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EXCLUSIVE
FOREWORD

NATO GEARING UP TO KEEP THE EDGE

NATO 2030 • The first ever Strategy on Emerging and Disruptive Technologies • The Civil-Military Defence Innovation Accelerator for the North Atlantic (DIANA)

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Photo © NATO

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In times of rising global challenges and growing competition, NATO is working hard to maintain the technological edge, which has been key to our success for over seventy years. This is why **accelerating technological innovation** featured prominently on NATO leaders' agenda at their Summit in Brussels on 14 June, and why we will continue to sharpen our edge through **NATO 2030**.

Transformed Security Landscape

Technology is moving fast and transforming the world, including our security landscape, at record speed. As a result, threats now come from anywhere: nearby or far away, from humans or unmanned systems, and from space and cyberspace. Conflicts are increasingly defined by bytes and big data, as much as by bullets and battleships.

The smart phone in our pocket packs more power than the computers that put a man on the Moon. Machines and algorithms outperform humans in an ever-growing number of ways — from playing video games to driving cars and piloting fighter jets. Sophisticated disinformation campaigns destabilise and disrupt our free and democratic way of life.

The cyber threat landscape is also evolving fast. A single click can send a cyber-virus across the globe within minutes. It can harm us and paralyse our critical infrastructure, including our energy supplies and health systems. The SolarWinds hack in December 2020 affected United States' government agencies and thousands of private sector companies around the world. The ransomware attack on the American "Colonial Pipeline" in May this year closed off oil supplies to the eastern seaboard for several days. Throughout the COVID-19 pandemic, a series of malicious cyber activities targeted hospitals and health services that were working to save lives.

New actors, that do not share our values nor play by the same rules, are challenging NATO's technological dominance.

Authoritarian regimes, like the ones in Russia and China, are racing to develop new technologies — from autonomous systems to hypersonic weapons and artificial intelligence. Chinese President Xi has stated his ambition for his country to become the world leader in artificial intelligence theory, technology, and application by 2030, and to have the technologically most advanced armed forces in the world by 2050. Beijing is rapidly integrating artificial intelligence, robotics, and hypersonic technology into the military. Given the record of progress the Chinese have made in recent years, President Xi's ambitions are not rhetorical — they are very real. Together with Russia, China is also investing heavily in space, where both countries announced plans to develop a joint lunar research station.

Not only are Russia and China developing new technologies, they are also abusing and misusing them to monitor and control their own citizens and exert influence in the world.

This is not to say that all technologies are dangerous and harmful. When used rightly, they can help solve some of the world's most intractable problems, from curing disease to tackling climate change. But we must make sure that these new technologies work for us, and not against us — or worse, for our competitors. Our future security depends on our ability to understand, adopt, and implement new technologies, at speed and at scale.

NATO is Adapting and Adopting

NATO is adapting to this rapidly changing world and re-doubling its efforts to stay at the forefront of technology in order to keep its one billion people safe and free.

NATO Allies are working together to develop and procure innovative solutions and applications to ensure the defence of its Allies and the success of its military operations. They are investing in new, cutting-edge capabilities that integrate some of the latest technologies.

Examples include the Alliance Ground Surveillance (AGS) system that provides high-quality radar imagery on land and at sea; the fleet of Airborne Warning and Control System (AWACS) aircraft that effectively monitor the skies over Allied territory; and maritime autonomous vehicles that detect and clear mines, monitor and protect sea lines of communication and underwater cables, and help find and track submarines.

NATO Allies are also taking important decisions to ensure NATO continues to adapt to, and adopt, new technology. At their meeting in London in December 2019, NATO leaders agreed an Emerging and Disruptive Technology (EDT) Implementation Roadmap, which identifies the seven main technologies that are most relevant to security and defence: big data, artificial intelligence, autonomy, biotechnology, hypersonic, quantum computing, and space technologies.

The roadmap defines the broad way ahead and the elements needed to address the challenges, mitigate the risks, and seize the opportunities presented by these technologies.

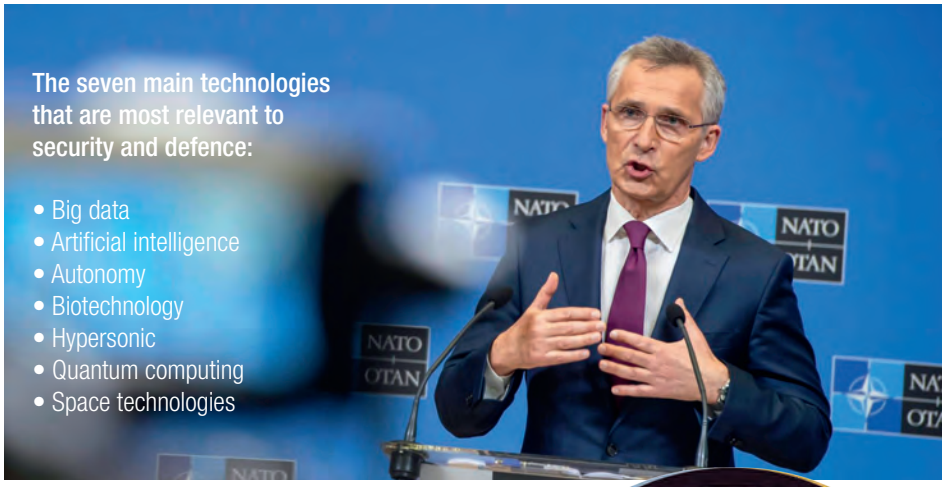
Earlier this year, NATO Defence Ministers endorsed the Alliance's first ever Strategy on EDTs. It focuses on fostering the development of dual-use technologies (i.e., technologies that are useful in both civilian and military contexts) that will strengthen the Alliance's edge, while also creating a forum for Allies to exchange best practices that help protect against threats.

Sharpening NATO's Technological Edge — Summit Proposals

Most recently, at the Summit in June, NATO leaders agreed a set of concrete proposals to further accelerate innovation and sharpen NATO's technological edge.

Standing NATO Mine Countermeasures Group 1, HNLMS Willemstad conducting mine countermeasures operation. Photo by MARCOM

CLOCKWISE: NATO Deputy Secretary General Mircea Geoană discussing the Alliance's role in cyber defence, its approach to cyber security, and responsibility in driving technological innovation at the "Defence Disrupted" conference on May 19, 2021. NATO Secretary General Jens Stoltenberg briefing the press ahead of the meeting of NATO Heads of State and Government on June 14, 2021. Alliance Ground Surveillance (AGS) remotely piloted aircraft. Photos by NATO. Illustrations on artificial intelligence (AI) and biotechnology, which are amongst the seven main technologies that are most relevant to security and defence today (Shutterstock).



"Our **future security** depends on our ability to **understand**, **adopt**, and **implement** new technologies, at speed and at scale."

Looking to the decade ahead and beyond, they decided to establish a NATO Innovation Fund, where Allies who so wish can support start-ups working on dual use emerging and disruptive technologies in areas key to Allied security.

They also decided to launch a civil-military Defence Innovation Accelerator for the North Atlantic — better known by its acronym DIANA. This accelerator will ensure NATO is best prepared to mitigate the risks and embrace the opportunities presented by advanced technologies, now and in the future. The initial components of DIANA will be set up by 2022 and the accelerator is expected to achieve initial operating capability by 2023. It should be fully operational by 2025.

For one, DIANA will facilitate transatlantic cooperation and exchanges on critical technologies between Allies — from Silicon Valley in the United States to rising innovation hubs in Central and Eastern Europe. Together, NATO's 30 countries have an abundance of excellent academic institutions, the finest scientific researchers, and amazingly creative start-ups. We have the best minds and the most innovative companies, free and able to work and collaborate in creative ways. Compared to closed, authoritarian regimes, the broad pool of talent in our open, democratic societies

gives us a significant advantage in the development of new technologies. We must leverage this advantage fully.

Second, DIANA will promote interoperability so that Allies are able to work together. Keeping pace with the development of new technologies is important. Equally, if not more important, is for NATO's 30 Allies to coordinate as they develop these technologies. A ship from one NATO country can always sail next to a ship from another. However, if their radar and tracking systems cannot communicate, and if they cannot share information, they may as well be in different oceans. Allies' technologies on both sides of the Atlantic must be as interoperable as possible to be most effective. NATO has a part to play to bridge the interoperability gap between Allies that possess technologically advanced capabilities, and those that only have less advanced ones.

Finally, DIANA will harness civilian innovation by engaging with academia and the private sector. With regional offices in Europe and North America, as well as test centres and a network of accelerator sites, DIANA will bring defence and security specialists (military and civilian) across the Euro-Atlantic to work alongside researchers, academics, and entrepreneurs, from big tech companies to small start-ups. Traditionally, developments in defence technology have been driven by the military sector, large defence corporations and governments. Today, however, the private sector, universities and start-ups often lead the way. Therefore, strengthening the so-called "triple helix" between government, industry, and academia is key to our enduring success.

CIVIL-MILITARY DEFENCE INNOVATION ACCELERATOR FOR THE NORTH ATLANTIC (DIANA)

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- Facilitates transatlantic cooperation and exchanges on critical technologies between Allies – from Silicon Valley in the United States to rising innovation hubs in Central and Eastern Europe
- Promotes interoperability
- Harnesses civilian innovation by engaging with academia and the private sector

Cooperation is Key to Preserve Technological Supremacy

NATO already has various networks, structures, and programmes in place to engage with relevant stakeholders within the western innovation ecosystem. We are building on solid ground: not only does NATO already have a long-standing engagement with the defence

The cyber threat landscape: Cyber threats to the security of the Alliance are complex, destructive, and coercive, and they are becoming ever more frequent. Resilience and preparation for a post-COVID-19 future include robust cyber defence against malicious cyber activities, which, amongst others, target hospitals and health services.

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and security industry through NATO's Industry Forum, we also benefit from the advice of experts from the private sector and academia that are part of the Advisory Group on EDTs. This group's advice feeds into the work of NATO's innovation board, which coordinates policy and cooperation on innovation across the NATO enterprise.

Moreover, the NATO Science and Technology Organisation — comprised of about 6,000 scientists and engineers in NATO Nations and across the globe — is the world's largest collaborative research forum in the field of defence and security. We also have a NATO Science for Peace and Security Programme, which brings civilian scientists and research institutions from NATO member and partner countries together to exchange knowledge, as well as to advance scientific research and technological innovation, including on EDTs.

Beyond NATO Allies and partner countries, we are also working closely on new technologies with other international organisations, such as the European Union, the United Nations and the Organisation for Economic Cooperation and Development. Together, we will need to defend, shape and enforce a multinational system of world governance in the field of new technologies.

Setting Norms, Rules, and Regulations

We cannot allow the world of emerging and disruptive technologies to become a free for all. Unlike cyberspace, where international law is applicable and norms guide state behaviour, the field of EDTs remains largely ungoverned by any strict rules designed to protect our rights and democratic values, foster cooperation, and establish guardrails against misuse or malign actions.

ABOVE: (Top) Norwegian Air Defence Battalion conscript next to a NASAMS III launcher (Norwegian Advanced Surface to Air Missile System). Photo by Forsvaret. **BOTTOM:** The NATO Flag flies under the Cinquantenaire Arch in Brussels during the Summit in June 2021.

Our competitors may not want to face up to the important ethical and moral dimensions in their race to develop and deploy technologies. However, at NATO, we do. While striving to be competitive, we must also remain true to the fundamental values underpinning our Alliance: democracy, individual liberty, the rule-of-law, and human rights. Our aim, therefore, is to ensure that the development and the use of emerging and disruptive technologies sustains peace and prosperity, in full alignment with the Universal Declaration of Human Rights.

Conclusion — A Look Ahead

In the coming months and year in the run-up to the next NATO Summit in Madrid in 2022, we will continue to work hard to maintain our technological edge. We will strive to implement decisions made and advance ongoing work on innovation, including EDTs, as outlined in this article.

We will also develop NATO's new Strategic Concept — the official document that outlines NATO's enduring purpose and nature, and its fundamental security tasks. The latest one dates back to 2010, and our security environment has significantly changed in the past ten years, not least because of rapid technological advances. If the 2010 Strategic Concept hardly mentions technology, only to say that "a number of significant technology-related trends [...] appear poised to have major global effects that will impact on NATO military planning and operations", we can expect technology to feature prominently in any future document.

NATO continues to adapt. No matter how unpredictable the security landscape or how limitless the battlefield, we remain strong and prepared to take on the challenges of today and tomorrow and keep our people safe.