NATO Science and Technology (STO) Key Publications

About the NATO Science and Technology Organization (STO)

The STO is a NATO subsidiary body created to meet the collective Science and Technology needs of the NATO Alliance and its partner nations. The STO does this by generating, sharing, and disseminating advanced scientific knowledge, technological developments, and innovation resulting from its many activities completed within the Collaborative Programme of Work (CPoW).

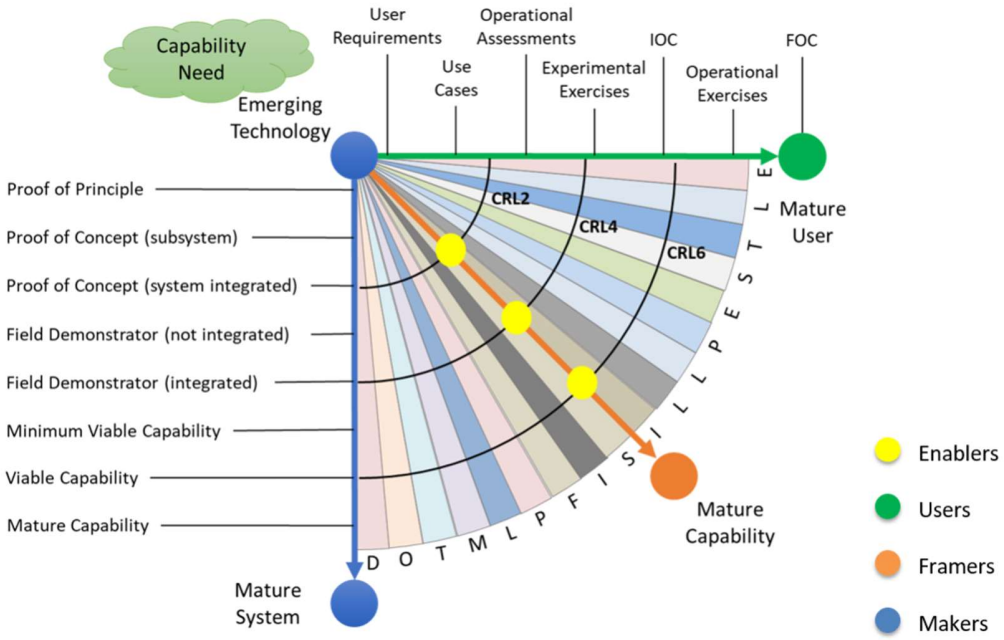
The STO conducts leading-edge Science & Technology programmes in order to help maintain the Alliance's military advantage. The STO generates, shares and exploits advanced scientific knowledge, technological developments and innovation to support the Alliance's core tasks.

As the organization for the largest science and technology collaboration on security and defence issues in the world. Over 5000 Scientists & Engineers from over 40 Nations working together, our collaborative research network is uniquely equipped to empower NATO's technological and military edge.

STO hosts meeting on integrating directed energy weapons into the NATO Force Mix

In April 2025, the NATO STO hosted the first in-person meeting of a new research team (SAS-SCI-209) dedicated to integrating directed energy weapons (DEW) into NATO forces. Held at the ATO Collaboration Support Office in Neuilly-sur-Seine, France, the meeting brought together experts from seven NATO nations and the NATO Communications and Information Agency.

The team formed under the STO System Analysis and Studies Panel, is focusing on high-energy lasers (HEL) and high-power radio frequency (HPRF) systems. Its goals include assessing DEW readiness levels, integration challenges, and strategic benefits, while building on previous STO efforts such as the Military Utility Readiness Framework (MURF).



Led by the team aims to support informed investment decisions and envisions NATO fielding DEW capabilities by 2032. A three-year development plan has been launched to help achieve this goal, marking a significant step toward future defence innovation. (Published on 07/05/2025)

STO Highlights 2024: Advancing Innovation and Resilience

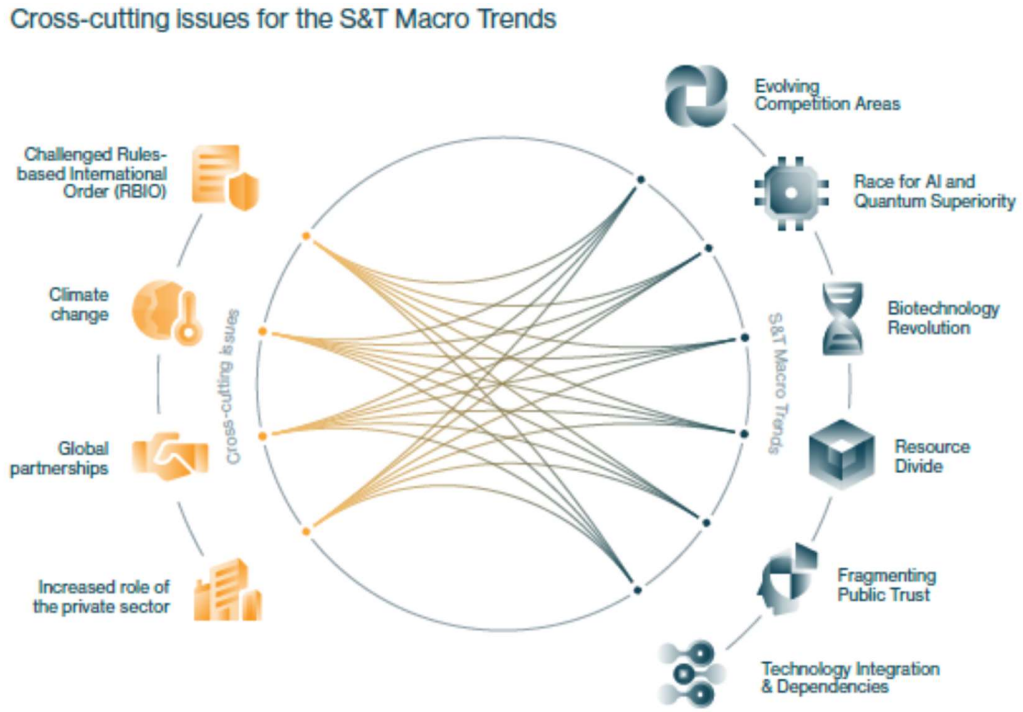
A year of Scientific Excellence and Strategic Impact

The 2024 STO Highlights report captures a year of dynamic advances in NATO's science and technology landscape. From maturing AI applications in field simulations to groundbreaking work in cyber resilience and integrated autonomy, the report offers a comprehensive overview of STO's achievements and strategic direction. The report emphasizes the importance of resilience in the face of emerging threats and role of innovation in maintaining strategic superiority. It also showcases collaborative work across NATO nations, addressing disruptive technologies and their impact on defense readiness. (Published on 08/04/2025)

Access full report here: https://www.sto.nato.int/public/2024-NATO-STO-Highlights-Web-v3.1-2025-03-31.pdf

Science &Technology Trends 2025 – 2045

This flagship report outlines long-term trends in defense-related science and technology, mapping future challenges and opportunities for NATO. Six strategic trends are highlighted: pervasive artificial intelligence, human enhancement, autonomy and robotics, advanced materials, space systems, and novel energy sources. Each trend is paired with implications for military adaptation, operational strategy, and capability development through 2045. (Published on 09/04/2025)



Science and Technology Macro Trends 2025-2045

Access full report here: https://www.sto-trends.com/

New STO Research Measures the Cognitive Load that Soldiers Face

The NATO Science and Technology Organization (STO) has published a new report (HFM-319) analyzing current tools and techniques for measuring the cognitive load experienced by soldiers in various operational environments. Developed by a team under the STO Human Factors and Medicine Panel, the report aims to support military practitioners in effectively monitoring and managing cognitive demands to enhance soldier performance and mission success.

As modern technologies like autonomous systems, wearable displays, and augmented reality increase both the data available to soldiers and the complexity of operations, the need to assess cognitive load has grown. The report identifies effective measurement methods—particularly in low- to moderate-mobility settings—while noting challenges in dynamic, high-mobility environments.

The study recommends combining physiological, subjective, and performance-based measures for more comprehensive assessments. It also highlights the potential of emerging technologies, such as advanced sensors and AI, to improve cognitive load measurement in the future. (Published on 13/03/2025)

Full report is accessible at NATO STO website: https://www.sto.nato.int/Pages/news.aspx