







NATO SCIENCE & TECHNOLOGY ORGANIZATION (STO)

STO at a Glance

"Scientific results cannot be used efficiently by soldiers who have no understanding of them, and scientists cannot produce results useful for warfare without an understanding of the operations."

Dr. Theodore von Kármán* (Hungarian-American mathematician and physicist, 1881 to 1963)

an Mar ----

The North Atlantic Council chartered the NATO Science & Technology Organization (STO) to deliver innovation and evidence-based advice that meet the Alliance's needs in an ever-changing security environment.

The work of the STO ensures that NATO will maintain its military and technological edge to face current and future security challenges.

The STO gathers the world's largest research network in defence and security. It brings together national scientists, engineers and analysts, industry and academia to collaborate within a trusted NATO framework.



OUR MISSION

We conduct leading-edge Science & Technology programmes in order to help maintain the Alliance's military advantage. We generate, share and exploit advanced scientific knowledge, technological developments and innovation to support the Alliance's core tasks.

Our Goals

The rapidly evolving and increasingly complex global security environment requires a strategic approach to push the boundaries of knowledge in order to create science and technologybased capability advantages for the defence and security of the Alliance and its Partner Nations.

We focus on accelerating the development and delivery of military capabilities, on delivering timely and targeted advice to inform political and military planning and decisionmaking, and on building capacity and interoperability through partnerships. We strive to stay at the forefront of S&T, to forge and nurture partnerships, to enhance Alliance decision-making, to focus on Alliance needs in order to boost impact, and to promote technology demonstrations.

We invest in enhancing the network of experts, intensifying our strategic communications, continuously improving the programmes of work, and promoting coherence across the Nations' S&T programmes and capacities.

QAHAT WEDELIVER

To fulfil our mission, we generate two leading-edge research programmes: the Collaborative Programme of Work (CPoW) and the Centre for Maritime Research and Experimentation Programme of Work (CMRE PoW).

Building on these programmes as well as other sources, we deliver timely, evidence-based advice to senior planners and decision makers in the Nations and in NATO.

Collaborative Programme of Work (CPoW)

The CPoW is planned and executed by the STO's Panels and Group (see Section 3), which represent a network of more than 5,000 national subject matter experts. These scientists, researchers, engineers and analysts collectively cover all aspects of defence and security- relevant science and technology.

These experts are directly funded by national employers and work on national priorities related to defence and security. Through the expertise that the participating Nations voluntarily share in the CPoW, this programme comprises around 300 projects per year. The international collaboration and sharing of results across the CPoW enhances the Nations' defence and security knowledge base.

The individual researchers and experts benefit from expanding their knowledge; the participating Nations benefit from leveraging their resources and de-risking their investments; and NATO benefits from the enhanced collective knowledge base for the technological advantage of the Alliance.

The CPoW is supported by the Collaboration Support Office (CSO).

CMRE Programme of Work (CMRE PoW)

CMRE PoW is an entirely customerfunded programme. It is planned together with paying customers and executed by the CMRE, which organises and conducts scientific research and technology development in order to deliver research-driven, innovative, and field-tested solutions to address the defence and security needs of the Alliance.

The biggest customer of CMRE to date is Allied Command Transformation. Other customers of the CMRE include Ministries of Defence, industry, and academia from Allied and Partner Nations and the European Union.

Advice

The STO generates and delivers evidence-based advice on significant S&T issues, including identifying Emerging and Disruptive Technologies (EDTs) and their impact on security and defence; while leading the delivery of S&T and promoting its exploitation throughout the NATO defence enterprise.

Building upon the STO network and research programmes, the NATO Chief Scientist, supported by an advisory section in NATO HQ, provides S&Tbased advice to senior-level political and military decision- makers.



NATO Research Vessels: Leonardo and Alliance



STO Publications: S&T Trends, Chief Scientist Research Report series, CPoW and CMRE annual reports, STO Highlights.

OUR PROGRAMMES OF WORK

CPoW

The CPoW comprises the full range of Science & Technology areas that are relevant to defence and security. We have structured the CPoW in seven topical domains, each of them managed by a dedicated committee of national programme managers and subject matter experts.

We call these committees the STO Panels and Group. They are the powerhouse that delivers the CPoW:

- Applied Vehicle Technology (AVT)
- Human Factors and Medicine (HFM)
- Information Systems Technology (IST)
- System Analysis and Studies (SAS)
- Systems Concepts and Integration (SCI)
- Sensors and Electronics Technology (SET)
- NATO Modelling and Simulation Group (NMSG)

CMRE PoW

Using the Centre's research facilities together with its two research vessels (NATO Research Vessel "Alliance" and Coastal Research Vessel "Leonardo"), the scientists and engineers at CMRE organise and conduct the Centre's Programme of Work along with five main areas:

- Autonomous Naval Mine
 Countermeasures (ANMCM)
- Cooperative Autonomy for Anti-Submarine Warfare (CASW)
- Data Knowledge and Operational Effectiveness (DKOE)
- Environmental Knowledge and Operational Effectiveness (EKOE)
- Maritime Unmanned Systems
 Enablers (MUSE)

The following pages provide an overview to the main research topics addressed under each of these broad programmatic areas.

IST

Improving consultation, command & control and information systems, and enhancing information.

HFM

Optimizing health, human protection, well-being and performance of the human in operational environments.

SAS

Providing expert analytical support for better decisions in NATO operations and capability development.

SET

Advancing sensors & electronic technologies for intelligence, surveillance, target acquisition, reconnaissance, electronic warfare and navigation.

SCI

Advancing knowledge concerning systems engineering, counter threat and interoperability.

AVT

Ensuring platform and weapons superiority for force protection, surveillance, and deployment.

NMSG

Exploiting modelling and simulation to its full potential across NATO and the Nations to enhance both operational and cost effectiveness.

PAGE 6

EKOE

Implement distributed intelligence solutions to nearreal time surveillance of denied- access environments.

MUSE

Deliver an interoperable operational capability based on autonomous systems-of- systems for the maritime domain.

CASW

Improve the Alliance's ability to counter threats in the underwater domain through autonomous security networks.

DKOE

Provide decision support to the Operations Commander through multisource information integration and fusion.

ANMCM

Develop networks of securely communicating autonomous vehicles for the localization, detection and identification of underwater mines.

WHO WE ARE

Collectively, we are NATO Science & Technology Organization:

- The NATO Science & Technology Board (STB),
- The seven STO Panels and Group, and
- The three STO Executive Bodies.

NATO Science & Technology Board (STB)

The NATO Science & Technology Board (STB) is a senior NATO committee that reports to the North Atlantic Council. As the governance body of the STO, the STB oversees and directs the work of the STO Panels and Group as well as the three Executive Bodies:

- The Centre for Maritime Research and Experimentation (CMRE),
- The Collaboration Support Office (CSO), and
- The Office of the Chief Scientist (OCS).

The STB is composed of Members from the Allied Nations, who typically are responsible for the national defence research budgets and programmes. They hold the decisionmaking authority in the STB.

In addition, the STB includes representatives from other NATO bodies that are part of the wider NATO S&T community.

The STB is chaired by the NATO Chief Scientist.

HOW WE WORK

At its core, the STO is NATO's hub for defence research collaboration amongst likeminded Nations, employing several different mechanism to achieve its mission.

- The CMRE PoW is planned and conducted by NATO experts and staff to meet the needs of paying customers in Nations and NATO,
- The CPoW is planned and executed by national experts, who bring in their own national resources to address commonly agreed research objectives,
- The advice is generated from CMRE PoW, CPoW, and other sources to inform planners and decision-makers in Nations and NATO.

The graph below illustrates the principal organisation within the STO. The STB is presented at the top, as it oversees the entire STO. In the middle are the Panels / Group and the Executive Bodies that execute the STO programmes and generate the advice to decision-makers. At the bottom are the main products the STO delivers to its customers in Nations and in NATO.



WHERE WE ARE

Brugge

Lille °

Amiens

aris

Dunkirk

KINGDOM

UNIICL

 \odot London

NETHERLANDS **Fssen** Dortmund

Utrecht



Nancy 0

• Luxembourg

Saarbrücken

Rouen

Caen

Reims

0

Gent

Collaboration Support Office (CSO) -Neuilly-sur-Seine (Paris), France: Supports the STO Collaborative Programme of Work (CPoW), in which Allied and Partner Nations contribute their national resources to define and promote cooperative research and

Poitiers

Stuttgart

Strasbourg

Mainz

Base Besancon

Dijon

0

Zürich • Vadu Luzern Berne LIECHTENSTEAN lacksquare

Lausanne SWITZERLAND

Limoges

information exchange.

Clermont-Ferrand

Centre for Maritime Research and Experimentation (CMRE) - La Spezia, Italy:

Genève

A customer-funded research centre that employs its facilities ashore and afloat to deliver innovative, field-tested solutions to address defence and security challenges in the maritime domain.

Bordeaux

Toulouse

Montpellier

Monaco

Milano

Firen

ITALY

Erfu

+

eno∖

WANT TO KNOW MORE?





https://www.sto.nato.int

https://www.cmre.nato.int

https://www.nato.int/sto



y A

in

0837-22 NATO Graphics & Printing