a meeting of the JWC's Advisory Team during NATO Exercise STEADFAST DEFENDER 2021 (STDE21) in Germany; a close-up of the SHAPE insignia during STDE21. Photos by JWC PAO

In early 2021, the JWC's new initiative gained momentum: the Joint Operations Planning Group (JOPG) Leader's Workshop, which focused on increasing the effectiveness of exercise planners before they conduct crisis response planning. The Centre conducted its first iteration of the JOPG Leaders Workshop in February 2021. Of note, each JWC-directed exercise requires a long planning period of 18 to 20 months. The planning of an exercise is arguably the most crucial phase in any exercise involving all stakeholders: the higher headquarters, the certifying headquarters, the training headquarters, various supporting organizations and trusted agents. It is a highly complex, cooperative effort that ensures the success of the execution phase. Between February 2021 and May 2023, the workshop

involved 13 different headquarters in NATO, training approximately 300 military planners.

Also in February 2021, the JWC achieved initial operational capability status in wargame design, following a matrix-style pilot wargame played out with the Civil-Military Cooperation Centre of Excellence, focusing on the impact of operational-level civil-military interaction on national resilience involving political, civilian and military stakeholders in a whole-of-government approach.

In May, following a 19-month planning phase, the JWC conducted the CPX portion of Exercise STEADFAST DEFENDER 2021. The exercise provided an invaluable opportunity for NATO's new Joint Support and Enabling Command (JSEC) to test the military mobility of 15,000 simulated troops and their sustain-

ment across Europe, paving the way for the JSEC's full operational capability.

At NATO Brussels Summit on June 14, 2021, the Alliance agreed on the NATO 2030 agenda, which also announced the provision of a new Strategic Concept: NATO's roadmap for the coming decade. On October 8, 2021, the JWC's current Commander, Polish Army Major General Piotr Malinowski, assumed command of the Centre. Soon after, he served as the Officer Directing the Exercise (ODE) for NATO's largest command post exercise that year: STEADFAST JUPITER 2021. The exercise involved the strategic, operational, and tactical levels to address the challenges of deterrence, from hybrid threats to real combat capabilities in a major joint operation, involving approximately 5,000 participants.





Above, clockwise: NATO Exercise STEADFAST JUPITER 2021 training audience at the JWC's In-Rock Facility in Stavanger and at Allied Joint Force Command (JFC) Brunssum during a simulated media interview with the former Commander of JFC Brunssum, General Jörg Vollmer (Retired), photos by Headquarters Rapid Reaction Corps-France and JWC PAO; the JWC's Advisory Team during NATO Exercise STEADFAST JACKAL 2021 in Italy, photo by JWC PAO

As the year drew to a close, the JWC also conducted STEADFAST JACKAL 2021. The non-Article 5 exercise focused on security challenges including destabilization, terrorism, migration and environmental issues.

A More Competitive World

On February 24, 2022, Russia attacked Ukraine with air and missile attacks, tanks, special forces, and with a campaign of lies and disinformation. "Peace in our continent has been shattered. We now have war in Europe, on a scale and of a type we thought belong to history," said NATO Secretary General Jens Stoltenberg, following an extraordinary meeting of the North Atlantic Council on the same day.

Even greater focus on collective defence

was now called for; NATO activated high-readiness elements of the NRF for the first time in a deterrence and defence role, which aimed at reinforcing the eastern flank of the Alliance. Marching on NATO's military instrument of power at the right pace became the priority of General Philippe Lavigne, SACT.

The SACT underlined that for the military instrument of power to be effective, it needed to "comprise the right capabilities (means to fight), right strategies and doctrines (ways to fight), and the fighting spirit." With the return of war in Europe, initiatives such as the Concept for the Deterrence and Defence of the Euro-Atlantic Area, the NATO Warfighting Capstone Concept, and the Warfare Development Agenda altogether marked NATO's forward-looking vision.



President Zelenskyy participating in NATO's Madrid Summit, June 29, 2022. Photo by NATO





Above and right: Colonel Fide Schoenrade (middle), the JWC's Deputy Chief of Staff for Support, pose in front of the construction site of the Centre's new G-Block building with Base Support staff; the re-opening of the JWC's In-Rock Facility: Norwegian State Secretary Mr Bent-Joachim Bentzen presents Major General Piotr Malinowski, Commander JWC, with a plaque. Photos by JWC PAO

At the Madrid Summit, June 29–30, 2022, NATO adopted its first new Strategic Concept in a decade, which underlined that "the Euro-Atlantic area is not at peace. Strategic competition, pervasive instability and recurrent shocks define our broader security environment." NATO's strategic environment included new focus areas such as emerging and disruptive technologies and climate change to highlight the changing security environment.

Today, NATO's military transformation is powered by the successful implementation of the concept of multi-domain operations. Here

the JWC has a role to play in transitioning to a multi-domain NATO: the Centre's training architecture, coupled with its warfare development enterprise, makes it a key venue for developing joint warfare in multiple domains. Additionally, the Centre is key in developing new ways of training and education to include wargaming and capability integration, such as operationalizing cyberspace and resilience. With wargaming, operational since May 2022, the JWC delivers a highly responsive and low-cost alternative to large-scale exercises and "helps provide a cognitive foundation upon

which to guide future training," as explained by the JWC's Wargaming Branch. The JWC developed and delivered its first large-scale wargame in November 2022 in support of the annual logistics-themed wargaming exercise "Joint European Time-Phased Force Flow Deployment and Sustainment Series," also known as JETS 3.0.

Another landmark exercise for the JWC was STEADFAST JUPITER 2022. With this exercise, the JWC directed its first tactical-level Article-5 CAX/CPX. It trained and evaluated 1 German-Netherlands Corps (1GNC) for

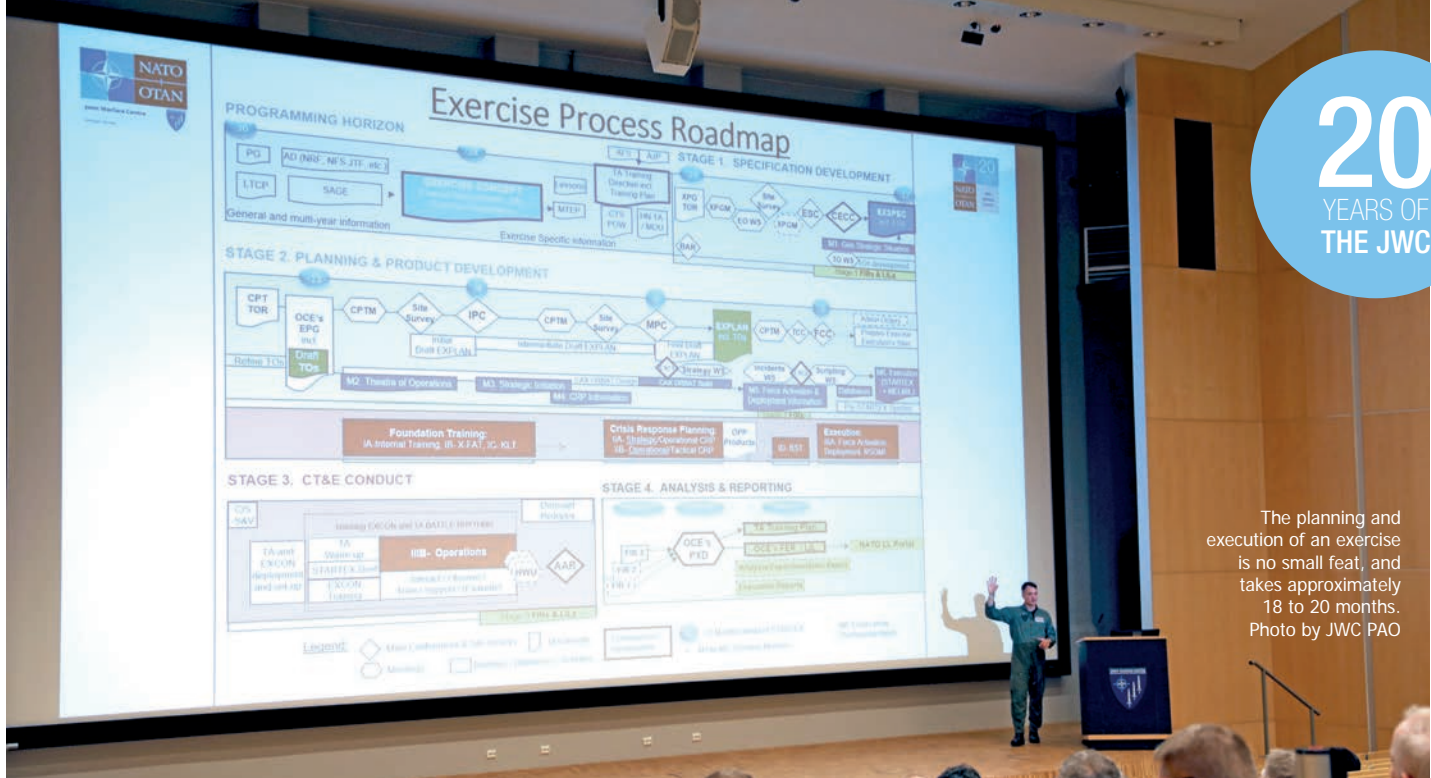


NATO Exercise STEADFAST JUPITER 2022. Photos by JWC PAO





The planning and execution of an exercise is no small feat, and takes approximately 18 to 20 months. Photo by JWC PAO



NRF23, and also involved a separate vignette-based exercise for SHAPE at the strategic level, and a battle staff training for JFC Naples at the operational level. The exercise was followed in December by STEADFAST JACKAL 2022, exercising a non-Article 5 small joint operation at the operational and tactical levels.

So how does NATO train for the new era of collective defence? The answer is undoubtedly STEADFAST JUPITER 2023 — NATO's largest and most complex CAX/CPX to date, for which the planning started as early as November 2021, involving 24 training audiences, in-

cluding SHAPE as a warfighting headquarters. Guided by NATO's Concept for Deterrence and Defence of the Euro-Atlantic Area (DDA), the exercise, set to take place in the autumn of 2023, is designed to strengthen the high-intensity warfighting skill sets of the NATO Command and Force Structure headquarters in a multi-domain, multi-joint operational area scenario. As NATO's first DDA-aligned exercise, STEADFAST JUPITER 2023 will be a strong landmark of the Alliance's vision, capabilities and resolve, ensuring that NATO forces remain fit for purpose well into the future.

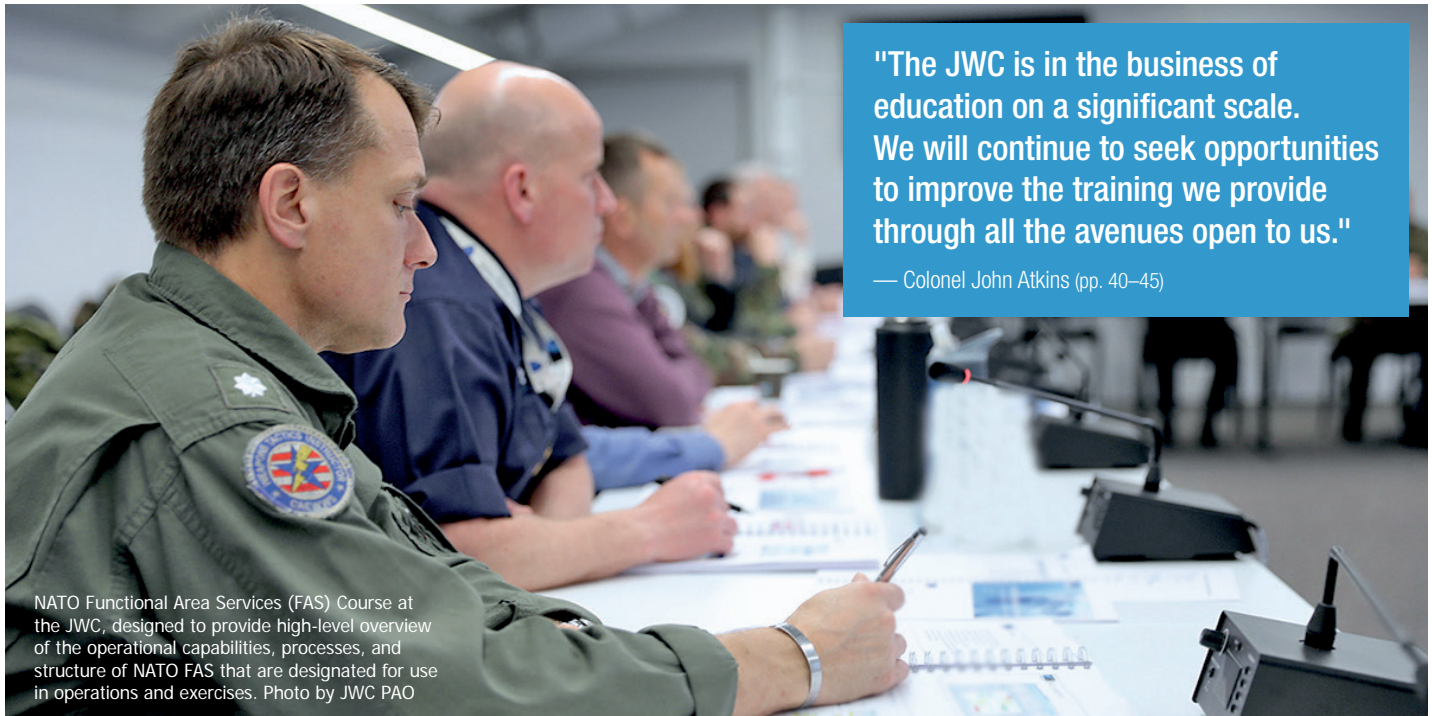
A Proud Heritage

The JWC is NATO's footprint in the Northern European region, which includes Scandinavia, the North Sea and the Baltic. The Centre's motto "Training NATO. Advancing Doctrine. Integrating Concepts" reflects its mission and warfare development capacity, which is unparalleled in NATO. The JWC's collective operational-level training has extended to include both the strategic level and, recently, the tactical level, adding a new dimension to the complexity of the exercises the JWC delivers.



The Main Events List/Main Incidents List (MEL/MIL) Scripting Workshop for NATO Exercise STEADFAST JUPITER 2023. Photo by JWC PAO





"The JWC is in the business of education on a significant scale. We will continue to seek opportunities to improve the training we provide through all the avenues open to us."

— Colonel John Atkins (pp. 40–45)

NATO Functional Area Services (FAS) Course at the JWC, designed to provide high-level overview of the operational capabilities, processes, and structure of NATO FAS that are designated for use in operations and exercises. Photo by JWC PAO

After 20 years, "the jewel in the crown of Allied Command Transformation," as described by the first SACT during a press conference following its activation, the JWC remains one of the most groundbreaking organizations within NATO, and a key contributor to its 360-degree readiness at the operational and strategic levels of warfare. The JWC's mission covers three interconnected areas:

1. Through collective training and exercises, the JWC contributes to the overall warfighting readiness of the NATO Command and Force Structures headquarters.
2. Through adherence to NATO joint operational doctrine and standards, capability integration and the delivery of the lessons learned process, the JWC contributes to NATO's Warfare Development Agenda.
3. Through its widespread cross-organizational cooperation, the JWC engages with various NATO commands on both sides of the Atlantic, national training and command organizations, governmental and non-governmental organizations, as well as regional security organizations and partners, contributing to NATO's interoperability and partnerships.

The Next Generation

The JWC was born amidst big changes and innovations in NATO: The NRF had just been announced at the Prague Summit in 2002, and the next year, NATO would take over command of ISAF in Afghanistan, marking its first mission beyond the Euro-Atlantic area. The JWC was a unique concept then, as it is today, although the world now is very different.

Looking back on how it all began, it is

hard to think of the JWC without the NRF. It is striking that the year the JWC celebrates its 20th anniversary, the NRF is in the process of transitioning to the Allied Reaction Force (ARF) — "a new, more mobile and multi-domain multinational reaction force in support of all three core tasks," as stated in the Secretary General Annual Report 2022, "bolstering responsiveness, readiness and combat power."



Joint Operations Planning Group train-the-trainer course for the JWC staff, August 25, 2023. Photo by JWC PAO



CRITICAL ENABLERS FOR NATO'S MILITARY INSTRUMENT OF POWER: Based on the NATO Warfighting Capstone Concept (NWCC), data, technology, agility, people, preparation and integration, together help to succeed in the multi-domain environment of 2040. The JWC is uniquely positioned to advance and operationalize NWCC through exercises, warfare development and an innovative organizational culture programme dedicated to human capital enhancement.



DATA

Improving the handling of data and advanced analytics within the military-strategic decision-making processes and ensuring data quality and the integrity and coherence of information flows.



TECHNOLOGY

Maintaining a technology advantage that is geared towards more effective capture of emerging and disruptive technologies to support warfighting and ensuring defensive capacity against the use of these technologies by other actors.



AGILITY

Placing agility at the centre of NATO's warfare development as the rate of commercial-led technological innovation and changes in the security environment accelerates. Allies must continue to adapt their capability development processes to allow more agile development, timely delivery and adaptation of military capabilities.



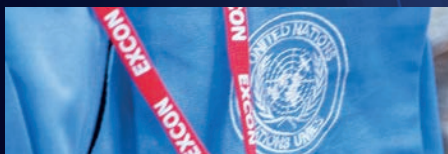
PEOPLE

Building allied recruitment, selection, training, promotion and retention systems that can deliver the right people with the right skills. NATO and Allies need leaders and staffs that are able to cope with the speed, complexity and data-centric technology of the future environment.



PREPARATION

Engraining persistent preparation within Alliance military culture to out-excel. This includes the development of demanding scenarios and practicing the development of decision-making using modelling and simulation, as well as realistic training, wargaming and experimentation.



INTEGRATION

Connecting with a broad network of partnerships, which includes partner nations, relevant international organizations, non-governmental organizations, civilian actors and industry.

Reference: HQ SACT NATO Warfighting Capstone Concept

Above: Photos by NATO, JWC PAO; illustrations by Shutterstock

In the new era of collective defence, the ARF, driven by a multi-domain approach, will be on the frontline of the JWC's mission as the Centre adapts to training the next generation of NATO's three- and four-star headquarters with its new exercise series: STEADFAST DETERRENCE, STEADFAST DUEL and STEADFAST DAGGER, as well as the STEADFAST FOXTROT wargame. Future warfighting and operating environments demand multi-domain exercises, innovation and increased collaboration between organiza-

tions. As a NATO warfare centre, the JWC is fit to respond to the requirements of the Concept for Deterrence and Defence of the Euro-Atlantic Area. However, it is not an organization that rests on its laurels.

The JWC's workforce of 261 staff members comprises NATO international civilians as well as military posts drawn from the following 17 NATO member nations: Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Romania, Türkiye, the

United Kingdom and the United States. There is a genuine sense of pride, as we look back on the JWC's 20 years, knowing that the Centre continues to offer something new and different to the Alliance every day with its One Team, who has earned the JWC such renown. We are proud as we mark our 20th anniversary in Norway, accomplishing one of the most extraordinary endeavours in NATO: bridging the missions of Supreme Allied Commander Europe and Supreme Allied Commander Transformation — the fight today and the fight tomorrow. ✦

Commanders* of the Joint Warfare Centre



**Lieutenant General
Thorstein Skiaker (Ret.)**
Norwegian Army
October 2003 – September 2004



**Major General
James Short OBE¹**
British Army
September 2004 – February 2005



**Air Marshal
Peter Walker CB CBE²**
British Air Force
February 2005 – July 2007



**Lieutenant General
Wolfgang Korte (Ret.)**
German Army
July 2007 – June 2011



**Major General
Jean-Fred Berger (Ret.)**
French Army
June 2011 – June 2013

* The official title of this position was "Director" from 2003 to 2008.

¹ Major General James Short also served as Deputy Director and Chief of Staff, respectively, in 2003. He passed away on October 16, 2022.

² Air Marshal Peter Walker passed away on September 6, 2015.



**Lieutenant General
Erhard Buehler (Ret.)**
German Army
June 2013 – September 2014



**Major General
Reinhard Wolski (Ret.)**
German Army
September 2014 – July 2016



**Major General
Andrzej Reudowicz (Ret.)**
Polish Army
July 2016 – July 2019



**Vice Admiral
Jan C. Kaack³**
German Navy
July 2019 – October 2021



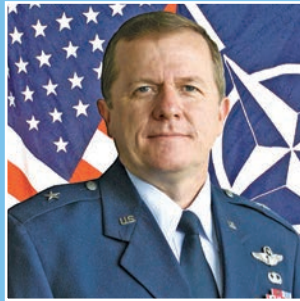
**Major General
Piotr Malinowski**
Polish Army
October 2021 – Present

³ Vice Admiral Jan C. Kaack served at the rank of Rear Admiral during his tenure at the Joint Warfare Centre.

Deputy Commanders*



Lieutenant General Stephen Mueller¹ (Ret.)
U.S. Air Force
August 2004–August 2006



Brigadier General Philip Ruhlman (Ret.)
U.S. Air Force
August 2006–August 2008



Major General Scott West² (Ret.)
U.S. Air Force
August 2008–August 2010



Brigadier General Steven DePalmer (Ret.)
U.S. Air Force
August 2010–July 2012



Brigadier General John Doucette (Ret.)
U.S. Air Force
July 2012–July 2014



Brigadier General Roger Watkins (Ret.)
U.S. Air Force
July 2014–July 2016



Rear Admiral John Skillman
U.S. Navy
August 2016–February 2018



Rear Admiral James A. Kirk
U.S. Navy
May 2018–April 2020



Brigadier General Douglas K. Clark
U.S. Marine Corps
August 2020–June 2022



Brigadier General Mark A. Cunningham
U.S. Marine Corps
August 2022–Present

* Since 2011, this position is dual-hatted as Deputy Commander and Chief of Staff.

¹ Lieutenant General Mueller served at the rank of Brigadier General.

² Major General West served at the rank of Brigadier General.

NINE THINGS TO KNOW ABOUT THE JOINT WARFARE CENTRE



01

We provide NATO's training focal point for simulated large-scale combat and multi-domain warfare at the operational and strategic levels.



02

We design, plan and execute NATO's highest-quality and most complex computer-assisted command post exercises to maintain the Alliance's readiness.



03

We actively contribute to NATO's persistent preparation and the Allied Command Transformation warfare development imperatives of layered resilience, cross-domain command, and integrated multi-domain defence to address the increased complexity in NATO collective training and exercises.



04

As NATO's trusted advisor, we are the bridge between Allied Command Operations' warfighting readiness and Allied Command Transformation's conceptual and transformational advances.



05

We maintain a continuous collaborative approach with every NATO Command and Force Structure headquarters to increase their interoperability and operational effectiveness.



06

We are the only NATO organization that can synchronize 11 core exercise functions, including an exercise control, joint and multi-domain advisors, opposing forces, simulation media and CAX. We are also NATO's only scenario generator for Article 5 and non-Article 5 exercises.



07

As the main wargaming centre in Allied Command Transformation's vision for audacious wargaming, we custom-build wargames to provide NATO with the tools to think creatively about problem solving and decision-making.



08

We provide cost-effective military accommodation and ready-to-use facilities with the capability to train up to 1,200 personnel.



09

We are the first NATO organization to initiate and sustain an organizational development and culture programme.

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Exercise TRIDENT JUPITER 2019. Photo by Bastian Koob, Eurocorps

NATO'S JOINT WARFARE CENTRE



We know our adversaries will always seek to gain advantage, so we must remain **one step ahead**. In doing so, we can remain **agile and ready to respond** with **appropriately trained capabilities**.”





Above: The JWC's CAX, media simulation and Grey Cell core exercise functions. Photos by JWC PAO

Here at the Joint Warfare Centre (JWC), exercises have always been our most visible contribution to the overall NATO mission. However, against a backdrop of frequent and significant change in warfare and geopolitics globally, little remains the same. As a consequence, the JWC is constantly working to maximize the warfare development benefits we offer to the Alliance and to ensure that what we offer is relevant and challenging.

As the JWC celebrates its 20th year, we have the opportunity to reflect on the geopolitical changes that have occurred since our formation. When the JWC was founded in the post-9/11 world, our focus was on conflict in Iraq and Afghanistan. Although the Afghanistan mission has come to an end, there is an increasing range of potential threats across the globe, including in the Far East and the Asia Pacific region, where actors continue to develop their military capabilities as a part of their multi-domain/DIME* approach to gaining greater regional and global influence. Along with other state and non-state actors in Africa and the Middle East, there is much activity "out of area," which is playing a part in the shaping of the NATO mission. However, it is the Russian annexation of Crimea in 2014 and the invasion of Ukraine in 2022 that have seen NATO refocus on its original mission.

* diplomacy, information, military, and economic

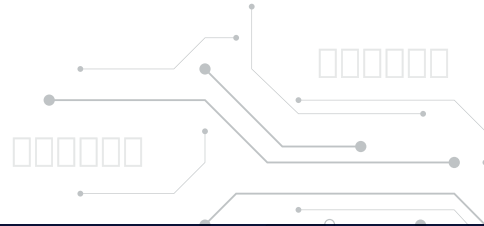
by **Colonel John Atkins**
British Army
Deputy Chief of Staff,
Exercise Training and Innovation Directorate
NATO Joint Warfare Centre

A Changing Focus for the Alliance

Whilst NATO summits in 2014 and 2016 brought about tangible change in Alliance vision, the 2022 Madrid Summit has provided the most significant refocus. The 2022 Summit acknowledged the importance of major conventional combat in addition to hybrid warfare, asymmetry, the information environment, global access to social media and many other factors.

So what for the JWC? It is imperative that exercise scenarios and scripts we write and deliver reflect the increasingly complex environment in which we are operating. In recent years, NATO has developed a 360-degree approach, which is an acknowledgement of the encompassing influence that conflict has on its surroundings and the effect the global environment has on the conflict in return.





The Incident Development Workshop for Exercise STEADFAST JUPITER 2023. Photo by JWC PAO

The Changing Force Structure

Since the JWC was established here in Norway, the strategic concept has had at its core the NATO Response Force (NRF), agreed in Prague in 2002 and in operation since 2003. Our exercises were designed around the development and support of a plan to provide forces at high readiness on a known rotational plan and able to respond to crisis management and collective defence in a short period. During the Wales Summit in 2014, it was agreed to strengthen the structure of the NRF through the development of the Very High Readiness Joint Task Force (VJTF). The VJTF employs around 40,000 cross-domain personnel at 15 days' notice to respond. It deployed for the first time in response to the Russia-Ukraine War.

The overall NRF concept has served us well, but it is not yet optimized for the anticipated future conflict environment. At last year's Madrid Summit, leaders agreed upon the new NATO Force Model. This follows on from the NRF concept and is aimed at increasing the scale and speed at which Allied forces can respond to crises.

In outline, the Allied Reaction Force (ARF) will deliver up to 100,000 cross-domain troops within 10 days; a second tier doubles those figures by 30 days and a third tier provides up to 500,000 troops within six months. The troops will be assigned to pre-formed units that have known parts to play in existing regional plans to achieve effective Allied defence.

At the JWC, our existing exercise construct allows us to facilitate collective training for select NRF elements using single stand-alone exercises. The new NATO Force Model represents a different vision. As conflict develops in a region, pre-assigned units already at high readiness and with knowledge of all aspects of the environment will be assessing and potentially adjusting existing plans. Maintenance of peace and a deterrence effect will be the focus. Tier 1 troops (our very high readiness units) will be the first to enter theatre, closely followed by Tier 2 within 30 days.

With the aim of representing such a scenario effectively for the training audience, the JWC is implementing a revised exercise frame-

“As a complete re-development of our current command post exercise aimed at Article-5 conflict, in 2024 we will deliver the first major joint exercise (MJX) for the Allied Reaction Force.”





The author, Colonel John Atkins, welcoming participants to the JWC's first Analysis Workshop, August 29, 2023. Photo by JWC PAO



AI presents an exciting opportunity for NATO

In October 2021, NATO formally adopted an Artificial Intelligence – the ability of machines to perform tasks that typically require human intelligence – Strategy.

The aim of NATO's AI Strategy is to accelerate AI adoption by enhancing key AI enablers and adapting policy, including by adopting Principles of Responsible Use for AI and by safeguarding against threats from malicious use of AI by state and non-state actors.

With the fusion of human, information, and physical elements increasingly determining decisive advantage in the battlespace, interoperability becomes all the more essential. Further, as competitors and potential adversaries invest in AI for military purposes, ensuring that Allies develop common responses to ensure their collective security will only become more urgent.

Allies and NATO commit to ensuring that the AI applications they develop and consider for deployment will be in accordance with the following six principles: lawfulness; responsibility and accountability; explainability and traceability; reliability; governability; bias mitigation.

Excerpt from "An Artificial Intelligence Strategy for NATO" by Zoe Stanley-Lockman and Edward Hunter Christie, NATO Review. Read full article at <https://www.nato.int/docu/review/articles/2021/10/25/an-artificial-intelligence-strategy-for-nato/index.html>

work. As a complete re-development of our current command post exercise (CPX) aimed at Article-5 conflict, in 2024 we will deliver the first major joint exercise (MJX) for the ARF. The new NATO Force Model will direct the deployment of our rapid reaction forces.

To simulate this, Exercises STEADFAST DETERRENCE and STEADFAST DUEL will use a single overall scenario, but this will develop over a longer period in two distinct phases, each with a distinct exercise identity. This will allow the Alliance to exercise the initial and follow-on forces in the same macro-scenario, but having presented a realistic pathway to execution for each force as a separate training audience.

Additionally, 2024 will see a revised smaller joint exercise (SJX) that will exercise the ARF concept in the form of STEADFAST DAGGER. This exercise will be in the context of a non-Article 5 out-of-area operation in response to an invitation from a host nation with a developing crisis.

All exercises will use near-real geogra-

phy with a single setting and scenarios that will be deep enough to allow the audience to grapple with the nuances of the environment. Our Scenario, Content and other branches are developing supporting storyline concepts that will provide depth and realism at the operational and strategic levels. This work has progressed at significant pace to ensure that NATO is fit for the future.

Innovation at the JWC

At the 2016 Warsaw Summit, the Alliance agreed that it would analyse, prioritize and integrate emerging technologies through innovative solutions. These technologies include, but are not limited to, artificial intelligence (AI), autonomy, human enhancement, and next-gen communications. The list is extensive and continues to grow. Once a capability is identified as either an opportunity or a threat to the Alliance, it is important that it be introduced into our collective training environment at the conceptual level.



The exercises provided by the JWC have clearly defined training objectives aimed at allowing force element certification for deployment. Finding effective ways to weave experimentation and innovation into a scenario without stalling the overall exercise process and compromising the training value for the audience has long presented challenges.

Our Transformation Delivery Division leader, Colonel Nicolas Tachon, has written an article in this publication that highlights the JWC's efforts in warfare development and includes doctrine, conceptual development and experimentation. We do not simply aim to deliver the same exercise scenario year after year; instead, we ensure that our products are focused above the horizon, that they are relevant and representative of emerging technologies.

Below, clockwise

The Opposing Forces Cell during Exercise TRIDENT JACKAL 2019; the JOPG Leaders Workshop train-the-trainer course; a computer-assisted exercise (CAX) is a type of synthetic exercise where forces are generated, moved and managed in a simulated joint environment, photos and the CAX graphic by JWC PAO; NATO's illustration of space-based early warning capability: full-scale integration of space support to operations at the operational level started with the JWC-directed exercise TRIDENT JUNCTURE 2016.

The Next 20 Years

As I write, we are developing and refining our exercise products to support the new NATO Force Model. Our 360-degree exercise setting is now becoming more realistic, and better reflects the real world. Innovation and experimentation are also vital — we know our adversaries will always seek to gain advantage, so we must remain one step ahead. In doing so, we can remain agile and ready to respond with appropriately trained capabilities.

The unpredictable nature of conflict and the environment as a whole will always be factors for us to some extent. Each challenge, whether military, political, social or otherwise, presents us with an opportunity to educate ourselves. The JWC is in the business of education on a significant scale. We will continue to seek opportunities to improve the training we provide through all the avenues open to us.

“We aim to introduce more demanding exercises with greater realism and an even more adaptive and agile-thinking adversary.”





WARFARE DEVELOPMENT IMPERATIVES (WDI)



1. COGNITIVE SUPERIORITY
2. INTEGRATED MULTI-DOMAIN DEFENCE
3. CROSS-DOMAIN COMMAND
4. LAYERED RESILIENCE
5. INFLUENCE AND POWER PROJECTION

The JWC contributes to NATO's integrated multi-domain defence, cross-domain command and layered resilience.

In the not-too-distant future, we aim to introduce more demanding exercises with greater realism and an even more adaptive and agile-thinking adversary, which will offer a broader range of challenges to the training audiences.

As we look to the future with fresh concepts such as multi-domain operations (MDO) shaping all that we do, we are duty-bound to keep ourselves appropriately informed and maintain our place as the training focal point for full-spectrum joint operational- and strategic-level warfare. Our people remain our greatest asset. We are a relatively small staff of civilians and military members, but we have representatives from 17 Allied nations within

our team and can draw on experience across all the domains. However, it is not just our own people that are critical to our success; the training audiences who engage with us throughout the exercise planning process do so with enthusiasm. We are frequently impressed by the eagerness with which they approach exercises (whether based here in Stavanger or in another location). Time and again, the professionalism our training audiences exhibit demonstrates the importance of the work that is done here.

The new NATO Force Model brings challenges for all of us within the Alliance and we look forward to embracing them together — because together, we make NATO better. ✦

WDI help organize and synchronize Alliance-wide warfare development efforts. They offer a new forward-looking multi-domain and cross-instruments of power approach to military thinking, organizing and acting.

Clockwise from above

Royal Netherlands Air Force F-35 Lightning II fighters during a training sortie on March 21, 2023; a Stryker infantry fighting vehicle from the U.S. Army's 2nd Cavalry Regiment arrives at the NATO multinational battlegroup in Poland for Exercise GRIFFIN SHOCK 2023.

Artistic illustrations of space and cyberspace domains. Exercise DYNAMIC MONGOOSE 2023 demonstrating the readiness and mobility of the maritime element of the Very High Readiness Joint Task Force. Photos by NATO

"Fire kills – As do outdated ideas."

— Marshal Ferdinand Foch

The Joint Warfare Centre's Dual Role in

TRAINING & WARFARE DEVELOPMENT

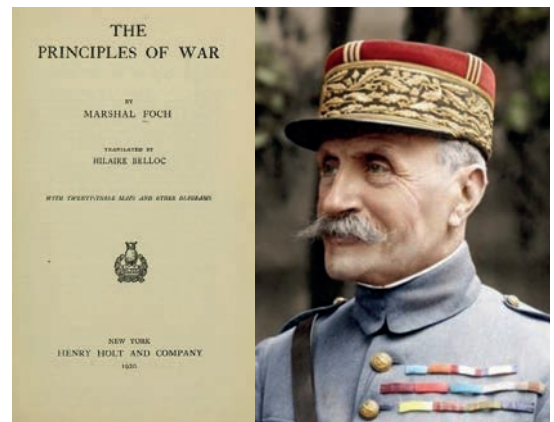
by Colonel Nicolas Tachon

French Army
Head of the Transformation Delivery Division
NATO Joint Warfare Centre

FIRE KILLS — AS DO OUTDATED IDEAS.¹ This maxim from Ferdinand Foch, who was appointed as the first "Supreme Commander of Allied Armies" on the Western front in April 1918, is one of the famous quotes from the lessons he delivered as a professor of military history, strategy and general tactics at the French War College in Paris from 1895 to 1901. Like Foch, who was highly influenced by Clausewitz, all military theorists have commented on the way armies manage the appearance of new technologies on the battlefield or new theories on the art of war — whether with reluctance or with a quick interest. Military history is filled with examples of battles, or even campaigns, that were lost because the top leadership failed to understand the potential of emerging technologies.

Below and right

The Principles of War was first published in 1906, based on Marshal Ferdinand Foch's (then Colonel) lessons delivered at the French War College, and translated into English in 1918; Marshal Ferdinand Foch.



This is illustrated, for instance, by a theorist of air operations, Giulio Douhet²: "Victory smiles to those who anticipate changes in the nature of war, not to those who wait for them to occur to start evolving."

Preparing the next likely engagement is the basic task of any military leader and organization, and it relies both on the education of individuals and the collective training of tactical units and command posts at all levels. And the organization of training is a kind of military art in itself: It exposes the trainees to the same situations as in battle and must therefore be continuously adjusted to new requirements, tools, capabilities and doctrine.

As NATO's main tool to prepare the Alliance's headquarters at the joint operational and strategic levels, the Joint Warfare Centre (JWC) cannot be content with merely replicating the same proven scheme of exercises over and over — otherwise its training audiences would keep preparing the previous war.

Consequently, the delivery of training events at the operational and strategic levels and contribution to the Alliance's warfare development are implicitly associated tasks. This explains the name of the organization: Joint Warfare Centre and not "Joint Training Centre."

This is also reflected in the context of the JWC's establishment and the present role

it plays within the NATO Alliance, as its activities integrate warfare development topics both in the education of staff officers and in the conduct of its exercises.

The Spirit of Innovation

The JWC was established on October 23, 2003, as an organization of the NATO Military Command Structure and under the newly created Allied Command Transformation (ACT). Taking over the facility from the NATO Joint Headquarters North in Jåttå, Stavanger, Norway, during a period shaped by major changes in the international security environment, the new organization was designed both to deliver training to NATO headquarters at the joint operational level and to assist NATO strategic commands in the implementation of various transformation processes, such as doctrine development and the conduct of experimentation.

After decades of a rather stable strategic environment during the Cold War, the previous decade had been characterized by sudden changes following the disintegration of the Soviet Union. NATO had been stretched between the need to face the resumption of crisis close to its borders in the Balkans and the desire of Alliance nations to reduce defence spending, since the Warsaw Pact had collapsed and Russia

was no longer considered a threat. Major inflexions in the context of the Alliance had occurred at an ever-increasing pace since the first actual engagement of a NATO-led mission in Bosnia-Herzegovina in 1995, and later in Kosovo in 1999.

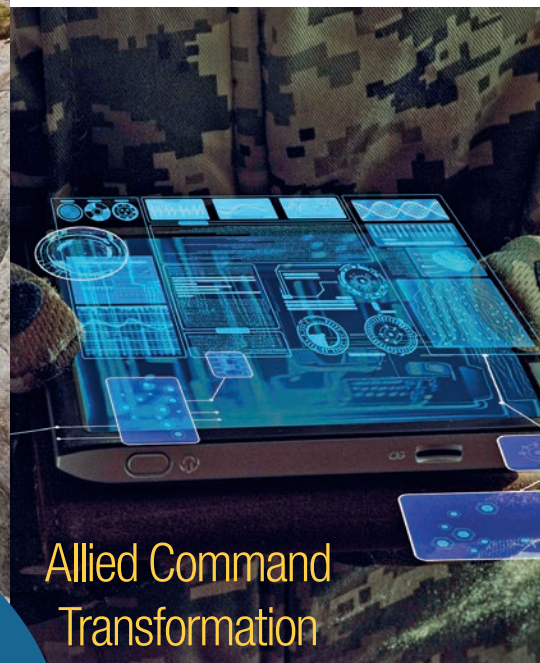
Subsequently, while some nations that used to present likely adversaries had already started to apply for membership, the Alliance invoked its collective defence clause, Article 5, for the first time on September 12, 2001, following the terrorist attacks against the United States. Two years later, NATO took over command and coordination of the International Security Assistance Force³ (ISAF) in Afghanistan, where the Alliance faced a completely different challenge than in the defence of the North Atlantic area. NATO had to conduct a deep reorganization, from a static structure whose mere existence was enough to deter the Soviet Union to a more dynamic and responsive organization.

Clockwise from left
NATO has been leading a peace-support operation in Kosovo since June 1999 in support of wider international efforts to build peace and stability in the area; ISAF remains the biggest coalition in NATO's history to date; the Kosovo Force (KFOR) was established when NATO's 78-day air campaign against Milosevic's regime, aimed at putting an end to violence in Kosovo, was over. Photos by NATO





Allied Command Operations



Allied Command Transformation

The JWC's Mission Possible: Bridging Operations (fight tonight) and Transformation (fight tomorrow)

As stressed by some organizational difficulties during the Balkan interventions, there was a need for the Alliance to undergo transformation and stir up innovation. Above all, the tool used to achieve this transformation had to actively disseminate new ways and means throughout the NATO Command Structure (NCS) and to the growing number of actors in the NATO Force Structure (NFS).

It is in this context that the JWC was formally inaugurated during a ceremony presided over by Admiral Edmund P. Giambastiani, Jr. (Retired), NATO's first Supreme Allied Commander Transformation (SACT). In his address to the audience at the JWC, he said: "Let the spirit of innovation become a new northern light for our Alliance here in Stavanger." [See "20 Years of the JWC" article, pp. 17–35]

Under Headquarters Supreme Allied Commander Transformation (HQ SACT), the JWC was to stimulate this spirit through its training events, keeping in mind the wise observation from British military theorist Sir B. H. Liddell Hart that "the only thing harder than getting a new idea into the military mind is to get an old idea out."

The JWC, A Spontaneous and Necessary Bridge Between ACT and ACO

Twenty years later, the JWC remains at the heart of the Alliance's operational readiness. It holds this position even after successive evolutions due to shifts in the strategic situation (such as the dedication to HQ ISAF pre-deployment training in the early years), redistribution of training responsibilities within NATO strategic commands, and internal restructuring. While it is involved in many of the transformation processes under HQ SACT, the JWC works in close collaboration with Supreme Headquarters Allied Powers Europe (SHAPE) and Allied Command Operations (ACO) to deliver large-scale exercises whose primary training audiences are usually the joint force commands and the command posts of the NATO Response Force (NRF).

This bridging role between ACT and ACO is explicitly illustrated by the shape of the "Kjerag boulder" at the top of the Kjerag mountain, a popular destination for hikers in the county of Rogaland just a couple of hours from

Above from left
The cockpit of a NATO E-3A airborne warning and control system (AWACS) surveillance aircraft, photo by NATO; the Kjerag boulder in Norway, photo by Shutterstock; technological advancements in the information domain, Shutterstock

Stavanger. Just as the parts of the mountain are not structurally dependent on the presence of the boulder, the strategic chains of command would not collapse without the presence of the JWC. The simile is rather meant to suggest that the JWC is equally engaged in supporting each of the strategic headquarters, for the sole purpose of "making NATO better."

The wide spectrum of the JWC's activities is expressed clearly in its latest mission statement: "The Joint Warfare Centre plans, prepares, and executes static and distributed joint operational-level training in support of warfare development and warfighting readiness. Furthermore, it supports concept development and the maintenance of joint operational doctrine and standards and coordinates the integration of experimentation and capability development in order to maximize transformational efforts to improve NATO's interoperability, capabilities, and operational





Above
The JWC's Harald Hårfagre Auditorium.
Photo by JWC PAO

effectiveness. The JWC contributes to developing and strengthening relationships and integration of national training and command organizations, governmental and non-governmental organizations, as well as regional security organizations and partners, in accordance with established policy and principles."⁴

This closely resembles the basic principles of testing a new type of equipment in realistic conditions before declaring it fit for purpose and delivering it to users. In the increasingly complex and versatile environment of present-day operations, headquarters must be put in realistic conditions of deployment and confronted with the full range of factors that compose the dilemmas necessitating their commanders' decisions.

The French and German headquarters of the late 19th century would often conduct staff rides or tactical exercises without troops through probable battlefields along the disputed border, following Foch's advice⁵ to his students at the École Supérieure de Guerre in Paris. Nowadays, modern command posts are rarely

trained without gathering a heavy machinery of response cells and simulation assets to achieve the needed realism. As a result, the enormous cost of these training events imposes to take advantage of each opportunity to ensure their cost-effectiveness. Consequently, they are also the perfect venue to conduct experimentation of developing concepts, or tools to be introduced to support the decision-making processes or the broader command and control structure.

THE JWC FACILITY concentrates in Stavanger all the necessary capacities to place ACO training audiences in the appropriate conditions to allow them to achieve their training objectives, while exploiting the venue as a tool to support ACT warfare development efforts. The Centre's most visible capacity is its unique and constantly upgraded training platform, able to provide a modular work environment for more than 1,200 personnel from training audiences as well as the exercise control response cells, and also to conduct classified lectures for audiences of up to 600 participants.

The most critical factor in the JWC's fulfilment of its role, however, is its workforce. NATO can rely on the expertise concentrated at Mount Jättå to conduct the increasingly complex exercise delivery process, with exercise planning teams, CIS architecture specialists, scenario content developers, simulation operators and quality assurance analysts. [See "How We Deliver Training", pp. 53–57] These teams and cells altogether replicate the operational environment in which the training audiences will develop their plans and face the fog of war.

Both complementary to NATO's education processes and vectors of the transformation objectives are the functional subject matter experts (SMEs) of the JWC's Transformation Delivery Division (TDD). This structure is composed of experienced officers (all posts are described to be occupied by an NATO grade coding "OF-4," which is a navy commander, or army/air force lieutenant colonel/wing commander) and civilian analysts. Nearly all the SMEs posted in TDD perform a joint advisory role in support of the training audience



The Joint Warfare Centre's MULTI-DOMAIN AND FUNCTIONAL SUPPORT

- Land operations
- Maritime operations
- Air operations
- Space operations
- Operations in cyberspace
- Special operations



- Command and control (C2) and Assessments
- Intelligence
- Operations planning
- Manoeuvre/Joint fires
- Joint targeting
- Force protection
- Strategic communications and information operations
- Civil-military cooperation
- Sustainment
- Joint logistics
- Chemical, biological, radiological and nuclear defence
- Integrated theatre ballistic missile defence
- Air operations
- Gender perspective
- Law
- Knowledge development
- Doctrine
- Capability development



Above and right

Space support during TRIDENT JUNCTURE 2018 LIVEX, photo by Marius Vågenes Villanger; members of the JWC's Advisory Team at USS Mount Whitney and during the JOPG train-the-trainer course. Photos by JWC PAO

throughout the exercise planning process and contribute to the concept development and doctrine assessment cycle in their area of expertise. Some also support the integration of experimentation during the exercises, in close coordination with all involved actors across NATO.

With such a concentration of expertise fully devoted to the needs of the Alliance, the JWC can stimulate the sharing of thoughts, both with external non-NATO actors and internally, through its JWC Warfighting Club [See "The Warfighting Club" article, pp 79–82] and other professional development efforts.

Despite the inevitable turnover of personnel that occurs in all NATO organizations, the JWC provides expert competence in all domains and operational functions, as well as in the rarer discipline of command posts training. This overall multi-domain experience is exploited not only in the exercise delivery, but also in warfare development dynamics.

A Combination of Tools Tailored to the Needs of the Alliance

The JWC can draw on the experience from 20 years of practice, with the development and direction of dozens of training events at the operational and strategic levels in a wide range of training purposes. The lessons learned from these exercises, exploited by experienced planners, allow the JWC to be a prolific actor in the transformation of NATO, both considering the training processes themselves and considering the type of support offered to trainees.

Following the release of the 2019 NATO Military Strategy, the JWC conducted its Future Exercise Support Capability Study (FESCS). The corresponding report contributed to ACT's development of the NATO Warfighting Capstone Concept (NWCC)⁶ and directives later developed from it. Simultaneously, SHAPE developed the Deterrence and Defence of the Euro-Atlantic Area (DDA) document, which was already in line with the FESCS thanks to the continuous contact between the JWC and the training audience within ACO.

Based on the analysis of the numerous exercises directed in the past five years, the JWC is able to propose and implement evolutions in the training process and the content of the training, aligned with ACO's short term focus on tangible improvements in readiness and interoperability ("fight tonight") and ACT's long term focus ("fight tomorrow").

Because of the Russian aggression against Ukraine, the scenario and computer-assisted exercise developers strive to meet new requirements and increase the realism of the exercises by making significant amendments to the exercise settings.

The JWC also proposes new ways and means to support the training audiences throughout the NATO exercise planning process (EPP), which will be described in more detail below. The main actors involved in these dynamics are the JWC's Advisory Teams, which on the one hand advise training audiences and report on the achievement of the training objectives, and on the other hand contribute to the integration of warfare development-related content.



“The JWC provides expert competence in all domains and operational functions, as well as in the rarer discipline of command posts training.”

In this regard, TDD is fortunate to gather highly experienced officers who are graduates of operational planning courses or have combat experience at the operational level, or both. While they are all true experts in their area of specialization, some may have little knowledge of how a computer-assisted/command post exercise (CAX/CPX) is developed at the operational level. The necessary induction training of these officers, once posted at the JWC, allows the Centre to exploit all their individual expertise for the collective development of the Advisory Teams.

In order to upgrade their legitimacy at acting as an advisor to a branch within the training audience, a consolidation process of their operational planning skills has been in place since early 2021: the Joint Operations Planning Group (JOPG) Leaders Workshop. [See "JOPG Update" article, pp 68–73]. The workshop's purpose is not to conduct a comprehensive operational planning course in a compressed time frame, but to give some tools to planners to run their planning efforts, based on combat-proven experience as well as best practices observed during training events. This activity allows even less experienced planners within a J5 (future plans) or J35 (future operations) to seamlessly manage a planning group through the crisis response process.

Initially built mainly for TDD internal interest as a "train the trainers" process, this workshop has been successfully exported to 20 various external training audiences across NATO in two years, such as three joint force commands, three land NATO Rapid Deployable Corps, two joint force air components, one special operations component command, the Allied Maritime Command and the Naval Striking and Support Forces NATO. It has also been exported to the Baltic Defence College in Tartu, Estonia.

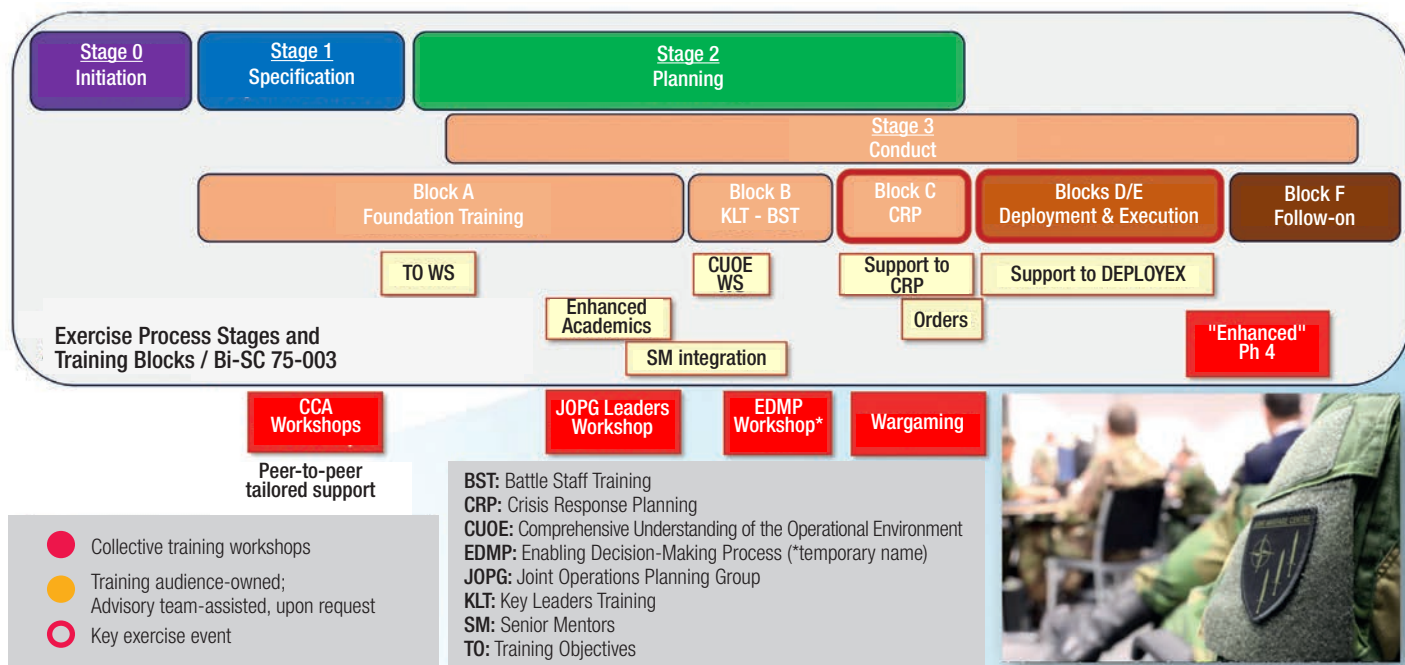
Complementary to the JOPG Leaders Workshop, although less mature for lack of opportunities of execution, another workshop called Enabling Decision-Making Workshop (EDMWS) has been set up with another type of target audience. This second workshop aims to support command groups by instilling joint synchronization and unity of effort fundamentals into their headquarters.

In fact, such workshops are always tailored to the needs of the training audiences, depending on the composition of their staff and ratio of augmentees, or the specific aim of the training. They are part of a set of tools proposed throughout the exercise planning process in close coordination with the exercise

Below
The author, Colonel Nicolas Tachon (right), during a daily meeting with his Division subject matter experts, July 11, 2023.
Photo by JWC PAO



The JWC's Continuous Collaborative Approach



Above
The different stages of the exercise process and training blocks, including the collective training workshops, such as the JOPG Leaders Workshop.

planning team, and are described in a process called continuous collaborative approach, or (CCA). This process starts with the definition of the exercise specification, when key objectives have to be discussed and agreed by senior leaders, with the contribution of the senior mentors, and continues through training audience internal training until the end of the exercise process. Indeed, the after-action review [See "The JWC After-Action Review" article, pp 74–75] often raises issues that are worth consolidating in the delivery of an enhanced Phase 4 while most participants are still in the mind-set of the scenario, for instance with the support of a wargame or an additional vignette.

AS A WAR IS RAGING on the doorstep of the Alliance, with a constant evolution of courses of action and warfighting techniques on both sides, the JWC does not merely repeat the same type of training to evaluate the execution of standardized staff processes. Instead, the Centre continuously adjusts its scenario development to the new realities of high-intensity warfighting. The deep reconsideration of training processes triggered by the decisions made during the NATO Summit in Madrid in June 2022 has emphasized the JWC's efforts

"We do not rise to the level of our ambitions, but we fall to the level of our training."

— Archilochus (5th century BC)

to support the orientations of both Strategic Commands. These efforts are successful thanks to the rich expertise concentrated within the JWC staff, while work is ongoing to optimize the human resources in the JWC's peacetime establishment and the compressed time frame of exercise development. With the increasing complexity of NATO exercises, the JWC must keep in mind the words of the ancient Greek poet Archilochus (5th century BC): "We do not rise to the level of our ambitions, but we fall to the level of our training." †

ENDNOTES

- 1 "Le feu tue. Les idées périmées aussi," Lieutenant Colonel Foch in Cours pour l'Ecole Supérieure de Guerre, Paris, 1899.
- 2 General Giulio Douhet (May 30, 1869 – Feb. 15, 1930), an Italian air power theorist. He was a key proponent of strategic bombing in aerial warfare and published The Command of the Air (1921).
- 3 In December 2001, following the overthrow of the Taliban regime, UN Security Council Resolution 1386 authorized the deployment of ISAF, a multilateral force in and around Kabul to help stabilize the country and create the conditions of a self-sustaining peace.
- 4 Reference: Bi-SC NATO Command Structure Adaptation Implementation, 25 April 2018 – confirmed in change 13, 28 July 2022.
- 5 "The lessons drawn from operations hardly reach those who did not participate [...] Staffs must go out of their offices and be confronted with reality." (Foch)
- 6 NATO Warfighting Capstone Concept: An Adaptive 20-year Strategy for NATO and its Allies. <https://www.act.nato.int/article/nato-warfighting-capstone-concept-an-adaptive-20-year-strategy-for-nato-and-its-allies/>



Clockwise

The JWC-led Grey Cell during Exercise TRIDENT JUPITER 2019-1; CIS provides the digital backbone for all exercises; the JWC's Advisory Team in Spain during Exercise TRIDENT JACKAL 2019; the OPFOR Cell during Exercise STEADFAST JUPITER 2023 MEL/MIL Scripting Workshop.
Photos by JWC PAO

HOW WE DELIVER
TRAINING

The JWC's 11 Core
Exercise Functions



Shooting a simulated news report for Exercise STEADFAST JUPITER 2023 MEL/MIL Scripting Workshop

Think you know all about **managing complexity?**

Here are **11 exercise functions** the Joint Warfare Centre controls simultaneously to ensure **NATO trains as it fights**. The JWC's training architecture is a truly immersive environment where everyone plays an important part in providing **first-class training** to NATO Command and Force Structure headquarters to prepare them **for any contingency**.



In no particular order



EXERCISE CONTROL

The Exercise Control (EXCON) organization is the "nerve centre" that commands and controls an exercise involving a diverse team of professionals, while setting the conditions for achieving exercise aims and objectives. The Commander Joint Warfare Centre (JWC) serves as the exercise director (EXDIR), leading the direction and tempo of the exercise play. The JWC provides the core of the EXCON personnel, which is augmented by staff from across the Alliance, partner organizations, other external resources, and trusted agents from the training headquarters. An EXCON organization can involve up to 1,000 personnel under the overall command of EXDIR. Although the JWC is the customary home to EXCON, it can be established at dispersed locations too, requiring high-calibre CIS support. One final takeaway about EXCON: it is how response cells, subject matter experts, warfighters and non-NATO elements come together to ultimately create a world-class exercise environment, providing the training audiences with a realistic, coherent, seamless and transparent presentation of the exercise play. All of this serves one purpose: to make NATO better.

SCENARIO DESIGN & MANAGEMENT

The JWC's Scenario team provides comprehensive scenario background and supporting documentation to JWC-directed exercises, tailored to meet both NATO and national requirements, and covering the Alliance 360 degrees geographically. The scope of these fictitious but highly realistic settings and scenarios allows for exercises in both Article-5 collective defence and non-Article 5 crisis response operations mode at various levels of effort, from divisional up to multi-corps, and across all five military domains — air, land, maritime, cyberspace and space. Within this broad spectrum, and in addition to the conventional spectrum of warfare, the JWC scenarios can also accommodate a wide range of modern warfare threads, such as anti-access/area denial, civil-military interaction and resilience, cyber defence, hybrid warfare, and state- and non-state actor-sponsored terrorism.

MAIN EVENTS LIST/MAIN INCIDENTS LIST

The main events list/main incidents list (MEL/MIL) is the "script" that keeps the exercise on track. The MEL/MIL team in Content Branch is responsible for the development and delivery of the overall exercise content during the planning and execution phases of JWC-directed exercises. Under the MEL/MIL team's guidance, the JWC's subject matter experts as well as trusted agents from the training audiences, participating nations and supporting response cells script the MEL/MIL over a series of three developmental workshops. The exercise script is synchronized with the exercise scenario, the training audience's operation and coordination orders, as well as opposing forces' actions. The result is an artificial but highly realistic exercise environment that affords the training audiences the opportunity to achieve their exercise and training objectives.





CAX

The JWC Computer-Assisted Exercise (CAX) team employs the Joint Theatre Level Simulation–Global Operations (JTLS-GO) to manage large-scale scenarios with multiple joint operations areas (JOA). The team prepares comprehensive databases for each exercise that reflect the complexity of contemporary multi-domain challenges. This allows the JWC's training audiences to conduct planning and decision-making in a demanding and realistic exercise environment that is as close as possible to that of a genuine operation. If the CAX team executes as intended, the training audiences are unaware that CAX support exists; they truly train as they fight. Given the shift to high-intensity, multi-JOA and multi-domain warfighting exercises, the JWC's CAX capability continues to evolve, such as the creation of a NATO order of battle (ORBAT) data inventory, as well as some analysis capability including an integration with wargame capability. Lately, the JWC CAX team has been working closely with the JWC Wargaming team to develop innovative CAX wargame methodologies that optimize the new exercise processes.

ADVISORY TEAM

The JWC's Advisory Team is composed of subject matter experts with diverse backgrounds in their respective warfighting functions. The team's mission is to advise, assist and monitor training audiences throughout an exercise. Working directly with the staffs at the different levels of headquarters, the Advisory Team participates in the planning, coordination and synchronization of each exercise. This allows the team to maintain situational understanding of the participants and the role of the different headquarters in their respective locations. The entire exercise process is normally an 18-month cycle, and so it is invaluable for the team to be integrated from the onset. Members of the Advisory Team also conduct the Joint Operations Planning Group (JOPG) Leaders Workshop during the training audiences' foundation training. In addition, the Advisory Team serves as the JWC's "EXCON Forward." An integral aspect of the Advisory Team is their partnered relationship with NATO senior mentors — the retired generals and admirals who have worked within the NATO Command Structure.

HIGHER CONTROL

The Higher Control (HICON) Cell replicates the highest political and military headquarters during the JWC-directed exercises. HICON facilitates the top-echelon military and political play during the exercise and serves as the linkage between the policy makers in NATO Headquarters, Supreme Headquarters Allied Powers Europe (SHAPE), and the operational- and tactical-level commands. With their in-depth knowledge of NATO processes at the operational, strategic and political levels, HICON staff ensure that current NATO doctrine, concepts, strategies and guidance are synchronized with the exercise and training objectives. The interaction, direction and guidance HICON provides to training audiences is critical in ensuring a realistic and legitimate exercise.



**The PLAN is nothing, but
PLANNING is indispensable.**

General Dwight D. Eisenhower
NATO's first SACEUR



MEDIA SIMULATION

The JWC delivers a full-scale media and information environment during the exercises it directs, which includes television news, online news and social media simulation. For television news, World News Today (WNT) is the flagship programme, replicating international news outlets such as CNN International or BBC World, as well as adversarial products. Online news span content from local, national, regional, and international perspectives, including adversarial content, all delivered digitally via NewsWeb, the JWC's news aggregate website. Social media effects are delivered via Chatter, JWC's simulated social networking platform. These simulation platforms bring the exercise to life, but more importantly, they provide the media consequences of operational decision-making. Media simulation products also include scenario-based scripted sentiment analysis and public opinion polls, which help training audiences to understand the effectiveness of their strategic communications efforts.

GREY CELL

Populated by retired senior military officers, civil leaders or diplomats, the aim of the JWC's Grey Cell is to prepare the training audiences for operating in a complex, multi-dimensional environment, which requires a comprehensive approach by the international community involving a wide spectrum of civil and military instruments. The Grey Cell generates and replicates key leaders from NATO and non-NATO host nations alongside non-military actors such as the United Nations, the European Union, the International Committee of the Red Cross et al., or international and non-governmental organizations with which the training audience would expect to liaise in a theatre of operations, depending on the exercise scenario. Interacting with the training audience through face-to-face meetings or video conferences, the Grey Cell subject matter experts, together with the Advisory and Media Simulation teams, make up the JWC "front of house."



Readiness and effectiveness are about much more than numbers. You need SPEED and SCALE as well as FLEXIBILITY and a wide range of CAPABILITIES.

Admiral Rob Bauer
Chair of the NATO Military Committee



REAL LIFE SUPPORT

Up to four major NATO exercises per year, along with national exercises and other events, bring thousands of participants to the JWC. On average, the Centre hosts 24 events annually with more than 4,000 external participants from all over the world. The RLS team is the participants' first point of contact with the JWC. An integral part of all JWC-directed exercises, the Real Life Support involves services in various areas including catering, accommodation, transportation, medical care, in-processing, facility preparation, event helpdesk and database, security, cleaning services, religious service and social events.

OPPOSING FORCES

The JWC's Opposing Forces (OPFOR) Cell was set up in 2012 to represent adversaries realistically during the JWC-directed exercises. Simulating all instruments of power (diplomatic, information, military and economic) that an adversary could potentially use, an intelligent OPFOR construct has been a key element of the JWC's comprehensive approach to training and scenario development since then. The simulated adversary acts in accordance with doctrine with coherent aims and objectives. Today, this evolving capability is an integral part of the combined effort to bring the exercises to life, providing realistic, contemporary challenges to the training audiences.

CIS

The JWC requires advanced technical networks and processes for the simulation and global coordination of exercise activity, as the challenges facing NATO continue to diversify in the 21st century and both technology and user expectations change rapidly. NATO's aim is to deliver fully interoperable command and control and information technology services to enable multi-domain operations and digital transformation. Communications and Information Systems (CIS) provide the digital backbone for the JWC-directed exercises, which involve large quantities of data, including the virtual battlespaces of the exercise environment across multiple networks. This generates its own challenges for CIS, as the speed and complexity of exercise activity must be supported by increased interoperability and ever more capable equipment. These core NATO and unique JWC networks are all directly supported by the NATO Communications and Information (NCI) Agency and the local CIS Support Unit in Stavanger (CSU Stavanger).

Exercise TRIDENT JUPITER 2019-1.
Photo by Bastian Koob, Eurocorps



LEARNING



Top and below

JWC wargames aim to accelerate Alliance learning: Exercise STEADFAST JUPITER 2023 Main Events List/Main Incidents List (MEL/MIL) Scripting Workshop. Photos by JWC PAO

FROM EXERCISES

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

IN 2016, I WROTE in this publication that "we will carry out TRIDENT JAVELIN 2017, a seriously ambitious undertaking with a new setting, SKOLKAN 3.0, and no fewer than three primary training audiences." It is amusing to think that, at the time, three primary training audiences were considered a large undertaking. Since then, ambi-

tion has risen beyond exponential growth, accelerated by the turn of events in Ukraine and persistent horizontal escalation by our adversaries. The new SKOLKAN setting was seen, at the time, to be a return to our Cold War origins, engaging a near-peer adversary in an Article-5 conflict: an existential fight on home turf. The developments in European affairs since then, almost unimaginable even in





Clockwise

The training audience during Exercise STEADFAST JUPITER 2021; CAX presentation at the JWC; Exercise STEADFAST JUPITER 2023 MEL/MIL Incident Development Workshop; the JWC's first Analysis Workshop conducted in partnership with the JALLC. Photos by JWC PAO

2017, underscore the relevance of NATO's exercises and the JWC's role in furnishing them to our many training audiences. The execution of these massive endeavours not only confirms NATO's commitment to preparedness but also reflects the scale of the threat to our societies and the values that underpin them.

The impact of COVID-19 emphasized the fragility of many assumptions regarding accessible economy, freedom to travel, and access to healthcare. As the Deputy Secretary General Mircea Geoană said at the 2021 NATO Lessons Learned Conference in relation to hybrid threats, "... the very definition of security has changed. [...] We are witnessing threats that could blur the line between civil and military realms, between traditional

and novel elements, between conventional and hybrid tactics. This is an evolution of epic proportions."¹ So where does the Joint Warfare Centre (JWC) fit in?

To put it in theatrical terms, the JWC provides the theatre, the script, the scenery and the props to allow our training audience players to perform their art of war. The JWC readies the actors with training and preparation, and also writes the reviews on the actors' performances in order to refine them for subsequent endeavours. In addition, the JWC and the wider NATO enterprise stand as symbols of our common values, the strength of our unity, and our collective determination to learn from the past by sparing no sacrifice to ensure a safe and secure future for our communities.

The NATO Warfare Development Concept merges Supreme Allied Commander Europe's (SACEUR) Concept for the Defence and Deterrence of the Euro-Atlantic Area with Allied Command Transformation's (ACT) capability development and force preparation

agenda. A key ambition within the NATO Warfighting Capstone Concept is the achievement of the six "outs": to out-think, out-excel, out-fight, out-last, out-pace and out-partner our adversaries, demonstrating our collective and collaborative ability to exceed our adversaries in every way as we exercise the military instrument of power.

It is here that the JWC and ACT are expanding their portfolio and practice in innovative ways, exploring new ground in order to challenge ourselves and our stakeholders. Initiatives such as the development of the JWC's continuous collaborative approach to stakeholder engagement, the development of wargaming as a tool to stretch staff's collaborative thinking, and the planning of more challenging exercises serve to set a very demanding tempo for our stakeholders and of course for ourselves and our families.

Within the current context of heightened friction, uncertainty and belligerence, and our rapid and innovative reorientation to



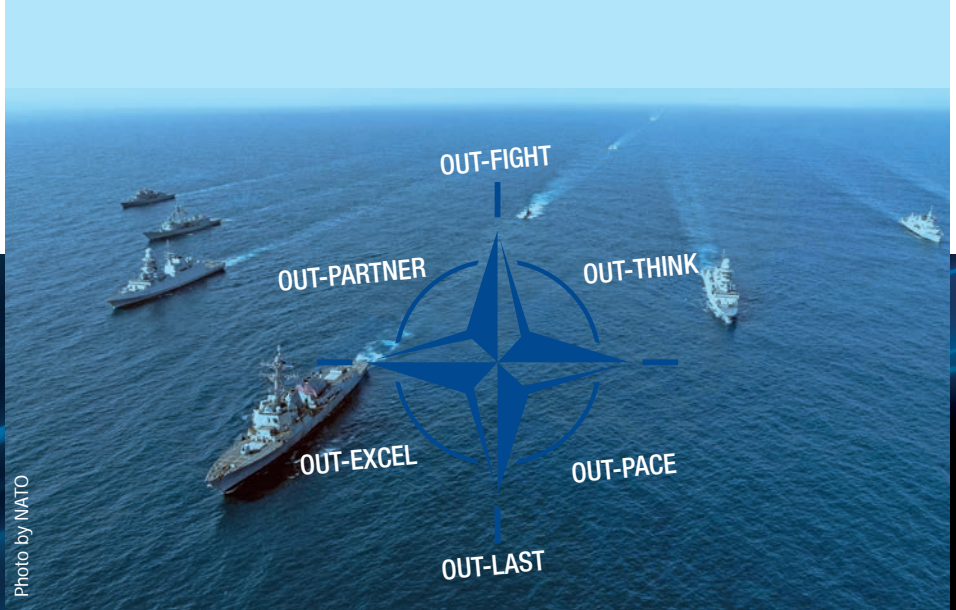


Photo by NATO



Above and right

Preparing for NATO Exercise STEADFAST JACKAL 2023 (STJA23). STJA23 will certify Eurocorps as a NATO Joint Task Force Headquarters for 2024, together with its associated Spanish Joint Logistic Support Group and the Spanish Joint Force Air Component (right). Photos by JWC PAO

these conditions after a period of relative European tranquillity, we can expect a degree of adjustment and refinement as we experiment with and trial our practices and performance to improve our precision in delivering effects. Our collective resilience will be both tested and burnished by challenges. We can expect the unexpected and should brace ourselves for setbacks in order to be able to reorientate, refocus and rebound stronger. To say it with former SHAPE Vice Chief of Staff Lieutenant General Michel Yakovlev: "To effect institutional change, we need humility; a recognition that we do not know all and that our ways are not always the best, because if we believe that, then we will never be in learning mode."

We must pay attention to the way we learn, to ensure that we learn not just individually but collectively, and that we learn the right lessons. Our exercises are collective training not just for the very large community of individuals engaged in them, but for their near- and mid-term successors by virtue of the communication of those hard-learned lessons and the way we manage change and learning in our organization.

EVENTS IN UKRAINE have demonstrated the force-multiplying effect of creativity, agility and adaptability in unimaginably difficult circumstances. Drone technology has been used to target and deliver munitions, and its exploitation in social media has brought conflict into the living rooms of our populations. But the grim nature of trench warfare has returned to haunt us again, reminding us of British Air Marshall Sir John Slessor's words: "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."

Longer-term challenges have been the focus of two recent JWC studies. We have scrutinized JWC exercises from two main perspectives: training audience performance and our own exercise planning performance. In doing so, we observe that there are common challenges across exercises that can be ascribed to organization-wide bottlenecks that are characteristic of large, multinational, common-funded organizations; we are well-prepared for these and have robust mitigation measures.

Indeed, coping with such frictions is itself a learning and strengthening experience, consolidating working relationships and expanding our abilities to collaborate and produce results under difficult circumstances. For example, the degree of business-as-usual in the exercise programme as NATO reacted to the COVID-19 pandemic demonstrated that our corporate adaptability and resilience is both





Above

The author, Andrew Eden, during the JWC's first Analysis Workshop conducted in partnership with the JALLC. The workshop paves the way into the drafting of a JWC analysis guide. Photo by JWC PAO

tested and proven by these real-life challenges in providing synthetic training. The JWC's adaptation to working from the recently refurbished In-Rock Facility also exemplifies the can-do attitude of the NATO community.

In terms of training audience performance, our long-term perspective suggests that while we see some common themes in how headquarters staff tackle the challenges of conducting operations from a joint headquarters, these challenges are quickly addressed within the short window of an exercise execution. Training audiences, and in particular their augmentees, endure a steep learning curve but nevertheless prevail, demonstrating adaptability and a positive team ethic to get the job done.

FURTHERMORE, IN 2022 we added another "first" to our trophy cabinet of exceptions, innovations and disruptions: our first training audience to return for an exercise two years in a row. NATO Rapid Deployable Corps Italy (NRDC-ITA) conducted STEADFAST JACKAL 2021 and returned once again for STEADFAST JACKAL 2022. This provided a unique opportunity for a training audience to

refine its practices with broadly the same staff. Usually, a training audience headquarters staff member will not enjoy more than one exercise with the JWC during their three-year rotation with NATO. On this occasion, we were able to demonstrate that headquarters staff continue the positive glide path after exercises, and capitalize on the organizational and individual knowledge gained. For instance, the logistical element of the exercise, including the use of the Logistics Functional Area Services (LOG-FAS), was best-in-class.

"The joint effects cycle is the most demanding element of HQ activity. It is the practice of operational art at its finest."

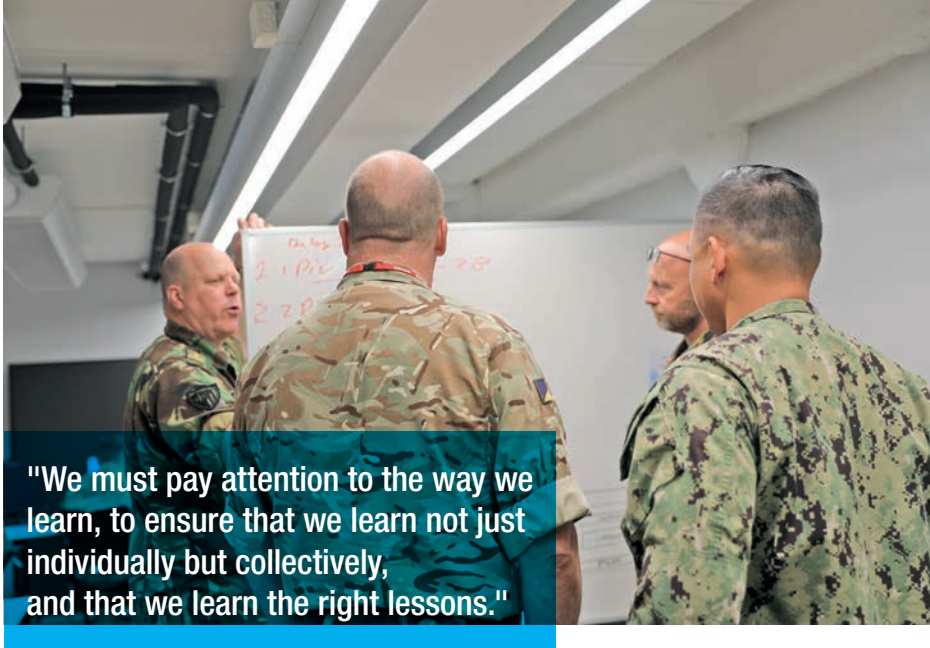
Some longer-term challenges remain, of course; these are rooted in the nature of our business and organization, and the challenges that stem from creating a synthetic conflict in an exercise. Recalling the analogy used earlier, namely the creation of a theatre, the script and the props to conduct an exercise, the JWC is challenged to provide those in a contained, near-real, short-lived context for consumption by a busy audience, with the audience seeing only two out of a number of separate, sequential acts, separated by six months.

Setting an exercise within a long narrative comprising all aspects of the PMESII² spectrum, with snapshots of the machinations of the NATO Crisis Management System to simulate political direction, while feeding a rich picture of tactical-level events and incidents, requires some trade-offs in the need for accurate simulation, against the need for timely stimulation to get the audience to undertake the activities required to meet their exercise and training objectives.

ANOTHER SIGNIFICANT CHANGE to how the JWC does business, and an interesting complication to our current projects, has been the updating of our exercise planning guide, Bi-SC Directive 075-003, Collective Training and Exercises. This refreshed doctrinal publication has taken almost a decade to update, due to the seismic changes that we have witnessed over those years. Since the Wales Summit in 2014, the guidebook for planning our exercises has come to require a significant update as it has been geared to developing smaller, discrete and tailored exercises. As the reins of the Officer Scheduling the Exercise (OSE) were recently transferred back to SACEUR after a decade with SACT, so was custodianship of our key directive.

Our major undertakings now require a different model that in many ways simplifies the way we do business, for instance by providing a menu of pre-determined standing training objectives, and by harmonizing terms and events throughout the long exercise planning process, making it easier for newcomers to orientate to exercise planning. What is particularly innovative in the new publication is the degree of concept development at the beginning of the exercise planning stage,





"We must pay attention to the way we learn, to ensure that we learn not just individually but collectively, and that we learn the right lessons."

Above
STEADFAST JUPITER 2023 MEL/MIL
Scripting Workshop. Photo by JWC PAO

now known as Stage 0. During this stage, the linkages in SACEUR's high-level strategic guidance for exercises are developed into overarching exercise objectives, and thereafter into a suite of training objectives and a myriad of supporting tasks for each training audience, in parallel with requisite evaluation objectives. This reflects the increasing complexity of our exercises and the highly ambitious requirement to challenge multiple organizations concurrently in tailored ways, and finally the seriousness with which NATO is exercising. Recently, the urgency and complexity of these demands is reflected in the increase in senior leadership engagement in exercise planning, with close Command Group involvement in every step of the process from inception to exercise culmination.

The increase in exercise ambition is not just about numbers, however. The growth in planned exercise scale since 2014, and in particular since early 2022, challenges participating headquarters to conduct kinetic multi-domain operations across expansive areas of responsibility, demanding optimal synchronization across all levels of command. Single headquarters' exercises develop internal operational art, stimulated by synthetic higher and lower formations by JWC staff, known as HICON (Higher Control) and LOCON (Lower Control). The JWC's previous exercises were therefore simpler by comparison, focusing on the actions and behaviours of the target headquarters' training audience. Now, with multiple headquarters in an exercise, at three levels of command, the JWC

surrenders some of that control, stimulation and simulation to the warfighters conducting their synthetic operation.

The synchronization required to cascade direction and guidance to peer and subordinate commands, and to coordinate and communicate effects, requires a nuanced blend of rigidity and flexibility, to enable a reliable and predictable rhythm of activity while allowing enough room for adaptation, creativity and flexibility as circumstances demand. Reports and returns are an important part of the battle rhythm, maintaining common situational awareness across all headquarters and their staff. In addition, this regular routine-driven activity is overlaid with a more irregular pattern of activity such as the joint effects cycle, driven by the events as they unfold. This is the most energizing and demanding element of headquarters activity, requiring highly time-

Below
Content developers at the STEADFAST JUPITER 2023
MEL/MIL Scripting Workshop. Photo by JWC PAO



sensitive and decisive actions, often with scant information available. This is the practice of operational art at its finest, and it is why JWC exercises are essential. By setting demanding and realistic conditions in which to practice and refine these activities, we are ensuring that NATO is ready for anything. The process is at least as important as the product, and when commanders present their review of the exercise in the after-action review [See "After-Action Review" article, pp 74–75], the satisfaction of a job well done is well-deserved.

As the scale of the exercises has increased, and those demands have stretched exercise stakeholders further, that achievement should not be underestimated or understated. It is hard to believe where we stand now in terms of exercise ambition and training audience performance, in relation to our viewpoint in 2016 as Exercise TRIDENT JAVELIN 2017 lay before us.

Looking back on the past decade, the exercise environment has changed quite radically; this is reflected even in the way the JWC looks now, with new buildings and a finely refurbished In-Rock Facility. We are NATO, and we are ready. ✦

ENDNOTES

- 1 Speech by NATO Deputy Secretary General Mircea Geoană at the NATO Lessons Learned Conference, March 16, 2021; https://www.nato.int/cps/en/natohq/opinions_182229.htm
- 2 Political, military, economy, social, infrastructure and information. We may add PT: physical environment and time.

WAR -



GAHNG



Lieutenant Colonel Travis Nedderson during the JETS 3.0 wargame.
Photo by JWC PAO

With the JWC's **wargaming design capability** becoming fully operational in May 2022, NATO acquired a new learning tool to advance **cross-domain command**, one of the five **NATO Warfare Development Imperatives**. How is the demand for JWC wargaming? Find out in this interview with the JWC's Wargaming Branch Head, U.S. Army Lieutenant Colonel Travis Nedderson.



"THE JOINT WARFARE CENTRE IS THE MAIN WARGAMING CENTRE IN ALLIED COMMAND TRANSFORMATION'S VISION FOR AUDACIOUS WARGAMING."

Interview by Inci Kucukaksoy, JWC Public Affairs Officer



The Joint Warfare Centre (JWC) has accomplished a lot since the initiation of its wargame design capability in June 2020. Today the JWC is Headquarters Supreme Allied Commander Transformation's (HQ SACT) bespoke wargaming centre. What do you think about the growing recognition of wargaming in NATO?

— The dedication and hard work of the JWC wargame design team over the past two years has certainly been an important factor, but the successful implementation of wargaming in NATO really rests upon the headquarters and commanders of Allied Command Transformation (ACT) and Allied Command Operations (ACO) who are willing to try something new and invest in the JWC's ability to deliver.

Below
ODIN STRIKE, an anti-access/area denial wargame developed by the JWC's Wargaming Branch, CAX operators and the Advisory Team. Photo by JWC PAO



Professional wargaming itself is not new, but it has come in waves over the past 200 years. Right now, we are seeing the rise of a new wave in wargaming interest. The establishment of wargaming branches at HQ SACT, JWC, Supreme Headquarters Allied Powers Europe (SHAPE), and other ACO headquarters is following on the heels of reinvigorated nationally-led wargaming. The U.S. military branches are driving forward to re-establish or grow their wargaming facilities and teach wargame design to a new generation of officers. Several European countries are pooling their wargaming resources to drive the field's development.

ACT recently conducted its annual Wargaming Initiative for NATO (WIN) conference, motivated by the combined efforts of Italy, France and Germany. We are also seeing professional wargaming emerge as an academic subject. At Georgetown University in the U.S. and King's College London in the UK, wargame design courses are bringing in students from outside of military circles, widening the diversity and range of viewpoints in wargaming while also helping to generate a pool of talented young designers for wargaming institutions.

The JWC began two years ago with a single wargame, WISE AEGIS, to demonstrate that its Wargaming Branch was functional. That grew into two wargames in 2022 when the JWC declared the branch fully operational. We started 2023 with the modest goal to create and deliver six wargames. With the demands coming in from ACO, however, we quickly surpassed that target and are now on track to deliver a total of 10 wargames in 2023. We are also quickly filling up our calendar for

2024 and even 2025! The demand is there and I think ACT and the JWC established this capability at the right time to be on the leading edge of this wave.

Q2: What is the JWC's role in NATO wargaming?

— The JWC is currently the main wargaming centre in ACT's vision for audacious wargaming. As such, our function is to link ACT and ACO by designing and delivering wargames that meet an ACO-sponsored headquarters' training needs while supporting Supreme Allied Commander Transformation's (SACT) Warfare Development Imperatives outlined in the NATO Warfighting Capstone Concept (NWCC). The close relationship between the JWC Wargaming Branch and ACT's Experimentation and Wargaming Branch helps to define our roles and responsibilities within the vision for audacious wargaming.

The team at HQ SACT focuses on those big strategic-level and innovation challenges that drive modernization and change within the Alliance. At the JWC, we set our sights at the operational level, helping to enhance understanding, develop solutions, and support operational planning at SHAPE, the joint force commands, NATO component commands and NATO Force Structure headquarters.

These headquarters are our main "customers" who drive our wargaming programme of work by requesting we develop wargames designed to meet an emerging need or challenge. The design process begins with these headquarters asking a fairly open-ended question: "What happens if...?", "Could we...?", "How do we...?".



Once they come to us with their questions, we consider that headquarters the wargame's "sponsor." The sponsor's role is to define the problem and set the initial parameters for the topic, including when and how much time is available for wargaming, whether the wargame needs to be integrated into other training such as a JWC-run exercise, the number of participants, the location, the available facilities. The most important thing for us is to understand what the sponsor wants to accomplish and set firm, defined objectives. We often help our sponsors take a broad concept and reduce it to one or two key objectives to focus the wargaming effort. For the sponsor, there must be an understanding that a single wargame cannot be all-encompassing and address every aspect of multiple challenges. In some cases, a sponsor might provide enough objectives to break a challenge into multiple wargames along related lines of effort.

The culmination of the sponsor engagement is a document we call the game specification or GAMESPEC. The GAMESPEC serves a similar purpose as the exercise specification (EXSPEC) does for a JWC computer-assisted exercise/command post exercise (CAX/CPX). It defines the wargame's objectives, scope, scale, participants and timeline, as well as any other parameters, constraints and information that will guide how we develop the game. The GAMESPEC is, in effect, a contract between

sponsor and JWC. Once the JWC Commander approves the GAMESPEC, the wargame becomes part of the JWC's programme of work.

Q3: How do we design a wargame? Can you walk us through the process?

— The actual design process begins with research. We conduct two types of research for our wargames. The first is topical research. We want to gain as thorough an understanding of the sponsor's challenge as we can from the technical, tactical, and operational perspective. Fortunately, the JWC is packed with some of the most knowledgeable subject matter experts (SMEs) in their fields from across NATO. We often draw on this expertise to ensure we are on the right track. This line of research also ties in with SACT's Warfare Development Imperatives. The sponsor's objectives usually relate to one or more of the five imperatives: cognitive superiority, influence and power projection, layered resilience, integrated multi-domain defence, and cross-domain command.

Our second research area is within the wargaming world. Before designing anything ourselves, we want to see what has already been done on the subject, whether at national wargaming centres or from commercial sources. If we find a wargame covering that subject, we can often take that game's core concept and adapt it to fit the sponsor's needs. If no related

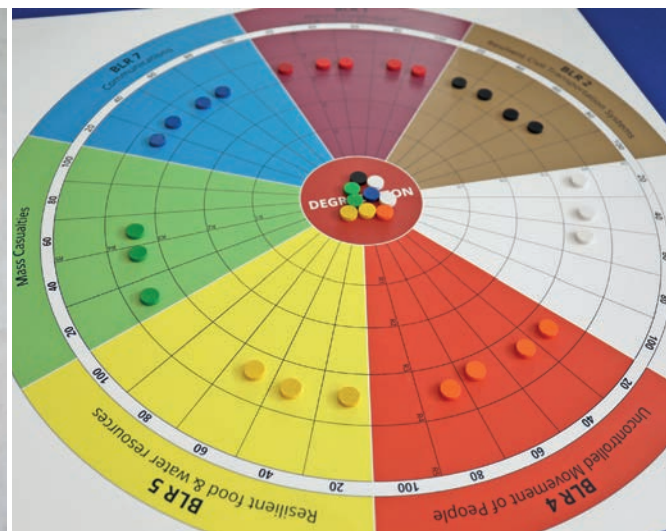
wargames exist, we look for mechanics within other games to help inspire our own wargame.

Then it is time to design our wargame. Wargames are about decision-making, not staff processes, and so our games seek to cut to the heart of the matter by ensuring that player decisions affect the course of the game. This is converse to a CPX where the training value is in getting a staff to analyse data to get to the "so what" for the commander. In wargaming we present the "so what" to the players up front, giving them only the key data they need to make their decisions. It also means immersing players in roles that are usually not their regular duty function. They may be put into the role of senior commanders or defence officials and make the decisions that drive operations.

These two aspects of wargaming often challenge people and get them out of their comfort zones. The game design must be straightforward and easy to understand while providing enough detail to address the sponsor's objectives. It is very easy to add complexity to a wargame, but any more than is necessary will confuse players, bog down the game and disrupt the players' immersion experience.

Once we feel that we have a viable concept for the wargame, we test the concept. These game tests or beta-tests are vital to ensure that we have a functional game and must be repeated

Below and right
JETS 3.0 wargame at Ulm, Germany; the JWC's first wargame, resilience-focused WISE AEGIS. Photos by JWC PAO



with different audiences. We usually start with a small game test within the Wargaming Branch, using our trained wargaming staff to iron out issues with the game's design. A second test is often done with the JWC staff and SMEs who contributed to the research. This test will show us how accurately we have addressed the challenge. A third game test introduces the game to an external audience. This may be the sponsor getting a preview of the game, or a third-party audience such as student officers at the NATO School Oberammergau. After each test, we refine the game's databases and mechanics to ensure that we have an engaging wargame that is fit for purpose.

Next, we move on to final production of the game materials, which marks the end of our design process. The time it takes to get this far varies. A typical design phase can take us from two to six months for a completely new wargame. If we are adapting an existing game, the time can be cut in half.

The last phase is the wargame delivery and execution. The size and scope of the wargame will determine how many people we send forward, but we always have at least two people delivering a wargame: one to administer the game to the training audience and the other both for support and as an observer to capture the sponsor's reception of the wargame and take down lessons learned to improve the game and our own facilitation techniques.

Big wargames such as STEADFAST FOXTROT will have many more facilitators to support the delivery to larger training audiences. We will also often call in NATO senior mentors (retired general officers) to act as

Below
Subject matter experts support the Wargaming Branch during the research phase for wargames. Photo by JWC PAO



moderators for the wargame. Whereas facilitators govern the rules and mechanics of the game, the moderator is responsible for guiding the players through discussions and decisions as the substance of the wargame. Finally, the JWC and the training audience usually fill the position of observer/analyst jointly. We want to ensure that the lessons learned and outcomes of the game are captured from multiple perspectives.

Following the wargame, we continue to work with the training audience in sharing observations and collaborating on a final wargame report. No wargame can ever be repeated, as each iteration will bring different players and decisions, but after several iterations we can establish trends, patterns or detailed data to inform future plans and decision-making. Each wargame we create at the JWC is added to our "menu." This menu is designed to help make the process easier for the next potential sponsor by showcasing what we have already done for others.

Q4: The JWC conducts both exercise-integrated and standalone wargames. Can you describe some of our key wargames so far?

— Our first wargame was WISE AEGIS in 2021. This was a wargame with an educational purpose, designed around civil resilience. Players gained familiarity with the seven resilience themes and explored situations that could erode or degrade national resilience. As an inaugural wargame, WISE AEGIS exceeded expectations and was afterwards adopted by the Civil-Military Cooperation Centre of Excellence for continued use.

In 2022, we created two wargames. The first was JETS 3.0, a deployment and sustainment wargame. In 2021, the United States European Command handed off ownership of the Joint European Time-Phased Force Flow Deployment and Sustainment (JETS) exercise to the Joint Support Enabling Command (JSEC) when the latter was declared fully operational. JETS had already been in use by the U.S. as a national wargame to simulate the large-scale reception, staging, onward movement, and integration (RSOI) of U.S. forces into theatre. The execution in 2022 was to be the third iteration of the exercise, but the transition to



JSEC had significant implications for the scope of the wargame to transition from a national to a multinational construct. For the first time we had U.S. and NATO logisticians working side by side to understand the challenges of the other. NATO logisticians were amazed by the personnel, material and infrastructure requirements of a complete U.S. heavy division crossing the Atlantic Ocean. U.S. personnel, meanwhile, gained a better appreciation for NATO's challenge of moving and sustaining a force composed of 30* different supply chains operating at once.

Our second wargame of 2022 was a deterrence-focused key leader training (KLT) wargame to help "raise the deterrence and defence IQ" within NATO. The wargame was received well enough that we are planning to run it again as part of Exercise STEADFAST JUPITER 2023, NATO's largest CPX to date.

Our programme of work has turned 2023 into quite the busy year. The largest upcoming event is Exercise STEADFAST FOXTROT, which picks up where JETS 3.0 left off. We have overhauled and redesigned the exercise and wargame to address deployment and sustainment in a competitive and contested environment. The exercise will be executed as a "mega-game" in which three separate wargames are played simultaneously and linked through the scenario and player decisions. The game mechanics are now easier for players to grasp and objectives are more clearly defined. We are expecting STEADFAST FOXTROT to be a great event for bringing the NATO enablement and sustainment community together.

* At the time of the JETS 3.0 wargame, NATO had 30 member countries.



"We are excited to see how far we can take this craft for NATO in the future."



From left
JWC staff members during the legal interoperability wargame SWORD OF JUSTICE and during ODIN STRIKE, an anti-access/area denial wargame. Photos by JWC PAO

Possibly the most unique wargame we are developing in 2023 is called SWORD OF JUSTICE, which is about legal interoperability within the Alliance. In our research we found only one other wargame on the subject of operational military law, developed by the U.S. National Defense University, called "Baltic Gavel." We really liked the game's concept, but it was nationally focused and we wanted our own wargame to take it further into the multinational space. The JWC Legal Advisor and Wargaming Branch teamed up to call in a core team of legal experts from around NATO to help us identify the most important legal issues that could challenge an operational commander or fracture Alliance unity.

Q5: What is next for JWC wargaming?

— We have six projects lined up for 2024 and 2025, but there will likely be more. Wargaming is designed to provide a flexible and rapid training capability on demand. In 2023, we started our programme of work with just two wargames planned. That has grown to the 10 we have today. We can generate wargames far more quickly than almost any other form of training. This gives our sponsor headquarters and our design team the freedom to work with very short planning horizons and capitalize on opportunities as they arise. The wargame projects we have planned for the coming year

are really going to help broaden our range. We will explore cross-joint operations area (JOA) targeting and deep strike capabilities in the air domain. We are going to work with industry, governments, and military to wargame solutions for protecting critical undersea infrastructure. There are also plans to use wargaming to integrate non-NATO partners into some of the JWC's new major exercises, such as STEADFAST DAGGER. And of course we are going to build wargames that help educate and inform NATO on emerging multi-domain operations (MDO) and concepts.

We are also training and preparing internally to deliver large-scale planning and course-of-action wargames utilizing the U.S. Marine Corps' Operational Wargame System (OWS), one of the most detailed and sophisticated professional wargame systems available today. It covers all domains and can be played at the operational or tactical level with any scenario and over any space. We own two sets at the JWC and will be expanding our collection with each new update from the U.S. Marine Corps team at Quantico.

Our biggest wargame project remains STEADFAST FOXTROT (STFX). The JWC has been formally requested to fulfil the role of Officer Directing Exercise (ODE) for STFX as this new exercise series gains momentum. STEADFAST FOXTROT will continue to support the needs of the enablement and sustain-

ment headquarters in NATO, whose functions and missions cannot be represented within the confines of the other CAX/CPX events. We are exploring wargaming solutions that involve digital-hybrid simulation in order to add depth and data analytics to the exercise structure as well. We are proud of our branch's progress over the past two years and we are looking forward to seeing how far we can take this craft for NATO in the future. ✦

Below
JWC wargaming presentation at the NATO Resilience Symposium in Riga, Latvia, April 26, 2023. Photo by JWC PAO





AN UPDATE ON THE

JOINT OPERATIONS PLANNING GROUP LEADERS WORKSHOP

"Successful planning groups remain adaptive in their ability to create and brief planning products that enable the commander to drive the decision-making process."



by **Lieutenant Colonel Matthew R. Prescott**
United States Army
Former Operations Planning Advisor
NATO Joint Warfare Centre



"Planning is a journey without an end – a journey informed by the compounding knowledge of planners who seek to learn from every opportunity to engage in the activity."

— Mark Gilchrist, Australian Army Officer

In the autumn of 2021, *The Three Swords* magazine published an article entitled "Preparing JOPGs for Crisis Response Planning" introducing the JWC's Joint Operations Planning Group (JOPG) Leaders Workshop initiative. The purpose of this article is to provide an update on the workshop and describe what the JWC Advisory Branch has learned from delivering the workshop over the past two years.



Above: JOPG train-the-trainer course for JWC staff, August 25, 2023. Photo by JWC PAO

THE JOPG LEADERS Workshop¹ is a collective training event for headquarters in NATO, designed to address and mitigate tensions the Joint Warfare Centre (JWC) observes during the conduct of crisis response planning. Some of the observed areas for improvement include: organizational management challenges; gaps in the overall understanding of the NATO operations planning process; a need for more awareness of the complexities in an operating environment; and a need for more integration and collaboration across the staff.

Since February 2021, the JWC has conducted the workshop 20 times, to 13 different headquarters in NATO, with an estimated 295 officers trained. Due to a lack of institutional publications or courses to assist JOPG leaders with the organizational and leadership challenges of running a planning group, the JWC's workshop aims to improve JOPG organizational and administrative management, increase proficiencies in NATO planning, and improve understanding of the operational environment through scenario-based practical exercises.

Although many JWC exercises focus on the operational level of warfare, the JOPG Leaders Workshop is applicable to all headquarters because the principles taught during the workshop apply across levels (tactical, operational, and strategic). The workshop has been conducted in support of real-world planning, as part of a headquarters' professional development plan, and to assist a headquarters prior to the start of Phase IIB (crisis response planning) during a JWC computer-assisted exercise/command post exercise (CAX/CPX). When conducting the workshop as part of a JWC exercise, it is recommended to take place during the academics period of the NATO exercise planning process. At the latest, a training audience should undergo the workshop before the execution of crisis response planning.

The 20 iterations of the JOPG Leaders Workshop have seen an even blend of NATO Command and Force Structure headquarters, encompassing multiple NATO component commands, tactical-level corps headquarters, and all joint force commands — some of which have also conducted the workshop more than once. The workshop curriculum remains

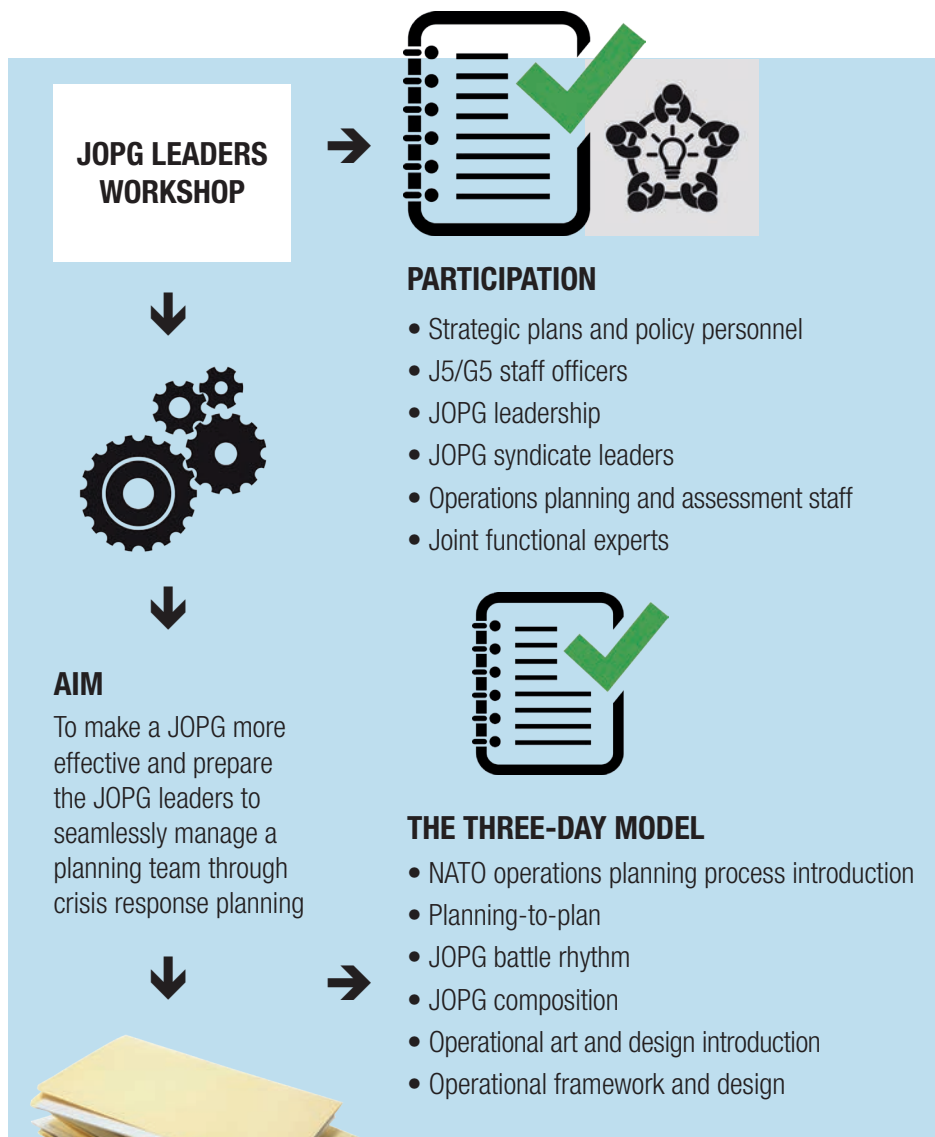
tailable to the needs of a headquarters, however, there are three distinct blocks of instruction the JWC recommends in order to reap the maximum benefit:

Block 1: Planning group organizational and administrative management before the start of planning.

Block 2: Enable greater proficiency in the NATO operations planning process with a focus on observed planning challenges, such as determining key factors and conclusions from factor analysis, framing the problem, establishing commander's critical information requirements tied to decision points, generating multiple options during course of action (COA) development, and COA analysis wargaming.

Block 3: When aligned to a JWC exercise, create a greater understanding and knowledge of the complexities in the operational environment, or exercise scenario, through practical exercises.





When these requirements are not in place prior to Phase IIB, the planning groups will struggle during the initial days of the crisis response planning as the group works to determine how to achieve planning milestones. Considering that a planning group is already facing time restrictions, this can present a disadvantage.

Many of these pre-planning requirements are often found in unit standing operating procedures and instructions (SOPs and SOIs) or in internal planning handbooks. These documents help to standardize a headquarters' approach to planning by providing a common understanding to all group participants.

However, sometimes these documents require adjustment to the respective headquarters' type of operation. Prior to beginning the workshop, JWC instructors review the headquarters' planning SOPs and SOIs and use the workshop to make recommendations on needed alterations before the crisis response planning begins.

Outputs of the workshop assist planning groups in developing their crisis response planning plan-to-plan, battle rhythm, and planning group composition — based on the duration of crisis response planning and type of operation being planned. To ensure a planning group maintains their momentum throughout Phase IIB, instructors will also recommend composition changes the planning group should consider as they transition to different operations planning process phases.

Ultimately, the better prepared a planning group is prior to the start of crisis response planning, the better the group can mitigate anticipated and unanticipated friction throughout Phase IIB.

Key Takeaways From the Past Two Years

"Fortune favours those who are prepared." — **The importance of JOPG preparation prior to the start of crisis response planning**

Planning groups that take the time to prepare and complete the needed organizational and administrative requirements before planning starts are able to begin and sustain planning activities at the pace needed to achieve operations planning process milestones. A Phase IIB schedule, battle rhythm, planning group composition and planning space requirements are all important considerations a planning group needs to organize, and often get approved, before the start of the crisis response planning.

"Planning is thinking about the future and writing a story about it." — **Knowing how your commander thinks and learns**

The most important relationship during the operations planning process is between the planning group and the commander. Therefore, it is important for the planning group to know how their commander learns via the planning products developed throughout the operations planning process, and how best to describe these products to the commander to ensure understanding. This is crucial in order to receive the needed direction and guidance from the commander to continue planning.

All blocks of instruction can take place over a period of up to five days, but depending on the needs of the training audience, workshops have been as short as two days.

In addition, the JOPG Leaders Workshop can be conducted virtually, at or near the training audiences' location, or at the JWC. All means of delivering the workshop have proven successful, but observations indicate that those workshops conducted at the JWC achieve greater effects. This is most likely due to participants being away from the daily requirements of their headquarters and focusing exclusively on the training.



Although headquarters often maintain standard templates for planning products and agendas for command decision briefs, a planning group should acknowledge that standard templates and agendas may not always list or illustrate information in the way that is most conducive to a particular commander's learning process, especially when a headquarters has a new commander. Successful planning groups remain adaptive in their ability to create and brief planning products that enable the commander to drive the decision-making process.

The JWC Advisory Branch maintains an advantage in knowing how commanders like to receive information for the following reasons: 1) Advisors have a great working relationship with the NATO Senior Mentor Programme and throughout the years have worked closely with senior mentors during all of the JWC-directed CAX/CPXs; and 2) advisors often interact with current senior leaders across the Alliance.

Our interaction with senior mentors and current flag officers enables JWC instructors in the JOPG Leaders Workshop to describe observed best practices for producing and briefing difficult portions during the mission analysis or course of action decision briefs. In addition, instructors also provide keys to success in briefing planning products such as an operations design, a course of action, or command and control structures. Through our observations and relationship with senior men-



Above
The author, Lieutenant Colonel Matthew Prescott (right), with Lieutenant Colonel Jens Janis, the workshop's lead planner, during a training event at the JWC. Photo by Chris Hill

tors, JWC instructors are able to describe the critical information that enables a commander to provide direction and guidance to the planning group. The main observation stressed during the workshop is that planning products are of little value for a commander unless the presenter can describe, through a narrative, the analysis that led to the planning group's conclusions and recommendations.

"Planning is a contact sport, but it is also always a team sport." — Creating unity of effort during the operations planning process

One point consistently stressed in NATO doctrine and other supporting planning manuals is the need to conduct collaborative horizontal and vertical planning throughout the operations planning process to minimize friction, ensure shared understanding, and set conditions to al-

low seamless transitions between each planning phase. Transitioning to a different operations planning process phase directly impacts each echelon in NATO. For example, as the joint task force (JTF) headquarters completes operations planning process phase requirements, inputs are reviewed for validity by the strategic headquarters and then merged into the existing strategic plan; likewise, the component headquarters will take the JTF commander's guidance and planning products to mature the tactical plan. Throughout this process, component command

Below
NATO's senior mentors with Brigadier General Mark A. Cunningham, the JWC's Deputy Commander and Chief of Staff. Photo by JWC PAO



COMMENTS FROM FORMER WORKSHOP PARTICIPANTS



Colonel Mietek Bieniek
Joint Force Command Brunssum
Planning Team 1 Chief

"From my perspective as the JOPG leader, the workshop was a great venue to explore organizational gaps, enable personal development, and build confidence and cohesion across the JOPG core staff shortly before the start of crisis response planning. To best describe the benefit of the workshop, I would paraphrase the Latin proverb 'fortune favours the brave' (audentis fortuna adiuvat) to 'fortune favours those who are prepared.'"



Lieutenant Colonel Stefano Pagani
NATO Rapid Deployable Corps Italy
Exercise Planner

"Being an air force staff officer and not having any land or operational-level background, the JOPG Leaders Workshop gave me a unique opportunity to learn and practice various approaches and techniques on how to run and perform in a JOPG. I think the real benefit of this workshop is how it constantly stressed the need to deeply understand system dynamics in order to exploit expertise among the JOPG."



Lieutenant Colonel Rob Smith
NATO Rapid Deployable Corps Italy
Exercise Planner

"The JOPG Leaders Workshop gave me the confidence to lead and coordinate a JOPG despite never having been a JOPG member or conducting operational-level planning before. The focus on the human dynamics involved was of particular value."

involvement is essential to create a comprehensive and multi-domain plan. Whole-of-staff and collaborative cross-headquarters planning supports each commander in making better decisions based on the broad range of inputs provided by each echelon. Integrating and synchronizing these diverse inputs enables shared understanding and unity of effort.

Human dynamics play a major role in the ability to conduct comprehensive planning. Often planning group leaders and participants, across echelons, are field-grade officers and of similar rank. This means that effective whole-of-staff and collaborative cross-headquarters planning is conducted via peer leadership

traits, where influence is more important than rank. Through pre-readings, facilitated discussions and practical exercises, the JOPG Leaders Workshop demonstrates techniques to mitigate friction, often caused by human dynamics, and to create an atmosphere that promotes collaboration and consensus throughout the various planning group echelons.

The JOPG Leaders Workshop has the greatest collaborative effect when both joint task force and component headquarters participate.² This ensures that workshop outputs directly contribute to the development of nested planning products and increase shared understanding across echelons.

Conclusion

Planning processes are designed to allow the masses to achieve by process what military geniuses throughout history have achieved through intuition.³ However, planners should be cautious in believing they must adhere to a process rigidly, because planning is a human endeavour and a journey without an end. Once one injects the human element into planning, a scripted process can become chaotic.

Effective planning is both an art and a science, and always benefits from the involvement of the commander. Effective planners are able to lead and manage through the chaos,



**Lieutenant Colonel Wilson Blythe
1 German-Netherlands Corps
Former Land Operations Planner**

"The JWC's workshop was a critical milestone in our preparation for Exercise STEADFAST JUPITER 2023, transition to a warfighting corps, and associated shift in emphasis from the Comprehensive Operations Planning Directive to the Tactical Planning for Land Forces Allied Procedural Publication (APP) 28. We left the workshop not only as a more cohesive planning team, but also with a better understanding of APP-28 and greater familiarity with best practices associated with land tactical planning."



to create the unity of effort and shared understanding that is needed to describe the approach that will lead to the most favourable end state.

When a planning team fails to deliver the planning products needed to drive the commander's decision-making process, this normally indicates a lack of organizational discipline, time management, and an incomplete understanding of the operational environment within the planning group. The workshop is designed to help headquarters in NATO mitigate such challenges while increasing the proficiency and effectiveness of a planning group before they conduct crisis response planning.

The JWC is the right organization to

Below and right

The author and the workshop's lead planner at the JWC's main entrance, photo by JWC PAO; the workshop taking place at NRDC-ITA, photo by NRDC-ITA PAO



lead this workshop for three reasons: 1) Years of collected insights and best practices from across every headquarters in NATO enable the JWC to understand training audience tensions throughout the lifecycle of an operation; 2) The JWC's Advisory Branch is composed of subject matter experts across the joint functions and domains, who are proficient in NATO doctrine and operational level planning; and 3) The JWC is NATO's exercise scenario generator and its Advisory Branch accompanies the training audience throughout the exercise planning process as part of our continuous collaborative approach.

FRAMING THE PROBLEM AND THE PROBLEM STATEMENT

Scan the code below to read this article, which argues that framing the problem is one of the most important steps in the NATO operations planning process and describes why NATO should consider incorporating the development of a problem statement as a doctrinal step in mission analysis.



FOR HEADQUARTERS INTERESTED in conducting the JOPG Leaders Workshop for staff professional development, start by sending an informal request to the JWC Advisory Branch. After initial coordination is complete with projected dates and duration, a formal request letter from your command group to the JWC Command Group is the preferred method to enable the workshop to be placed on the JWC's programme of work.

For headquarters interested in conducting the workshop due to their participation in a JWC-run exercise, each headquarters aligned to the exercise has the opportunity to request the workshop during the various planning conferences that take place throughout the initial stages of a JWC exercise. †

ENDNOTES

- 1 See "Preparing JOPGs for CRP: JWC's new JOPG Leaders Workshop Initiative," The Three Swords, November 2021 Issue No. 37, 28–31, or <https://www.jwc.nato.int/articles/jwcs-jopg-leaders-course-initiative>
- 2 During Exercises STEADFAST JACKAL 2021 and 2022, the joint task force headquarters conducted the JOPG Leaders Workshop first, followed by several supporting components. Outputs of each workshop enabled relationship-building, directly contributed to shared understanding, and created better cross-headquarters synergy during CRP.
- 3 Mark Gilchrist, "It's a Journey, Not a Destination: Seven Lessons for Military Planners," Modern Warfare Institute, September 17, 2019, <https://mwi.usma.edu/journey-not-destination-seven-lessons-military-planners/>.



THE ROLE OF THE AFTER-ACTION REVIEW

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

SITTING ON MY HOTEL balcony overlooking Lake Geneva is the perfect setting to consider the role of the after-action review (AAR) in the exercises conducted at the Joint Warfare Centre (JWC): reflecting on reflection, if you like. The AAR is the main opportunity for senior exercise stakeholders to reflect on their exercise performance, most often after the culmination of a Phase IIIB, the execution phase.

I find myself in Geneva because I was tasked to brief a constellation of international and non-governmental organizations on the

ways in which they can contribute to exercise AARs and the NATO lessons learned process. They are keen to be heard, and eager to provide feedback on how NATO is operationalizing the comprehensive approach in our exercises.

The AAR, in practice, is a carefully planned and choreographed event conducted under the auspices of the officer conducting the exercise. The value of the AAR, for the observer, is the opportunity to witness key leaders articulate their thoughts on their headquarters' performance, the commanders binding those reflections into a forward-looking message to their staffs, and finally the senior mentors' carefully considered objective view for consumption at all levels.

For a JWC exercise, the list of attendees comprises senior leaders in all training audience headquarters (typically deputy chiefs of staff and above), along with the JWC Commander as the officer directing the exercise. The final comments are usually articulated by

the senior mentor. On occasion, Supreme Allied Commander Europe (SACEUR), one of NATO's two strategic commanders and the head of Allied Command Operations (ACO), may also contribute.

The presentations are usually structured along the lines of three positive points and three learning points for improvement: three ups, three downs. The intent of these apologies is to share immediate reflections on collective branch or division performance, to set some expectations for the development of the first impression reports and the subsequent final exercise report, and perhaps also to record some initial discussion points for the post-exercise discussion, some 60 days later.

The AAR therefore comes hot on the heels of the end of exercise (ENDEX); it is quite reactive; it is relatively raw in its analysis; and it comes at a point of very public culmination of a two-year endeavour and 10 days of intense headquarters activity. It is also often juxtaposed



with certification for the training audience.

The event is certainly a masterclass in strategic communication. Replete with rich learning opportunities, the AAR is a precursor to deeper dives into the highlighted themes. Indeed, the JWC's analysis team hopes that the themes raised in the AAR complement the director's observation guidance articulated at the earliest stages of exercise development, and also SACEUR's focus areas and local commanders' guidance on observation priorities.

As a professional practice, the idea of taking time to reflect on personal and collective performance is gathering wider interest and adoption. Academically it plays a key part

in postgraduate assessments. It is an established practice in the nursing and teaching professions, with the intent of encouraging practitioners to understand their central role in affecting outcomes in their organization. It sustains the principle that the vector of the message has as much influence as the message itself.

The practice also encourages practitioners to conduct a personal learning loop to identify their role in the task accomplishment and to improve their performance in the process. To many, some reflection comes naturally, but a formal process, or external encouragement such as mentoring or coaching, can tease out further insights.

Below, from top

The AAR for Exercises TRIDENT JUNCTURE 2018 and STEADFAST JACKAL 2021. Photos by JWC PAO



"The AAR comes at a point of very public culmination of a two-year endeavour and 10 days of intense activity."



The author, Andrew Eden, during a briefing. Photo by JWC PAO

Returning to the AAR, as this edition of *The Three Swords* goes to press, we will see a revised edition of Bi-SC Directive 075-003 Collective Training and Exercises promulgated by the new custodian, Supreme Headquarters Allied Powers Europe (SHAPE).

Amongst other nomenclature changes, "Phase IIIB" will be known as the "EMPLOYEX" or the Employment Exercise, and the former "Stage 4 (Analysis and Reporting)" will become known as the "exercise feedback process." The AAR remains unchanged.

The new process is more forward-looking, incorporating and embedding experience at the forefront of the exercise planning process. This means that the AAR will, we hope, contribute to exercise design and execution in a more agile way, while remaining a vehicle for training audience reflection.

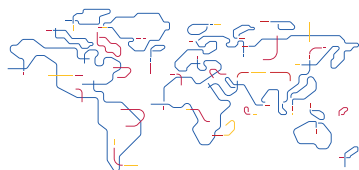
As the 2024 exercise programme takes shape as an ambitious sequence of endeavours demanding multiple commitments from the NATO Command and Force Structure headquarters, the AAR will continue to provide inspiration for successive training audiences to refine their exercise performance, collectively making NATO better. †

Multi-Domain Setting

The Joint Warfare Centre's

360° MDS

Scenario Design and Development



by Lieutenant Colonel Jürgen Moteka
German Army
Head of the Scenario Branch
NATO Joint Warfare Centre



THE JOINT WARFARE CENTRE (JWC) Scenario Branch provides comprehensive and realistic scenario background and supporting documentation to the JWC-directed exercises, tailored to meet both NATO and national requirements, and covering the Alliance's 360-degree view geographically. The mission of the Branch is to support Allied Command Transformation (ACT), one of NATO's two strategic commands that are part of NATO's Military Command Structure, in delivering training and exercise programmes to the Alliance. To this end, a setting as close to reality as possible as well as realistic exercise scenarios of the highest standard are being designed and developed, based on NATO's current and future concepts for the changing, complex strategic environment.

In line with today's intensified security challenges, the JWC has developed 360° Multi-Domain Setting (360° MDS), which serves as a basis for the development of all future training scenarios. This setting closely resembles reality, but is still adapted to meet exercise objectives.

The exercise scenarios to be developed for each particular exercise from 2024 onwards include a fictitious but realistic political, military, socio-economic, infrastructural, informational and geospatial environment, as well as the encompassing narrative on the political, strategic and operational levels of warfare.



Above
The author, Lieutenant Colonel Jürgen Moteka.
Photo by JWC PAO

Those combinations of the 360° MDS and the individual scenarios strengthen NATO's readiness and responsiveness and allow the Alliance to practice and exercise its fundamental tasks: deterrence and defence; crisis prevention and management; and cooperative security. The narratives are relevant to the particular operational- and strategic-level exercise programme, as each exercise is based on the 360° MDS and particular scenarios to be developed separately.

Scenario support is one of the cornerstones of the JWC's mission portfolio, funded through a multi-million NOK annual budget within the Centre's overall financial plan.

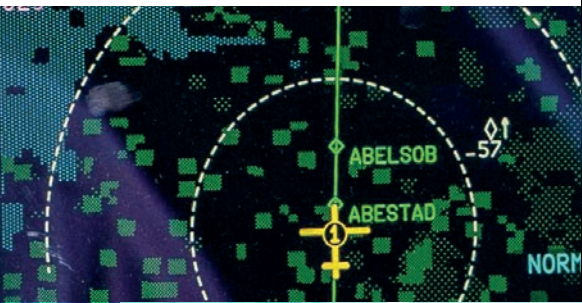
The scope of the 360° MDS and these individual scenarios allows for command post exercises (CPX) and computer-assisted exercises (CAX) in both Article-5 collective defence and non-Article 5 crisis response operations mode on various levels of effort, from divisional up to multi-corps, and in all domains and dimensions.

Within this broad spectrum, and in addition to the conventional spectrum of warfare, the JWC scenarios can also accommodate a wide range of modern warfare threads, such as space and cyber defence, civil-military interaction, hybrid warfare, state and non-state terrorism, and other measures aligned with the respective exercise and training objectives.

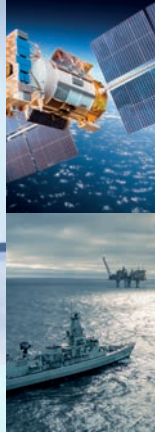
Before each exercise, military and civilian experts from a wide variety of fields and with extensive experience at all levels of command develop the information and documentation needed to support the training audience with the advice and content to replicate key actors and entities during the execution phase. Focus teams for military-political, strategic and operational planning; intelligence; targeting; and geospatial development assist in channelling the information flow in order to create a realistic

Below
Scenario Branch staff discuss geospatial aspects of the training scenario for NATO Exercise STEADFAST JUPITER 2023. Photo by JWC PAO





"The JWC's Scenario Branch continues to follow geostrategic developments and prognoses in order to allow NATO to exercise not recent, but future challenges."



Scenario Branch staff, scenario managers and mission partners from various JWC branches, August 25, 2023. Photo by JWC PAO

information environment as the source for the training audience's knowledge development.

As a whole, scenario support is coordinated by a small team of scenario managers who provide the interface to other critical elements and branches of the JWC's overall exercise programme. In the past, the JWC Scenario Branch has developed several generations of various settings, sub-settings and scenarios. Some of these exercise foundations have achieved prominence in NATO. SKOLKAN, SOROTAN, OCCASUS and FIKSO, for example, are names that are remembered by many and that have been used extensively in the past 20 years. Times have changed and this affects the NATO exercise process, the individual exercises, and thus also the foundations to be developed and provided by the JWC. OCCASUS and FIKSO will be used for the last time during the exercises STEADFAST JUPITER 2023 (STJU23) and STEADFAST JACKAL 2023 (STJA23), respectively.

FOR THE NEW EXERCISE series beginning from 2024, the JWC Scenario Branch has already started updating and redeveloping its products and adapting their design to the new requirements. The changing global security situation will be reflected in our products and mirror reality as closely as feasible and permissible. As an example, we will not give individual names to sub-settings anymore. The previous scale "setting – sub-setting – scenario" will be dissolved and reduced to the categories of "setting" and "scenario" only. It is important to clearly separate these two.

The 360° MDS will be managed exclusively by the JWC and cannot be changed by external entities. Our newly implemented setting management process is designed to ensure that the product is constantly and consistently updated, further developed and made available in the latest version for the next upcoming exercise through incoming information requirements (IR) as well as requests for in-

formation (RFI). Based on this continuously updated 360° Multi-Domain Setting, we then model the scenario required for the JWC's new respective exercise series: STEADFAST DETERRENCE, STEADFAST DUEL and STEADFAST DAGGER.

As in the past, these scenarios will also be designed to support the NATO Command Structure (NCS) and the NATO Force Model (NFM) in the training and exercise process, even if there should be further fusions of national and NATO exercises. The variety and design of challenging "problem sets" and the ability to combine them into a multitude of different scenarios are critical in flexibly tailoring major joint exercises (MJX) as well as smaller joint exercises (SJX) to existing and emerging requirements. As a key facilitator in this, the JWC's Scenario Branch continues to follow geostrategic developments and prognoses in order to allow NATO to exercise not recent, but future challenges. ✦

20
YEARS OF
THE JWC

The Joint Warfare Centre

WARFIGHTING CLUB

Raising Our Warfighting IQ

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

Above
U.S. Marines provide logistic support
to Finnish forces, November 30, 2022.
Photo by NATO

THIS ARTICLE WILL DETAIL the overall intent and framework of the Joint Warfare Centre Warfighting Club, focusing on its objective to raise the shared warfighting intelligence quotient across the organization through divergent thinking. It will explore the club's guiding principles that empower its participants through a culture of learning and growth, fostering intentional relationships, and sparking curiosity and creativity.





Explore the Unknown, Challenge the Familiar, and Question Everything

Watching a child explore and learn something new is fascinating. Do you remember what it was like to first learn what is now familiar to you? Do you remember when learning was fun?

Recently, the author and his wife took their children to their first local football match (soccer game, for fellow Americans) in Norway. The children took endless detours, dancing and twirling along as they stretched a 20-minute walk into almost 40 minutes. The run-on questions arguably contributed to oxygen depletion in the atmosphere. "Are we there yet? Why are we walking instead of driving? How long will the game last?" Unabating energy and chatter electrified the air. Tiny hearts were beating fast even before all the candy was consumed. During the game, the children rattled on with questions like a pair of medium machine guns with endless supplies of ammunition.

After the walk home, the children plummeted from their sugar highs and quickly fell asleep. The next morning, the six-year-old recalled intricate details of the football match and many of her parents' responses on the details of how to play the game. She drew pictures of the family outing and went outside to test her football skills against her mother.

Energy. Conversation. Divergence. Creativity. Relationship. Fun. And patience... a lot of (parental) patience. These things allowed a six-year-old girl's learning to flourish. Are these random occurrences that can only be enjoyed by children? Is there a design in this simple story that we can learn from and replicate in our profession as warfighters?

Crooked Sticks Can Draw Straight Lines: Unity Through Divergence

A natural truth of gardening is that we always reap what we sow — and that we cannot reap immediately after sowing. The same holds true for people. There is a way humans grow and develop. People take time. People have their own perspectives and personalities. If we hope to solve the complex, non-linear problems of warfare in pursuit of a unified future state, we can neither "microwave" shared understanding nor stifle divergent thinking and creativity.

The most meaningful applications of a proven developmental model, David A. Kolb's experiential learning cycle,¹ involve choices and actions that grant individual purpose and enjoyment through the effective development of new concepts and their applications.² Organizational growth and development demand a wide array of experienced input, since being an expert in one domain does not automatically make someone an expert in other domains. Divergence promotes and accelerates the creativity needed for such development.³ History teaches us that the champions of the most unusual and divergent ideas often achieve the greatest breakthroughs. These "crazy" ideas must then be translated into action by large groups of people, unified under the same purpose, to change industries, save lives, and win wars.⁴

Below
Unusual ideas often achieve the greatest breakthroughs: Decoy "Rupert" paratroopers used for deception in the Second World War during Operation TITANIC.⁵



Unfortunately, many organizations (especially military ones) often educate, train and evaluate in centres where rigid processes, doctrine, and self-assessment reign supreme. Assessments are often based on compliance with a process, following the assumption that adhering to processes leads to mission accomplishment. Such rationale may work in simple or even complicated systems, but it is paradoxical in the chaotic and complex systems of warfare.⁶ The intended message here should not be misinterpreted; processes, doctrine and self-assessment are not bad things. However, placing blind faith in their merit, and failing to constantly question, challenge and prove their efficacy, is foolish behaviour. To create, develop and learn as a warfighting organization, we must ask thoughtful questions, create space for individual and collective meaning-making, and promote non-linear and divergent thinking.

But how often do we only receive input from one perspective and are then tasked with creating cross-functional, action-oriented results — without having space to grapple with our understanding of the matter at hand? How often do we truly seek out (or even listen to) the "crazy" ideas in the room? Is blindly accepting and submitting to someone else's thoughts the hallmark of a professional warfighter? Is there not perhaps space for challenging biases and applying our own meaning-making?

It is no less absurd to think we can ignore divergent thinking and rush to informed, cross-domain solutions in warfighting than it is to think the author's daughter can understand football without making space for her saturation, incubation, illumination, and application of the sport. It bears repeating: There is a way people grow and develop.

Our Intent

Our Warfighting Club (WFC) intent provides the holistic structure that has been lacking in some facets of warfare development. The methodology is a creative adaptation of guidance from General David Berger, the 38th Commandant of the United States Marine Corps, who is one of the top senior leaders and warfighters of our generation.⁷ This vision is essential



“To learn as a **warfighting organization**, we must **ask** thoughtful questions, **create** space for individual and collective meaning-making, and **promote** non-linear thinking.”



The JWC Warfighting Club aims to:

- Empower warfighting culture across the Alliance
- Engage warfighting curiosity
- Energize warfighting creativity

in establishing our success. Our WFC battle rhythm makes the space for collaborative, intelligent growth.

Quick to Speak and Slow to Listen: A Course of Looming Failure

As with most maiden voyages of ships, rough seas will challenge the crew's resolve and the simple excitement of novelty will eventually fade over the course of the journey. For these reasons, it is just as important to imagine — and reinforce against — our failure as it is to define our starting point. In doing so, we can outline some guiding principles to help us stay on the desired course.

Intellectual arrogance and exclusion are sure catalysts to our demise. Research has shown that being an expert in an area, or assuming to already know the answers to problems posed, can create bias, preclude collaboration and otherwise make it difficult to maintain an open and creative mind.⁸ Even seemingly strong organizations and individuals are often unable to enact intelligent change due to habit-based bias. These habitual

thoughts and actions, especially when devoid of reflection and holistic feedback, result in fragile individuals and teams that repeatedly shy away from the unfamiliar.⁹

Leading in Word and Deed

The senior leadership at the JWC understands that identity drives our actions and shapes our future. The team has embraced the identity of a learning organization and realizes that such organizations must transform from a single-minded, hierarchal focus to the precept that all are equally valued and should engage in a collaborative, interpersonal learning experience.

This is all rooted in the understanding that before experiencing the benefits of self-motivated, successful development, groups of people must accept the fact that life-long learning is best achieved with and from oth-

Above Participants explore and challenge ideas on multi-domain operations with Major General Piotr Malinowski, Commander JWC, and Brigadier General Mark A. Cunningham, Deputy Commander and Chief of Staff. Photos by JWC PAO

ers.¹⁰ Collectively accepting and applying Kolb's model helps to combat intellectual arrogance and exclusion while promoting meaningful hypotheses, research and development in the organization through continuous reflection and feedback.¹¹

Guiding Principles to Fight and Win

While a strong identity is crucial, identity alone is insufficient to guide us. If we are honest, we have all encountered someone who clearly articulated their identity, but whose arrogance and self-fascination made them miserable to work with (or for). If we are more honest yet, we have all been that miserable person to



someone else. Perhaps humility provides the best starting, acting, and ending posture for our organization.¹²

Let us conclude by refocusing on what matters most: people. The WFC acknowledges that people, first and always, are the key to our strength and success. We submit that ideas and technologies are meant to serve and empower our people, and never the other way around. At its core, warfighting is a people business that inflicts mental, physical, and spiritual harm on its victims. Victory remains non-optional. We must press through. For these reasons, we choose humility, identity, resilience, and teamwork (HIRT) to guide us in the face of warfare's complexity and hurt.

- **Humility:** This is our starting, acting, and ending posture. We must promote a culture where all are recognized as students of each other's experienced thoughts, actions, and reflective feedback. All members must be quick to listen to, deliberate to understand, and eager to practice each other's ideas.

- **Identity:** All must understand who they are and why they are valued, both as individuals and as team members. We must clearly articulate our purpose and desired future state. Our thoughts must be divergent and our actions must be decentralized to leverage the team's creativity and strength.

- **Resilience:** We accept and press through every task or challenge with unified tenacity and unwavering positivity. We are always attentive to, but never fascinated or bound by, our thoughts, surroundings, circumstances, or opposition.

- **Teamwork:** A culture of collaboration and feedback must be pursued and welcomed both from inside and outside of our team, ultimately promoting timeless and unbiased growth. Teamwork ties the other three principles together and empowers us to be the team with (and on) which everyone wants to work.

Victory Through HIRT: An Invitation to Develop Our Future Together

As we reflect on the past 20 illustrious years of the JWC, we are excited and hopeful for continued success in our future. Built on our guiding principles, our WFC ethos of "Victory Through HIRT" is a reminder that we are at our best when we are together. ✦



If you wish to learn more, share ideas for quarterly topics, or simply stay updated on the club's development, please email our facilitators at warfightingclub@jwc.nato.int.

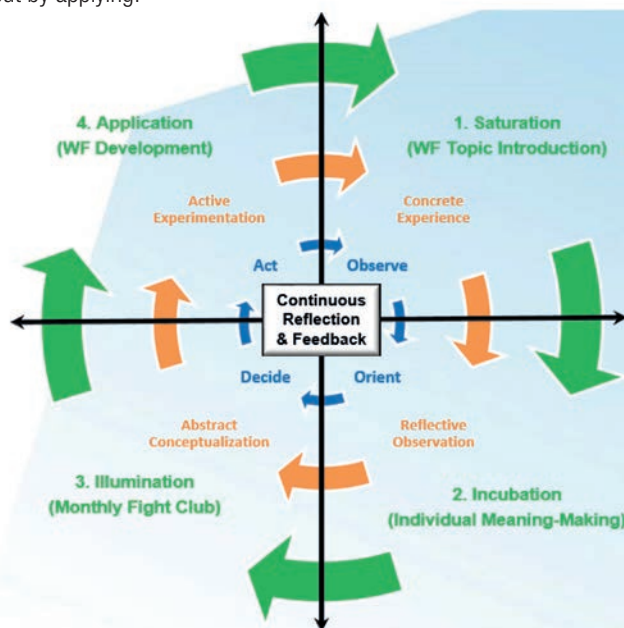
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- 11 Wallace, D. (2019). Parts of the whole: Theories of pedagogy and Kolb's learning cycle. *Numeracy*, 12(1). <https://doi.org/10.5038/1936-4660.12.1.17>
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Boyd's OODA loop + Kolb's experiential learning theory = Warfighting Club's methodology

The WFC Method: Conduct a monthly gathering with a quarterly, actionable output by applying:

- **Adult learning methodology** with an emphasis on teamwork, problem-solving, and enabling the ability to cycle through the OODA (observe, orient, decide, act) loop faster than any opponent we may face with a bias for intelligent action becoming second nature to all.
- An approach that is focused on **active learning** using a problem-posing methodology, while challenged with problems as groups in order to **learn by doing** and also **from each other**.



The JWC's operational-level exercises are the ideal venue to develop the military resilience concept. They merge the political and military strategical aspects from above with the civil and military tactical-level implications from below.



Photo by Torbjørn Kjosvold, Norwegian Armed Forces

The Future of NATO's

RESILIENCE

Concepts and Wargaming

by **Lieutenant Colonel Jeroen van Mill**
Royal Netherlands Army
Concepts, Capability Integration and
Experimentation Branch
NATO Joint Warfare Centre

Resilience and civil preparedness were important aspects of national defence during the Cold War period. Post-1989, there was a reduced focus on resilience, but this started to change as Russia grew increasingly aggressive. Disruptive events included the Estonia 2007 cyber attacks, the 2008 Russo-Georgian War, and the Russian annexation of Crimea in 2014, evolving into Russia's unprovoked invasion of Ukraine in 2022. All these events inevitably led to a sharper focus on — and a new framing of — resilience by NATO.¹





The Layered Resilience Concept considers military and civil resilience necessary to support the military instrument of power.



Resilience was prominently mentioned in 2014 in Article 23 of NATO's Wales Summit Declaration. After the North Atlantic Council convened in 2016, NATO underlined the importance of resilience in Article 73 of the Warsaw Summit Communiqué. Alliance leaders agreed on seven baseline requirements for resilience. In 2018, the Brussels Summit Declaration addressed enhancing NATO resilience in support of strengthening the Alliance's deterrence and defence posture. In the 2019 London Declaration, the NATO heads of state and government agreed to continue to increase resilience.

At the 2020 GLOBSEC Bratislava Global Security Forum, Secretary General Jens Stoltenberg contextualized and emphasized the future of Alliance resilience: "In fact, resilience is in NATO's DNA... Article 3 of the Washington Treaty places a duty on Allies to become more resilient. When the treaty was written, the concern was an armed attack from the Soviet Union. Today, we face a far broader range of challenges. That is why boosting resilience is a key task for the future."

The Allied leaders agreed in the 2021 Brussels Summit Communiqué and then in 2022 in the Madrid Summit Declaration to enhance resilience. These communiqués and declarations can be seen to form a body of evidence, not only of the evolving nature of resilience within the Alliance, but also of the importance of resilience to Allies. Finally, Headquarters Supreme Allied Commander Transformation (HQ SACT) has responded

with the development of the Layered Resilience Concept as one of the lines of delivery under the Layered Resilience Warfare Development Imperative, agreed by chiefs of defence as one of their priorities from the NATO Warfighting Capstone Concept (NWCC) outputs.

The aim of this article is to inform about some of the developments in the Layered Resilience Concept by looking at some working descriptions, providing information on the role of resilience in transformation, highlighting a possible relationship with wargaming and concluding with some options for action.

Above, clockwise
 Exercise ARCTIC BOLT 2022, photo by Synne Nilsson, Norwegian Armed Forces; medical tents during JOINT VIKING 2023, photo by Torbjørn Kjosvold, Norwegian Armed Forces; U.S. Army tank transporter tractors, photo by NATO. An illustration of the smart city concept, Shutterstock



Civil Resilience

To enhance resilience by civil preparedness and boost NATO's resilience to the full spectrum of threats, the Allied leaders agreed seven baseline requirements for national resilience. These are guidelines to continue developing countries' individual and NATO's collective capacity to resist any form of attack. Member states can measure their level of preparedness against these requirements.

1. **Assured continuity of government and critical government services:** for instance the ability to make decisions, communicate them and enforce them in a crisis;
2. **Resilient energy supplies:** backup plans and power grids, internally and across borders;
3. **Ability to deal effectively with uncontrolled movement of people,** and to de-conflict these movements from NATO's military deployments;
4. **Resilient food and water resources:** ensuring these supplies are safe from disruption or sabotage;
5. **Ability to deal with mass casualties and disruptive health crises:** ensuring that civilian health systems can cope and that sufficient medical supplies are stocked and secure;
6. **Resilient civil communications systems:** ensuring that telecommunications and cyber networks function even under crisis conditions, with sufficient backup capacity. This requirement was updated in November 2019 by NATO defence ministers, who stressed the need for reliable communications systems including 5G, robust options to restore these systems, priority access to national authorities in times of crisis, and the thorough assessments of all risks to communications systems;
7. **Resilient transport systems:** ensuring that NATO forces can move across Alliance territory rapidly and that civilian services can rely on transportation networks even in a crisis.

These requirements reflect the three core functions of continuity of government, essential services to the population and civil support to

the military, which must be maintained even under the most demanding circumstances. They are all connected, which means: if one area is affected, another may suffer as a result.

Military Resilience

NATO's military resilience is developed as a layer of the broader Alliance resilience in order to create better understanding and to acknowledge and highlight the interdependency of the military instrument of power and the civil resilience layer. The HQ SACT-developed working definition of military resilience from the read-ahead package of the Bucharest Layered Resilience Seminar in October 2022 is as follows: "A resilient NATO military instrument of power, or simply military resilience, supports the deterrence and defence of the Alliance through its ability to anticipate, prepare for, and adapt to threats and hazards and to withstand, respond and recover rapidly from strategic shocks."

The 2019 NATO Military Strategy defines the military instrument of power as "the primary instrument for the Alliance. It contributes to the achievement of the Alliance's political objectives in coordination with the Alliance's other instruments of power, across the entire network of partners and internation-

al organizations, through a whole-of government approach that recognizes the relevance, and often the precedence of other instruments of power in advancing Alliance interests. This approach combines diplomatic, information, military and economic (DIME) instruments based on principles such as civilian-military interaction, coherence of actions, and cooperation with external actors as appropriate."

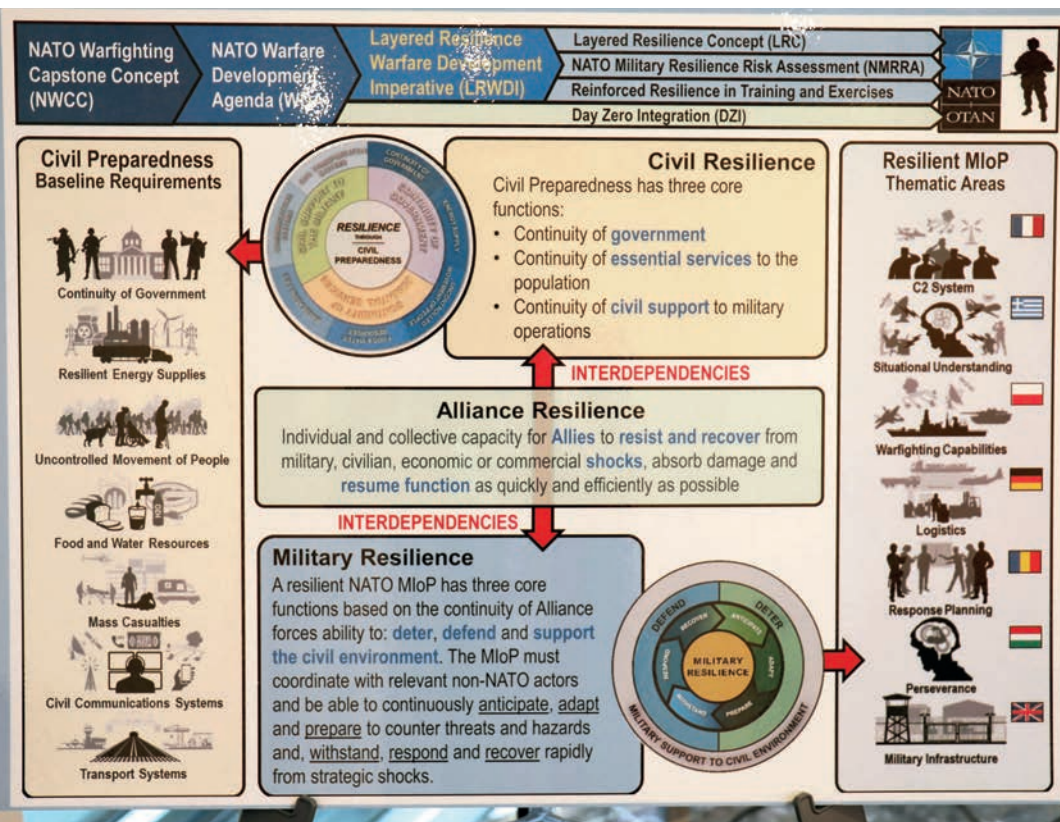
In the working definition, the ability is further explained by military resilience tasks in different phases of conflict. The distinction is made between resilience as a process and the resulting military resilient capabilities.

Military Resilience Concept

The Layered Resilience Concept considers military and civil resilience as two layers necessary to support the military instrument of power and explains these two mutually reinforcing layers. The key focus of the concept is military resilience and its overall aim is to increase understanding of military resilience and

Below
The author, Lieutenant Colonel Jeroen van Mill (left) speaking with Vice Admiral Guy Robinson OBE, HQ SACT Chief of Staff, at the NATO Resilience Symposium, April 26, 2023. Photo by JWC PAO





Above
NATO's Layered Resilience Concept. Photo by JWC PAO

its interdependencies with civil resilience. This will strengthen NATO's ability to withstand, recover and adapt from strategic shock.

Due to the complexity and scale that resilience represents, the Layered Resilience Concept offers a thematic framework of seven military resilience areas. Each of these areas is being addressed through a thematic working group, each led by an Allied nation:

1. Command and Control (C2) System (France)
2. Warfighting Capability (Poland)
3. Situational Understanding (Greece)
4. Logistics/Deployability of Forces (Germany)
5. Response Planning (Romania)
6. Military Infrastructure (United Kingdom)
7. Perseverance (Hungary)

With support from stakeholders and subject matter experts from all relevant fields, these thematic working groups will undertake a deep-dive to develop subordinate conceptual work that informs the overall concept development. This thematic approach allows for effective consideration of existing cross-cutting work within the Alliance and for a more systematic approach in identifying potential risks, vulnerabilities and critical shortfalls that need to be addressed in future military instrument of power development.

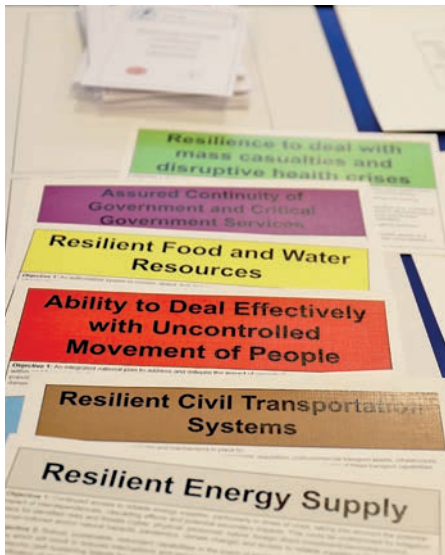
Resilience in Transformation

With many different definitions of resilience and many perspectives, resilience can be regarded as a fuzzy concept with multiple meanings.² The diversity of meanings and perceptions imposes epistemological and methodological challenges and makes it difficult to operationalize military resilience. An important instrument for the operationalization in NATO transformation is the NATO Concept Development and Experimentation

(CD&E) process. As described in the NATO CD&E Handbook, in the development of the military resilience concept via this CD&E process, the venue of operational-level exercises can provide an opportunity for development. The operational level is the ideal venue because it merges the political and military strategic aspects from above with the civil and military tactical-level implications from below.

As the Alliance's provider of complex command post exercises at the operational and strategic levels, the Joint Warfare Centre (JWC) is uniquely positioned at the confluence of these processes to meld stimuli and present complex resilience challenges to NATO's training audiences. The resilience community of interest is represented by key stakeholders during operational-level exercises, among them the military training audiences, nations, and non-governmental and governmental organizations. On the one hand, operational-level exercises integrate civil and military resilience in military processes at the operational level and on the other hand, they create more resilient capacity at this level.





Above
A close-up of the JWC's resilience-themed WISE AEGIS wargame. Photo by JWC PAO

Resilience in Wargaming

Wargaming is an effective tool to build an environment before, during or after an exercise to create a different context in which to explore aspects that could not be explored in the main phases of an exercise. The safe-to-fail environment exists because of the potential to constrain the nature of the wargame: It is accepted as a further level of abstraction from that of an exercise. It is designed to explore specific issues, and so failures within the wargaming context do not imply the failure of an operation. It also provides the possibility of supposing a more extreme case of national civil resilience breakdown, with nations likely permitting a level of degradation beyond what they would normally expect in an exercise, accepting that the wargame is there to explore a generalized possible future.

Wargaming is increasingly recognized as a potentially powerful tool both to shed light on existing problems and in support of concept development to solve a future capability gap.

Options for Action

To conclude, enhanced resilience will remain a key focus for NATO, and this is a capability that must be understood and managed at multiple levels: political-strategic, military-strategic, operational and, in the case of military resilience, tactical. In addition, stakeholders require flows of information between all these

levels and from lower tactical levels. The Alliance will address this important area by developing, implementing and operationalizing the Layered Resilience Concept with an initial emphasis on military resilience.

The JWC's operational-level exercises are the most important venue to transform the theoretical concepts into applied capabilities, with support from all stakeholders and subject matter experts — including academia and industry — and in line with practitioners' perspectives, to create a more resilient military instrument of power. Resilience is more than merely a vague buzzword in the line of flexibility, adaptability and resilience. Both resilience, as a vital concept for the Alliance, and resilience wargaming, as a valuable tool for exploring and training it, are here to stay. ✦

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There are different factors influencing the bidirectional discourse about transformation via exercises. One perspective is in favour of creating a steeper learning curve and thus more training effect by creating a safe-to-fail-training environment. The scenario opposing forces (OPFOR), for example, are often in favour of an approach that sees the training audience going beyond the point of failure.

However, the other perspective holds that an exercise is to show potential adversaries that NATO is ready to defend every inch (territory), byte (virtual) and neuron (cognitive), so training audiences cannot fail. Failure can never be an exercise aim because an exercise is about achieving training objectives to ensure units have the necessary certifications. Exercises necessarily take place in a secret environment, making them less accessible to industry and academia. The impact of civil degradation on military operations is generally slow, and thus very hard to integrate into the script for an exercise's 10-day execution window.

Compared to exercises, wargames with specific objectives could be a better venue to create safe-to-fail environments and thus facilitate transformation. A wargame can be designed for a specific aim, in line with the available time as well as human and financial resources — and unlike an exercise, without impact on other training objectives.



Lieutenant Colonel van Mill (middle) during a meeting with Transformation Delivery Division staff in preparation for Exercise STEADFAST JACKAL 2023. Photo by JWC PAO



Left
The author, Paul Sewell (top right), with the rest of the JWC's One Team facilitators, supporting the JWC's One Team ethos. Photo by JWC PAO

A great deal of work has already been done. Some examples include:

- The development of a streamlined online handover/takeover (HOTO) process to capture the knowledge of staff before they leave (which has also been adopted by several other organizations within NATO);
- An annual climate survey, which taps into the "atmospherics" of the staff, providing invaluable feedback to leaders at all levels and identifying new ideas and areas in need of focus;
- Proactive and bespoke team development programmes for teams at all levels of the organization to find better ways of working;
- A highly comprehensive and integrated newcomers' training programme aimed at preparing the new staff so that they are able to contribute to the JWC's mission more quickly.

Many NATO commands have taken an interest in the JWC's approach to improving organizational culture. In other words, the JWC continues to be held in high regard as a resource for managing and understanding organizational culture and human capital. The One Team ethos has indeed become an enabler for strong collaborative and innovative work across the many nations, services, and working styles of our diverse and engaged staff.

In conclusion, the main goal of our organizational development and culture work is simple: that the JWC be seen as the best possible location to get a comprehensive education in NATO joint operational- and strategic-level training. But our goal is also to be a place where staff are given meaningful work, which taps into their unique set of skills and experience, and which ultimately contributes to the safety and security of the Alliance. ✦

The JWC's One Team Ethos

by **Paul Sewell**
NATO International Civilian
Organizational Development and Culture
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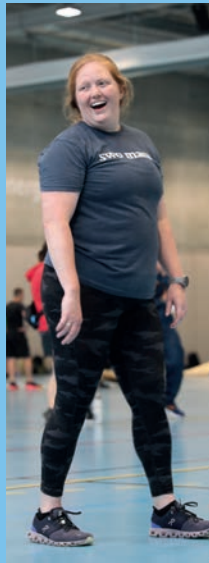
TRADITIONALLY, organizations focus on a clear strategy before creating the structure to support it. In recent years, however, organizations have begun to focus on what is known as the "third pillar" of organizational effectiveness: culture.

As abstract as "culture" may sound, it actually has a direct and tangible effect on not only the strategy and structure, but also on the people who work within it. The Joint Warfare Centre's (JWC) One Team approach provides

workshops that differ from most NATO courses in that they expose the staff, in interactive ways, to aspects of organizational culture and ways of working in a multinational environment. The programmes include over 20 concepts, such as "Be Here Now," "Levels of Listening," "The Mood Elevator," "Gravity," "Energy" and the "Accountability Ladder."

As the JWC's matrix organization developed and evolved, the leadership started seeing the One Team ethos as a vital resource in continually shaping the organization and its staff in line with the mission. This work would not only encompass the existing One Team programme work, but also focus more broadly on programmes and initiatives to improve the JWC and its output.

The JWC underscores workforce diversity and celebrates its community spirit in various community events and activities. The photos below include Major General Piotr Malinowski, Commander JWC, and Brigadier General Mark A. Cunningham, Deputy Commander and Chief of Staff, at the JWC Library to recognize the "top readers" in the U.S. Department of Defense-sponsored Summer Reading Program for children; the JWC's Field Gun Team at the Brickwoods Field Gun Competition after winning the "Soapy Watson Plate" and the trophy for the cleanest run; as well as the JWC International Day and the Sports Day.



• ONE TEAM •

RESEARCH/ OPINION

IN THIS SECTION

How Commanders Make Decisions – and What Staffs Can Learn
Nuclear Deterrence
Cognitive Warfare
Cognitive Bias
The High North and the Arctic

HOW COMMANDERS MAKE DECISIONS – & WHAT STAFFS CAN LEARN



Always ahead: Flight deck of the USS Harry S. Truman. Photo by Bela Chambers, U.S. Navy

Scan the code below to read the original research article published in *Scandinavian Journal of Military Studies* about commander-staff relations and the difference between structured and intuitive decision-making.



by **Major Søren Sjøgren**
Royal Danish Army
Military Analyst at the Royal Danish Defence College

WHAT IS A HEALTHY staff-commander relationship, and how do commanders understand the command function? This article is an abridged and adapted version of the research article "What Military Commanders Do and How They Do It" (available via the QR code). It is based on my interviews with 33 former and current NATO commanders and senior staff officers.



We can sum up their key perspectives as follows:

- Commanders support a conservative or doctrinal definition of command as well as clear divisions of labour, authority and responsibility.
- Commanders make key decisions in the planning process based on professional judgement, discretion and intuition.
- Commanders find value in structured decision-making processes but recognize that these tend to produce predictable solutions.

Command is Personal

NATO defines command as "the authority vested in a member of the armed forces for the direction, coordination, and control of military forces."¹ Command is personal and deals with authority. The asymmetry between the command and subordinates is visible in at least two instances in the planning process: when the commander issues the initial planning guidance, and at the decision brief when the commander approves the plan.

In my interviews, every commander emphasized their responsibility for the plan and their involvement in its conception. U.S. Army General David Petraeus explained his own approach in this way:

"I personally built templates well in advance of major exercises and combat operations to ensure that I provided all necessary planning guidance and then adapted them to the actual situations we encountered. I shared them with key staff members for feedback in advance, but then refined the guidance myself."

NATO doctrine states that planning is commander-centric, and there is a debate on command-led and staff-driven operations. However, when I asked the commanders to give examples of how they developed and provided the initial planning guidance, they gave similar answers.

Commanders habitually invite others to participate in the development of their initial guidance. In the German staff system, this is a doctrinal principle involving the chief of staff; in other national systems, this involvement is more ad hoc. In any case, it takes the form of feedback. It is the commander who provides

guidance, although sometimes this may be delegated to the chief of staff, acting on the commander's behalf.

How Commanders Decide

We might ask why we even need input in the form of initial planning guidance or a draft intent. Could the staff not use the planning process to analyse the situation, wargame the courses of action, and devise the optimal solution? Exercise scenarios are most often designed to test staff processes. Reality, however, presents more ambiguity and operational dilemmas, even at the earliest planning stages. Lieutenant General Mart de Kruif of the Royal Netherlands Army explains:

"I think the ultimate challenge at the operational level is how you translate sometimes very vague military-political guidelines into clear military missions. And that is not science. That's an art."

There may not be analytical, logical or procedural answers to operational problems. When facts are ambiguous, contradictory and far-flung, individuals inject much of themselves into their decisions.²

The most formative experience generals spoke of in the interviews were exercises in which they tried to do everything by the book and failed because this approach rendered them predictable. Lieutenant General de Kruif

shares his experience as a battalion commander in Hohenfels in 1996:

"We used this three-to-one mathematical approach. We did a doctrinal defence with certain lines, penetrations, counterattacks, and support, you know? And we were smashed to pieces by OPFOR. We were completely smashed to pieces by OPFOR! Why? Because we declared doctrine as the absolute principal guideline for operations. And doctrine is just a framework for thinking. If you don't add surprise, creativity, and risk towards doctrine, it will get you nowhere. It will get you nowhere!"

Commanders must recognize that when facing an adaptive enemy that fights to win, something needs to be added to doctrinal or procedural approaches. Thus, military officers and commanders should know the procedural approach to planning and decision-making and recognize its limits. Experienced decision-makers draw on the repertoire of cases they have previously seen and inject this experience into the situation, here in the form of guidance and key decisions.

How Staffs Work

Staffs work according to linear logic and follow the procedural steps in the planning process. Without explicit guidance or at least encouragement from the commander to challenge the planning parameters, staff cannot produce



much more than textbook manoeuvres. Polish Lieutenant General Andrzej Falkowski put it this way:

"We are too much into keeping the doctrine, keeping these standard operating procedures; we are coming with the same solutions, which is a big mistake [...] There must be some margin for finding solutions that are outside the box."

When a situation changes, as it inevitably does at some point, it is hard for the staff to return to a previous planning step to incorporate the new situation. Such backtracking could derail the process and destroy the internal synchronization of the staff. The procedural approach fuels an inward focus, and the mere management of resources can consume the entire staff. Doctrine and processes exist to make coordination and synchronization efficient; however, if not guided, blind compliance also runs the risk of becoming an end instead of a means to an end.

Yet, not a single one of the commanders and staff officers I interviewed dismissed the value of the structured work of the staff. U.S. Army General John Nicholson said:

"We had a very detailed planning process, because in the planning process, you seldom actually followed the plan that you wrote, but the process of planning enables you to have a shared understanding of the problem and a shared visualization of how you were going to solve the problem. This was really the important thing that emerged from deliberate planning. Not the solution itself."

The procedural focus ensures that the intuitively developed initial guidance is feasible. Indeed, commanders know that they are fallible and thus emphasize the importance of a command climate in which staff officers speak up when they see things differently. U.S. Marine Corps General James Mattis put it this way:

"There's nothing closer to God on Earth than a general, frankly. I mean, people even laugh if you tell a stupid joke. Everybody is there to pat you on the back and say that you're a good guy. You need to keep a couple of contrarians around."



"Intuitive decision-making also offers the option of making quality decisions faster."

The "contrarian" is not necessarily one person, but rather a climate that ensures diversity of thought and that dissenting voices are heard. Commanders need to have their ideas challenged.

Helping the Commander Succeed

In an ideal world, we could combine the different approaches. Perhaps planning is and should still be considered the rational alignment of how "actions (ways) and resources (means) are employed to achieve (ends)."³ While this may be achieved through a relatively rigid planning process and adherence to procedure, as staff officers, we should always seek to understand our commander's intentions. There is rarely only one viable solution to an operational problem, and every plan must be based on assumptions about the enemy, other actors, and our forces' capabilities. We do not know these things; we assess them. Overlaying this assessment is the commander's appetite for risk. It is our job to analyse how their intent can be achieved and what the consequences might be. We cannot expect the commanders to assess the details.

The commanders, in turn, must ensure they have ample time to devise and communicate their intent with the staff, sometimes pushing for thinking that challenges the prevalent planning parameters and leaving the relatively safe space of procedural reasoning for a while. It is not that the commander is necessarily a better decision-maker or the military genius that Clausewitz argued for. Command is a professional function that guides and balances the staff, and the commander issues guidance and makes critical decisions as a central part of this function.

What Can We Learn?

Given the importance of two-part exercises, we should create more of such training events. Implementing even more full-scale exercises may be too resource-intensive, whereas wargames and military history may offer viable options to learn that procedure is essential, but not sufficient. Building intuition requires deliberate practice, an environment in which it is safe to fail, and a focus on whether and why a plan worked, rather than a focus on following the process to the letter.⁴

Intuitive decision-making also offers the option of making quality decisions faster, since the well-trained intuitive decision-maker can quickly separate the important from the unimportant. This practice could be a way to slim our staffs, speed up the orders process and produce notably shorter orders. ✦

ENDNOTES

- 1 NATOTerm — The NATO terminology database, accessed March 21, 2023, <https://nso.nato.int/natoterm/content/nato/pages/home.html>.
2 NATO 2022 Strategic Concept, p. 1, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf
- 3 Sydney Finkelstein, Donald C. Hambrick, and Albert A. Cannella, *Strategic Leadership: Theory and Research on Executives, Top Management Teams, and Boards*, Strategic Management Series (New York: Oxford University Press, 2009).
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Nuclear capable B-2A Spirit.
Photo by Staff Sgt. Bennie J. Davis III



A computer graphic image of the UK's nuclear capable Successor class submarine. © Crown Copyright 2013 Photo by BAe Systems



Norwegian F-35 armed with missile.
Photo by Ole Andreas Vekve, Norwegian Armed Forces

STRATEGIC PILLAR OF THE ALLIANCE

NUCLEAR DETERRENCE

Part 1

by **Wieslaw Gozdiewicz**
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WHILE THE WAR in Ukraine has not changed anything in the nuclear doctrine of NATO and the three nuclear-capable member states, and the Russian doctrine in this respect did not evolve, Russia's aggression against Ukraine could, in my opinion, affect the strategic calculations of Russia on the use of tactical nuclear weapons.



NUCLEAR DETERRENCE

This article, written in two parts, is based on information from open sources. Conclusions presented here are the personal views of the author and should not be identified with the official position of any government, NATO or any NATO entities. The second part of the article will be published in the next edition of the magazine.



F-35A is planned to be nuclear-capable by 2024.
Photo by Hedda Gjerd Grindhaug, Norwegian Armed Forces

More than 12,500 nuclear warheads are reportedly active worldwide, the vast majority of which (90 percent) are in the possession of the U.S. and Russia. Although the number of nuclear warheads held by the two most potent nuclear powers has been reduced significantly under successive disarmament treaties, these quantities are still sufficient to devastate our entire planet more than once in the event of a full-scale nuclear conflict.

Tactical nuclear weapons are intended for use in direct combat operations, in which they are to be carried over short distances (up to 500 kilometres). Due to the relatively low yield of the warheads, they can be used to achieve a tactical advantage over the enemy, but also against targets of strategic value.

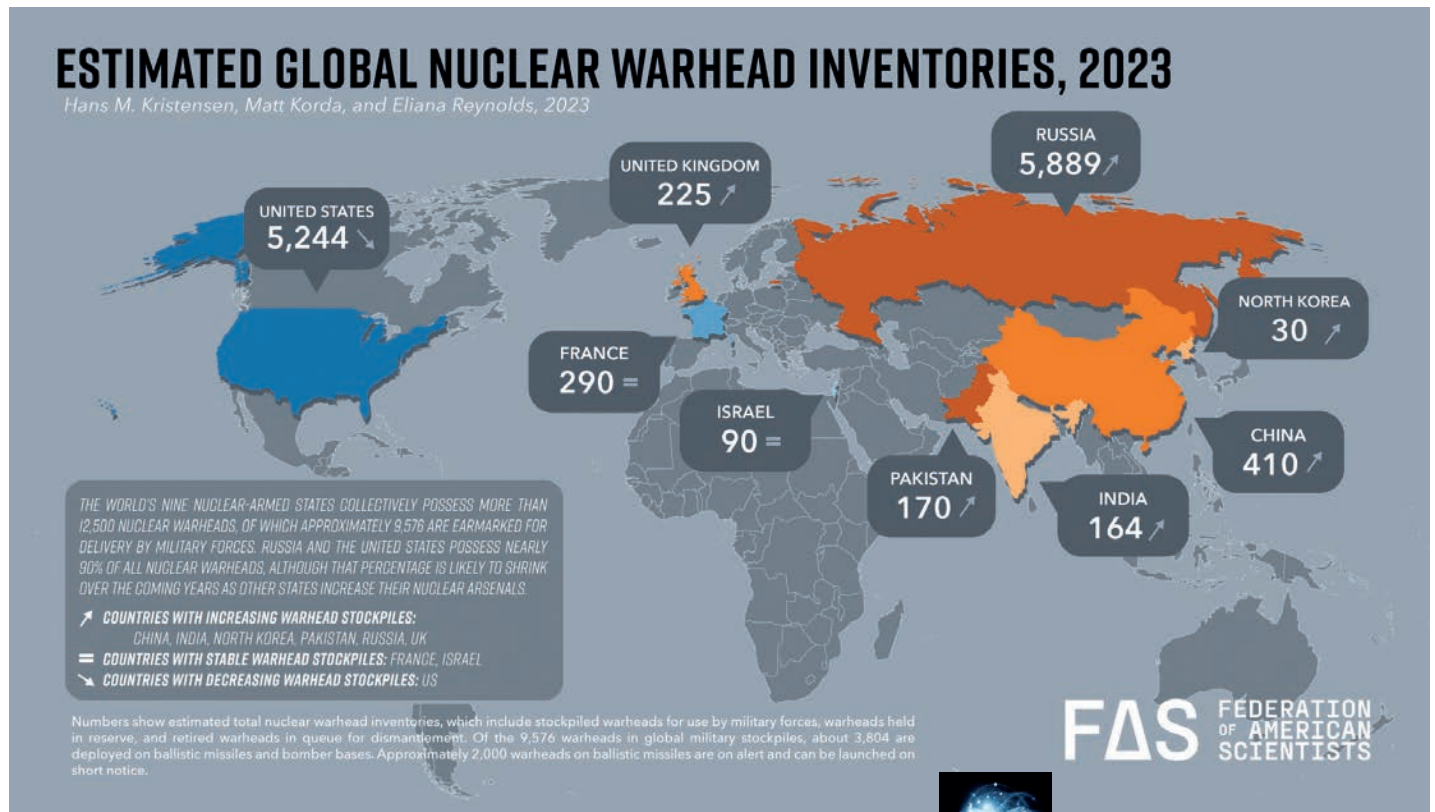
It is estimated that there are currently about 230 tactical nuclear charges in the U.S. arsenal, of which about 100 are located in Europe, while in the Russian arsenal there may be up to 2,000 such charges.¹ This disproportion may have an impact on the shape of the policy and doctrine on the use of tactical nuclear weapons by these countries, which will be discussed in more detail below.

NATO is a nuclear alliance, and its official position is that it will remain a nuclear alliance as long as nuclear weapons exist.² In the current Strategic Concept, the Alliance states that NATO's deterrence and defence posture is an appropriate combination of nuclear, conventional and missile defence capabilities, complemented by space and cyber capabilities.³

The Deterrence and Defence Posture Review (DDPR),⁴ endorsed at the NATO Summit in Chicago in May 2012, stresses that the primary objective of the Alliance's nuclear forces is deterrence, which is essentially a political function. The Alliance will exercise political control over nuclear weapons, and nuclear planning and consultation within the Alliance will be in line with political guidelines.

It should be noted that NATO as an alliance does not possess nuclear weapons. Instead, the Alliance's three individual nuclear-capable member states maintain absolute

Below
The world's nuclear weapons illustration
by Federation of American Scientists
(FAS). <https://fas.org/initiative/status-world-nuclear-forces/>



oversight and control over their weapons, which can be made available to other Allies under so-called nuclear sharing agreements. According to a fact sheet by the Center for Arms Control and Non-Proliferation, "U.S. Nuclear Weapons in Europe," dated August 18, 2021, it is estimated that there are 100 U.S.-owned nuclear weapons stored in five NATO member states across six bases: Kleine Brogel in Belgium, Büchel Air Base in Germany, Aviano and Ghedi Air Bases in Italy, Volkel Air Base in the Netherlands, and Incirlik in Türkiye.

The fact sheet explains that these nuclear weapons are entirely B61-3 and -4 gravity bombs. Additionally, Czech Republic, Denmark, Greece, Hungary, Norway, Poland and Romania participate in the Support of Nuclear Operations With Conventional Air Tactics (SNOWCAT), providing assistance in nuclear missions through conventional air support.

The B61 is a tactical (though actually "non-strategic") nuclear weapon with variable (adjustable) yield from 0.3 kilotons to 400 kilotons equivalent to TNT.⁵ These bombs are supposed to be stored in NATO member states for use by dual-capable aircraft (DCA), i.e. aircraft capable of carrying both conventional and nuclear weapons. In the inventory of the countries listed above, these are the F-16, F-35 and Panavia Tornado. The Eurofighter Typhoon can also play this role, but none of the countries using it has carried out appropriate certification (at least to my knowledge), although there were signs that Germany may decide to take such a step in the face of the inevitable end of the exploitation of the "Tornadoes."⁶ The French Air Force also has dual-capable aircraft (Mirage 2000 and Rafale), but France does not participate in the Alliance's nuclear planning.

THE NUCLEAR PLANNING GROUP (NPG) is the Alliance's main multilateral forum for nuclear policy and includes all members (whether they themselves possess nuclear weapons or not), with the exception of France, which decided not to participate during De Gaulle's presidency. The NPG High-Level Group (HLG) was created in 1977 to meet the challenges posed by new Soviet nuclear systems, especially the SS-20 ballistic missile system. It continues to serve as the NPG's senior advisory body on nuclear policy and planning issues, and oversees the safety, security, and "survivability" (ability to survive an adversary nuclear

strike) of nuclear weapons.

While the NPG is led by NATO's International Staff and operates under the leadership of the Secretary General, the HLG is led by the U.S. and is mainly composed of experts in nuclear weapons and tactics/strategies. The NPG acts as a senior nuclear body, reporting to the North Atlantic Council (NAC), and reviews the Alliance's nuclear policy.

NAC decisions are made by consensus. Similarly, the use of nuclear weapons deployed in the above-mentioned locations in Europe will only be possible on the basis of an appropriate decision of the NAC, with the consent of the U.S. as the "owner" and with the carrier being a DCA made available by the member state on whose territory the American B61 bombs are stored. This is a guarantee, or a strengthening of consensus, because it means the automatic involvement of countries other than the U.S. in the process of planning and using non-strategic nuclear weapons. Thus, the decision to use it will have to be made at the political and strategic level, and therefore, in the context of NATO's nuclear policy, I would rather not use the term "tactical nuclear weapons," but "non-strategic." No tactical-level commander in NATO will be able to decide on the use of nuclear weapons. Such a decision will not be made even at the operational level, but the operational level will be responsible for planning missions related to the use of non-strategic nuclear weapons.

Preparations for such a mission are unlikely to escape the attention of the adversary for several reasons. I will not repeat strictly technical arguments related to storage, preparation for use, etc. of B61 bombs. From an operational perspective, the use of non-strategic nuclear weapons will often require a change in DCA location. In fact, the deployment of nuclear weapon carriers could only be concealed (and not entirely) in relation to the submarine part of the triad. Ballistic missile submarines routinely go on patrols in peacetime, and when the crisis escalates to the point of using the strategic nuclear weapons these submarines carry, their exact location will not always be known to the adversary.

Movements, deployments and changes in the readiness levels of DCAs will be a clear signal that "something is happening." The situation is similar with mobile ground-based ballistic missile launchers — not everything



France, the United Kingdom and the United States are the three nuclear powers in NATO. Photo by NATO

can be "masked" under the guise of exercises or readiness tests. In the case of underground silos, intensified maintenance, refuelling or re-supplying their personnel could be indicators of preparations for a launch.

As for DCAs, movement of these aircraft is not the only potential indicator. Nuclear missions will not be executed by a single aircraft, as such a mission would have a minimal chance of succeeding. Instead, it will take the form of a COMAO (composite air operation) involving many aircraft, some of which will carry out SEAD (suppression of enemy air defence) tasks, while others will conduct offensive counter-air strikes and yet again others will escort the DCAs.

It will also be necessary to allocate sufficient joint intelligence, surveillance and reconnaissance (JISR) resources, including imagery, electronic and signals intelligence, and most likely the use of an AWACS (airborne warning and control system). Neither the preparation for such a mission, nor its commencement, will escape the adversary's attention.

In practice, therefore, "tactical" nuclear weapons will be used under the control of the operational, if not strategic, commander, and the decision to use them, due to the procedures resulting from NATO doctrine and the principles governing the functioning of the NPG, will be made at the strategic and political levels. Hence, the phrase "tactical nuclear weapons" in relation to Allied nuclear deterrence can, in my opinion, be partially misleading, especially since nuclear deterrence is one of the strategic pillars of the Alliance.



The national policies of the three NATO nuclear-capable member nations and Russia will be discussed below. While NATO is quite open and transparent on general issues related to its nuclear policy, individual countries are a bit more restrained and the information available through open sources is limited.

U.S. Doctrine

NATO has for decades relied heavily on the U.S. nuclear arsenal for nuclear deterrence, as reflected in the 2016 Warsaw Summit Communiqué,⁷ which states that the Alliance's strategic forces, in particular those of the United States, are the highest guarantee of the security of the Allies and that the "independent" strategic nuclear forces of the United Kingdom and France have their own deterrent role and contribute to NATO's overall security. At the same time, it is noted that NATO's nuclear deterrence also depends on U.S. nuclear weapons being deployed in Europe and on the infrastructure European Allies provide for this purpose.

Recent discussions on U.S. nuclear weapons policy have again emphasized the role of U.S. non-strategic nuclear weapons in so-called extended deterrence and security. The concept of "extended deterrence" was conceived, meaning the option for the U.S. to use nuclear weapons in response to attacks by Russia or other opponents against NATO Allies and certain allies in Asia.

The "guarantee" mentioned in the Communiqué refers to the commitment of the United States to its allies to come to their aid in the event of a threat to their security or an armed attack against them. The weapons deployed in Europe are a visible reminder of this commitment, just as the nuclear-capable bombers stationed in Guam served similar purposes for U.S. allies in Asia.

Some debates, however, have focused on the question of whether a credible U.S. nuclear deterrent requires the United States to maintain nuclear weapons deployed in Europe and the ability to deploy them in the Pacific, or whether other U.S. military capabilities, including strategic nuclear weapons and conventional forces, may be sufficient to achieve deterrence.

In a 2010 Nuclear Posture Review (NPR), the Obama administration stated that the United States would be committed to the security of U.S. allies and would "demonstrate

that commitment not only in words but also in deeds," and that these commitments would retain their nuclear dimension as long as there is a nuclear threat to the U.S. and its allies, even though the U.S. decided to withdraw nuclear-tipped cruise missiles from the Pacific theatre of operations.

While during the 2016 presidential campaign, Donald Trump seemed to question NATO's importance to the U.S. and even suggested that some Allies should begin developing their own nuclear capabilities instead of relying on the U.S. arsenal for this, this did not translate directly into the 2018 Nuclear Posture Review.⁸ It questioned whether conventional forces and missile defence are sufficient to deter nuclear-weapon adversaries and called for the development of new types of non-strategic nuclear weapons.

While the 2010 NPR reiterated that the U.S. would not threaten to use nuclear weapons against states parties to the NPT that do not possess such weapons and comply with their non-proliferation obligations, the U.S. also reserved the right to adjust the security guarantees given to allies as may be justified by the development of "non-nuclear strategic offensive technologies" by potential adversaries, including chemical, biological, cyber and large-scale conventional aggression.

In other words, where the Obama administration reserved the right to a nuclear response to a biological attack and wanted to deter other threats with the prospect of a "conventional response on a devastating scale," the Trump administration envisioned expanding the catalogue of threats that the U.S. could respond to with nuclear weapons.

At the same time, the nuclear-based cruise missile programme was restored as an adequate response to Russia's violation of the Intermediate-Range Nuclear Forces (INF) Treaty⁹ and a way to force Russia into serious negotiations on the issue of limiting its arsenal of tactical nuclear weapons. The INF Treaty was signed on December 8, 1987, by the United States and the former Soviet Union and entered into force on June 1, 1988. It required both countries to eliminate land-based ballistic and cruise missiles, which could travel distances of 500 to 5,500 kilometres (300 to 3,400 miles), with a deadline of June 1, 1991. By that time, the two countries had destroyed a total of 2,692 short- and medium-range missiles:

1,846 Soviet missiles and 846 American missiles. This marked the first elimination of an entire category of weapons capable of carrying nuclear warheads.

Russia's development, manufacture and deployment of a new medium-range missile (9M729/SSC-8) that was mobile, easy to conceal and capable of carrying nuclear warheads, reduced the warning time to minutes, thus lowering the threshold of nuclear conflict. In this context, first the U.S. and then NATO deemed the implementation of this missile a Russian violation of the INF Treaty. The U.S. announced the suspension of its obligations under the Treaty in February 2019 and, as a consequence, the termination of the Treaty in August 2019.

The U.S. 2018 Nuclear Posture Review reserves the possibility of a nuclear response to cyber, biological, chemical and conventional threats against the U.S. and its allies.

I will conclude with this statement from the Strategic Concept 2022: "NATO will take all necessary steps to ensure the credibility, effectiveness, safety and security of the nuclear deterrent mission. The Alliance is committed to ensuring greater integration and coherence of capabilities and activities across all domains and the spectrum of conflict, while reaffirming the unique and distinct role of nuclear deterrence. NATO will continue to maintain credible deterrence, strengthen its strategic communications, enhance the effectiveness of its exercises and reduce strategic risks." ✦

ENDNOTES

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- 3 Ibidem, p. 6
- 4 https://www.nato.int/cps/en/natohq/official_texts_87597.htm
- 5 A detailed technical specification of these bombs is available at: <https://www.tandfonline.com/doi/pdf/10.1177/0096340214531546>
- 6 <https://dgap.org/en/research/publications/germanys-role-natos-nuclear-sharing>
- 7 https://www.nato.int/cps/en/natohq/official_texts_133169.htm
- 8 <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/2018-Nuclear-Posture-Review-Final-Report.PDF>
- 9 <https://2009-2017.state.gov/t/avc/trty/102360.htm#text>

The 21st-Century Game Changer

COGNITIVE WARFARE

Although most of the cognitive attacks remain below the threshold of armed conflict, the effects can be lethal and multi-domain, affecting all five domains of warfare.

"Victory will be defined more in terms of capturing the psycho-cultural rather than the geographical high ground. Understanding and empathy will be important weapons of war."

Major General Robert H. Scales (Retired), Ph.D.
Former Commandant of the U.S. Army War College



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

Introduction

This article aims to raise awareness of a new NATO concept that is in its infancy, but that will have a significant impact on individuals, groups, societies and the way future wars are fought: cognitive warfare.

As part of the NATO Warfighting Capstone Concept and using the Warfare Development Agenda as a framework for the delivery, Headquarters Supreme Allied Commander Transformation (HQ SACT) initiated the development of a Cognitive Warfare Concept in 2021. The concept is part of the Warfare Development Imperative of cognitive superiority. The aim of the concept is to seize the initiative in the cognitive dimension through enabling a shared understanding and appreciation of the dimension looking 10 to 20 years into the future. This needs to be accomplished through defensive and proactive measures that ensure the Alliance's protection and enhance our cognitive processes. An exploratory concept is foreseen for 2023, while the final concept is to be approved by NATO's Military Committee in 2024.

The cognitive warfare concept is a means to engage more effectively, ensure preparedness and, in doing so, maintain credibility and deterrence capability against adversaries across all domains of warfare. This article will describe what cognitive warfare is and why it is important to NATO.

Furthermore, it will explain the most important ways and means used in cognitive warfare as well as the actors who engage it in. Based on this, the article will examine how the Alliance can best protect itself against the impact of cognitive activities. Finally, we will conclude with a look at expected future developments.

Why It Matters

Cognitive warfare is a structured and well-considered approach to target the human cognition of individuals, groups and societies in a way that affects their decision-making processes and ultimately their behaviour.

While cognitive effects are not measurable in the typical sense, they do affect how we think, what we feel and how we act using brain-centred technologies that aim to destabilize structures, create distrust, and fracture and break social cohesion, for example through amplifying pre-existing social differences in

order to undermine democracies and weaken our rule-based systems.

Allied Command Transformation explains cognitive warfare as including "activities conducted in synchronization with other instruments of power to affect attitudes and behaviour by influencing, protecting, or disrupting individual and group cognition to gain advantage over an adversary."

Why is it a priority for the Alliance to improve its understanding of cognitive warfare? Is countering cognitive attacks actually a military task? It is. The reasoning for this can be found in Article 3 of the Washington Treaty, NATO's founding document. It establishes the principle of resilience:

"In order more effectively to achieve the objectives of this Treaty, the Parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack."

Article 3 includes supporting the continuity of government and the provision of essential services, among them resilient civil communications systems. This means that cognitive resilience, as an aspect of promoting and enhancing



civil preparedness, requires that NATO plays a key role — but only in support of its member nations' own efforts and not as a standalone actor. NATO nations differ in their cultural, social, technological and governmental structures and with that, their susceptibility to cognitive attacks. A tailored approach is needed to provide the right support to the nations.

There is an additional reason why NATO is developing a concept for cognitive warfare: A cognitive attack directly targets the minds of civilians, meaning non-combatants. As that is a violation of the Law of Armed Conflict.

Unlike psychological operations, cognitive activities are not directed at our conscious mind, but at our subconscious mind, the main drivers of our behaviour: emotions. This takes place through hyper-personalized targeting integrating and exploiting neuroscience, biotechnology, information and cognitive techniques (NBIC), mainly using social media and digital networks for neuro-profiling and targeting individuals. We need to realize that individuals are at the centre of all military operations and strategic-political decision-making.

Although they often sound like ideas from a science-fiction film, cognitive attacks are not science fiction anymore. They are taking place already now, and these attacks will continue to become more sophisticated. Several countries are developing NBIC capabili-

ties and collecting data for use in targeting the cognitive dimension. These activities are supported by aspects such as datamining and data analytics, and are further combined with artificial intelligence.

Although most of the cognitive attacks remain below the threshold of armed conflict, the effects can be lethal and multi-domain, affecting all five domains of warfare. Furthermore, these attacks are people-centric, meaning they have human cognition as their centre of gravity, and in principle that is a continuous, never-ending battle. Although not proven to be a cognitive attack, the so-called Havana syndrome, a cluster of adverse symptoms reported by U.S. intelligence and military personnel stationed abroad in recent years, could well be an instance of the use of cognitive capabilities.

China is globally one of the leading nations in the scientific development of NBIC capabilities. China conducts human research and experiments that are deemed unethical according to Western standards, but these experiments nevertheless attract scientists from all over the world. Within the context of the Chinese "three warfares" strategy, an integrated people-centric, psychological and legal approach, the Chinese have developed a database with the profiles of more than two million prominent individuals worldwide that may be used to influence decision-making processes.

LOOKING AT COGNITIVE activities in more detail, we can identify long-term campaigns taking place over several years, but also one-off activities. What both have in common is a structured approach to achieve a specific aim without the target becoming aware of an attack. Generally the damage is already done before the target realizes that it has been targeted.

The reason why cognitive attacks go unnoticed by their targets is that cognitive activities bypass the conscious mind and directly target the subconscious of a person. In fact, within the subconscious mind, the primary target is the amygdala. From an evolutionary point of view, the amygdala is the oldest part of the brain. Before we go more into detail on the ways and means used for cognitive activities, we will briefly look at the functions of our conscious and subconscious mind as well as the relationship between the two.

As the term suggests, our subconscious mind exists "beneath" our conscious mind. Contrary to the conscious mind, the subconscious mind is always active; it never sleeps. It regulates our basic organic functions, our emotions and, surprisingly enough, most of our decision-making. The reason why most of our decisions are made by our subconscious is that our conscious mind uses a lot of energy, which causes it to reach the limits of its capacity quickly. Actually only five to ten percent of the decisions we make are rational decisions; for the rest, we rely on our subconscious decision-making, which is strongly influenced by repetition, automatisms, biases and fallacies. We tend to then use our conscious mind to justify, rationalize and explain our emotionally driven decision-making and behaviour.

What cognitive attacks then do is exploit these emotions, automatisms, biases and fallacies in a way that affects our processes of making meaning of our surroundings, affecting not what we think but how we think. Adversaries do this in different ways, integrating and exploiting NBIC techniques. In this context we need to consider that both biases (non-rational shortcuts acceptable in normal situations) and fallacies (conclusions without evidence, based on assumptions) are commonly uniform across cultures and therefore easier to exploit.

The preferred way to do this is via social media and digital networks, as these are our primary environment for sharing all sorts of information, and they have increasingly

"Only five to ten percent of the decisions we make are rational decisions; for the rest, we rely on our subconscious decision-making, which is strongly influenced by repetition, automatisms, biases and fallacies."

Cognitive activities target the subconscious mind, which is always active.

Photo by ARRC



become our main source for news. However, there are more aspects that make social media an ideal vector for cognitive activities. Social media weaken our cognitive abilities as the content can easily stir up emotions and forces us to react quickly. Social media platforms are designed to foster addictive behaviour. On average, we are exposed to digital information systems between five and seven hours a day. Internet use disorder is now a recognized mental disorder. Furthermore, social media are ideal for collecting personal information and for carrying out data analysis and datamining. Drawing up a person's digital profile is a quick and relatively simple process that can be carried out with limited means. The effects of the digital age are far-reaching: A paper copy of the newspaper does not know what we read; our tablets, however, do. The advertisement in the paper does not know what we bought and where; our smartphones do. The newspaper editor does not know what article we found interesting and shared with friends; our social network does.

Closely related to and often fully integrated with social media are our smart devices. Smart devices collect all manner of personal physiological information such as blood pressure, heart and breathing rate, skin temperature and so on. All this information is relevant to target people in the right moment, for example when they are tired, hungry, stressed or angry.

Looking to digital networks, gaming platforms, with their more than three billion gamers worldwide, are ideal venues for cognitive activities. The platforms contain all kinds of sub-cultures that are in turn linked to non-gaming groups who can create their own games or modify existing games to infiltrate the gamers' lives without any control or regulations of the content of the games. An aspect that, in this context, should not be overlooked is that the lines between physical, digital and mental personas are becoming blurrier and with that, the difference between reality and fiction is also becoming unclear. Virtual reality environments in particular drive this trend.

Digital spaces have also been known to breed echo chambers. Within them, people concentrate on a narrative that supports their beliefs and desires while ignoring information that is not aligned with their narratives. The



result is closed micro-societies vulnerable to group thinking, polarization and generation of distrust. This becomes more likely when the time to think about the information is limited; the less time is available, the more people tend to unquestioningly follow a narrative aligned with their beliefs.

“In cognitive warfare, the ultimate aim is to alter our perception of reality and deceive our brain in order to affect our decision-making.”



In addition, it should be noted that echo chambers are an excellent venue to collect personal information that can be used for micro-targeting of individuals.

Furthermore, emerging technologies such as synthetic media, deepfakes, artificial intelligence and datamining create opportunities to collect and process information that can be used for cognitive activities. One of these emerging technologies is the Metaverse. The Metaverse is able to replicate the physical world and provide a highly immersive social experience through the use of headsets, body suits and haptic equipment. At the same time, it can provide a significant amount of physical and mental information that can be used for psychological and emotional manipulation or, in the hands of adversaries, microtargeting of individuals.

Who becomes a target for cognitive attacks? Some people are more vulnerable than others. The most vulnerable are individuals who feel a lack of belonging, feel marginalized, think they lack the ability to express their grievances or believe they are deprived of their rights. Usually this is combined with a lack of trust in governance and social structures. These perceptions can stem from ethical, racial, religious, economic or even historical reason. Vulnerabilities are also the key when it comes to understanding how we can protect ourselves against a cognitive attack.

In Western societies, there are four fundamental vulnerabilities to consider:

- **Government structure:** The Western liberal democratic structure is vulnerable to cognitive attacks and at the same time limits the opportunity to detect and defend against these attacks.
- **The media and information landscape:** Limited means or lack of willingness to share information openly, especially in combination with low literacy or underdeveloped critical thinking skills, opens up a critical vulnerability that can be exploited by adversaries.
- **Social structures:** Fragmented social structures and particularly echo chambers are vulnerable to false and misleading narratives. The lack of communication between people that only exchange information within their own communities is an easily exploited vulnerability.

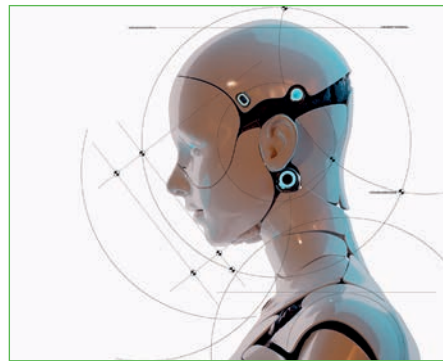


• **Increasing level of populism:** People who feel that they are not being heard or properly represented in institutions and that the "elite" is disregarding their concerns see populism as the solution to their problems, making them especially vulnerable to cognitive manipulation.

Knowing one's vulnerabilities is important, but knowing when a cognitive attack is taking place is just as vital. This requires a high level of awareness and a basic understanding of the different methods used. For example, it is essential to maintain awareness about the information we unknowingly share that can be used against us. At the same time, technological solutions can help to identify cognitive attacks through algorithms and artificial intelligence, but also with real-time pattern and signature recognition. General awareness and technological solutions may alert us to cognitive attacks in good time and help us in determining the best way to respond. This brings us to the subject of creating cognitive resilience.

Within the Cognitive Warfare Concept, cognitive resilience is defined as "the capacity to withstand and recover quickly from an adversarial cognitive attack through the effective preparation of groups and individuals." In order to create cognitive resilience, we must look at the current ways in which cognitive activities are conducted, and by which means. In order to keep the initiative, we need to anticipate possible future developments. Currently such future developments include ways to read thoughts and emotions, which can enable measurements of the effect of cognitive activities. Based on the result, models can be developed to improve decision-making, but also to identify weaknesses to exploit.

THERE ARE OTHER RAPID developments in the fields of nanotechnology, biotechnology and information technology. In nanotechnology we see the development of nanorobotics, nanosensors and nanoenergy sources making in-body processes possible. Bioartefacts linked to nanorobotics can stimulate perception, cognition and behaviour. In the field of biotechnology, there are encouraging developments in bioengineering, biogenomics and neuropharmacology. One of the most promising projects is the development of embedded synthetic DNA or sDNA. This can be a useful alternative to silicon semiconductors. Currently it is



"Neural nanotechnology can be used to bring nano-sized robots close to a neuron via the bloodstream and make it possible to link the human brain directly to a computer, making use of artificial intelligence in the process."

possible to store 2.14×10^6 bytes of data on sDNA. This organic material could enable human-machine interfaces and is often seen as the 47th human chromosome.

In the field of neurocomputing, implants can be used to improve hearing and vision. Furthermore, neural nanotechnology can be used to bring nano-sized robots close to a neuron via the bloodstream and make it possible to link the human brain directly (i.e. not intercepted by our senses) to a computer, making use of artificial intelligence in the process. But we must keep in mind that this is a two-way street: such an artificial intelligence will, in turn, be linked to a human brain.

Below

HAL 9000, a sentient computer from the film "2001: A Space Odyssey."
Photo by Hethers, Shutterstock



**COGNITIVE
ATTACKS**

are no longer science-fiction

In April 2013, U.S. President Obama announced the launch of the White House initiative Brain Research Through Advancing Innovative Neurotechnologies (BRAIN). Its goal was to support innovation that would further our understanding of the brain; Russian commentators perceived it as a project to "hack the human brain."

In 2016 Elon Musk started the neurotechnology company Neuralink, which aims to develop a brain-computer interface to extend the abilities of people with paralysis. Of course, such an interface may also be used to extend the abilities of people without disabilities, for instance to improve their performance on the battlefield. Future developments include innovation in artificial intelligence, machine intelligence and means to enhance human brainpower, either through alteration of genes or directly, by linking the brain through physical peripherals or anatomically internalized products.

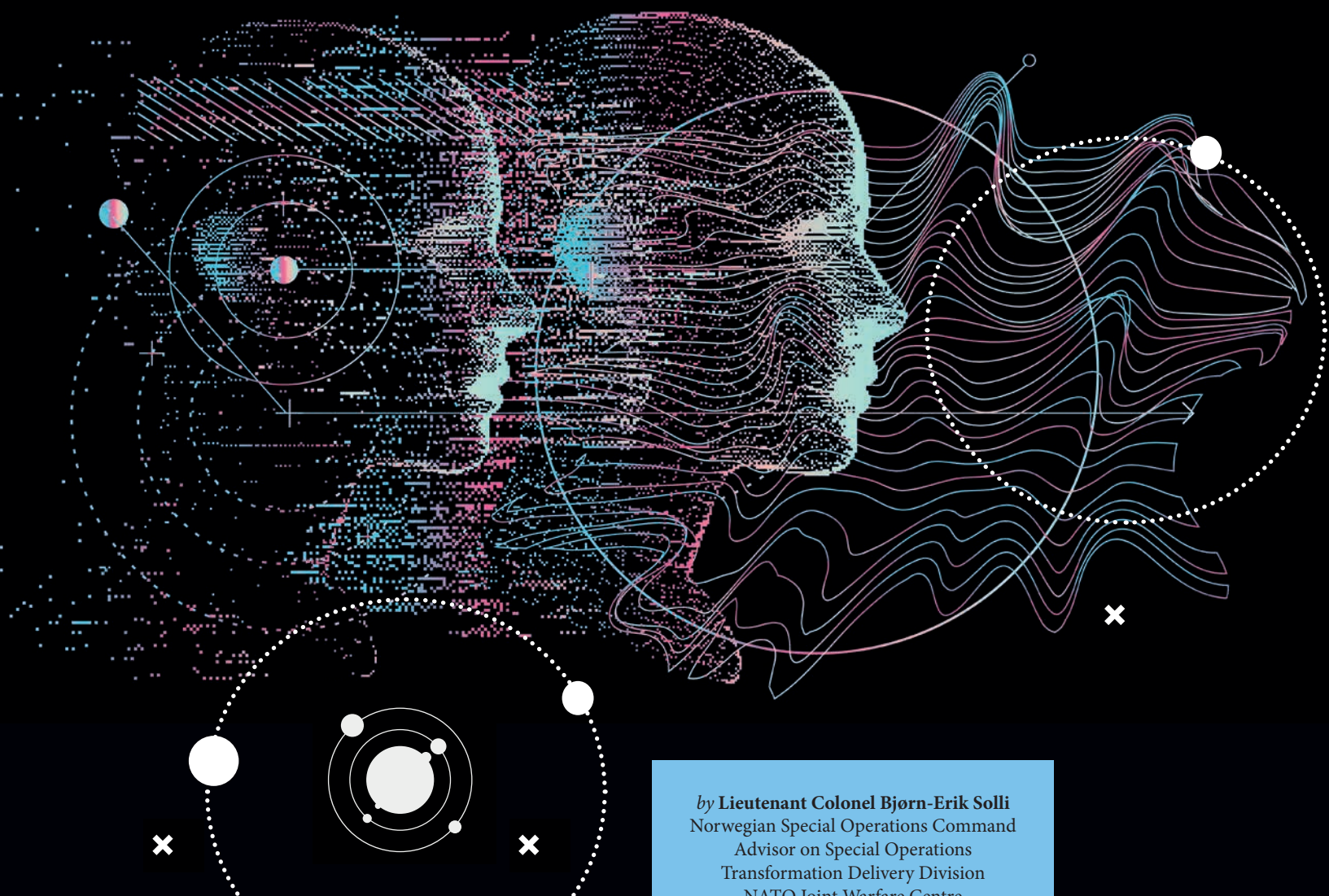
IN CONCLUSION, it is important to reiterate that cognitive warfare is no longer science-fiction. Cognitive warfare is a fact of the modern age and everyone, whether civilian or military, is a potential target. Cognitive attacks are aimed at exploiting emotions rooted in our subconscious, bypassing our rational conscious mind. This is achieved by exploiting biases, fallacies, emotions and automatisms, but also through nanotechnology, biotechnology and information technology.

In cognitive warfare, the ultimate aim is to alter our perception of reality and deceive our brain in order to affect our decision-making. We are commonly unaware of such attacks before it is too late and they have already affected their targets. Therefore, we must protect ourselves by raising awareness and developing a system of indicators and warnings that can provide real-time information. The use of artificial intelligence can show us the preferred way to react to a possible cognitive attack.

The human mind is becoming the battlefield of tomorrow, and this means that every person is a potential target. Warfare is no longer a purely military concept; it has become much broader and more complex. In the future, there will only be one rule in warfare: There are no rules. While other domains can provide tactical and operational victories, the human domain is the only domain in which we can secure a full victory. †

THE ESSENCE *of* COGNITIVE BIAS

The Case for *Humility* in Planning and Decision-Making



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"A reliable way to make people believe in falsehoods is frequent repetition, because familiarity is not easily distinguished from truth. Authoritarian institutions and marketers have always known this fact."

— Nobel Prize laureate Prof. Daniel Kahneman



COGITO ERGO SUM, I think therefore I am, is a foundational statement of Western philosophy and describes thought as the source of all human experience. The cognitive revolution of homo sapiens gave our distant ancestors the ability to comprehend, communicate and cooperate, which has been the primary driver of human evolution.¹ This article aims to motivate military practitioners to think about how they think, and hopefully discuss the "craft" of thinking with their colleagues. Because the question is not whether or not you and your colleagues are affected by cognitive bias. The question is how biased your thinking is at any given time and by what kind of biases you are affected. The next question is how you can mitigate this bias. Because as we wield the military power of our nations, we are morally obligated to fight our propensity for flawed thinking.

"I spent 30 years getting ready for a decision that took 30 seconds."

This popular quote from former Supreme Allied Commander Transformation (SACT), General James Norman Mattis (Retired), is only a drop of humility away from the acknowledgment that said decision was, in fact, dictated by the preceding 30 years of experience. If one could rewind time to the start of those 30 seconds of decision-making an infinite number of times,

it would always yield the same result — unless one also changed some of the influencing factors leading up to that decision.

NATO's goal of achieving cognitive superiority requires the ability to think and reason qualitatively wider, deeper and faster than opposing actors.² For 20 years, the Joint Warfare Centre has prided itself in creating immersive training experiences for NATO headquarters. These experiences are designed to provide staff and leaders with dilemmas that challenge their cognitive sobriety, as planning and decision-making is cognitive work.

Psychology of Judgment and Decision-Making

Scientists have accumulated lifetimes of scientific knowledge about the human brain. Amos Tversky and Daniel Kahneman revolutionized the foundational scientific knowledge of human judgement with their "heuristics and biases" programme. The findings of this research programme have proven relevant in a number of disciplines.³ In 2002 the importance of one of these findings was demonstrated when Kahneman received the Nobel Memorial Prize in Economic Science. The prize was awarded for his integration of prospect theory, developed with Amos Tversky in 1979, in the field of behavioural economics. The essential insight on which he developed his findings is that "judgment under uncertainty often rests on a

limited number of simplifying heuristics rather than extensive algorithmic processing."⁴ What is military planning and military decision-making if not judgment under uncertainty?

When making judgments and decisions, we have two primary challenges for our cognitive processes: bias, the main focus of this article, and noise. "Noise" is used here in the sense of undesirable variation in our judgment and decision-making. There have been numerous studies on this aspect of judgment, several of which found correlation between judgment and arbitrary and non-relevant factors. The most important finding is the scope of unjustified variance in the decision-making for what should virtually be the same decisions.⁵



COGNITIVE BIAS

To explain the differences between bias and noise, and how they "complement" each other in creating flaws in our judgment, we can look at a basic military skill-set.

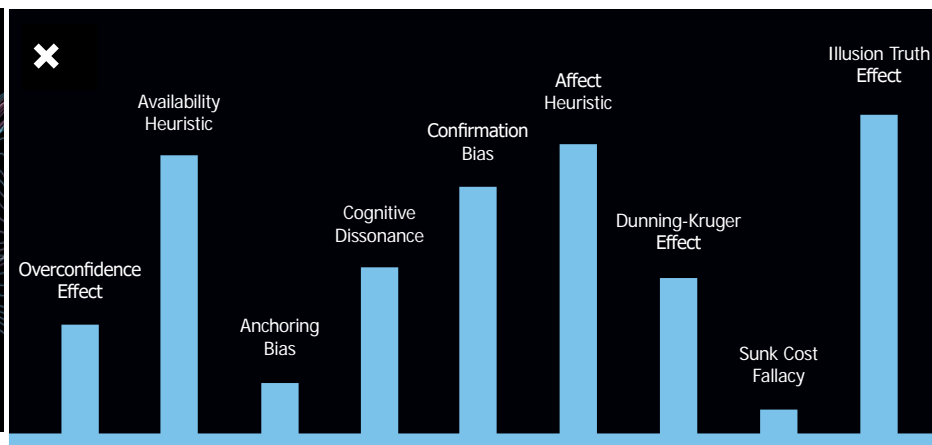
Depicted in Figure 1 are four targets with their respective shot groupings. Shot group Alpha represents the ideal result by a proficient shooter with a zeroized rifle. Shot group Bravo, however, demonstrates a proficient shooter with a rifle that is not zeroized properly. This shot group is consistently biased in that it systematically deviates from the shooter's aim. Shot group Charlie demonstrates a zeroized rifle, but a highly variable performance from the shooter. This shot group is noisy, as it demonstrates an undesirable variance in performance. Finally, shot group Delta demonstrates the combination of a biased rifle and a noisy shooter.⁶

In this analogy, the rifle is our cognitive tool for making judgement and the shooter is the user of that tool. In bias and noise, we have two types of error. As military practitioners we should be aware that both of these errors can occur at the same time.

When trying to correct for noise and bias, it is important to recognize a key difference in how they manifest. In the four squares to the right, the targets have been removed. This illustrates how one can identify noise without knowing of any bias or target, but one cannot easily identify bias without knowing the target. In other words, bias is harder to detect and correct.

Below

The graphic illustrates how several biases can affect one's thinking simultaneously. We make hundreds of decisions every day, influenced by psychological and social factors as well as previous experiences. Our brains take shortcuts to enable rapid judgments, which is known as heuristics. This can, however, lead to faulty thinking. [See p. 106]



Noise and Bias Illustrated

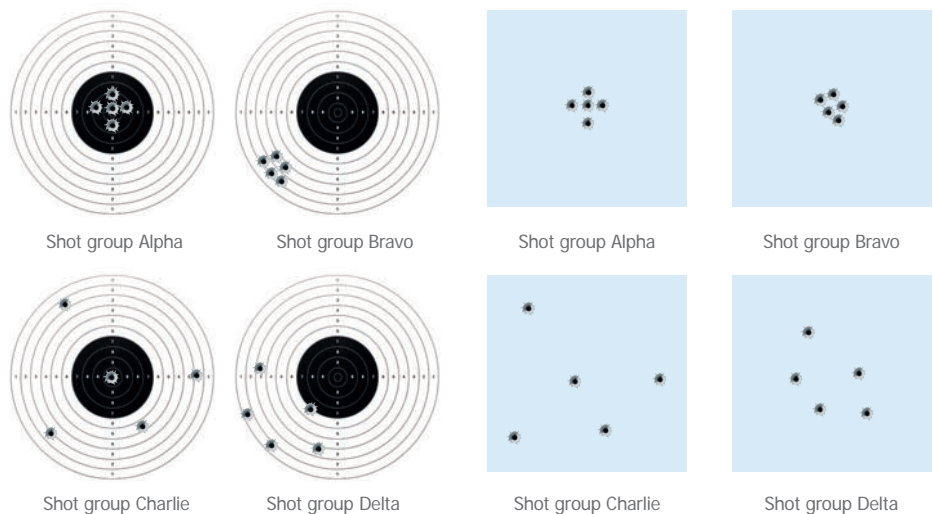


Figure 1

The illustration above is based on how Daniel Kahneman, Olivier Sibony and Cass R. Sunstein describe the way noise and bias affect human judgment and decision-making in their book "Noise – A Flaw in Human Judgment": "In an ideal world, every shot would hit the bull's eye."

Cognitive Bias Simplified

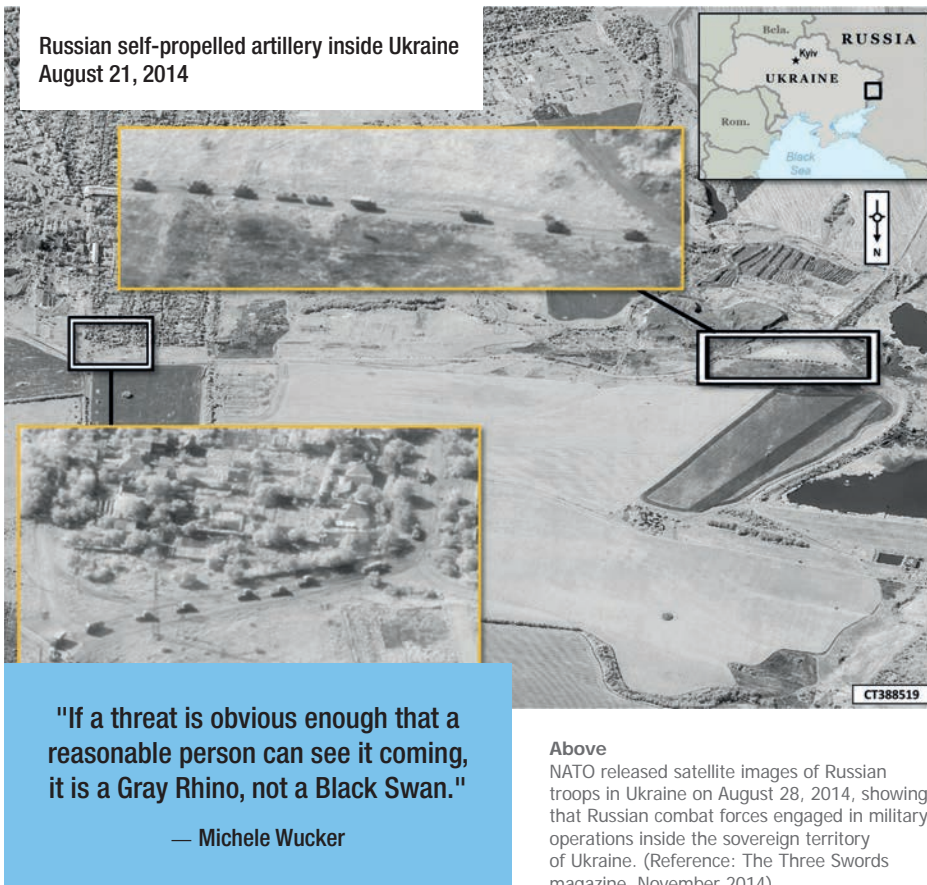
When we are faced with uncertainties in the foundation for pending decisions, our cognitive sobriety is challenged. We can take the long and mentally taxing approach of thor-

oughly investigating these uncertainties to make them less uncertain, or ideally certain. This strategy will cause mental strain as opposed to mental ease.⁷

In the strenuous process of cognitive activity of judgment under uncertainty, a vast number of "shortcuts" tempt our mind. Psychology refers to these shortcuts as heuristics. The use of such heuristics can potentially lead to cognitive bias. Cognitive bias is a systematically erroneous judgment following "misuse" of heuristics when dealing with uncertainty.

To be precise, the foundation on which these judgements are made can be biased as well, but for it to be a case of cognitive bias, there must be an erroneous judgment of said foundation. However, the most important thing to note regarding cognitive bias is that it occurs in our minds without us being cognizant of it.^{8,9,10} The question is therefore not if we suffer from cognitive bias at any given time, but to what extent our thinking is biased.





Russian self-propelled artillery inside Ukraine August 21, 2014

"If a threat is obvious enough that a reasonable person can see it coming, it is a Gray Rhino, not a Black Swan."

— Michele Wucker

Above
NATO released satellite images of Russian troops in Ukraine on August 28, 2014, showing that Russian combat forces engaged in military operations inside the sovereign territory of Ukraine. (Reference: The Three Swords magazine, November 2014)

that with limited knowledge comes a limited ability to realize or acknowledge the limits of one's own knowledge. Professors David Dunning and Justin Kruger have proven that people with poor knowledge tend to overestimate their knowledge, while highly competent individuals tend to underestimate themselves. As they so eloquently put it, "people [...] suffer a dual burden: Not only do they reach erroneous conclusions and make unfortunate choices, but their incompetence robs them of the ability to realize it."¹⁷ This is a psychological theory known as the Dunning-Kruger effect.¹⁸

In our time, the term "black swan" has been given a new meaning by Nassim Nicholas Taleb, who used it to mean rare and extreme but predictable events in his book "The Black Swan — The Impact of the Highly Improbable."¹⁹ Our possibility to identify the black swan events pre-emptively is hampered by our limited ability of prediction. Dealing with predictive assessments numerically carries its own set of vulnerabilities. This is particularly relevant for military judgement in the context of estimating time or probability. It is quite possible to experience an anchoring bias, where the assessment of a value or argument's validity is erroneously compared to a previously presented value or argument.^{20,21}

News reporters repeatedly claim that the Russia-Ukraine war started in 2022, while in fact it was the full-scale invasion that started in 2022. The initial invasion started in 2014, and if we include sub-military threshold activities in the definition of war, we can confidently say that war started even before 2014.

However, enabled by the ease of recollection owed to the frequent repetition of this statement in the news, availability bias is setting up for an anchoring bias that creates "gravitational pull" from recalling 2014 as the year in which the war began towards a 2022 version of events. Such a biased cognitive process makes it even harder to predict Taleb's black swan events, or even to identify them after the fact.

Some argue that the Russian full-scale invasion of Ukraine in 2022 is a black swan. But Taleb's criteria for a black swan are that the event is an outlier to what would be reasonable to expect given the available knowledge, with extreme consequences that could have

Bias and Heuristics Illustrated

The following exploration of the ways in which cognitive bias may affect military decision-making will utilize three well-established metaphors used within the fields of risk management and emergency preparedness: the black swan, the grey rhino and the boiling frog.

In 1697, a fundamental bias in European knowledge of the natural world was exposed. A single observation of a black swan by the Dutch explorer Willem de Vlamingh in what is now known as Swan River in Perth, Australia, put an end to the biased conclusion that all swans are white. Prior to this discovery, the term "black swan" was confidently used as a metaphor for the impossible even though Europeans had not visited all corners of the planet.^{11,12}

To be fair, the unjustified confidence of those past Europeans was as much a case of biased data as it was a bias of imaginability in the form of intellectual laziness. However, it is also possible that this is a case of availability

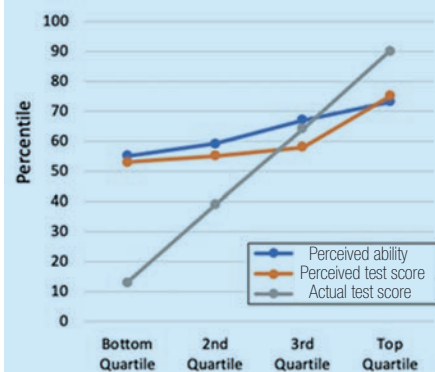
bias: what comes to mind most easily might not be relevant, accurate or even factual, but still result in unjustified confidence due to the ease of its recollection.^{13,14,15,16} Generally speaking, the more readily knowledge, information or experience can be recalled, the easier it is to perceive it to be highly relevant or correct.

The ease of our recollection may be biased by erroneous or misleading claims presented in large volumes, such as the claim that the Russia-Ukraine war started in 2022 (and not in 2014). However, probably the most prevalent form of availability bias in a joint military staff is the "single service bias," which can only be overcome through humility and a willingness to learn from the other services.

That Europeans of centuries past failed to understand the possibility that swans can be black, or that a reporter may not realize that Russia's war against Ukraine may have started before 2022, can also be attributed to the fact



The Dunning-Kruger Effect



Above
Dunning-Kruger effect. Perceived ability and test score vs. actual test score (J. Kruger and D. Dunning, 1999)

been predicted.²² Does Russia's 2022 invasion of Ukraine fulfil these criteria? Deeming these events a black swan would probably be the conclusion that imposes the least cognitive strain. But that does not necessarily make it the correct conclusion. Russian history, preceding political rhetoric and partial invasions of both Georgia and Ukraine in the past 15 years make it unreasonable to argue that a full-scale invasion was an outlier of what was reasonable to consider. "As a rule, if a threat is obvious enough that a reasonable person can see it coming, it is a Gray Rhino, not a Black Swan," writes Michele Wucker, an eminent policy analyst specialized in crisis anticipation, in her book coining this new term.²³ The grey rhino is a threat we should identify as such with its full potential, but which we for some conscious or subconscious reason ignore.²⁴

There can be many reasons why we create grey rhinos by ignoring such obvious threats. A likely contributor are cognitive biases. The scientific work related to judgment and

decision-making has for the most part been focused on cognition, but over the past 30 years, there has been a growing acknowledgement of how feelings can affect judgment.²⁵ Scientific studies on judgment of risk and benefits imply "that people base their judgments of an activity [...] not only on what they think about it but also on what they feel about it."²⁶

It is reasonable to think that feelings about the potential of a full-scale invasion influenced people's judgment of its likelihood. It is much easier to consider how we feel about the possibility of a full-scale invasion than to enumerate the factors contributing to the possibility of such an invasion and to assess how to weigh these factors. Replacing the hard, cognitively straining question with the easy one is in essence how so-called affect heuristics create bias in our judgement.²⁷

Affect heuristics can also create an opportunity for exploitation by those who want to manipulate our affective reactions in order to control our behaviour.²⁸ Another potential culprit in our flawed judgment is the phenomenon of confirmation bias. This bias enables us to confirm our desire to ignore the grey

rhino by unjustifiably validating arguments that favour ignoring it, while at the same time enabling doubt or denial of arguments that advocate for taking the grey rhino seriously.^{29,30}

The cautionary tale of the boiling frog can also be used as a tool to critically examine one's own thinking. According to the tale, placing a frog in boiling water will make it jump out, but placing the frog in cold water and then slowly heating it will boil the frog to death. This is a metaphor describing how the severity of threats is perceived based on the speed of their development.

A gradually developing threat of certain catastrophe is perceived as far less dangerous than a rapidly developing threat of a lower severity. "We have been working for so long to establish an amicable relationship with Russia that we cannot give up now." This line of thinking is a textbook example of the cognitive bias known as the sunk cost fallacy.

We have a tendency to continue on a path of action based on previous investment even when the current cost outweighs the potential benefits; we simply do not want all our previous effort to go to waste.³¹

Below
All descriptions in this table are adapted from Wikipedia

A selection of other relevant cognitive phenomena that can create cognitive bias		
<p>Authority Bias</p> <p>An individual is influenced by the opinion of an authority figure, believing their views to be more credible, and hence places greater emphasis on the authority figure's viewpoint and is more likely to obey them.</p>	<p>Overconfidence Bias</p> <p>A person's subjective confidence in their judgments is reliably greater than the objective accuracy of those judgments, especially when confidence is relatively high.</p>	<p>Optimism Bias</p> <p>Optimism bias (or optimistic bias) causes someone to believe that they are less likely to experience a negative event than others. Also known as unrealistic optimism or comparative optimism.</p>
<p>Illusory Truth Effect</p> <p>The illusory truth effect (also known as illusion of truth effect, validity effect, truth effect, or reiteration effect) is the tendency to believe false information to be correct after repeated exposure.</p>	<p>The Planning Fallacy</p> <p>A phenomenon in which predictions about how much time will be needed to complete a future task display an optimism bias and underestimate the time needed. This phenomenon sometimes occurs regardless of the individual's knowledge that past tasks of a similar nature have taken longer to complete than planned.</p>	<p>G.I. Joe Fallacy</p> <p>The tendency to think that knowing about cognitive bias is enough to overcome it.</p>



In a military context, justifying staying in an armed conflict based on previous loss of soldiers is such a biased way of thinking. There may be many valid reasons to stay in a fight where one continues to lose soldiers, but the number of previously killed soldiers is not one of them.

One could argue that Russia has tried to "boil" the West for several decades by weaponizing the sunk cost fallacy and the aforementioned biases. It has maintained a threat level below the threshold of causing the West to jump out of the water by balancing economic transactions such as oil and gas exports with malicious activities. Neither assassination operations in Western countries such as Germany or England, nor malicious cyber-campaigns to subvert Western democracies and cohesion, or military aggression against Georgia and Ukraine made the "Western frog" jump out of the water. There were always enough arguments to confirm the desired perception of Russia as a strategic partner and to justify overlooking the grey rhino as it was slowly turning up the heat, as it were. Fortunately, it appears that the effort to conduct a full-scale invasion of Ukraine was an abrupt enough increase in temperature to get most of the Western world out of the water.

"The question is not whether or not you and your colleagues are affected by bias. The question is rather which biases affect your thinking and to what extent."



Above
Humble and deterministic insight, pioneered by retired General James Mattis, is necessary to mitigate bias: Here, Mattis reading the exercise plan for the JWC-directed Exercise STEADFAST JUNCTURE 2008 on February 6, 2008. Photo by JWC PAO

The Case for Humility

With this knowledge of our common propensity for flawed thinking, the effort to combat bias in planning military operations becomes a moral imperative. As mentioned in the introduction to this article, the question is not whether or not you and your colleagues are affected by bias. The question is rather which biases affect your thinking and to what extent.

The next question is how you can mitigate the identified bias. It is in the humble and deterministic insight we can draw from General Mattis' quote about his 30 years that led him to a 30-second decision that we can find a remedy for such cognitive challenges. By being aware of our cognitive vulnerabilities, we can impart basic knowledge of cognitive bias in planning courses.

Moreover, we can design the processes for our planning and decision-making, and the environments in which they occur, in such a way that they foster sound judgment unaffected by intellectual laziness or arbitrary factors of influence. We require a structured inclusion of critical thinking techniques and disciplined rigour in our planning and decision-making processes. These should be followed by established routines for conducting bias and noise audits of said planning and decision-making.

The Joint Warfare Centre is, within its capacity, already helping to combat cognitive bias through its focus on creative and critical thinking techniques in the Joint Operations Planning Group Leaders Workshop [See article, pp 68–73], by facilitating a safe-to-fail environment during wargames, and through its full-scale exercises. †

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Coast Guard Svalbard during Exercise JOINT VIKING 2023.
Photo by Torbjørn Kjosvold, Norwegian Armed Forces

FROM COOPERATION TO COMPETITION

HIGH NORTH

by Jonny Didriksen
Special Advisor on Security Policy
Norwegian Joint Headquarters

The High North and the Arctic in a Changing Security Environment





THERE ARE A FEW sayings that I have encountered in the north of Norway over the course of my career. Years back I served with a commander who said that if you have nothing new to report from the High North, it is because you have not noticed it yet. This holds true, because while some things may happen at a glacial pace, small incremental changes have large consequences over time.

The Arctic nations comprise the United States, Canada, Denmark, Finland, Iceland, Norway, Russia and Sweden. Two major factors have shaped the Arctic security environment we now face in the 21st century: the first is the conflict in strategic interests between the major Arctic powers, the U.S. and Russia, and the second is the growing Arctic focus of countries without Arctic territory, with China at the forefront of burgeoning interests. And there are more stakeholders whose policy interests are tied to the Far North: France, Germany, Italy, the Netherlands, Poland and the United Kingdom, as well as the European Union.

Another saying frequently heard from those familiar with the region: what happens in the Arctic does not stay in the Arctic. This can refer to the geopolitical and environmental ramifications of events in this remote-yet-central region, but also to the extraction of its many treasures: natural gas, oil, diamonds — and intercontinental ballistic missiles.

To understand the ever-changing but always impactful role of the region, one may want to turn this last saying on its head: what happens elsewhere ends up in the Arctic.

A closer look at recent history will illustrate this perspective. A turning point for the Arctic was Russia's annexation of Crimea in 2014. Up until then, the Arctic region had seen lively cooperation between military forces in Russia and some NATO countries. Norway and Russia held annual bilateral exercises named POMOR, and Russia, the U.S. and Norway conducted Exercise NORTHERN EAGLE every two years. All such cooperation ended in 2014. The Norwegian-Russian exercises were named POMOR after the trade between the Pomors of Northwest Russia and inhabitants of coastal Norway, including Bodø, the city that today hosts the Norwegian Joint Headquarters. The Pomor trade lasted from 1740 until revolution swept Russia in 1917. The traders, as in so many trade posts across the

world, developed their own pidgin language, mixing Russian and Norwegian to ensure mutual understanding. Pomor trade was an economic and political force in the region, akin to an Arctic Silk Road.

The 2014 cessation of military exercises with Russia did not lead to an immediate disconnect in all spheres of society. The institutions related to Arctic governance and the vast majority of commercial relations remained intact.

The new erosion of trust between Russia and the West had begun, however, with a negative effect on the remaining climate of cooperation in the Arctic. What had been a trickle turned into a flood in February 2022. Russia's full-scale invasion of Ukraine had an immense effect on the High North and the Arctic. Political contacts and commercial links were shut down or put on hold. On the military side, there was not much left that could have been curbed. However, Russia's demonstrated will to use military power on a neighbouring country affected Norway's and NATO's monitoring and interpretation of Russian operations along NATO's northern flank.

MISSION

Norwegian Joint Headquarters
Forsvarets Operative Hovedkvarter

66'33°

- Plan and conduct exercises
- Surveillance and situational understanding
- National sovereignty/sovereign rights
- Support to and conduct national jurisdiction
- Military presence and crisis management
- Support to civilian authorities
- Command and control of, and support to, Norwegian units in international operations
- Advisor to Chief of Defence on operational matters

THE ARCTIC HAS LONG BEEN an area of Russian strongholds for power projection and deterrence that are felt far beyond the region. In addition, it is worth noting that the Russian Arctic is home to a large reservoir of oil and gas. Energy has proven to be an effective lever of power in the ongoing war. For years, Russia emphasized "low military activity" in the Arctic, but in recent years, the country has established a new joint command that covers much of the Arctic, has reopened a large number of





Above
Winter exercise JOINT VIKING 2023, photo by Helene Sofie Thorkildsen, Norwegian Armed Forces

Soviet-era military installations and established new air bases and deep water ports. It has also used the region to test novel weapon systems. In July 2022, Russian President Vladimir Putin launched a maritime doctrine that prominently featured the Arctic as a strategic priority, pledging to protect Russia's Arctic waters "by all means" and setting high ambitions for the development and control of the Arctic Zone of the Russian Federation.

These efforts include increased activity around the Norwegian Svalbard archipelago and arming Russia's Northern Fleet with hypersonic Zircon missiles. In August 2022, Russia revealed plans for a new strategic ballistic missile submarine for Arctic operations. The doctrine lists the perceived threats to Russian interests, centring on a fear of encirclement by NATO and of U.S. and NATO activity in the region.

We are witnessing a Russian power play with the intent to set rules, regulations and norms for operations in the Arctic. NATO's activity in the High North is a consequence of aggression demonstrated by Russia, not the other way around. Russia's pattern of infrastructural investment and military doctrine focused on the Arctic, coupled with its illegal aggression against Ukraine, have naturally shaped the strategic concerns of the Alliance.

That an expansion of NATO presence is a result of Russian aggression is nowhere

more apparent than in Sweden and Finland's successful bids to join the Alliance; such a step was unlikely to occur before Russia's invasion of Ukraine. For years, "great power global competition" has been a key phrase in the framing of dynamics in international politics.

"This is the region that connects the Atlantic and the Pacific theatres, and it is becoming the most important region for the policy interests of major global powers."

This is reflected in plans and strategies among several NATO Allies, as well as in Russian doctrine. It is this view that allows us to put into proper perspective that things happening elsewhere may end up in the Arctic: this is the region that connects the Atlantic and the Pacific theatres, after all, and it is becoming the most important region for the policy interests of major global powers. Consequently, at the Norwegian Joint Headquarters we have experienced a significant increase in Allied presence during the past three to four years. This enhanced presence is not only related to major exercises, but instead covers all domains and persists all year round.

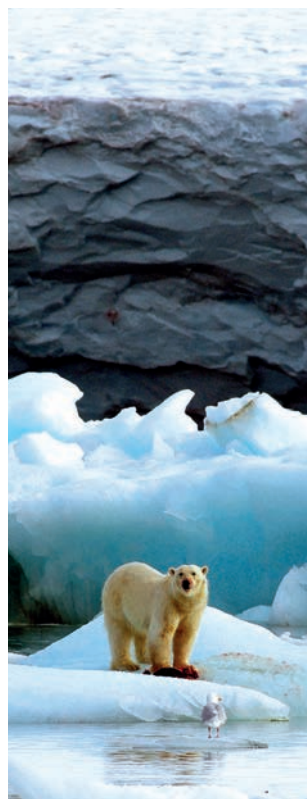
The strategic role of the Arctic will continue to make the region a focal point for Allied nations in the years to come. This will happen in reaction to and in anticipation of the activities of other countries, with China being a key player. China and Russia have recently announced an agreement on cooperation between their coast guards. So far, we have not seen Chinese security forces in the Arctic. This is now changing.

China is expanding its reach, laying claim to the position of a "near-Arctic state" and planning a "polar silk road" that will link China to Europe via the Arctic. Beijing is strengthening its navy and building what may become the world's largest icebreaker vessel, making it the first country after Russia to build nuclear-powered ships for this purpose. China, much like Russia, is investing vast sums in energy, infrastructure and research in the Arctic. This is part of what Secretary General Jens Stoltenberg in an August 2022 press conference with Canadian Prime Minister Justin Trudeau called a "deepening strategic partnership" between China and Russia "that challenges our values and interests."

While the future always remains somewhat unpredictable, we can predict that what happens elsewhere ends up in the Arctic. With Finland joining NATO, and with Sweden's ongoing accession process, seven out of the eight Arctic Council member states will become members of the Alliance. The High North links North America and Europe, the link that is so central to NATO. Events in the region will continue to be shaped by the wider political climate — and, indeed, our planet's climate, as the ice recedes and makes the Arctic more accessible and coveted than ever. ✦



"At the Norwegian Joint Headquarters we have experienced a significant increase in Allied presence during the past three to four years."



Clockwise
Northern lights during Exercise ARCTIC BOLT 2022 in Finnmark, photo by Torbjørn Kjosvold, Norwegian Armed Forces; the Global Seed Vault in Svalbard, photo by Marcin Kadziolka/Shutterstock; a polar bear on Bråsvellbreen, photo by Michell van Dijk/Shutterstock; a panoramic view of the city of Tromsø/Shutterstock; the signpost at the Norwegian-Russian border, photo by JWC PAO

CELEBRATING 20 YEARS: THE JOINT WARFARE CENTRE'S "ONE TEAM" MARKS THE 20TH ANNIVERSARY OF THE CENTRE'S 2003 INAUGURATION WITH A GROUP PHOTO TAKEN ON AUGUST 18, 2023. *Photo by Simon Øverås*



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