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NATO INDUSTRY FORUM

2023 REPORT

ADDRESSING THE NEW STRATEGIC REALITY
TOGETHER

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EXECUTIVE SUMMARY

Under the theme '**Addressing the new strategic reality, together**' the NATO-Industry Forum 2023 (NIF23) held in Stockholm, Sweden on 24-25 October 2023, attracted 800 participants, of which 450 industry representatives from more than 250 companies. 36 countries were also represented; 27 Allies, plus a number of partner nations including Ukraine and three Asia-Pacific partners (Australia, Japan and South Korea).

Participants welcomed the timely conversation on critical issues, acknowledging the new reality, Russia's illegal war on Ukraine, the rise of China, renewed conflict in the Middle East and the necessity for NATO, governments and Industry to find solutions to produce more diverse capabilities, in larger quantities, leveraging new technologies, faster, better, and affordable.

Keynote addresses were provided by the Secretary General, the Swedish Minister of Defence, the Chair of the Military Committee, Supreme Allied Commander Transformation, Deputy Supreme Allied Commander Europe and the Assistant Secretary Generals for Defence Investment and Emerging Security Challenges. The keynote address by the Minister of Strategic Industries of Ukraine demonstrated the elevated attention attached to the implications of the war in Ukraine, Allied solidarity and the need to continue supporting Ukraine until the war is won.

NIF23 commenced with focussed sessions on Operationalizing Vilnius decisions, including the Defence Production Action Plan (DPAP) with its main pillars: aggregation of demand; improving the understanding of industrial capacity and supply chains, engagement with industry; and standardization - interoperability – interchangeability. It continued with transformation subjects such as multi-domain operations (MDO), space as the newest operational domain where defence and non-defence industry is extremely active, and Environmental, Social and Governance (ESG.

The Secretary General's engagement with the young NIF23 participants represented a call for the younger generation to play a stronger role in all aspects of defence.
Key points from the panels include:

- We need **trust, openness, transparency and willingness to transform** in order to cooperate more effectively with the defence industry and see **industry as a closer partner**. We (NATO, governments, Industry) must find solutions to produce more capabilities, faster, better, and cheaper.

- NATO and Allies should **involve industry early in the planning process** (not just primes, but also subcontractors).

- In reciprocity, **Industry must be proactive** on proposing low-cost high tech capabilities, which are complementary to current low-cost mass and very expensive exquisite capabilities.

- In order to build industrial production capacity, **governments and industry need to take immediate action**. Building capacity takes time and requires clear commitment. Increasing production capacity in times of crisis is considered a risk for industry that could be alleviated by a longer term planning perspective for the capacity when the crisis is over.

EXECUTIVE SUMMARY

- **Modelling and measuring production capacity and efficiency** is not only about counting factories. It **includes supply chains, production lead-times** (e.g. identifying components with long lead times), availability of a competent **workforce**, automation and robotics.

- **NATO's signals to industry about future needs are useful but not sufficient. Industry needs to know what the aggregated demand** is for them to adjust production; countries should align to provide multi-national, multi-year demand signals. Industry has already ramped up capacity based on their own forecasts and available internal resources. However, to make it possible to continue increasing production capacity and to ensure that defence industry investments align with NATO's strategic goals, **industry needs to understand NATO countries' needs/goals** better and need to be able to demonstrate to their stakeholders that future investments will be profitable. **Industry needs** clear signals of future demand transformed into **concrete orders**.

- Allies should shift from 'the closest alligator' syndrome to solid planning. EDTs and Digital Transformation towards MDO should not be forgotten despite the challenges of today, since transformation takes anticipation, time and resources. **It is too late to invest when the technology is needed**, therefore Allies need to be able to work on two fronts: ramping up production, and investing in new technology and accelerating Digital Transformation.

- **Interoperability equals deterrence**; the power of our diverse platforms multiply if they are interoperable and can operate together. There are some technology-based barriers for building interoperable systems but also political barriers resulting from national and industry interests and governments not aligning their decisions. To improve interoperability, we need the nations to prioritize it. When demand is low, industry maximizes reserve by monopolizing supply chains. Governments have to build interoperability/interchangeability into requirements. The ability and willingness to share data across domains and Nations is the key.

- **Allies must adopt open Architectures** and Defence industry primes need to work with Small and medium-size enterprises (SMEs). Small companies and start-ups can deliver R&D and may have the cutting edge competence in disruptive technologies.

- **Resilience of defence critical supply chains provides deterrence**. The vulnerability of our critical supply chains was demonstrated during the Covid-19 pandemic and by the war in Ukraine – not only a war of industries but also a war of warehouses.

- NATO can help by promoting the defence industry and its value to our societies when ESG criteria are considered. The continuous need for security goes beyond the current geopolitical crisis. **ESG investing criteria are affecting the defence sector**, particularly small and medium size enterprises and sub tier suppliers.

- "There is nothing unethical about producing weapons to defend NATO Allies. There is nothing unethical about defending our freedom" (quote by SG).

KEYNOTE ADDRESS
Secretary General
JENS STOLTENBERG

Minister Jonson, General Lavigne, Excellences, ladies and gentlemen,

First of all, it's great to see you all here today, representing NATO Allies and partners. Also Ukraine is present and for the first time, our Indo-Pacific partners Japan, South Korea, and Australia are also present at this conference. And it demonstrates the importance of bringing together governments and industry from across the Alliance, but also from partner nations.

Then, a special thank you, to you Pål, for hosting us all, for the wonderful evening yesterday in the Stockholm City Hall, but also for everything you do to move and to ensure that Sweden becomes a full-fledged member of NATO.

You are now for the first time hosting this conference, the first time an invitee nation is hosting the NATO-Industry Forum and that demonstrates how close you already are to this Alliance. But I totally agree with you that next time we meet, we should ensure that you don't meet us as an invitee, as a close partner, but that we meet together as members, that Sweden is a full member of this Alliance. And as I said at the reception yesterday, we are moving now with the decision by the Turkish president to submit the papers for ratification to the Turkish parliament. The time has come to find Sweden's membership process to NATO.

Then we would like to have Sweden as a full-fledged member for many reasons, not least because you have a lot to offer when it comes to innovation, the defence industry and top-tiers of technology. And [we] therefore very much look forward to welcome you as a full member. This will make NATO stronger and Sweden more secure. For me, it is important to ttend the NATO-Industry Forum because I know how important industry is to our defence. I know that not everyone sees this in the same way. Actually, some investors have the misguided idea that the defence industry is somehow unethical. But there is nothing unethical about producing weapons to defend NATO Allies. There is nothing unethical about defending our freedom. And there is nothing unethical about helping Ukrainian soldiers to defend the country. Indeed, without industry, there is no defence, no deterrence and no security.

So therefore, I'm actually extremely grateful for what you do as defence industry every day. Thank you so much.

And therefore, the relationship between governments, nations

But today, it is vital, for three reasons: to support Ukraine; to strengthen our own deterrence and defence; and to maintain our technological edge.

First, Ukraine. When Russian forces crossed the border, many expected Ukraine to be defeated in a matter of days. But they stood strong and fought hard. The extraordinary courage and heroism of the Ukrainian people has seen them exceed expectations again and again. But courage alone does not stop drones. And heroism cannot intercept missiles. To defend itself, Ukraine needs capabilities. High quality. High quantity. And quickly.

Therefore I welcome that NATO Allies are providing unprecedented levels of support to Ukraine. With everything from tanks and drones, to F-16s and ammunition. But we have mainly done this by depleting our own stocks. And that is not sustainable. So now we need to ramp up production. To meet Ukraine's needs. But also to strengthen our own deterrence and defence. This is the second reason why NATO's relationship with industry is so vital now. Because when this war ends, there is no turning back to where we were before. We face a more aggressive Russia. A more coercive China. And a more unstable world. So we must adapt for the long term.

And therefore I'm glad that for the last 10 years, since the illegal annexation of Crimea and the first time Russia went into eastern Donbas in 2014, NATO has implemented the biggest reinforcement or collective defence since the Cold War. And we have increased defence spending. We now have nine consecutive years of increased defence spending across European Allies and Canada. And I really understand the need to further increase, but it is a good move, a good trend that after years of cutting defence budgets until 2014 all Allies have started to increase defence spending since 2014. We need more, but you should also recognise the progress that has already been delivered by NATO Allies.

They have added in total across Canada and Europe 450 billion extra dollars for defence, including a rise of 8.3% in real terms, meaning adjusted for inflation, the biggest increase in decades this year. Allies have now committed to invest at least 2% of GDP for defence. They did that at the Vilnius Summit.

We made our defence investment pledge first in 2014 in Wales after the illegal annexation of Crimea, then the language was more like a move towards spending 2% of GDP on defence and many Allies have moved towards that that goal. And then almost all Allies have now plans in place to be there soon.

In Vilnius we actually strengthened that commitment by referring to 2% not as a kind of ceiling, but a floor, a minimum. And that's a big new important step by NATO Allies agreed in July this year. And then it's our task, my task to ensure that Allies deliver on that commitment, 2% as a minimum. And let me also add that, of course, 2% is more than they spent before, at least for most Allies. But 2% is not very much compared to what they spent during the Cold War. The average in Europe has been like 1.5% over the last years.

The average during the Cold War until at the beginning of the 1990s was 3%, twice as much as percentage of the GDP. So it is possible to spend minimum 2%, if you realise how important it is and that's exactly what we are in the process of telling the broader public, parliaments, governments that they have to ramp up and they are in the process of doing so.

At the Vilnius Summit in July this year, we didn't only agree to increase defence spending further, but we also agreed robust plans for the defence of Europe. With 300,000 troops on high readiness, backed by substantial air and naval power. And we also agreed a new Defence Production Action Plan. To aggregate demand, boost capacity, strengthen engagement with industry, and increase interoperability. We will substantially increase capability targets for battle-decisive ammunition. And boost our work on standards and their implementation. So the demand is there. Now we need to meet that demand with substantially increased supply.

And then the challenge is that when we increase demand, what we want is more supply. We don't want higher costs and higher prices. And I think we have a kind of joint responsibility as governments, as industry to look into how can we increase supply without unacceptable high increases in prices and costs. And I have now a better understanding of some of the challenges we meet because, as you know better than I, even though there are national regulations across the Alliance that are as I say more or less a kind of standardised approach that the defence industry is more regulated than other industries, meaning also that profits and return on investments are more regulated.

And we have to ensure that these regulations which are there for different historical reasons, are not then disincentive to invest long-term. Because if there are disincentives to invest in long term, we are actually undermining our own security. And the challenge is

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that this industry has a kind of strange demand. When there's peace there's a kind of relatively low level of demand. And then suddenly there is a crisis and this enormous need to boost and to make available quickly and suddenly enormous amounts for instance of ammunition. We have seen that during this war against the Ukraine. And therefore we either need huge stocks or we need big spare capacity which is not used in peacetime.

That is a real cost for our societies. It's a cost that doesn't disappear. If we want spare capacity, there is a cost. And the answer is that we want that spare capacity, because we need to be able to boost production when there is need. So the question is how do we pay? And then fundamentally, there are two ways of paying that either through market, but then maybe we need to adjust the regulations for the industry so they can put prices in different ways than they do today. Or we need the state, the governments to pay, to buy the service of spare capacity. I don't know the answer, but

I know that we have not enough spare capacity today. So we need more of that to ensure that we have the production when we need it.

So I look forward to you going in panels and solving that question for me. If you should, please submit it to NATO and then we will fix it.

Then, finally, NATO needs industry as we navigate a world shaped by disruptive new technologies. Technologies like artificial intelligence, autonomous systems, biotech and quantum are changing the character of conflict as much as the industrial revolution. As our strategic competitors invest heavily, they are becoming new arenas for global competition. So we must constantly sharpen our technological edge. By developing and adopting new technologies. Cooperating with the private sector. Shaping global standards. And embedding principles of responsible use that our democratic values enshrines.

This is what NATO's Defence Innovation Accelerator for the North Atlantic is doing – our DIANA. DIANA is a network of test centres and accelerator sites across NATO countries.

Last month, I opened an accelerator site in Copenhagen. The 'Quantum Lab' helps innovators to develop new technologies to solve some of our biggest security challenges.

We also have the NATO Innovation Fund. The world's first multi-sovereign venture capital fund, to support innovators across NATO.

And Allies recently agreed strategies on artificial intelligence and autonomy. We are developing others, including on quantum technologies.

Next spring, we will celebrate NATO's 75th anniversary in Washington. Our Alliance is vibrant, dynamic and fit for purpose today as it was on the day it was founded. Because we constantly adapt. And constantly innovate. Together with you, the private sector.

Cooperation between NATO, Allies and industry is growing stronger by the day. Because now more than ever, security is a shared responsibility. So I continue to count on you to help create a future of peace and freedom.

Thank you so much.

KEYNOTE ADDRESS
Assistant Secretary General for Defence Investment
MS WENDY GILMOUR

NATO Leaders' Decisions at the Vilnius Summit

In the current context of changing geopolitical environment, and strategic shock following Russia's aggression towards Ukraine, which was a stark reminder of the multitude of threats Allies face, NATO is adapting rapidly to the new circumstances.

NATO developed robust regional plans, and renewed the Defence Investment Pledge marking 2% of GDP being dedicated to defence as a floor (not as a ceiling as previously considered) while reiterating the 20% of the defence budgets to continue to be the target for capital investment, research and development and the acquisition of much needed capabilities. At the Vilnius Summit, Allied Heads of State and Government approved the Defence Production Action Plan in order to reinforce the criticality of defence industry and better integrate it into defence plans, took steps toward Ukraine's membership of NATO and reinforced global partnerships.

The Plan underscores the strategic importance of sustaining the defence industrial production capacity required in peacetime, crisis and conflict, and sets out a number of specific actions and projects to enable the Alliance to bolster engagement with the defence industry. A robust and flexible defence industry will contribute to strengthening the Alliance's deterrence and defence.

The Plan consists of three major themes: aggregating demand, addressing defence industrial challenges, and increasing interoperability. The Plan's output will be informed by and take into account developments and ongoing efforts in other international organizations, in particular the European Union. Aggregating demand can provide industry with clear long-term, predictable requirements to help drive investment in production capacity. The Plan will facilitate aggregation of demand, including multi-year procurement, help identify more agile procurement and funding mechanisms, and provide increased insight and clarity for industry of stockpile and production requirements. The Plan foresees greater usage of both existing NATO frameworks for aggregating demand, as well as the creation of new flexible mechanisms to address critical needs.

Aggregating demand through multinational cooperation can

help drive greater interoperability of key systems and interchangeability of munitions. Existing frameworks have already helped to drive forward significant purchases of munitions. In the run-up to the recent meeting of the Land Battle Decisive Munitions framework held in September, the NATO Support and Procurement Agency put framework contracts and orders into place for hundreds of thousands of pieces of key ammunition. These contracts, estimated at 2.4 billion euros – including 1 billion euros in firm orders – will deliver a wide variety of critical munition types such as 155mm artillery, anti-tank guided missiles and main battle tank ammunition. The first deliveries under these contracts are scheduled to start towards the end of 2023.

> **NATO needs a defence industrial base fully capable and agile, with access to talented and innovative workforce, to flexible finances, and to resilient, redundant and secure supply chains.**

The Plan highlights the need for sufficient and sustainable defence industrial capacity. As more orders have been placed by Allies, delivery times for certain ammunition types have lengthened. A set of metrics will be established to build a better understanding of defence industry supply chain issues and overall capacity. A Defence Industrial Production Board will bring together senior Allied experts on defence industrial planning and procurement, to link with defence planning and other relevant issues such as procurement and supply chains. The Plan underlines the need to strengthen mechanisms to engage with industry to ensure their perspective is fully taken into account.

The third element of the Plan is interoperability and standardization, with an initial focus on land battle decisive munitions. Interoperability ensures that Allies can operate together to achieve common goals, including by using equipment which meets NATO standards. The Plan outlines a set of activities to improve the materiel standards review process, increase visibility on the status and level of implementation of standards across the Alliance, and support NATO materiel standards in Allies' national capability requirements for industry. The Conference of National Armaments Directors (CNAD) is also establishing an improved testing and certification methodology, with a view to improving future munitions

interchangeability and interoperability.

The Plan's milestones and deadlines are set to accomplish a number of practical outcomes before the end of 2023.

The Defence Production Action Plan is designed to deliver. Interoperability work will not just focus on materiel, but take a much broader perspective, to include tactics, procedures and exercises.
The industrial factors will be better linked into NATO defence planning, and will bring together in addition to defence expertise, a wider body of knowledge to ensure NATO has defence capacity, but we also have the capacity needed today and into the future.

We shall be able to rethink the relationship and the ways of working with industry, in particular looking at avoiding vendor lock which is vital for future NATO capabilities.

The implementation of the Defence Production Action Plan is anticipated as a whole of government effort, as well as attracting the interest of other elements of the private sector.

NATO needs a defence industrial base fully capable and agile, with access to talented and innovative workforce, to flexible finances, and to resilient, redundant and secure supply chains.

OPERATIONALISING THE SUMMIT DECISIONS

We commit to contribute the necessary forces, capabilities and resources to the full range of NATO operations, missions and activities. This includes meeting requirements for deterrence and defence, providing the forces needed to implement NATO's defence plans and contribute to NATO crisis management operations. Allies will ensure that our forces are ready and have the necessary personnel, equipment, training, spares, logistics, infrastructure, and stockpiles. We commit to improve the interoperability of our national forces, including through transparent compliance with, and further development of, NATO standards and doctrines.

-NATO 2023 Summit Communique

Russia's unprovoked and illegal invasion of Ukraine has brought war on an industrial scale back to Europe. Many Allies have significantly depleted their stocks in order to support Ukraine and they need to ramp up production to continue to do so as well as to replenish their stockpiles. These challenges need the Alliance to reinvigorate the relationship between governments and the transatlantic defence industry, a partnership that has never been more important.

At the Vilnius Summit, Heads of State and Government took decisions to strengthen our deterrence and defence. Specifically, they agreed new defence plans and a new NATO Force Model, resulting in more troops at higher readiness. This in turn drives an increased requirement for capabilities, expressed through the NATO Defence Planning Process and the capability targets given to Allies.

Hand in hand with this operational step change, NATO leaders highlighted the need to thoroughly examine and act on the challenges inherent in delivering these capabilities. Through NATO's first Defence Production Action Plan, Allies at the Summit agreed to take a practical and focused look at three main pillars of activity: better aggregating demand, understanding the defence industry and increasing interoperability.

Aggregating demand provides industry with clear long-term, predictable requirements that in turn can be converted into firm orders and contracts. The Plan will facilitate aggregation, for example by creating new opportunities for multinational cooperation, including multiyear procurement contracts, identifying more agile procurement and funding mechanisms and providing increased insight and clarity for industry of stockpile and production requirements.

The Plan highlights the need for NATO to have a clear understanding of the complexities of the defence industry, including its composition, drivers, incentives and principles. To equip the Alliance with the requisite knowledge of defence industrial cooperation challenges, the Plan calls for the establishment of metrics to build a better understanding of defence industry supply chain issues and will enable increased Allied engagement and dialogue with industry and defence procurement agencies, including through

the establishment of a Defence Industrial Production Board.

The third pillar of the Plan is interoperability and standardization, with an initial focus on land battle decisive munitions. Interoperability is the ability to operate collectively to achieve common goals, including by using standardized equipment. The Plan outlines activities that will improve the materiel standards review process, increase visibility on the status and level of implementation of standards across the Alliance and help ensure that NATO materiel standards are incorporated into Allies' national capability requirements for industry. In addition, the Conference of National Armaments Directors will establish an improved testing and certification methodology, with a view to improving future munitions interchangeability and interoperability.

By examining these areas together, we can collectively explore the complexity and challenges of delivering the capabilities needed for a robust and responsive Alliance today and tomorrow.

The participants are invited to consider:

- *What collective strategies can NATO and the trans-Atlantic defence industry adopt to address the current and future technological challenges to enhancing NATO's collective defence capabilities?*

- *How can NATO and the defence industry work together more effectively to ensure the rapid delivery of capabilities to address evolving security challenges and enhance its deterrence posture?*

- *What changes in the NATO – defence industry relationship would bring the most benefit in terms of collaboration and understanding of each other's needs? [In particular, defence procurement processes]*

- *What could we do to ensure that defence industry investments align with NATO's long-term strategic goals and principles?*

OPERATIONALISING THE SUMMIT DECISIONS

The first panel was an opportunity to reflect on the issues raised during the opening keynote address by Assistant Secretary General for Defence Investment, Ms Wendy Gilmour. The panel exchanged perspectives on the implications of decisions made at the NATO Summit in Vilnius, in particular the Defence Production Action Plan, for capability delivery now and in the future.

Discussion points of note:

- The need to understand the aggregated demand signal from the Alliance is critical to ensuring industry matches it with the capacity to deliver the capabilities needed to nations at the requisite scale. The signal must factor in both today's requirements and those anticipated in the future. Understanding what the demand signal needs to be in order to fight at scale in the future if needed, whilst currently at peace, is crucial.

- Industry must be involved at an early stage in both national and multi-national defence planning. This engagement should include the eco-system of suppliers that underpin the defence sector to fully understand constraints, risks and opportunities.

- Industry and NATO must work as partners to meet the collective demands for security and defence. For the relationship to work transparency and openness are essential. There needs to be a willingness to share information to build the requisite trust.

- Industry and the Alliance will benefit from NATO being more open about its understanding of the future military operating environment, emerging requirements and capabilities in defence planning and stockpile requirements.

- Building industrial capacity takes time, commitment and action from both nations and industry. Reactively increasing capacity during crises presents risk for nations and industry, while proactively increasing capacity increases the financial risk to industry, therefore a longer term approach is required.

- In addition to aggregating demand there is a need for more discussion on risk sharing. Industry hopes the Defence Production Action Plan could facilitate this.

- NATO strategic planning needs to be linked to strategic planning for the defence industry and NATO can provide a forum for increased national and international cooperation to achieve this.

- Established prime contractors in the defence sector, Small and Medium Size Enterprises (SMEs) and suppliers all have a role to play. Both primes and SMEs bring innovation but primes can have a role to help SMEs scale up and bring their research and development, cutting edge competencies and disruptive technologies to the defence market. Considering this expanded defence sector eco-system more holistically could drive efficiencies and economies of scale.

- The metrics for measuring the capacity of the defence eco-system need to expand beyond notions of factory or production line capacity. They need to factor in supply chain lead times and material/component availability as well as workforce capacity and competence, the impact of automation and the application of new technologies.

- Investment in production capacity must not come at the expense of research and development. Both are necessary.

- There needs to be greater planning alignment between NATO and the European Union to avoid duplication, improve efficiency and send clear demand signals to industry. Regional approaches could also be explored to help deliver against aggregated demand signals.

- Aligning national procurement procedures could help improve interchangeability and interoperability.

- While there are technology based barriers for building interoperable systems, most are political barriers determined by national interests. Nations should be the main facilitators and prioritize interoperability.

- Interoperability is a necessity which does not mean using the same platforms and systems, rather making existing systems operate together. There is a need to develop open architectures and build solutions for connecting various systems.

- NATO's Common Funded Capability Delivery Governance Model has not yet been optimised. This is particularly apparent for the procurement

of software capabilities which have fast development cycles.

- NATO, nations and industry must work together to deliver the capacity to fight the next war and not the last one. This must include not only the equipment, but equally the ability to train, sustain and maintain forces and equipment.

Moderator:
Ms Oana LUNGESCU, Distinguished Fellow, Royal United Services Institute

Panelists:
Ms Tarja JAAKKOLA, National Armaments Director, Finland
Mr Micael JOHANSSON, Chief Executive Officer, Saab AB
Vice Admiral Guy ROBINSON, Chief of Staff, Supreme Allied Commander Transformation
Mr Michael WILLIAMSON, President Lockheed Martin International, Lockheed Martin Corp

KEYNOTE ADDRESS
Chair of the NATO Military Committee
ADMIRAL ROB BAUER

The case for NATO – Led Standardization

Ladies and Gentlemen,

As Wendy Gilmour announced I am going to talk you about the sexiest and trending topic of the day: standardization. Most of you here will recognise the artillery shells on the screen. These are one of the most coveted objects in the world right now: 155 mm rounds.
The fact that they are so coveted, tells you something about the state of the global security environment.

Does anybody here know the cost of this piece of ammunition before Russia's large-scale invasion in February last year? It was 2.000 euros.

Does anybody know what it costs right now? 8.000 euros. That is an increase of 400 percent. And this increase does not only pertain to 155 mm rounds.

This is happening across the board.

2023 will be the ninth consecutive year of defence investment increases across European Allies and Canada. We expect a real increase of 8.3%, the biggest increase in decades.

By the end of this year, European Allies and Canada will have invested over $450 billion extra since the Wales investment pledge in 2014. Eleven Allies now reach or exceed the 2% target, and we expect this number will rise substantially next year. After serving in the Armed Forces for almost 4 decades I never thought I'd say this… but money is no longer our biggest problem.

One month ago, the Allied and Invitee Chiefs of Defence gathered in Oslo to talk about the executability of our new defence plans.

And our biggest concern was that across the Alliance: production capacity is lagging behind; delivery times are moving to the right; prices for equipment and ammunition are going through the roof.

Right now, we are paying more and more for exactly the same and that means that we cannot make sure that the increased defence spending actually leads to more security. Despite what you may think I am not - only - pointing the finger at industry (If nothing else, for the simple reason that my mother

taught me that if you point the finger at anyone you point at least three fingers at yourself).

This is a problem that we ALL own.

Our liberal economies are not apt at creating the prioritisation and long-term vision that is so desperately needed right now. For decades, our defence industries were aimed at producing "just enough, just in time". They were aimed almost solely on efficiency and not effectiveness.

On how to make the most out of the least amount of investments.

In an era when NATO Allies conducted mainly crisis management operations, that was understandable. The system worked, because everything was plannable, predictable. But now: we are in an era of collective defence. Time is no longer on our side.

> **If we want peace, we must prepare for war.**

And we have to be ready to expect ANY kind of scenario. That means that it is time we look at effectiveness again. Both the private and public sector need to fundamentally change their approach. Both sides need to loosen the mutually destructive chokehold and stop waiting for the other to move first and investors play a huge role in this as well.

For instance in the Netherlands the largest pension fund has decided to sell its stocks in the defence industry, because they believe it is "unethical" to invest in defence. A decision like this makes it increasingly difficult for the industry to find the money to increase production capacity.

Let me state one thing in public, despite Chatham House rule; the ability to defend ourselves IS ethical! I am more than happy to answer any question on that!

So, in order to change the system: we need leaders from industry AND investors AND government to come together. Ladies and Gentlemen, at the Vilnius Summit NATO Allies approved a new Defence Production Action Plan to accelerate joint procurement, boost production capacity and enhance Allies' interoperability.

This is a prime example of NATO doing what it does best: adapt, unite and protect.
At its core, NATO is three things: command and

control, exercises and crucially: standardisation. Without standardization, it is impossible to have interoperability amongst Allies. We need these common standards and common ways of working together. Standardization is part of NATO's DNA. It is part of our brand, our strength, and our identity. And it's nothing new.

In fact, I have found a STANAG from 1968 (!) that sets the standard for indirect fire ammunition, amongst them 155mm rounds. Back then, they looked a little different than the one you see on the screen. But it shows how far back these things go.

The thing about standardization though… is that it is voluntary for nations. Implementation is a national decision and Allies self-report on their implementation status. The 1968 STANAG for instance was revised in 1998 and 2012, and currently has an annex in which 14 (!) nations state that although they subscribe to the STANAG. They reserve the right to deviate from it. I guess in an Alliance of 31 sovereign nations, one would expect nothing less. Sovereignty is what we fight to protect. But are we really protecting sovereignty here? Or are we protecting national industries because we are too afraid to really trust each other?

Another key problem is certification: if Allied nations don't each accept or trust each other's certification process it has big implications for interoperability and interchangeability. In this new era of collective defence you can ask yourself the question how effective that is? With the current shortfalls in production capacity there is a desperate need for MORE standardisation.

We need it and we need it FASTER and we need it EVERYWHERE meaning with all our Allies (more, faster and everywhere; where did I here that before?) because not only does standardisation lead to more interoperability. It also leads to more joint procurement and that in turn creates the effectiveness the current security climate calls for.

And the long-term demand signal that the industry wants.

The key therefore is to not only implement existing NATO standards to a higher extent… but to also adopt more non-NATO standards, through closer cooperation with industry and Standards Developing Organisations. We need to involve companies more directly in the standards development process. As early as possible. This is a two way street.

Government should reach out to industry and industry should actively look for opportunities to promote technical standards to NATO's expert groups, through increased engagement with National government representatives.

Adopting civil standards - especially for new and emerging technologies - will shorten the timeframe to establish new standards.

Ladies and Gentlemen, as fraught as the situation is, this is also a moment of immense opportunity. Our support to Ukraine has demonstrated the enormous fragmentation of our equipment, especially amongst European Allies. Our Ukrainian brothers and sisters are unfortunately dealing with that fragmentation day in and day out. It is a logistician's nightmare. So let us seize this moment and help both ourselves and our Ukrainian brothers and sisters to create more interoperability, and preferably even more interchangeability.

To come back to the 155mm again: in the current system every 155mm artillery system is built slightly different. At the moment Allied manufacturers produce 14 different types, and 4 more are under development.

Why? Not because it is more effective on the battlefield but because it ensures that the company that has made the gun, receives sufficient revenue. Just like the common printer in your household: the actual printer is relatively cheap the real money is in the ink cartridges.

Again: everything is aimed at efficiency.

If you are a CEO of a company and you can tell your shareholders that you have filled the order portfolio until 2030 for double or triple the revenue you had before February 2022. You're good CEO. A great CEO. But shouldn't being a good CEO also entail that you make sure your company contributes to long-term peace and stability? That you make sure your company actually contributes to deterrence?

Because the ability to produce what Allied armed forces need, at the speed in which they need it is a key part of our deterrence. If the commercial interest always wins out over the collective interest... we lose the peace upon which our prosperity has been built. SECGEN stated rightly that there is no Defence without Industry, but let me add to that that there is actually no Industry without Defence.

For almost 75 years, the defence industries in Allied nations could rely on their factories to be there the next day. In Ukraine, the factory can, as a result of a missile attack, be gone tomorrow along with all the investments. That could happen to us, if we don't get our deterrence in order.
War is a whole-of-society event.

Therefore, the prevention of war through resilience and deterrence is also a whole-of-society event. If we start to change once the conflict has begun, we are too late. That is why it is so important that we act

NOW and make a big push for more standardisation and more uniform certification. It will enable more joint procurement, more signed contracts and the long-term demand signal.

And crucially for our soldiers: it will enable more effectiveness on the battlefield.

If the EU can regulate phone chargers then surely we can all find a way to regulate 155 mm shells. This, by the way does, not only apply to the physical domain, like the artillery shells. This requirement for standardization by the way also very much applies to the digital domain when we want to be able to share information based on the increasing data we collect at the battlefield and during maintenance.

We have a unique opportunity here. NATO has a network of 17,000 experts across the Alliance! We have decades of experience to work with and a global reach that none of our adversaries do. I have all the faith in the world that Allied governments and industries have what it takes to turn the current system around.

And that together, they can do what NATO does best: unite, adapt and protect but we have to act fast.

If we want peace, we must prepare for war.

Thank you

> "
> *The ability to produce what Allied armed forces need, at the speed in which they need it is a key part of our deterrence.*
> "

STANDARDIZATION AND INTEROPERABILITY TODAY AND TOMORROW

All Allies will commit to improve the interoperability of their national forces, including through transparent compliance with, and further development of, NATO standards and doctrines.
-NATO 2023 Summit Communiqué

Interoperability is essential for NATO to conduct operations and missions across all domains at any scale, including with partners. This is not new but in an era of rapidly evolving and increasingly accessible emerging and disruptive technologies and weapon systems it requires additional attention. Long lead times to field new capabilities and the challenge of incorporating them with a large pool of legacy systems are increasing significantly. Furthermore, Russia's war in Ukraine underlined the need for stricter implementation of agreed standards and to integrate new technologies at the speed of relevance.

NATO Interoperability Policy and Strategy defines Interoperability as the ability to act together coherently, effectively and efficiently to achieve Allied tactical, operational and strategic objectives. For the Alliance, standardization is a means to support achieving, maintaining and enhancing interoperability, improve efficiency in the use of available resources, strengthen Alliance defence capabilities and enhance operational effectiveness.

By strengthening relationships with the defence and technology sectors and by using open standards to the greatest extent possible, NATO continues to pursue interoperability as a force multiplier and a mechanism for streamlining national efforts. This is especially relevant in the area of Emerging and Disruptive Technologies, for which there is a need to rapidly and efficiently adopt and/or develop standards to ensure the best utilization of these new technologies in a coherent way.

While it is NATO policy to use extant standards as much as possible and only develop new ones if no other alternative exists, Allies are responsible, where applicable, for incorporating ratified NATO materiel standards into their national capability requirements for industry. Moreover, nations must synchronize their capability development efforts ensuring the implementation of the same standards at the same time.

Recently NATO has also launched a new Fund for Accelerating Interoperability and Standardization (AIS) to address the shortfalls in the areas of capability development and standardization. Part of the NATO 2030 initiative AIS is already funding projects to address ammunition interchangeability and interoperability; Interoperability between Allied equipment, including un-crewed systems and more generally, projects to identify interoperability and standardization issues and help lay the ground to prioritize future standardization activities.

The participants are invited to consider:

- *What challenges exist between the different business sectors, Standard Developing Organizations and National Administrations that affect development and use of standards in parallel with the evolution of technologies?*

- *Alliance-wide standardization ensures interoperability between Allies' forces. What approach is industry taking to ensure that, on the one hand, standards which are sufficiently precise are correctly implemented in their products and, on the other hand, innovation in capability developments can be promoted? How can NATO support this continuous challenge?*

- *How is industry using new technologies like AI to modernize and innovate activities across the wide portfolio of existing standards and their customer base?*

- *What further actions should NATO take in order to make better use of its role as convener, standard setter, requirements setter and aggregator, and delivery enabler that would enhance Alliance standardization and interoperability? What more should industry do? How can all stakeholders collaborate better?*

# STANDARDIZATION AND INTEROPERABILITY TODAY AND TOMORROW

This plenary session addressed the perennial challenge of standardization and interoperability with a focus on what needs to be done in order to integrate current and legacy systems into modern networked architectures and be able to field the capabilities of the future.

Discussion points of note:

- Standardization does not have to hinder innovation. Fast standardization cycles can facilitate innovation and allow actors to tap into standardized architectures with their research and development efforts.

- New technologies would benefit from elements already being standardized, thus providing stability for the customer. Where the standardization cycle is driven by industry, NATO can help defining the specific requirements regarding technology and interoperability related to the military context.

- The war in Ukraine highlighted standardization issues and the urgency to solve them. Interoperability becomes an immediate problem in high intensity warfare but interchangeability is even more important, such as the availability of common munitions across platforms and of spare parts between interoperable systems.

- Industrial protectionism is a problem. Only 4% of the European defence market follows the principles of open market, instead prioritizing national or business interests over collaboration. This also leads to less standardization, less resilience and less healthy competition - as one speaker noted, "survival of the fattest, not of the fittest".

- Supply chain resilience is critical. Often fixed sets of suppliers are the result of long standing business relationships, therefore changing suppliers is difficult. However, more diversified supply chains and multiple sources of components will increase resilience and improve price competition.

- One issue for Allied nations to pursue is the qualification processes. Different processes for each country fragment the customer base and creates inefficiency. Multinational qualification processes, where countries with similar needs harmonize requirements would improve efficiency, interoperability and interchangeability.

- It is necessary to increase production, which means production rhythm and capacity; however increasing capacity takes time. Harmonization of orders, standardization and delivery calendars facilitate increased production rates. Nevertheless, challenges and risks associated with increased production cannot be carried by industry alone – governments need to be active.

- Integrating current and novel systems is challenging, even at the national level. However, there are examples of success with technology transfers from countries selling the technology, allowing other nations to maintain equipment and produce spares.

- Not everything needs or should be standardized. It's about striking a balance between standardization and the pace of adaptation and innovation. The focus should be on standardizing basic architectural structures and user interfaces and certain system functionalities.

- Ukraine is undergoing a digital transformation on the battlefield. Their experience shows that digitalisation and standardization can be drivers for innovation.

- 5G communications and Internet Providers have opened up innovation and are good examples of standardization. NATO adoption of 5G would be a key enabler for the Alliance.

- There is a need for mechanisms that provide for continuous feedback from the battlefield to industry.

- Industry must be involved in setting standards. Standardization should be pursued in the development of advanced munitions that fit existing platforms, rather than developing bespoke platforms that lock customers into one product.

- Standards and regulations need to be binding for industry and Allies, since today standardization in NATO is voluntary. This change will require strong political will.

- Long-term investment is needed to ramp up production, replenish stockpiles and create and maintain spare capacity. Industry needs clarity on the goals including the level of defence capabilities needed.
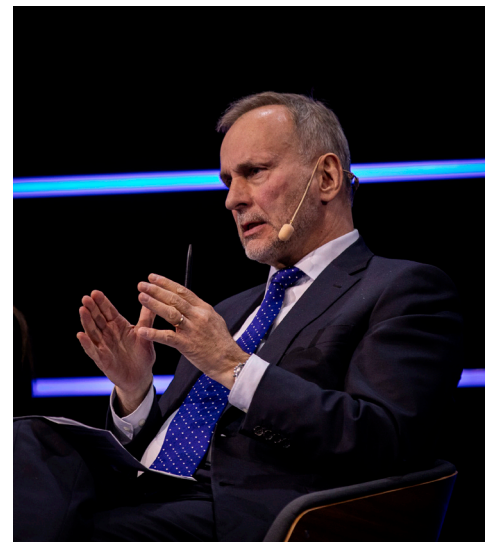
Session Led by:
Mr Ludwig DECAMPS, General Manager, NATO Communications and Information Agency

Panellists:
Mr Philippe Agard, Head of Defense Vertical, Nokia
Mr Morten BRANDTZÆG, President and Chief Executive Officer, Nammo
Ms Małgorzata KOBYLARCZYK, President of the Board – General Manager WZE, and Vice-President of the Board - Director of R&D Department, PIT-RADWAR
Mr Esa RAUTALINKO, President and Chief Executive Officer, Patria

UNDERSTANDING THE OBSTACLES AND OPPORTUNITIES TO DEFENCE INDUSTRIAL COOPERATION. WORKING AS A TEAM: TRANS-ATLANTIC DEFENCE INDUSTRIAL BASE

*To have the necessary capabilities, the Alliance requires a strong and capable defence industry, with resilient supply chains. A strong defence industry across the Alliance, including a stronger defence industry in Europe and greater defence industrial cooperation within Europe and across the Atlantic, remains essential for delivering the required capabilities. Furthermore, consistent with our commitments, obligations and processes, **we will reduce and eliminate, as appropriate, obstacles to defence trade and investment among Allies.***
-NATO 2023 Summit Communiqué

The trans-Atlantic relationship lies at the core of the Alliance. It is enshrined in the Washington Treaty, in Article 2: "The Parties … will seek to eliminate conflict in their international economic policies and will encourage economic collaboration between any or all of them." It is the bedrock of the Alliance and with the new strategic reality driven by Russia's illegal war in Ukraine our defence industrial base is once again centre stage and a critical player.

At the NATO summit in Vilnius, Heads of State and Government renewed the Defence Investment Pledge to "invest at least 20% of our defence budgets on major equipment, including related Research and Development" and industry is expected to be able to rapidly ramp up production to match the surge in demand, while Allies are at peace.

Nations and companies alike have started to reinvest in long neglected capacities but current demand is out-pacing supply. In some cases this may lead to a lack of diversification driven by the principles of just-in-time supply and can create single points of failure, for example, in the case of powders, propellants, or other basic raw materials for munitions.

The Defence Production Action Plan lies at the heart of addressing these challenges as it aims to "identify, reduce and eliminate obstacles or barriers to the transfer of capabilities and munitions between Allies." These capabilities are essential to rebuild Allies' depleting stockpiles, to provide future and innovative solutions to the Alliance's armed forces and to continue to allow governments deliver on their commitment to support Ukraine.

However, defence industry cooperation is multi-facetted and includes the transfer of technology, know-how and intellectual property, the transfer of equipment, setting up joint ventures and participation in development programmes, directly or as third-parties. It must also contend with export control processes and procedures as well as industry-to-industry engagement based on government established procedures, government-to-government relations and multinational arrangements. The landscape is complex!

Some mechanisms for facilitating cooperation already exist, such as the Reciprocal Defense Procurement Memorandum of Understanding between the US Government and individually the governments of 21 Allies and Sweden but their effectiveness is limited.

The participants are invited to consider:

- *How the current status of obstacles/barriers to defence industrial cooperation should be characterized following Russia's invasion of Ukraine? Are there noticeable changes compared to the past and if positive, in what sense? What else should be done?*

- *What additional actions should NATO take in its role as convener, standard setter, requirements setter, aggregator and delivery enabler that would help promote a sustainable trans-Atlantic defence industrial base?*

- *What would the panel recommend to industry, governments and international organizations such as NATO and the EU in order to facilitate and incentivize greater defence sector cooperation in the short, medium and long term?*

UNDERSTANDING THE OBSTACLES AND OPPORTUNITIES TO DEFENCE INDUSTRIAL COOPERATION. WORKING AS A TEAM: TRANS-ATLANTIC DEFENCE INDUSTRIAL BASE

This plenary session was an opportunity to explore obstacles to enhancing multinational collaboration in the defence sector and propose potential solutions.

Discussion points of note:

- There is no defence without industry and industry needs contracts/orders to increase capacity.

- In a normal market Western defence sector companies are competitors but Ukraine has brought them together around shared values. A lesson identified for industry is to focus more on partnerships. Industry has learned how to bring together capabilities to rapidly deploy them into theatre in order to maintain that pace.

- Ukraine has highlighted that we need to deliver more rapidly and that nations needs to work better together to achieve this. The huge level of demand requires nations to understand and collaborate on the depth of supply. It is important to understand capacity as well as capability.

- Defence industry collaboration needs improvement. Industrial capacity needs to increase and procurement processes need to be simplified.

- Collaborative working will result in greater understanding of the demand and the scale of the challenge. Combining resources and integration of systems will then lead to greater effectiveness. Working together would also push governments to move faster.

- Allies need to collaborate and make efficient use of platforms. For example, there are currently 17 different main battle tanks in Europe but only one in the US.

- Export restrictions and regulations hamper collaboration and capability delivery and should not be in place for NATO nations. This is particularly prevalent in the Space domain and is only growing in importance. Fragmentation in NATO is a fact, with nations progressing independently.

- Roadmaps highlighting the direction of NATO and the demand signal for industry are essential. We collectively need to deliver faster and to be able to scale up to meet the requirements. Aggregated demand would support the nation that needs the asset in getting it when needed.

- Interoperability and interchangeability are both key. Strategic alignment, especially in the context of wider geo-political activity, is essential, even though it is hugely complex to align the 31 NATO Nations.

- Support to Ukraine was rapid because governments cut corners in procurement processes. Can this be standardized? Aside from European export issues, ITAR and US export controls are also seen as obstacles.

- Industry innovates through robust research and development programmes, often through small and start-up companies. However, not all small companies are able to navigate government bureaucracy and they need support. Industry stakeholders must complement and augment each other to scale up when required.

- There is scope for a closer NATO-Industry partnership.

- Allies' regulatory bureaucracy which are the result of democratic processes, can hamper industrial effort whilst our adversaries do not operate in democracies and can move at a very different pace.

- Collective reliance on a limited number of suppliers across the NATO nations presents risk.

Moderator:
Cynthia COOK, Director of the Defense-Industrial Initiatives Group and Senior Fellow in the International Security Program, CSIS

Panelists:
Mr Theodore (Ted) COLBERT III, President and Chief Executive Officer, Boeing Defense, Space and Security
Mr Thomas (Tom) LALIBERTY, President Land and Air Defense Systems, Raytheon, an RTX business
Mr Eirik LIE, Chief Executive Officer, Kongsberg Defence and Aerospace
Mr Michael SCHOELLHORN, Chief Executive Officer, Airbus Defence and Space
Mr Taha YÜCEL, Deputy CEO, Aselsan

KEYNOTE ADDRESS
Assistant Secretary General for Innovation, Hybrid and Cyber
MR DAVID VAN WEEL

The Energy Transition of Military Capabilities

Mr van Weel noted:

- The magnitude and importance of the choices faced by NATO today by drawing a parallel between the current energy transition and historical examples, such as Winston Churchill's strategic decision to switch the Royal Navy from coal to oil.

- NATO will have to think about how to adapt to all aspects of the energy transition, from performance and sustainability to interoperability. The Alliance also needs to understand the role it will play in driving this change noting the global energy transition is well underway and militaries are inherently reliant on civilian infrastructure. Considerations of these future needs will need to be understood in relation to future energy systems and future operating environments.

- NATO is an active participant in the energy transition which is why last year, NATO's Secretary General announced plans for NATO's Energy Transition by Design Initiative.

- NATO is cognisant of the weaponisation of the issue by Russia and thus the need to play a proactive role in the energy transition. The energy transition must not result in new energy dependencies that could compromise security (eg Chinese supply or processing of rare earth metals).

- NATO must address several key issues; How to embrace the energy transition while ensuring operational effectiveness in the military as well as interoperability among Allies? How to ensure standardization and how to retain enough fossil fuels during the transition period. Addressing these issues will require greater engagement with Allies, partner nations, industry and other stakeholders including European Union and the International Energy Agency.

- NATO is investing in the energy transition directly through the Defence Innovation Accelerator of the North Atlantic (DIANA). Investing in start-up companies, NATO is seeking to find innovative solutions to increase our energy security, for example deployable and scalable micro-grids
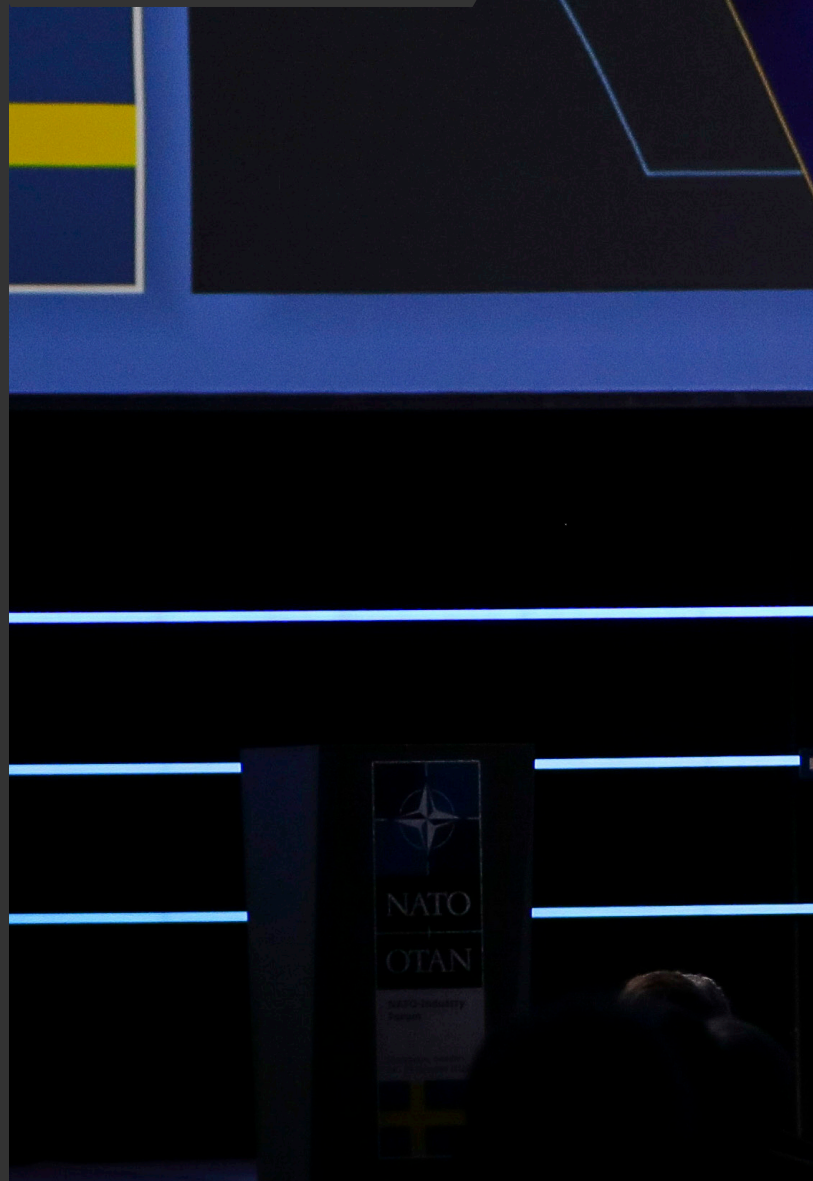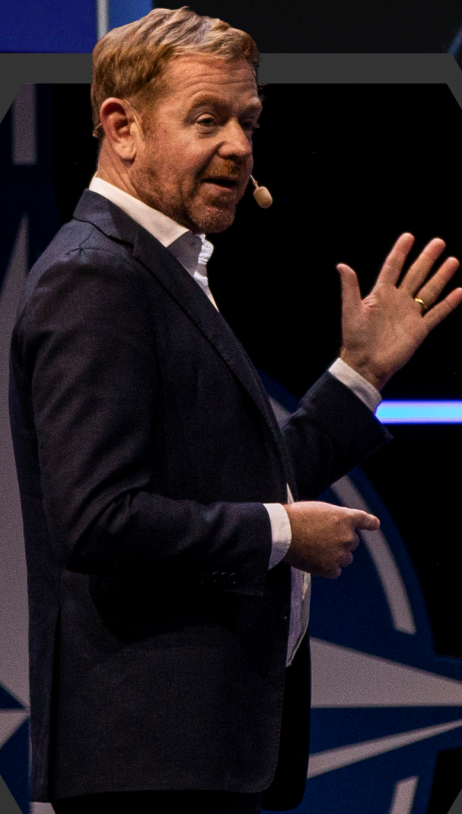
and adaptive and intelligent power conditioning and management solutions.

- NATO recently created the world's first-ever multi-sovereign venture capital fund and amongst other investments there is a focus on energy and propulsion technologies. The fund will aim to prioritise greener technologies, including those with dual-use purposes to promote a more sustainable future. NATO can play a key role as a major purchaser of equipment and vehicles by sending a clear demand signal to the defence industry and by strengthening collaboration with stakeholders across this sector

"

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KEYNOTE ADDRESS
Ukraine's Minister of Strategic Industries
MR OLEKSANDR KAMYSHIN

Russia's War of Aggression – the Old and the New

The minister's speech was a reality check to highlight what has changed about warfare and what has not, especially in a highly connected global economy.

Key points:

- The minister stressed that the invasion brought NATO back to its initial goal, of collective defence. He highlighted that NATO should not underestimate this vital task and that NATO also should not underestimate Russia.

- The minister noted that Ukraine has been the breadbasket of Europe and is now the arsenal of the free world.

- Ukraine is able to share the lessons learned, not only military but also related to defence industry.

> **"**
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> *Ukraine is able to share the lessons learned, not only military but also related to defence industry.*
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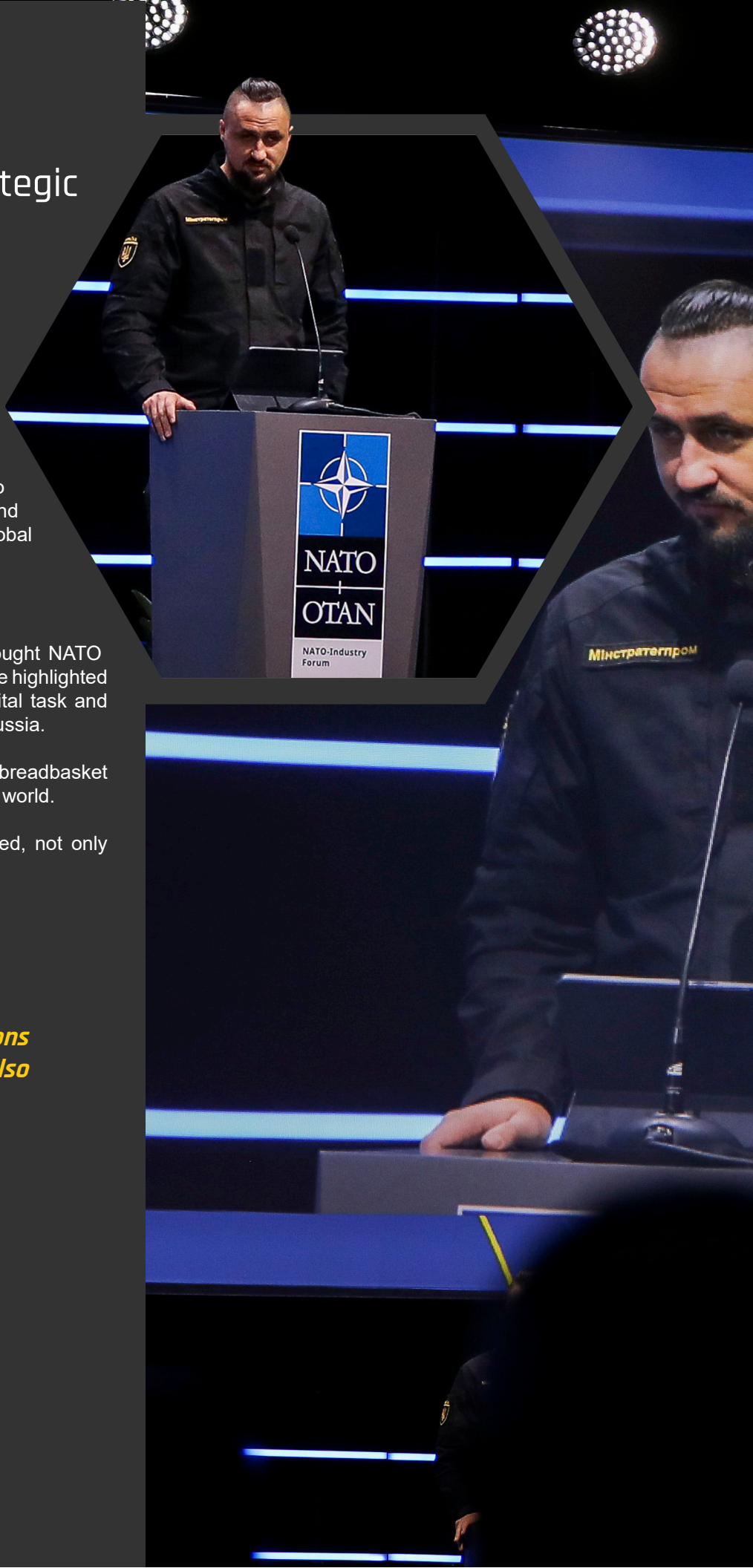
KEYNOTE ADDRESS
Deputy Supreme Allied
Commander Europe
ADMIRAL SIR
KEITH BLOUNT

The Military Requirements to Fight at High Intensity

The Admiral reflected on the initial lessons from Ukraine and on where the military commander needs industry to focus their effort.

Key points:

- NATO has adapted to the new strategic environment through coherent, converging strategies (Strategic Concept, DDA and NWCC).

- As the operational HQ, SHAPE and ACO are implementing new collective defence plans for the first time since the end of the cold war.

- These plans will be delivered through four mutually supporting lines of effort, the Plans themselves, an updated C2 model, appropriate authorities and the right Forces.

- Implementation is an iterative process rather than a fixed answer, as we learn more through testing, exercising and the introduction of technology.

- What does NATO need:

  - A reversal of the last 30 years of disinvestment.

  - Efficiencies by leveraging technology to truly deliver Multi-domain operations.

  - To consider how to best use common funding to deliver integration and efficiencies of scale when purchasing.

  - To understand that capability pathways are small iterative steps rather than a giant leap.

- What big steps could we take:

  - Re-model our career pathways to harmonise requirements for the warfighter of the future and deliver the troops and commanders that can fight in the complexity of the future's battlefield.

> " *Implementation is an iterative process rather than a fixed answer, as we learn more through testing, exercising and the introduction of technology* "

- Embrace new ideas such as DIANA and the NATO Investment Fund.

- Drive efficiencies in the procurement process through better requirement elicitation (our senior leaders need training in this as a profession).

- Understand that the stimulant of conflict as a motivator for defence investment also upsets the market, driving demand (and prices) higher.

- Given the pace of technological change, be comfortable that 80% may be good enough.

- These problems are not new, defence procurement has been criticized for decades, it is up to us to ensure we do not continue the cycle.

NATO'S APPROACH TO MULTI-DOMAIN OPERATIONS FORCE REQUIREMENTS AND CAPABILITIES – TODAY AND TOMORROW

Allies have agreed to continue our work on multi-domain operations, enabled by NATO's Digital Transformation, which further drives our military and technological advantage, strengthening the Alliance's ability to operate decisively across the land, air, maritime, cyberspace and space domains.

-NATO 2023 Summit Communique

Russia's war of aggression in Ukraine has brought the reality of high intensity conflict into sharp relief. NATO is now operating in an age of constant competition, pervasive instability and strategic shocks. It must continually shape and contest this environment whilst being prepared to fight and win. This new-era of simultaneous activity is increasingly dynamic and often boundless. As one of the answers to this challenge, on May 19th 2023, Nations approved the Alliance Concept for Multi-Domain Operations (MDO).

MDO entails orchestrating military activities across all five operating domains and synchronizing non-military activities through collaboration with non-military entities. Enabled by an improved digital backbone through NATO's Digital Transformation Implementation Strategy, MDO will shape the future of deterrence and defence in the North Atlantic area of operations.

For Multi-Domain Operations to succeed, digital systems must work seamlessly together, to collect, secure, curate, process, and efficiently exploit data. Data is the fuel of Multi Domain Operations – it is a strategic asset. Whilst most Allies possess cutting edge hardware, with advanced sensors capable of gathering valuable data, these platforms often work in isolation, sometimes within a single nation and even within single domains. We need to ensure that Allies' data can be exploited at the speed of relevance, to inform timely decision-making, and then shared with the relevant effectors at a tempo that outstrips our adversaries. Due to the vast quantities of data we generate, automation and AI will be essential tools – increasingly it will be our software that gives us competitive advantage, as well as our hardware.

Consequently, cyberspace has become the primary battleground below the threshold of kinetic military action and there is increasing competition for advantage in the space domain. This complexity is exacerbated as many actors are intertwined in a complicated mix of socio-political relationships and economic reliance.

This panel will explore how to accelerate NATO's transition to a MDO enabled Alliance through digital transformation and data exploitation as well as considering the opportunities and challenges the adoption of emergent and disruptive technologies will have on MDO in the longer term. The participants in the NATO's approach to Multi-Domain Operations Force Requirements and Capabilities – today and tomorrow session are invited to consider:

- *The implications of next generation communication (eg 5G-6G) and computing architectures on the transition to an MDO enabled Alliance.*

- *How can NATO collaborate better with industry in order to define capability requirements that factor in MDO?*

- *What other EDTs should NATO be addressing now in a MDO context?*

NATO'S APPROACH TO MULTI-DOMAIN OPERATIONS FORCE REQUIREMENTS AND CAPABILITIES – TODAY AND TOMORROW

Aplenary session that extended the problem set from the preceding keynote addresses into the future. The session considered both the critical enablers NATO and Allies need now and in the near future (Digital Transformation, data exploitation and analytics, ubiquitous communications, 5G-6G-next generation comms, cloud computing, etc.) and provided a longer term perspective on technology.

Discussion points of note:

- Digital transformation is the critical enabler for MDO and the exponential growth in data and data transmission rates must be anticipated during the process; it is possible to plan for higher capacity and lower latency which bring numerous benefits including greater resiliency and reduced energy consumption.

- The pace of the threat is changing at an extraordinary rate in the digital space. This can drive innovation but creating and fostering strong relationships with industry.

- Digital transformation will require new hardware and software solutions which should leverage the opportunities presented by 5G/6G advances as well as AI and VR across all domains.

- Digital transformation and delivering a Multi-Domain enabled Alliance will require a cultural shift and mind set change across the Alliance. Education across the military is essential to deliver this change and ensure personnel have the requisite skills for the digital environment of the future. NATO also needs a culture with a willingness to experiment and fail fast in order to innovate faster.

- Better sharing and exploitation of data across all stakeholders, including industry, is critical for delivering an MDO enabled Alliance. Considering AI as a use case, it will not be possible to fully exploit the technology without shared access to vast quantities of data.

- Many of the technical solutions to address big data (including cloud computing solutions) exist but there are obstacles to adoption. These include national policies, slow procurement processes and data sovereignty issues. There is a need to harmonize national classification levels and allow industry to share information more easily to realise these solutions.

- Cloud computing solutions to enable multi-domain operations must have redundancy in case the cyber domain is attacked, so that military effects can still be delivered. A two cloud solution, one for the strategic level and one for operational MDO activity that is resilient to denial could be a viable model.

- Digital transformation requires services articulated from the start, built in zero-trust and open architectures, with the right controls at the right level for NATO, governments and industry. Nations must lead the way on access to data.

- The tools exist to share data but data sovereignty issues and legacy infrastructure and processes are constraining progress. Adversaries do not have these constraints and are developing capabilities now. Industry can support governments to resolve the challenges of data sovereignty and sharing.

- Discrete use cases (eg 5G networks on military bases) can be used to build trust and accelerate the role out of new technologies and associated capabilities.

- Industry involvement in the problem space can help ensure requirements are set that will ensure MDO capabilities are fit for purpose and leverage relevant technologies. Digital solutions are critical to an MDO enabled Alliance but the current pace of delivering these capabilities is too slow.

- The war in Ukraine should be a catalyst for greater investment to deliver an MDO enabled Alliance.

- NATO should leverage its convening power to facilitate work on complex defence problems at the multi-national level.

- NATO should set standards for MDO across both the physical and virtual domains.

- NATO should take a system of systems approach

to operationalise MDO and incorporate existing systems while creating new systems.

- Delivering the capabilities for a multi-domain Alliance will require clear policy commitments from NATO and nations.

- Greater collaboration amongst stakeholders in the defence sector can help deliver complex MDO capabilities required by NATO and the associated enablers. Industry needs to understand the threats and required mission outcomes to support this effort.

- In a digitally enabled MDO context all capabilities are sensors and doctrine and processes need to be developed to ensure this data can be leveraged.
- Effective uses for AI must be found in an MDO context before adversaries gain a competitive advantage.

Moderator:
Major General Joseph D'costa, Deputy Chief of Staff Strategic Plans and Policy, Allied Command Transformation

Panellists:
Lieutenant General Michael CLAESSON, Chief of staff for the Armed Forces Headquarters, Sweden
Mr Erik EKUDDEN, Chief Technology Officer, Ericsson
Mr Olivier KERMAGORET, VP and CTO Defence Production Systems, Thales
Mr Max PETERSON, VP worldwide public sector, AWS
Mr Andy START, National Armaments Director UK and CEO, DE&S
Dr Charles WOODBURN, Group Chief Executive Officer, BAE Systems

INDUSTRY – THE GATEWAY TO SPACE

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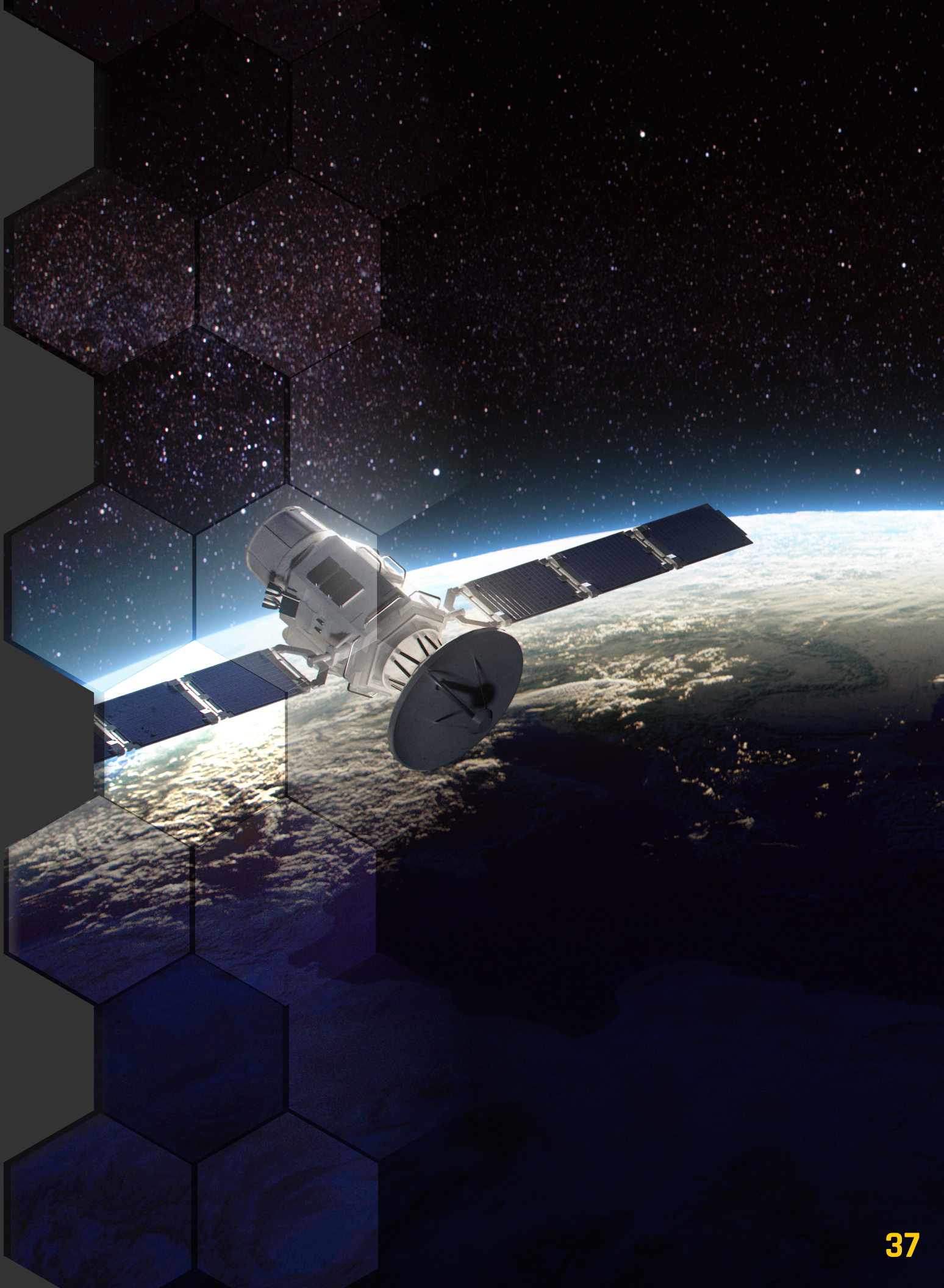
-NATO 2023 Summit Communique

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INDUSTRY – THE GATEWAY TO SPACE

A short session that explored the uniquely outsized role that industry has in delivering space capabilities, products and services.

Discussion points of note:

- NATO declared space an operational domain in 2019. Space is an enabler and critical to NATO's operations but also creates new risks and vulnerabilities. The development of spaced-based capabilities is driven by the commercial sector which enable Allies and NATO to outperform adversaries but also creates new threats to industry.

- The space sector provides critical infrastructure for civil society (communication, navigation, positioning, weather monitoring), however many of the space systems are dual use and military and civil actors have shared interests and can both benefit from collaboration.

- Space capability development would be improved by better communication between civil and military actors. Military actors need to understand the context in which private companies operate. Private companies are often small and have trouble navigating the slow and bureaucratic procurement processes of military actors. Processes need to be simple and fast. The public and private sectors also need common goals and achievable milestones.

- The public and private sectors need to collaborate to resolve how to appropriately share and handle sensitive information and ensure cyber security.

- Policy makers need to stop seeing space as an unregulated frontier of development, or as an exciting environment where our presence is for educational or science purposes only. Space infrastructure provides data to the global population. Space is becoming more crowded therefore more regulation is needed in this domain. Risks like collisions in space, counter-space technology and the deliberate targeting of space-based assets are increasing and create serious problems for the sustainability of the domain. All actors need to act responsibly, follow existing regulations, take care of existing space infrastructure and consider platforms' end of life.

- Standardisation is key, not least for the data traffic received from orbiting platforms.

- Development of the civil aspects of space is slow but with significant potential and competition maintains continuous development. However, shortfalls in resources and a qualified workforce are limiting industry's ability to quickly scale up.

Moderator:
Brigadier General Chris Sage, Head of Joint Air Power and Space Staff Element, IMS, NATO

Panellists:
Dr Anna RATHSMAN, Director General for the Swedish National Space Agency
Ms Emmanuelle MERIC, General Manager, Loft

FUTURE PROOFING CRITICAL SUPPLY CHAINS

You need to invest in your national security. And when I say security is not only defence budgets, it's also economic security, is energy security, is technological security, is supply chain security, is climate change and security. It costs money.

-NATO Deputy Secretary General Mircea Geoană,
69th Annual Session of the NATO Parliamentary Assembly

The maintenance of secure and resilient supply chains contributes to Allies' commitment, under Article 3 of the Washington Treaty, to develop individual and collective capacity to resist any form of attack.

While primarily a national responsibility, actions to secure critical supply chains are essential to maintaining the Alliance's military advantage, by ensuring that the Alliance develops its military capabilities free from competitors' and potential adversaries' licit or illicit influence. They are equally important to assuring the availability of these capabilities and their key constituent elements, as well as to protect Allied capability development from internal and external disruptions. As such, resilience of critical supply chains is a key enabler of credible deterrence and defence, including for goods and services that are not strictly military in nature but would be vital to support national and collective defence.

A robust and resilient trans-Atlantic defence industry, able to sustainably meet the needs of significantly strengthened collective defence commitment, is also key in this regard. The Defence Production Action Plan, endorsed by NATO leaders at the Vilnius Summit in July 2023, underlines the importance of having a clear understanding of defence industry supply chain issues and highlights the need to consider the resilience of defence-critical supply chains as the Alliance seeks to identify measures to contribute to increasing production capacity.

The Covid-19 pandemic highlighted the extent to which critical supply chains are vulnerable in a highly interconnected global economy as global supply chains were generally designed around the principles of affordable and 'just-in-time'. Additionally, Russia's war of aggression against Ukraine once again brought the realities of high intensity conflict into focus and made it evident that such a supply model is not optimal in this new security context. Finally, the private sector, a key stakeholder and partner in ensuring the resilience of national supply chains, needs to adapt to this changing environment and be supported in its efforts to do so.

In this context, NATO has been undertaking important work to enhance the security and resilience of supply chains essential to Allied capability development and delivery. NATO offers to Allies a platform for exchanging national approaches and responses, as well as for considering possible collective responses, common methodologies and cooperation in relevant areas.

Supply chain resilience requires dialogue and engagement between NATO and a variety of communities and stakeholders, including industry as highlighted in the NATO Defence Production Action Plan. It also requires greater defence industrial cooperation within Europe and across the Atlantic.

This panel will explore how to identify and mitigate strategic vulnerabilities and dependencies with respect to supply chains. In this regard, it will consider how to go from just-in-time logistics to secured critical supply chains in a highly inter-dependent global economy. It will consider additional measures that Allies, NATO and other like-minded organisations, such as the EU and the private sector, can take to make this strategically important transition.

This panel will aim to come to a common understanding of the risks undermining critical supply chains and the ways in which to optimise the efforts of the key stakeholders in securing them.

The participants are invited to consider:

- *Their understanding of the challenges and vulnerabilities to critical supply chains, as well as related mitigation efforts.*

- *Existing tools and mechanisms that are facilitating the management and operation of complex, global supply chains.*

- *Their views and expectations on the role of key stakeholders, including NATO and industry and the challenges faced in taking forward their efforts.*

- *The possible opportunities and requirements for coordination and cooperation between key stakeholders, in particular NATO and industry, with a view to making supply chains future-proof.*

FUTURE PROOFING CRITICAL SUPPLY CHAINS

T his session explored how to transition from just-in-time logistics to secured critical supply chains in a highly inter-dependent global economy. role that industry has in delivering space capabilities, products and services.

Discussion points of note:

- Supply chains are complex and data is critical to ensure they work efficiently and effectively. Nations, NATO and industry sharing data can help improve supply chain resilience by understanding the demand and providing focus on what is important. Industry is expected to speed up and deliver at greater volume but the lag time in supply chain ecosystems cannot be reduced to zero, therefore long-term demand signals are important as well as visibility of the whole supply chain.

- Both industry and governments need to know their supply chains better. For this, extensive data sets, data sharing and trust are needed. To overcome the unwillingness to share data due to culture, intellectual property, competition etc it is important to find common cause and start collaborating on small scale problems. Strategic partnerships will be required to build trust and field the necessary tools to share supply chain data.

- To build supply chain resilience, strategic partnerships need to be developed before any crisis hits. Establishing partnerships early can reduce risk in times of crisis.

- Supply chains should be considered holistically to include data, material and human resources. The right data can help provide supply chain visibility and holistic understanding of where vulnerabilities lie (eg reliance on a sole source provider) but there is a cultural dimension that will drive more, faster and cheaper.

- It is important to ensure there is the right level of investment in supply chains and that they recruit the right people with the right skills. Governments can support this effort if they have visibility of where the vulnerabilities lie.

- Defence supply chains are big and complex, involving hundreds of subcontractors that are often multi-national. To understand and manage the risks in these supply chains (including sole source suppliers) it is essential to understand all the connections within the eco-system. The eco-systems need to be monitored in real time using trusted data that can be used to make decisions on mitigating actions.

- As virtually no supply chain is national from end to end, no single government has the means to regulate them in their entirety, therefore Allies need to collaborate to create resilient supply chains.

- Proactive supply chain management will require industry, governments and NATO to work together.

- Investing in readiness ahead of a crisis has positive effect on crisis management when it is needed. NATO, together with the Nations, should invest in readiness to guarantee reliable supply chains when they are needed most.

- Visibility of clear, long-term demand signals are key for creating the trust and incentives necessary to adjust and ramp up production throughout supply chains. Governments need to share the risks and bridge the gap between defence demands and ramping up production by making long-term orders, building stocks of critical components, investing in machinery, educating and attracting a workforce to the defence sector. To do this, governments need to understand their critical supply chains and where the bottlenecks are. Some bottlenecks can be corrected by regulatory means, others need international collaboration and long-term investment. Industry can focus on interoperability, work to streamline supply chain ecosystems, share data and understand the need for security as well as profit.

- To align everybody to efficiently work towards the same goal (supply chain resilience), there needs to be a shared understanding of purpose and a shared sense of urgency. Here, politics have a role to play.

- The NATO Summit in 2024 could be used as an opportunity for industry to make a strategic declaration on data sharing and working together to improve supply chain resilience and interoperability.

- Overregulation can stymie innovation and hinder increasing production capacity in the defence sector. National and multi-national collaboration is necessary to optimise regulation but the lead-time to implement change carries risk.

- Just-in-time and just-in-case supply chains are both necessary and do not need to be mutually exclusive. Strategic partnerships and shared incentive structures can help develop alternative supply solutions.

Session led by:
Ms Stacy CUMMINGS, General Manager, NATO Support and Procurement Agency

Panellists:
Mr Eric BERANGER, CEO, MBDA
Mr Troy EDGAR, Finance and Supply Chain Transformation Leader, IBM Consulting, US Federal
IGA Olivier LECOINTE, Direction Générale de l'Armement (DGA)
Mr David PLATT, Chief Strategy Officer, Moody's
Ms Caroline PONTOPPIDAN, EVP, Chief Corporate Affairs Officer, MAERSK
Mr Paul SAUNDERS, Head of Product Strategy S/4HANA and Chief Evangelist Cloud ERP, SAP

ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG)

Environmental, Social and Governance (ESG) refers to the three central sets of standards of companies' behaviour that inform the evaluation of sustainability and societal impact of an investment in a company or business. The increasing emphasis on ESG arises from a growing recognition that businesses affect the world beyond simple profit and loss. As we face challenges with climate change, societal well-being and corporate ethics, ESG helps investors and stakeholders ensure that they are supporting companies that acknowledge, minimize and responsibly manage the implications of their operation. In short, they should do no significant harm.

The number of ESG funds is growing and more banks and investors are integrating ESG criteria into their long-term risk assessments. This trend affects capital flows in the financial markets; it is also important to note that the operationalization of ESG can vary between investors. This prompts questions about its impact on defence companies: how will investors evaluate defence? The defence sector supplies weapon systems according to the specific needs and criteria of armed forces; some systems can contain components that can only be made with certain toxic raw materials, like lead and PFAS. This raises the question how should environmental standards be applied to the defence sector when no viable alternatives to these materials exist without compromising on capabilities and security? While potentially penalised for using toxic materials, how are companies, or their suppliers, rewarded for pursuing environmentally friendly alternative solutions?

ESG is about more than the environment. The defence sector faces unique challenges, especially in relation to the social pillar, which is about how it manages relationships with employees, suppliers, customers, human rights, and the communities where it operates. Defence products are bound by strict regulations concerning their use and export, in order to avoid misuse. This is especially important for armaments, which are designed to deter, and when used, to defend against or neutralize enemy soldiers, equipment and infrastructure. Given their function, these products carry an inherent and significant social risk. However, no weapons can be sent anywhere without the explicit approval from national governments. **How can ESG concerns be balanced with respect to potentially exporting to controversial areas, with decisions taken at governmental level?**

But it is also about environment. Defence companies should definitely match the efforts of all of society to reduce their environmental footprint and to become part of the global transition to low-carbon energy sources. This is valid for their infrastructure, operations, manufacturing processes, supplies and supply chains. Additionally, to the extent it does not compromise military effectiveness and interoperability, this is valid for their end products, armaments, munition systems, IT, in fact everything they produce for all five operational domains: air, land, maritime, cyber and space. The design of defence products must take into consideration the challenges posed by Climate Change and its impact on the mission of our armed forces and on the defence industry. It is imperative for NATO and Allies to focus on the operational effectiveness of the platforms and systems. Defence companies should innovate and ensure the operational effectiveness of those platforms and systems, while mitigating those capabilities' impact on the environment.

Many ESG funds shy away from the defence sector, preferring to channel investments towards more peaceful initiatives rather than 'instruments of war'. However, the new strategic reality following the illegal Russian invasion of Ukraine demonstrated once again that peace cannot be taken for granted. The NATO Secretary General paraphrased the thousand years old 'si vis pacem para bellum' by noting: "We all want peace, we all want to invest in something other than weapons, but the problem is that sometimes you need to invest in weapons to ensure peace"

ESG criteria are increasingly central to investment decisions. However, the position of defence companies within this paradigm is a matter of debate. Some ministers have criticized what they perceive as a bias, suggesting that due to "deliberate discrimination or the unintended consequences of a broad-brush approach, defence companies are swept up in ESG investment groupthink". Contrasting this view, Morningstar states that ESG funds exposure to defence is "not so different to other funds", however "79% of sustainable funds have no exposure to companies that make controversial weapons", such as nuclear. Additionally, there are an increasing number of investors, banks and service providers who exclude companies involved in nuclear weapons manufacture from their portfolio of customers.

In the current international security environment NATO Allies need to scale up their

defence industrial capacity. As international dynamics shift and new challenges emerge, any lag or obstruction in adjusting defence capabilities exposes Allies to risk. ESG considerations, as they are now, may introduce additional friction to the needed upscaling. **Balancing** sustainable practices with defence needs is vital for a credible defence and to sustain Ukraine's war effort for as long as it takes.

This panel discussion should attempt to address some of the following questions, provided for orientation and inspiration. The participants are invited to consider:

- *Since governments are the sole customers for defence, how can they balance security needs with the increasing ESG demands affecting the financing and sustainability scoring of defence companies? Are external regulations necessary to guide or complement the internal ESG policies of financial actors? Can regulatory changes, both proposed and desired, enhance the alignment between the defence industry and ESG principles?*

- *Have recent geopolitical events, like Russia's invasion of Ukraine, reframed the financial industry's understanding and priorities in the ESG-defence debate? Have shifts in sentiment around defence and ESG over the past few years occurred in the financial sector? If so, has this already been reflected in changes to their policies?*

- *How can the financial, insurance, energy and other industries interpret the 'Social' criterion in ESG to encompass the range of societal impacts of defence activities? What options are there for governments, NATO and defence companies to pursue in order to help?*

- *In an increasingly ESG-conscious financial landscape, how should the defence industry adapt to ensure sustained capital inflow and access to services? What might a middle ground look like, where ESG criteria are met without compromising on defence capabilities and the operational readiness of the armed forces?*

ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG)

This session explored how to transition from just-in-time logistics to secured critical supply chains in a highly inter-dependent global economy. role that industry has in delivering space capabilities, products and services.

Discussion points of note:

- Although Russia's invasion of Ukraine had positive implications for the defence industry, many banks, investors and insurance companies are still reluctant to explore and expand investment opportunities in this sector. The bigger picture indicates that while few investors adapted their funding criteria and leaned more towards the defence sector, the global capital market is still hesitant about investing in defence.

- The defence industry is often associated with negative connotations as it is considered unsustainable and unethical. This fosters a reluctance amongst some investors to further explore defence investment opportunities.

- In order to overcome the reluctance to invest and showcase that the defence industry can be sustainable, social and ethical, governments need to encourage financial investors to explore and integrate ESG frameworks within defence investments.

- ESG is about taking environmental, social and governance factors into consideration for economic decisions. Although ESG is still fairly new for the defence industry, many larger companies have already institutionalized ESG policies. However, many of these mainly relate to the 'governance' aspect and place less emphasis on the 'environmental and social' factors. Smaller organizations often do not have the capacity to establish ESG frameworks.

- At the moment, there is no commonly agreed definition of ESG which creates a window of opportunity to influence current and emerging regulations. Hence, ESG as a concept leaves much room for improvement and opportunities for defence.

- ESG efforts are unevenly distributed across the Euro-Atlantic area, mainly reflected in stricter ESG criteria in Europe compared to other parts of the world.

- The question of how ESG can be better incorporated by stakeholders still raises many questions and concerns for banks and investors. In order to promote the defence sector as a more 'green and ethical' opportunity for financial investors, ESG policies need to be incorporated into institutionalized frameworks. This requires relevant stakeholders, including governments and investors, to engage in more regular dialogue. This will enhance the understanding of each stakeholder and might overcome the reluctance towards defence investments.

- NATO addresses ESG by including climate change and gender topics in their institutional frameworks. However, the Alliance could do more to promote the importance and relevance of the defence industry to societies.

Moderator:
Ms Marija Pujo TADIC, Climate Leader and EU Climate Pact Ambassador

Panellists:
Ms Hortense BIOY, Global director of sustainability research, Morningstar
Ms Raffaella LUGLINI, Chief Sustainability Officer, Leonardo
Mr Kris PEETERS, Vice-President, European Investment Bank
Mr Jan PIE, Secretary General, Aerospace and Security Defence Industry Associations of Europe (ASD)
Mr Rudy PRIEM, Chair, NATO Industrial Advisory Group (NIAG)

CLOSING REMARKS

Initial takeaways from the conference and a broad outline of next steps/activities.

In their closing remarks General Chris Badia and Ms Wendy Gilmour highlighted:

- The need to deliver (capabilities) faster, more, everywhere and better (cheaper), recognizing there is no defence without industry. Further citing the reality of economic deterrence (including the defence industrial base) but noting deterrence cannot be delivered without collaboration between NATO and industry.

- That to win the next war 'the important' must not be forgotten because 'the urgent' usually takes precedence.

- NATO's military strengths include command and control, standardization and exercises that help deliver interoperable capabilities. NATO is also good at analysis and strategy.

- The need to do better on Standardization and interoperability through a true strategic partnership between NATO and nations.

- The criticality of partnerships, not only between nations but also with industry. Further, the importance of talking 'with industry' and not 'at them' as part of the defence planning process.

- The need to include data sharing into future defence plans to ensure the demand signal is embedded.

- That each and everyone has a role to play and challenged NATO and nations to avoid developing difficult regulations, be more innovative to make industry is included at an early stage.

- The need for a cultural shift to ensure processes and policies include everything necessary for success.

- The need to include a younger generation to contribute both in the defence industry and in NATO.

The principals thanked Sweden for hosting the NATO-Industry Forum 2023.

Speakers:
General Chris BADIA, Deputy Supreme Allied Commander Transformation, NATO
Ms Wendy GILMOUR, Assistant Secretary General for Defence Investment, NATO

KEYNOTE SPEECH
SWEDISH MINISTER OF DEFENCE
MR PÅL JONSON

Secretary General Stoltenberg, General Lavigne, National Armaments Directors, CEOs, distinguished guests,

It is a great honour to host the very first NATO Industry Forum in Sweden.

I would like to touch upon three subjects in my remarks today. Firstly, how Sweden can and will contribute to Alliance security as a member. Secondly, what we can learn from the battlefield in Ukraine. And finally, how we can maintain a strong industrial base and the technological edge for the future.

To my first point – how Sweden can contribute.

Once a full-fledged member of NATO, Swedish territory will provide the Alliance with increased strategic depth. The integration of Sweden into the new Regional Plans will consolidate the whole Northern flank in line with the Deterrence and Defence Agenda. We also have assets and capabilities in all domains that will contribute to NATO's New Force Model.

We are ready, willing and able to join the Alliance.

We understand that we are joining an Alliance where an ambitious approach to defence investments is a matter of burden-sharing, but also cohesion and solidarity. Sweden stands fully behind the increased ambition in NATO's updated Defence Investment Pledge, as agreed by Allies in Vilnius this summer. From 2020 to 2024, Sweden has doubled its defence budget from six billion Euros to twelve billion Euros.

We expect to reach 2.1 percent of GDP to defence investments next year and will remain significantly above 2 percent for the foreseeable future. Sweden already exceeds the twenty percent guideline for defence spending to major equipment, research and development. In fact, next year, more than half of our defence spending will be on equipment and R&D.

We are greatly helped in this endeavour by having strong and internationally recognised government agencies such as FMV and FOI. Once we have become full members, we are also looking forward to joining DIANA and NATO Innovation Fund.

We hope that we can contribute to the Alliance's endeavour to maintain the technological edge. This is how:

> **" The key is of course to transform innovation power into military power. "**

According to the Global Innovation Index, Sweden ranks number two in the world among the most innovative countries. According to the European Innovation Scoreboard, we rank number one in EU according to the same measure.

This is of course greatly helped by substantial research funding in Sweden. In terms of civilian R&D expenditures, Sweden ranks number one in the EU and number four in the world.
One in fifty Swedish citizens holds a PhD. That makes Sweden number five in the world in this category.

This long-time and sustained focus on R&D spending, education and infrastructure sustains our vibrant and innovative industrial base, with companies from Ericsson and Volvo to Spotify, and many others that are here today.

The key is of course to transform innovation power into military power. Sweden's unique industrial base combines innovation and technology to design, develop and produce world class submarines and ships, anti-tank weapons and armoured vehicles, as well as fighter aircraft and airborne early warning systems. This is rather unique for a country of ten million people. We would never be able to accomplish this if we did not have a strong civilian R&D community in Sweden.

In addition, we are gradually building an integrated air defence with our Nordic and Baltic Sea neighbours. Our Nordic air forces have long practiced cross-border training in our shared air space and are integrating to operate together as a future joint force of some 250 modern fighter jets, F-35s and Gripen Es.

Another example is how Swedish sensor technologies onboard our own and allied submarines, signal intelligence ships and airborne early warning and control systems now contribute to a shared picture, stretching from the North Cape to the Baltic Sea, and all along NATO's Eastern border. This is going to be much more effectively integrated when we become part of NATO and its Integrated Air and Missile Defence.

Still, innovations of tomorrow require engagement and investments today. A few months ago, the Swedish Government launched a Defence Innovation Initiative, in which we work in a triple helix model with civil and military actors, academia, and industry. The initiative is being developed in close partnership with industry. Together, we will identify and provide action points to strengthen the whole defence innovation ecosystem in Sweden.

And let me be clear, the time when we talked to the industry is long gone, we now talk with the industry. It is all about partnership and teamwork if we want to be successful.

This leads me to my second subject – what we can learn from Ukraine.

First, supporting Ukraine is not only the right thing to do, but also the smart thing to do. It's an investment into our own security. We will continue to support Ukraine until it regains its freedom and territorial integrity. Russia's full-scale invasion of Ukraine has shown us

that war is as violent, as kinetic and as bloody as it always has been.

It is about scale and volume – that is what happens when many brigades and hundreds of thousands of soldiers are involved. But it is also a war which has shown us not only courage from the Ukrainian side, but also agility, creativity, and innovation. This is where Ukraine maintains its edge. Even though the Ukrainians where outgunned in the beginning of the war, they have been able to regain more than fifty percent of the occupied areas. Russia now controls less than twenty percent of Ukrainian territory.
In essence, this war has been a political and military disaster for Russia. We are all grateful to Ukraine for not just defending its own security, but also ours by fighting so bravely and innovatively.

With the war being far from over, we have identified several initial observations:

We need a strong and robust defence industry in Europe. This is a war of warehouses and a war of attrition. A strong defence industrial base is an indispensable part of credible deterrence. We also need to strengthen our UAS and drones assets, our long- range precision strike capabilities, as well as air defence Systems and robust satellite communication.

Space-based assets and secure communication have played a crucial role in this war. We need to understand that, but also act upon that fact.

And most important of all, we must ensure a strong will to fight. You can have all the technology and assets in the world, but if you do not have the will to fight, you will fail. This demands political leadership and effective strategic communication among other things. This leads me to my third subject of today – strengthening the defence industrial base.

Firstly, we need to ramp up production in Europe. There are new and encouraging programmes and initiative on the way, in the EU with both ASAP and EDIRPA, and in NATO with the Defence Production Action Plan.

The EU and NATO has never worked as closely together as they have done in the run-up and during the war in Ukraine. We need to build upon that. I warmly welcome that the third joint declaration between the EU and NATO in particular underlines cooperation around new and disruptive technologies and space.

But as participants in this room know more than anyone, ramping up production is difficult. Nevertheless, it

needs to be done. The industry's willingness to invest in production capacity must be met with long-term commitments from governments. The current rise in demand must stay on these high levels for many years to come if we want investments in production capacity.

Secondly, we need to ensure that emerging and disruptive technologies are more quickly integrated into test beds and demonstrators and in the hands of the operators. On balance, we are operating with too long acquisitions cycles in Europe. It is crucial that we increase the pace of integration, as the technology develops exponentially.

To conclude, let me stress that at the end of the day, we need to develop weapons that are more effective and advanced than those of our adversaries.

We need both quality and quantity to win. And we need it fast.

Thus we need to act, and we need to invest. And we need to invest together.

We can have all the strategies and plans in the world, but there is a sacred expression that "culture eats strategies for breakfast". We need to encourage a culture that is not afraid to make mistakes and is open to innovation and collaboration across traditional sectors.

It all needs to be done in a close and open dialogue with you, the industry.

With these remarks I would like to thank you for listening and I now look forward to listening to Secretary General Stoltenberg and General Lavigne.

Thank you.

> **"**
> **We need a strong and robust defence industry in Europe. This is a war of warehouses and a war of attrition. A strong defence industrial base is an indispensable part of credible deterrence.**
> **"**

KEYNOTE SPEECHES
Supreme Allied Commander Transformation
GENERAL
PHILIPPE LAVIGNE

Admiral Bauer, Chair of the Military Committee, Dear Rob, General Bydén, Swedish Chief of Defence, dear Micael, Ambassador Gilmour, NATO Assistant Secretary General, dear Wendy, Distinguished leaders and representatives from industry, Admirals, generals, Let me say hello to General Denis Mercier, former SACT! Ladies and gentlemen, Good afternoon.

Thank you Director General Mårtensson for your kind welcome and your very pragmatic thoughts and recommendations as a National Armements Director.

Together with my co-host, Ambassador Wendy Gilmour, I want to start by thanking our wonderful hosts, and soon to be fellow Ally, Sweden.

Our goal is for us all to leave this forum with a shared understanding of what we mean by today's theme: "Addressing the New Strategic Reality, Together".

How in a changing world, emerging and transforming actors and a constantly accelerating future operating environment, low-cost high tech as well as brute force, are upending the nature of warfare.

Together, NATO, Industry and Allies, we must make the most of our respective contributions for the good of our Alliance. To overcome these challenges and secure our future, together. And for that to happen we need a new closer and more agile, Industry-NATO paradigm.

If I was asked to present the New Strategic Reality in an elevator pitch, I would use three words:

MORE - FASTER - EVERYWHERE

More new and advanced technologies, including more low-cost unmanned systems, at sea, in the air and on the ground. More munitions being expended in a day than some of our industries produce in a year. Requiring us to think harder about the mix of quantity and quality,
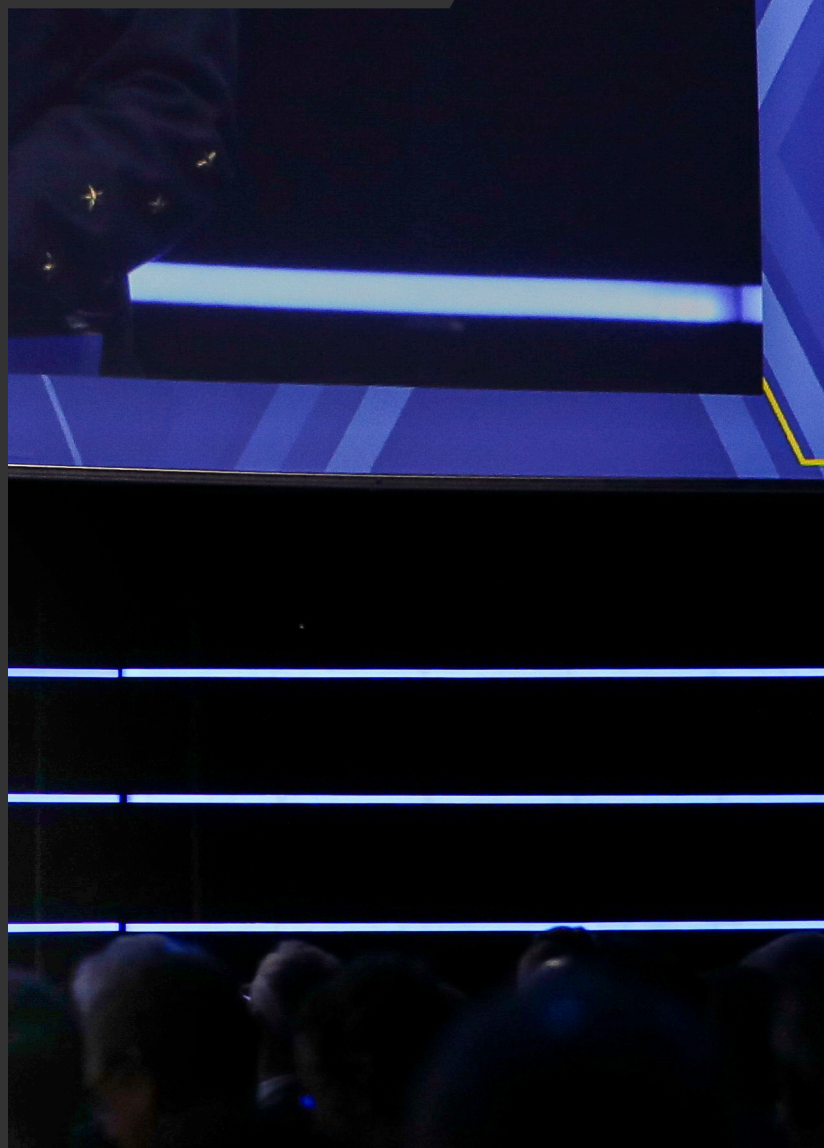
Because today we need both, we need to balance cheap mass and Tech with exquisite capabilities, at the right cost. But also more data and more information. That need to be collected, analysed and acted upon at the speed of relevance.

All of which means that NATO, after 20 years of what you could call its expeditionary phase is now confronted with an unprecedented and much greater level of intensity.

Faster. Including hypersonic weapons that are cutting into our own decision and reaction loops or yesterday's EDTs that are now … well … fully emerged!

And accelerating the development, dissemination and availability of cheap high-tech weapons. An acceleration likely to intensify because Quantum Computing and AI, for instance, have only just begun to deliver on their promise.

Finally everywhere. The weaponization of energy and food security, of mass migration. From up in space to the bottom of the sea. Furthermore, the pervasive nature of these threats extends to the wider cognitive and informational spheres and across all domains.

The paradox is that if the fog of war is being lifted on the battlefield by the wide availability of sensors and drones, the vast quantities of data and information, especially when combined with targeted cognitive campaigns can also induce a decisional fog.

Which we will have to deal with.

So what? What do we do about it? How do we get from the NATO of yesterday to the NATO we need today and tomorrow?

If I can characterize our threat environment in three words, I only need a few more to define what is needed: understand better, decide faster and be stronger together!

With military plans and the readiness we need today for deterrence and defence (DSACEUR Admiral Keith Blunt will talk about that tomorrow), with a Multi-Domain Operations (or MDO)-enabled Alliance that has undergone a Digital Transformation.

Going from operating across multiple domains to our leveraging data, digital interoperability, automation and AI to optimize converging effects across all domains and making a synchronized use of all NATO's instruments of power. More details to come with General Da Costa from ACT and also With Partnerships, with nations, with the EU with academia and with the private sector.

And what does that mean more specifically for our relationship with Industry?

Let's look at that in a wider context. We can all see how innovation is now being driven by the private sector. and that limited public resources will continue to be a factor, despite bigger defense budgets.

I think that we can also agree that traditional defence development and procurement processes have shown their limitations.

Together, NATO and Industry must provide an answer to our "more, faster and everywhere" strategic environment. By developing our own "more, faster and multi-domain" Alliance, whose Digital Transformation has put data at the heart of everything it does. With forces that are more agile, more mobile, more ready and more interoperable. With industry helping us to provide the right interoperable EDT augmented capabilities at the right scale, at the right time and at the right price today, tonight and tomorrow.

That is likely to require a new collaboration framework

including an approach towards a better, faster and cheaper capability development. To implement quickly and efficiently the NATO capabilities we need to get the right mix of cheap but lethal mass capabilities, commercially-driven technology (which has shown a remarkable ability to hold costs down) and where necessary exquisite capabilities (meaning very advanced, but very expensive).

And, in an age of data dominance, and the need for interoperability across domains and Nations, Digital Transformation must connect these capabilities by design, to enable data-centric MDO.

I look forward to exchanging with you on these and other topics today and tomorrow but will conclude these remarks by addressing that last part of this year's theme: together.

We must work together, but also think about how to work together better and I have many ideas through MDO and DT implementation, wargaming, a continuum of experimentation, interoperability and talents.

Because the stakes are too high and because the threats are too numerous in a fast-changing Future Operating Environment, as we confront the changing nature of warfare, while our processes are not yet agile or fast enough, and our costs too high for the mass and intensity.

And because as you just heard, today's new strategic reality requires we pool our respective advantages to win as a team, stronger together.

DAY 2 SPEECH

Secretary General Stoltenberg, Minister of Defence Pål JONSON, Distinguished panellists, Leaders and representatives from industry, Admirals, generals, Ladies and gentlemen,

Good morning, yesterday, in my opening remarks, I discussed a rapidly evolving security environment characterized by more, faster and everywhere.

The brutal war in Ukraine has put those trends under the harshest of lights. For this particular audience I would point to the issue of limited availability of our most advanced capabilities, alongside opportunities and challenges that come with mass and production at scale. Or the big role played by a number of big tech players in ensuring the 'digital survival' of the Ukrainian state.

Although, nations everywhere are becoming more dependent on services provided by commercial providers, in areas as diverse as space and cyberspace, or even the 'older' worlds of logistics or telecommunications.

So how does NATO continue to defend and deter in this environment, today and tomorrow?

We have already started of course. Today's level of linkage between NATO and national defence plans is without precedent. With Regional Plans, built on objective, threat-based Force Structure Requirements and a Defence Production Action Plan to speed up joint procurement, boost production capacity and enhance interoperability, in parallel with complementary European initiatives.

We are moving from today's Joint Operations framework to a Digitally Transformed and MDO-enabled Alliance. From a NATO Defence Planning Process centred on crisis management, to one built around MDO-based collective defence and to striking the right capability balance of Tech and Mass. We do this by leveraging innovation at both ends of that spectrum and pulling from the brain power and resources of our tech and industrial sectors.

It will also mean turbocharging interoperability. Which, as Admiral Bauer reminded us yesterday, has always been at the heart of NATO business and is equally central today to NATO's Digital Transformation.

Interoperability is also a place where NATO and industry have a long shared history. Stronger relationships with the Tech and defence industry, and wherever possible, the use of open standards, will help NATO ensure interoperability embraces digital and data-centricity and continues to work as a force multiplier and streamliner of national efforts in our transformation towards MDO.

Although it will, as it has always been, up to the individual nations to implement the norms and the standards we have agreed together.

To give a concrete example of what MDO might look like: It means going from the intensive (and manpower demanding) Desert Storm air-to-ground targeting process, to an uber-like on-call model that is automated and AI assisted to optimize and accelerate the synchronization of all domains, including to the greatest extent possible, space and cyber, and addressing the competition/war in the info sphere.

A model that has integrated all relevant data and information, from all available sources. Data centricity for better understanding, for rapid decision-making, tasking and execution. Using the most appropriate combination of Lethal, Non-Lethal, Influence and Information military activities.

> **The fact is neither Industry nor NATO can afford to be priced out of the market.**

On the "production side", it will require to address quality and quantity, in complementary of exquisite capabilities to keep our edge. It will require we find ways to produce more mass and more Tech faster, better and cheaper, together with industry. Both for mass lethal capabilities and consumables and for high-tech digital capabilities.

Because the return of high-intensity warfare translates into significantly higher rates of consumption and attrition. We cannot ignore that harsh mathematical reality. Those ratios must also help think through the implications for Deep Precision Strikes or Integrated Air and Missile Defence for instance. If our interceptors cost ten or a hundred times more than the cheap threat they are countering clearly that is not a viable long-term solution.

How do we intercept at a fraction of the cost of the threat? Faster, because innovation and experimentation allows us to cycle through the definition of a need, solution trialling, development and fielding so much faster especially for digital, data and AI related capabilities, but we need to apply those principles more widely. Including to the urgent work of revamping our command and control systems. Or actually producing the kit we need in the numbers we need and ensuring we can resupply in the quantities we need in a reasonable amount of time and money.

Which brings me to cheaper (a dirty word for some I know!). The fact is neither Industry nor NATO can afford to be priced out of the market. Operational needs will always tend to outrun defence budgets and NATO's pockets are not bottomless.

Commercial tech sectors have shown how they can innovate, bring new products to the market while keeping costs under control. Some examples among many: Shrinking costs for space access and connectivity or electric vehicles, advanced AT tools available to all for next to nothing. Low-cost tech solutions must therefore be part of the mix, as our friends in Ukraine have shown, again and again.

At Allied Command Transformation, we are already fully engaged on all these fronts. Making the most of

our 'strategic' position on the other side of the Atlantic, I spend a lot of time meeting with academia and industry. Recognizing that there is no monopoly on good ideas and an urgent need to rapidly identify, test, experiment and deliver the most promising solutions.

Among our ongoing efforts I could mention our effort to transform our annual interoperability experimentation event into a distributed Interoperability Continuum. Where we can, together : military and Industry, continuously test and experiment systems in a coalition setting, to ensure their compatibility and interoperability and especially their ability to share and consume data as a federation.

In line with ACT's open innovation DNA, we also bring experts and innovators to look at specific challenges, as we did last month to talk about Cognitive Warfare. Which is increasingly being used to challenge our narratives, but also to impact behaviours and influence decisions makers and ultimately undermine the Alliance's cohesion. To move ahead with the data-centric integration of capabilities, information and decision-making across domains and environments.

A new Industry-NATO paradigm for Capability development would have much to offer. It would help the Alliance, individual Allies, and industry move more rapidly towards more mass and more tech, on the basis of a more agile Capability Culture and greater Digital Interoperability alongside a stronger MDO-enabled NATO Defence Planning Process (NDPP).

As I did yesterday I will end on the importance of doing all of this together. NATO, Allies and Industry, we must make the most of our respective strengths and work on our respective weaknesses, for the good of our Alliance because we all bring something different to the party.

We at NATO could, and should, do more to involve the private sector in our exercises, experiments for instance. So that together we can get closer to getting the right mix of low-cost high-tech, exquisite capabilities and mass that NATO needs. In short: More Tech, More Mass, Faster, Better, Cheaper YES WE CAN!

Thank you for your attention

NATO INDUSTRY FORUM

Master of Ceremonies
Ms Katarina TRACZ

Welcome Remarks
Mr Göran MÅRTENSSON,
National Armaments
Director, Sweden

Opening Remarks
Gen Philippe LAVIGNE,
Supreme Allied Commander
Transformation

Keynote Address
Ms Wendy GILMOUR,
Assistant Secretary
General for Defence
Investment, NATO

Moderator
Ms Oana LUNGESCU,
Distinguished Fellow,
Royal United Services
Institute

Panelist:
Ms Tarja JAAKKOLA,
National Armaments
Director, Finland

Panelist:
Mr Micael JOHANSSON,
Chief Executive Officer,
Saab AB

Panelist:
Vice Admiral Guy ROBINSON,
Chief of Staff, Supreme
Allied Commander
Transformation

Panelist:
Mr Michael WILLIAMSON,
President Lockheed Martin
International, Lockheed
Martin Corp

Admiral
Rob BAUER
Chair of the NATO Military
Committee

Moderator
Mr. Ludwig DECAMPS,
General Manager,
NATOCommunications
and Information
Agency

Panelist:
Mr Philippe AGARD,
Head of Defense
Vertical, Nokia

Panelist:
Mr Morten BRANDTZÆG,
President and Chief
Executive Officer, Nammo

Panelist:
Ms Małgorzata KOBYLARCZYK,
President of the Board – General
Manager WZE, and Vice-
President of the Board - Director
of R&D Department, PIT-RADWAR

Panelist:
Mr Esa RAUTALINKO,
President and Chief
Executive Officer, Patria

Moderator
Cynthia COOK, Director
of the Defense-Industrial
Initiatives Group and Senior
Fellow in the International
Security Program, CSIS

Panelist:
Mr Theodore (Ted)
COLBERT III, President
and Chief Executive
Officer, Boeing Defense,
Space and Security

Panelist:
Mr Thomas (Tom)
LALIBERTY, President
Land and Air Defense
Systems, Raytheon, an
RTX business

Panelist:
Mr Eirik LIE, Chief
Executive Officer,
Kongsberg Defence and
Aerospace

Panelist:
Mr Michael SCHOELLHORN,
Chief Executive Officer,
Airbus Defence and Space

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Mr Taha YÜCEL, Deputy CEO, Aselsan

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Assistant Secretary General for Emerging Security Challenges, NATO

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Minister of Defence, Sweden

Keynote Remarks
H.E. Jens STOLTENBERG
NATO Secretary General

Keynote Remarks
General
Philippe LAVIGNE
Supreme Allied Commander Transformation

Keynote Address
Mr Oleksandr KAMYSHIN
Minister of Strategic Industries, Ukraine

Keynote Address
Admiral Sir
Keith BLOUNT
Deputy Supreme Allied Commander Europe, NATO

Moderator
Major General Joseph D'costa, Deputy Chief of Staff Strategic Plans and Policy, Allied Command Transformation

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Panelist
Mr Erik EKUDDEN, Chief Technology Officer, Ericsson

Panelist
Mr Olivier KERMAGORET, VP and CTO Defence Production Systems, Thales

Panelist
Mr Max PETERSON, VP worldwide public sector, AWS

Panelist
Mr Andy START, National Armaments Director UK and CEO, DE&S

Panelist
DrCharlesWOODBURN, Group Chief Executive Officer, BAE Systems

Moderator
Brigadier General Chris Sage, Head of Joint Air Power and Space Staff Element, IMS, NATO

Panelist
Dr Anna RATHSMAN, Director General for the Swedish National Space Agency

Panelist
Ms Emmanuelle MERIC, General Manager, Loft Orbital

Moderator
Ms. Stacy CUMMINGS, General Manager, NATO Support and Procurement Agency

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Panelist
Mr Troy EDGAR, Finance and Supply Chain Transformation Leader, IBM Consulting, US Federal

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EVP, Chief Corporate Affairs
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Head of Product
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Chief Evangelist Cloud
ERP, SAP

Moderator:
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Climate Leader and EU
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Panelist
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General, Aerospace and
Security Defence Industry
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Panelist
Mr. Rudy PRIEM, Chair,
NATO Industrial Advisory
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**Closing
Reflections**
General Chris BADIA
Deputy Supreme
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**Closing
Reflections**
Ms Wendy GILMORE
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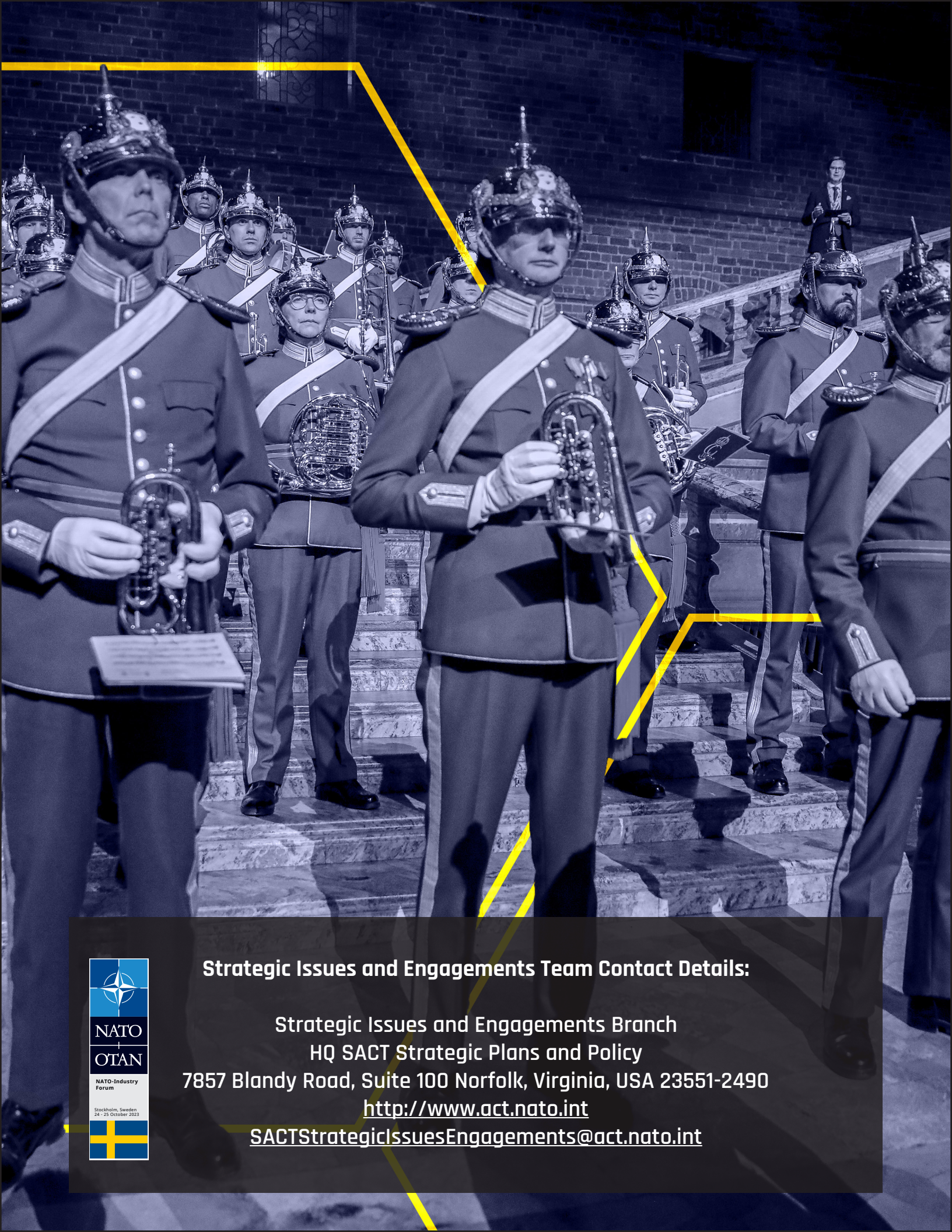
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