DIGITALEUROPE

REDEFINING DEFENCE INNOVATION:

An industry blueprint for NATO's Rapid Adoption Action Plan

Preface

Facing daily attacks on connectivity, water, and energy supplies, hospitals and airports have become key targets in modern warfare. Wars are now fought with dual-use technologies that have innovation cycles as short as 2 to 6 weeks. Agile dual-use innovation and procurement are no longer optional—they are the foundation of defence and warfare.

NATO stands at a crossroads where rapid adoption of cutting-edge technologies will determine its strategic edge. Modern conflicts, as seen in Ukraine, highlight how dual-use innovations—AI-powered logistics, cloud computing, cybersecurity, jamming, decentralized energy, and low-cost drones—are reshaping warfare. A tech race is now underway between autocratic and democratic regimes.

To stay ahead, NATO must adopt agile defence innovation and procurement, break national silos to enable large-scale investments, and forge strong private-sector partnerships. Tech companies hold the innovations that define security—not in the future, but today.

Our report, *"Redefining Defence Innovation: An Industry Blueprint for NATO's Rapid Adoption Action Plan"*, outlines three transformative priorities to secure NATO's technological leadership:

- **Setting capability targets:** Ensuring at least 25% of Allied common budgets are invested in emerging technologies—such as AI, 5G, quantum, secure energy tech, drone and anti-drone tech and next-generation connectivity.
- **Accelerating procurement cycles:** Overhauling traditional national frameworks such as shortening timelines from years to months even weeks, enabling the rapid deployment of innovations during crises and not least prepare to avoid them.
- **Strengthening NATO-industry partnerships:** Integrating dual-use technologies and forging institutional partnerships with the private sector to drive technological integration.

DIGITALEUROPE has played a central role in shaping NATO's Rapid Adoption Action Plan by collecting companies' input and recommendation on how to improve the private public collaboration and improve the procurement processes. NATO has already made great strides: initiatives such as the NATO Innovation Fund and DIANA reflect their commitment.

Now is the time for action! By bridging public and private sectors, we can redefine defence, safeguard critical infrastructure, and ensure that NATO can continue to secure peace for future generations.

Cecilia Bonefeld-Dahl
Director General
DIGITALEUROPE

Foreword

Integrating Emerging and Disruptive Technologies (EDTs) into defence is transforming warfare. We have all observed, for example, that Ukraine's ability to rapidly identify, scale and adopt technological innovation—and integrate it with traditional warfighting—has been a fundamental pillar to Ukraine's ability to counter Russia's conventional military advantages in armour, artillery and manpower.

Maintaining NATO's technological edge is a strategic priority for the Alliance, especially because the democratic world's leadership in these critical technologies is increasingly being contested. Staying ahead requires fostering an innovation ecosystem where Allied militaries have access to the most advantage-preserving technologies, and work seamlessly with a private sector that is innovating at a pace that far outstrips that of national defence. It also requires creating the conditions for smaller and non-traditional businesses to thrive, including via simplifying access to capital and processes such as procurement that will help them scale and cooperate more closely with defence stakeholders.

However, creating an ecosystem of transformative technologies is not enough on its own. The Alliance needs to adopt these technologies into defence at speed. NATO's Rapid Adoption Action Plan, which will be launched at the 2025 NATO Summit in The Hague, aims to do just that.

Developing such a plan requires intensive consultations with the Alliance's innovation and technology ecosystems. This report from DIGITALEUROPE is thought-provoking and precisely the type of well-considered input that helps us identify and shape practical actions. We are grateful that DIGITALEUROPE took the time to contribute such an important stakeholder perspective.

Jean-Charles Ellerman-Kingombe
Assistant Secretary General
NATO

Executive summary

NATO faces an urgent need to transform its approach to innovation. Dual-use technologies developed by the private sector for civil purposes offer the Alliance unprecedented opportunities to maintain its strategic edge. Yet, realising this potential requires strategic alignment between NATO and private sector innovators, where the innovation cycles of 2-10 weeks in large, global, scalable markets are completely out of sync with long procurement processes and nation-by-nation procurement. The need for speed and scale will have to lead to structural reforms within NATO's ecosystem.

NATO has launched the development of a Rapid Adoption Action Plan to substantially enhance the adoption by Allies and NATO of new technologies to maintain the Alliance's technological edge. This aims to ensure it does not lag behind the rapid development cycles of the commercial dual-use technology industry (including startups, SMEs and large enterprises) and those currently taking place in Ukraine. In addition to these efforts, DIGITALEUROPE outlines three strategic recommendations:

- **Set capability targets for critical technologies and digital protection of critical infrastructures:** NATO should benchmark 25 per cent of collective capability targets and budgets overseen at the organisational level towards developing adequate digital infrastructure and emerging technologies, ensuring strategic investment in both critical technologies and their enabling systems. These technologies include artificial intelligence (AI) and big data; quantum computing; autonomous systems; 5G and next-generation connectivity; satellite communication; cloud computing; digital twins and additive manufacturing; and edge computing. In addition, this should integrate the protection of critical civilian infrastructure as a core component of NATO's strategic goals, reinforcing operational readiness and resilience.
- **Accelerate procurement cycles:** NATO and Allies must reduce its procurement timelines from years to months, particularly during crises. This should include a review of its existing framework agreements. NATO can ensure that cutting-edge technologies are deployed at speed by streamlining testing and approval processes, multinational procurement to ensure scale and embracing modular bidding and leveraging rapid contracting mechanisms. A NATO Technology Marketplace would provide central access to cutting-edge innovation from the dual-use technology industry and defence primes across the Alliance. In the short term, it's advisable to examine all existing framework agreements and multiple innovative scaleup reports that are already in agreement but do not find their way into the system.
- **Partner with dual-use technology industry:** The Alliance must expand its innovation ecosystem to include dual-use technology industry providers.

Establishing formal partnerships with non-nation entities such as DIGITALEUROPE will institutionalise the role of dual-use technology innovators in NATO's strategic framework.

Whilst these high-level recommendations address NATO's strategic goals, their success depends on adopting actionable measures that create an inclusive ecosystem, empowering the dual-use technology industry to contribute effectively. These **measures** include:

- Streamlining certification and compliance standards across members through a NATO-wide certification programme, enabling interoperability and reducing barriers for suppliers. This should include a strong emphasis on cybersecurity that is aligned with existing civilian standards.
- Controlled testing environments, or sandboxes, must be leveraged to validate technologies under realistic conditions, with cost-sharing mechanisms alleviating financial burdens.
- Transparency and agile project management practices, such as phased project structures and real-time feedback loops, would ensure flexibility and responsiveness, whilst outcome-based contracting would emphasise results over rigid specifications. This shall enable NATO to adopt a more risk-taking approach. This should be combined with pre-allocated funding for scaling post-pilot projects.

Our proposals offer NATO a roadmap for rapid transformation, enabling the Alliance to overcome current barriers and harness critical dual-use innovations. By integrating these measures into its Rapid Adoption Action Plan, NATO can ensure its readiness and operational effectiveness for an increasingly technologically driven defence world.

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The urgency of technological transformation

Dual-use technologies – developed for civilian purposes but essential for military applications – are redefining the defence and security landscape. DIGITALEUROPE has identified ten key areas where dual-use technologies offer significant value to NATO's strategic goals. These include: artificial intelligence (AI) and big data; quantum computing; autonomous systems; 5G and next-generation connectivity; satellite communication; cloud computing; digital twins and additive manufacturing and edge computing.[1]

The potential of dual-use is evident in fields like AI, data analytics and secure communications. A company developing AI-powered supply chain optimisation for logistics firms, for instance, can adapt its technology to support NATO's operational planning. NATO can thus gain ready access to cutting-edge, commercially proven capabilities.

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However, integrating technologies requires strategic alignment. Dual-use technology industry suppliers must understand NATO's needs, and NATO must create a path for them to enter its ecosystem.

These technologies are no longer peripheral but central to Allies' ability to defend themselves.

Any lag in adopting them for our defence creates vulnerabilities in an environment where adversaries are increasingly adept at leveraging the same innovations.

The 2024 Washington Summit underscored NATO's commitment to maintain its technological edge.[2] Yet NATO faces significant barriers to adopting cutting-edge solutions at the required pace. Whilst NATO boasts a robust innovation ecosystem—including research institutions, venture-backed projects, and accelerators such as DIANA—the integration of these advancements into Allied nations' armed forces remains cumbersome. Commercial technology companies often bring products to market in weeks, but NATO's procurement cycles can still take years.

In response, NATO has committed to developing a dedicated Rapid Adoption Action Plan to accelerate the adoption of emerging and disruptive technologies (EDTs).[3]

DIGITALEUROPE outlines several high-level recommendations to improve NATO's ability to harness critical technologies effectively and at the pace required to address current and future challenges.

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[1] See Chapter 2 in DIGITALEUROPE, *Europe, a secure and digital powerhouse: Recommendations for the digitalisation of defence*, available at https://cdn.digitaleurope.org/uploads/2024/06/DIGITAL-EUROPE-DEFENSE-REPORT-FINAL-WEB.pdf.

[2] See Washington Summit Declaration, available at https://www.nato.int/cps/en/natohq/official_texts_227678.htm.

[3] The NATO Rapid Adoption Action Plan is envisioned as a deliverable for the 2025 NATO Summit, with a clear mandate to accelerate the adoption of EDTs and preserve NATO's strategic advantage. See https://www.nato.int/cps/en/natohq/topics_184303.htm.

Set capability targets for critical technologies and infrastructure

NATO should benchmark 25 per cent of the Allied nation's new spending on developing adequate digital backbones for their ministries of defence and armed forces. This ensures sustained investment in areas such as AI, quantum computing, autonomous systems, 5G, next-generation connectivity and secure communications, supporting the digital transformation needed to enable multi-domain operations across NATO enterprise and military operations.

Capability targets should include not just traditional military systems but also technologies aimed at protecting **critical infrastructure**, such as energy grids, water supply systems, transportation networks and communication systems, which are increasingly targeted in hybrid warfare.

Recognising the dual-use nature of these technologies and their increasing reliance on civilian infrastructure, NATO must take a more active role in protecting such vital services. This aligns with Allied nations' commitments under Art. 3 of the Washington Treaty and the recommendations outlined in the Niinistö report emphasise the critical importance of interoperability between military-civilian infrastructure. Resolutions addressing this issue should be included in the June 2025 Hague Summit conclusions to ensure both military and societal resilience against hybrid threats.

Accelerate procurement cycles

NATO must drastically reduce its procurement timelines to remain competitive. Whilst the appropriate timeline may vary depending on the complexity and scale of the technology being procured, procurement cycles should generally be **reduced to 8–12 months** under normal circumstances and as little as 1–3 months during crises. Lessons from Ukraine, where critical technologies were deployed in just 4–6 weeks, illustrate what is possible when agility is prioritised for critical, time-sensitive solutions.[4]

To achieve this, NATO should streamline its approval processes, embrace modular bidding and leverage rapid contracting mechanisms tailored to high-priority technologies.

Further amplifying these reforms is the concept of a **NATO Technology Marketplace, a digital platform where suppliers can showcase their technologies**.

This central hub would serve as both a catalogue and a collaborative space. For SMEs, it would provide visibility; for NATO, it would offer a streamlined way to identify and engage with potential partners. It can also represent a framework encouraging large defence contractors to collaborate with the dual-use technology industry.

Partner with industry

NATO's innovation ecosystem must expand beyond national-level defence players to include the dual-use technology industry and industry organisations. Many of these actors operate without direct ties to national governments but bring critical innovations to the table.

To formalise these relationships, NATO should establish **formal partnership status for industry organisations** such as DIGITALEUROPE. This would institutionalise the role of civilian technology providers and ensure their contributions are integrated into NATO's strategic framework.

More structured collaboration with the dual-use industry can integrate cutting-edge commercial expertise further into the Alliance. Early engagement of private sector partners in strategic planning and concept development helps suppliers align with NATO's long-term objectives.

[4] See Chapter 4, *Europe, a secure and digital powerhouse.*

Barriers in NATO's procurement framework

Whilst the recommendations in the previous section address NATO's high-level goals, their success hinges on the Alliance's ability to foster a dynamic and inclusive innovation ecosystem.

Dual-use technology presents unique challenges, mainly when developed by actors unfamiliar with NATO's and Allied nations' stringent procurement requirements.

Our analysis identifies several key pain points that must be addressed to enable a more agile and inclusive defence market.

Lengthy and complex procurement processes

NATO's and Allies' procurement processes are notoriously intricate and time-consuming. SMEs, operating with limited resources, struggle to navigate the extended timelines and opaque procedures.

The rigidity of predefined requirements further exacerbates the problem, preventing the adoption of adaptive solutions that could evolve alongside technology.

Lengthy approval cycles, often lasting years, are especially problematic in fast-evolving fields like cybersecurity, where timely responses to emerging threats are critical.

Limited market access for the dual-use technology industry

The defence market is heavily dominated by large prime contractors – well-established companies that manage and deliver large-scale defence contracts. This dynamic leaves limited room for SMEs to gain traction. Additionally, traditional defence primes often do not specialise in providing the digital solutions – whether large- small-, or medium-scale – that are increasingly critical to meeting modern defence requirements. At the same time, NATO and Allied nations' ministries of defence lack established frameworks for engaging with digital technology providers.

Without the economies of scale and government connections enjoyed by traditional contractors, companies focused on the consumer and business market, alongside smaller firms, face significant barriers to entry. This dynamic limits NATO's ability to access innovative solutions and stifles competition, resulting in higher costs and slower innovation.

High compliance and security standards

Whilst essential for safeguarding sensitive information, NATO's stringent security and compliance requirements create substantial burdens for suppliers. Achieving NATO-specific certifications often requires significant investments of time and money, deterring SMEs and non-traditional suppliers from pursuing contracts. Fragmented compliance across Allied nations forces suppliers to navigate a patchwork of standards and protocols.

In the context of dual-use technologies and solutions, NATO can mitigate these challenges by leveraging commercially proven systems through a structured "roadmap" for adaptation and enhancement. This approach allows NATO to utilise existing, effective solutions while ensuring they meet required security compliance standards through targeted updates and refinements.

Fragmented and siloed decision-making

NATO's decentralised structure and varying national priorities among Allies often lead to scattered decision-making, causing delays and inefficiencies, making it difficult for suppliers to engage effectively. Whilst NATO facilitates collaboration, procurement decisions remain predominantly the domain of individual countries, resulting in limited multinational coordination except in exceptional circumstances. This fragmentation creates challenges for suppliers attempting to navigate differing national requirements. Drawing on the EU's efforts to streamline defence procurement, NATO could explore ways to promote greater alignment among Allies.

Risk-aversion and preference for familiar solutions

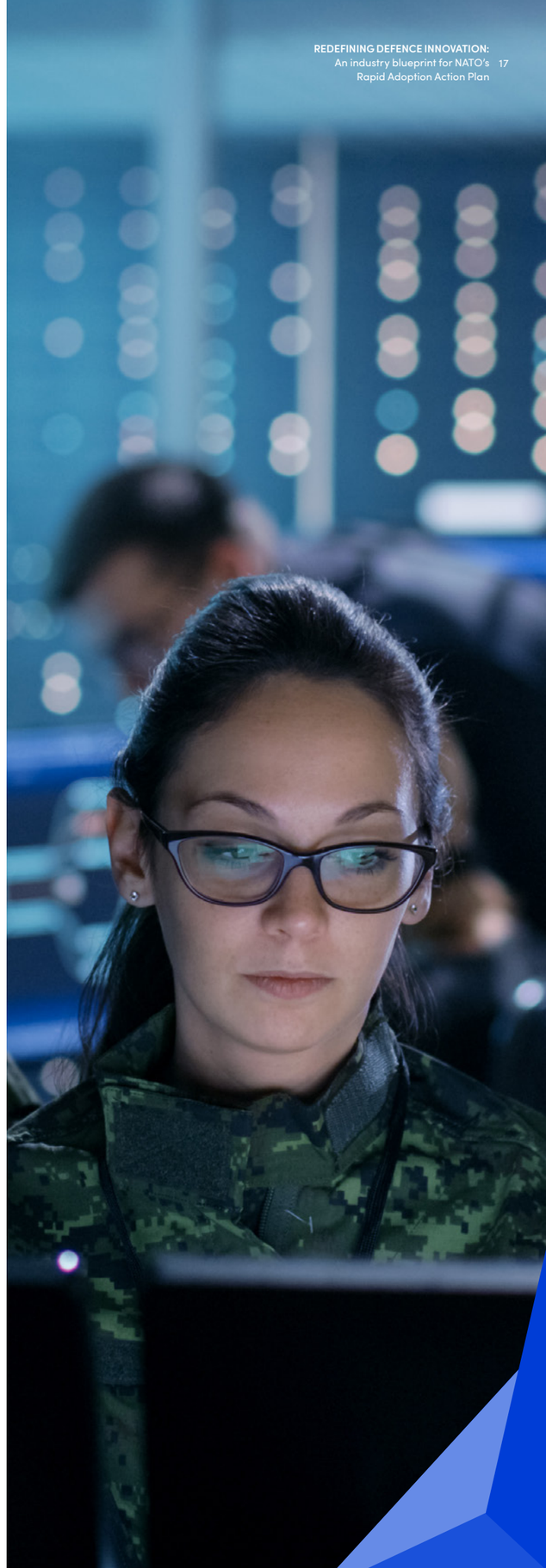
NATO and Allied governments tend to favour established, low-risk solutions over experimental technologies, even when the latter offer superior capabilities. This conservatism discourages SMEs and non-traditional suppliers from investing in defence-specific innovations, as they perceive a low likelihood of success.

Budget constraints and low contract values

Budget limitations across Allied nations create additional barriers. Low contract values often fail to justify the high costs of compliance and certification, making defence projects financially unviable for smaller firms.

Challenges with newly introduced procurement systems

Recent attempts to streamline NATO's procurement systems have met with mixed results. Whilst intended to reduce complexity, many of these platforms are seen as cumbersome and administratively burdensome.



Industry best practices in NATO procurement

Large defence companies and the dual-use technology industry have developed best practices that have been refined through trial and proven to work within NATO's system constraints.

Iterative development

Iterative development, whereby solutions evolve in response to feedback and real-world testing, allows NATO to adapt quickly to emerging threats whilst suppliers refine their offerings.

For example, instead of waiting for a fully polished product, a European 5G firm working on a deployed 5G system for NATO can present a minimum viable product (MVP) addressing critical needs. NATO then deploys this MVP in a controlled environment, providing immediate feedback. The firm iterates on the design, enhancing functionality. By the time the system reaches full deployment, it is not only effective but also tailored to NATO's unique requirements.

Iterative development also extends to phased project models. Rather than committing to a single, monolithic contract, NATO and its suppliers work in stages, evaluating progress and adjusting goals at each phase. This reduces risk and fosters alignment.

Testing in controlled environments

Controlled testing environments, or sandboxes, provide a safe space for NATO and suppliers to validate new technologies before full-scale deployment.

In these environments, suppliers can test their products under conditions that mimic operational scenarios. A drone manufacturer, for example, might use a sandbox to trial its autonomous navigation system in GPS-denied zones. NATO observers assess the system's performance, identifying strengths and areas for improvement.

Building transparent relationships

Open communication between NATO and its suppliers creates an environment where expectations are clear, and collaboration is encouraged. Regular engagement events, such as 'meet the buyer' sessions, provide a platform for suppliers to present their solutions directly to NATO decision-makers. For SMEs and non-traditional suppliers, these interactions offer insights into NATO's priorities, create opportunities for feedback and form a basis for long-term collaboration.

When engaging with the dual-use technology industry, moving beyond a purely transactional provider-customer dynamic is essential. NATO should consider establishing fora to facilitate meaningful dialogue and enable industry to understand its strategic challenges, share information and co-develop norms.

Investing in expertise and training

NATO procurement requires a deep understanding of its compliance requirements, technical standards and operational needs. Suppliers that invest in expertise and training are better equipped to succeed.

Larger defence firms often support SMEs through this process. By sharing resources, providing mentorship and offering onboarding support, established primes can help smaller companies integrate into NATO's supply chain. But training must also be offered to the whole dual-use technology industry.

Agile project management

Agile methodologies that prioritise flexibility, responsiveness and continuous improvement require projects managed as evolving processes rather than fixed deliverables.

Timelines and objectives are adjusted based on real-time feedback, allowing suppliers to respond to NATO's changing needs. For example, a cybersecurity firm developing a threat-detection system might shift its focus to address a new type of attack identified during the project. Subscription-based service models are another aspect of agile procurement. These models allow NATO to access up-to-date technologies without significant upfront costs. For suppliers, this approach provides a stable revenue stream, encouraging long-term investment in NATO-aligned solutions.

Strategic partnerships

Strategic alliances between the dual-use technology industry and larger primes combine diverse capabilities, creating a collaborative ecosystem that benefits all parties.

A company specialising in quantum encryption, for example, can partner with a defence prime experienced in large-scale integration. Together, they can develop a secure communications system that leverages the SME's cutting-edge technology whilst benefiting from the prime's expertise in deployment.

Easing NATO's innovation path

NATO and Allied nations must address systemic challenges in their procurement and integration processes. The focus must be on crafting mechanisms to transform a historically rigid system into an adaptive one.

The need for simplification

The first challenge to address is the complexity of NATO's procurement systems, which often overwhelms smaller players.

Under current conditions, a European tech company faces months, if not years, of navigating layers of bureaucracy. Each document, certification and compliance check is essential, but also slow and often discouraging. Simplifying procurement protocols is necessary. This should include a review of NATO's existing framework agreements.

Equally transformative is the idea of modular bidding. This approach would allow suppliers to bid on discrete parts of larger projects, tailoring their offerings to their specific strengths. For example, an autonomous navigation company could focus solely on providing its navigation module rather than competing for an entire unmanned system project.

Aligning standards and cybersecurity

As seen above, the diversity of NATO's member countries creates a fragmented set of standards and compliance requirements. Suppliers often find themselves navigating protocols tailored to each individual nation.

Clear guidelines should also be established for non-NATO companies operating subsidiaries in NATO members. Providing clarity on their eligibility to participate in delivering defence solutions and the criteria for compliance with NATO's security and procurement standards will ensure that such entities can contribute effectively while maintaining the Alliance's security integrity.
The creation of a NATO Certification Accelerator would provide clear guidelines, training resources and support teams to help suppliers achieve NATO-wide certification that is automatically recognised across all Allied nations – ensuring that even the smallest firms can meet NATO's high standards.

Robust protocols are necessary to protect the Alliance's procurement systems and operational technologies from cyber threats. To this end, NATO's standards should be aligned with existing civilian cyber standards, ensuring security measures that can be followed more consistently by dual-use players internationally across Allied nations.

Creating opportunities for the dual-use technology industry

More platforms and events must bridge the gap of smaller firms still struggling to gain visibility in NATO procurement. More 'meet the buyer' events would create direct channels fostering long-term relationships and trust between NATO and innovators.

To enhance access to NATO Allies' defence markets, a comprehensive resource should be compiled, listing NATO nations and partners. This would facilitate innovation transfer, collaboration, and the sharing of dual-use technologies. Such a resource would enable stakeholders to identify eligible countries for partnerships, streamlining efforts to align technological advancements with NATO's strategic objectives.

Scaling proven innovations

A consistent funding pipeline is critical for sustaining innovation and ensuring successful technologies reach operational deployment.

Initiatives like DIANA and the NATO Innovation Fund, which provide financial support for emerging technologies, should be expanded. To support scaling, funding should be pre-allocated for post-pilot projects, ensuring that validated technologies can transition smoothly from testing to deployment without losing momentum. For example, a battlefield-ready AI surveillance system that successfully completes a pilot could immediately move to broader implementation, supported by dedicated funding streams.

The NATO Technology Marketplace, as described above, could highlight proven technologies, encouraging adoption across NATO member states.

Transparency and adaptability

Maintaining open lines of communication throughout the procurement process, from initial engagement to post-deployment support, is crucial to minimise misunderstandings, enhance accountability and ensure projects stay on track. A digital dashboard providing real-time updates on procurement timelines and project statuses would keep suppliers informed and aligned with NATO's evolving priorities.

At the same time, NATO must embrace flexibility in its engagement models. Phased project structures, where milestones are periodically assessed and adjusted, allow both NATO and its suppliers to respond dynamically to changing needs. For example, an AI-powered threat detection system could be deployed incrementally, with each phase building on lessons learned from the previous stage.

Adopting outcome-based contracting, as demonstrated in successful NATO missions such as ISAF, allows contractors to deliver adaptive solutions. This approach focuses on results rather than rigid specifications, supporting flexibility and speed in NATO's technology adoption.

Harnessing testing and validation

Sandboxes would allow NATO and its partners to evaluate emerging technologies in real-world conditions before operational use. The result would be solutions ready for deployment, with their reliability tested and validated.

To encourage participation in these testing programmes, cost-sharing models can reduce the financial burden on dual-use technology industry, ensuring they can bring innovative solutions to the table without risking unsustainable expenses.

Conclusion

DIGITALEUROPE's recommendations offer a comprehensive roadmap for NATO to enhance its technological capabilities and accelerate the adoption of critical innovations.

By allocating at least 25 per cent of funding to emerging technologies, redefining capability targets, streamlining procurement processes and partnering with non-national actors, NATO can fully integrate dual-use solutions to strengthen its defence and security framework.

Integrating these recommendations into the NATO Rapid Adoption Action Plan will enable the Alliance to overcome its current barriers and ensure its readiness to collaborate effectively with the dual-use technology industry for the future technological world of warfare.

DIGITALEUROPE represents the voice of digitally transforming industries in Europe. We stand for a regulatory environment that enables businesses to grow and citizens to prosper from the use of digital technologies.

We wish Europe to develop, attract and sustain the world's best digital talents and technology companies.

www.digitaleurope.org

@DIGITALEUROPE

DIGITALEUROPE

DIGITALEUROPE
Rue de la Science, 37
B-1040 Brussels
Info@digitaleurope.org
+32 2 609 53 10