NATO's Science and Technology Organisation: "a 101"

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Outline

- The new NATO S&T Organisation (STO)
- The “in-house S&T” Business Model
  - Centre for Maritime Research and Experimentation
- The “Collaborative S&T” Business Model
  - Network, supported by the S&T collaboration support office
- Contact us and stay in touch
- Conclusions

NATO' Science & Technology Organization (STO)

- Established on 1 July 2012 as the outcome of NATO S&T Reform
- Successor to the former NATO Undersea Research Centre (NURC) and the NATO Research & Technology Organisation (RTO), combining their expertise and legacy of over 60 years
- *Establishing a NATO Chief Scientist position*

Drivers of the NATO S&T Reform

- NATO's reforms
  - Austerity
- Increased impact of S&T to cope with today's challenges
  - Global, complex, interdependent, speed
- Unified governance of ***NATO S&T***
  - NATO S&T Strategy, priorities, coordination, synergy
- Accountability, leadership and visibility
  - Chief Scientist presence in NATO HQ

Mission (Charter, 19 June 2012)

- To help position the Nations' and NATO's S&T investments as a strategic enabler of ***the knowledge and technology advantage for the defence and security posture*** of NATO Nations and partner Nations, by:
  - Conducting and promoting S&T activities that ***augment and leverage the (S&T) capabilities and programmes*** of the Alliance, of the NATO Nations and the partner Nations [...]
  - ***Contributing*** to NATO's ability to enable and influence security- and defence-related ***capability development and threat mitigation*** [...]
  - ***Supporting decision-making*** in the NATO Nations and NATO

The Science and Technology Organisation

The STO is composed of:

- ***One Science and Technology Board***
  - With ***level 2 Scientific and technical committees***
- ***Two business models***
  - "In house-delivery" model
  - "Collaborative S&T" model
- ***Three executive bodies***
  - Centre for Maritime Research and Experimentation (La Spezia)
  - Collaborative S&T Support Office (Neuilly-sur-Seine)
  - Office of the Chief Scientist (NATO HQ)
- ***Leadership*** is vested in the ***Chief Scientist,*** as Chairman of the S&T Board and the Scientific Advisor to NATO senior leadership

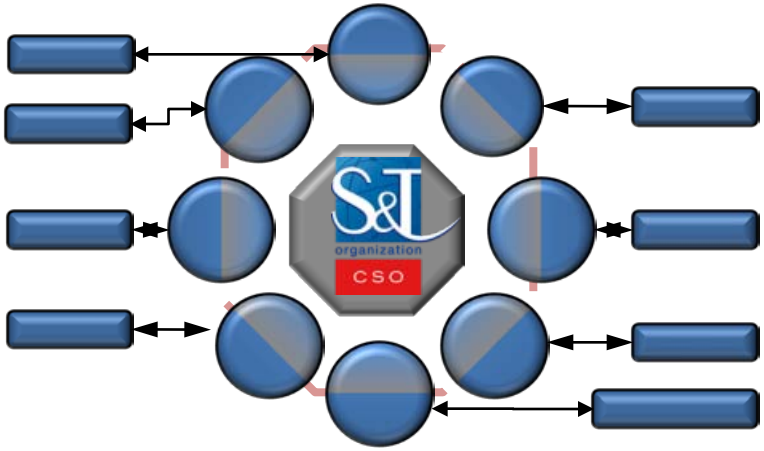
Two Business Models

A Lab

The ***in-house*** delivery business model: a dedicated STO executive body, having its own personnel, specific capabilities and infrastructure, customer-funded

A network

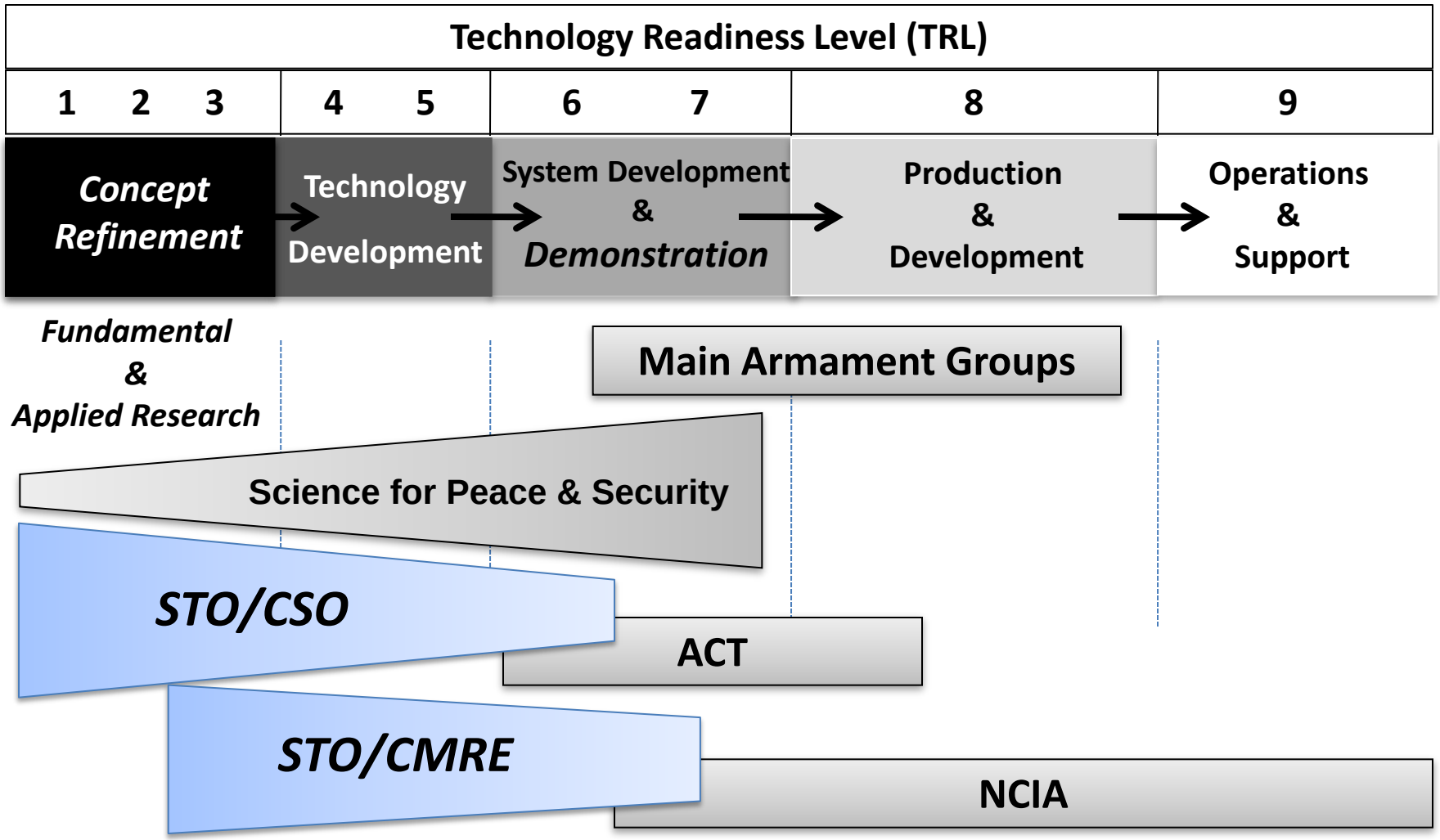
The ***collaborative*** business model: a forum where Nations elect to share national resources to conduct cooperative research



Expertise

- Centre for Maritime Research and Experimentation
  - Maritime, and particularly the undersea; may extrapolate into other domains to meet customers' demands
- Collaborative Programme of Work (STO Panels-Group)
  - Applied Vehicle Technology
  - *Human Factors and Medicine*
  - Information Systems Technology
  - Modeling and Simulation
  - Systems Concepts and Integration
  - System Analysis and Studies
  - Sensors and Electronics Technology

Technology Readiness Levels' Spectrum



Expertise

- Key challenges – R Adm Klunder's keynote
  - Threats Undersea ☑
  - Integration manned/unmanned ☑
  - Cybersecurity/spectrum ☑
  - Effectiveness of systems ☑
  - Affordability/reliability ☑
  - Warfighter performance (Trg/Medi) ☑
- Network of 3000+ Scientists
  - NATO Nations and Partners

NATO S&T Unified Governance: **NATO S&T Strategy**

December 2012

3 Strategic Goals

NATO S&T Unified Governance: **NATO S&T priorities**

- "Push-Pull" – STB leadership
- Drivers/lists
  - Military requirements (major role for Allied Command Transformation)
  - Hard Problems
  - Emerging/emergent and Disruptive Technologies
    - "Game Changers"
- To be updated
  - S&T Strategy implementation

The Centre for Maritime Research and Experimentation

Centre for Maritime Research and Experimentation

… organizes and executes a customer-funded programme of *scientific research and technology development centred on the maritime domain*, and focused on solutions for the defence and security needs of the Alliance

CMRE

- **Centre** where scientists and engineers **gather to collaborate** on maritime research priorities of the NATO Nations
- **Centre** where the nations **pool their equity** in specialized, sea-going platforms, and share the costs, efforts, data and results of a maritime research programme
- **Place and a programme** to develop, demonstrate, and **de-risk** emerging maritime technology

SMART DEFENCE

Collaboration At Sea

R/V ALLIANCE

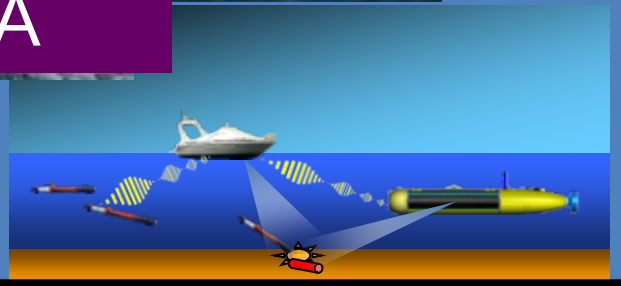
R/V LEONARDO

CMRE Core Competencies

- Underwater acoustics
- Sensors and signal processing
- Ocean prediction
- Ocean physics
- Autonomy in the maritime domain
- Computation and data management
- Underwater communications engineering
- Exploitation of remote sensing at sea
- Modeling and simulation in the maritime domain
- Oceanographic instrumentation, platforms, and systems
- Hydrographic systems
- Portable sensors in the maritime domain
- Sonars, transducers, and arrays
- Ocean engineering
- Seagoing capability
- Operations research
- AUVs, USVs and gliders
- Calibration

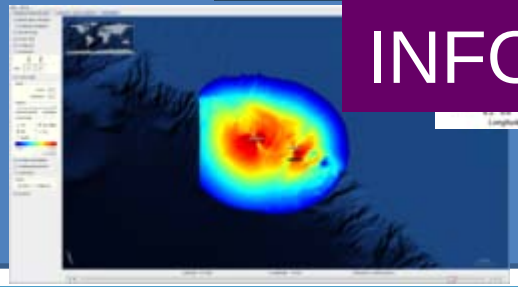
Cooperative Anti-Submarine Warfare

Autonomous Naval Mine Countermeasures



AUTONOMY AT SEA

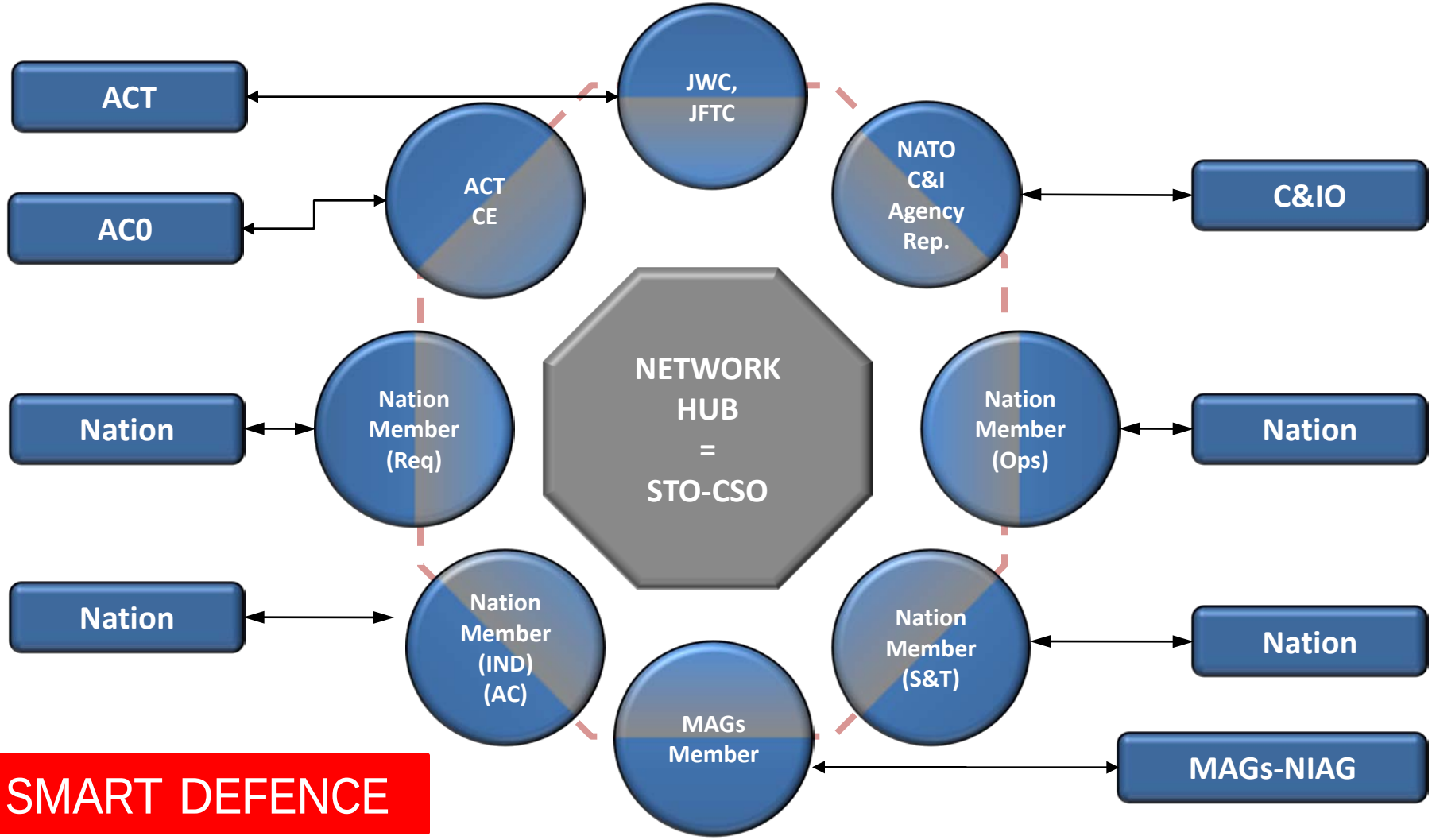
Environmental Knowledge and Operational Effectiveness



Maritime Security

MARITIME INFORMATION/ DECISION

Collaborative NATO S&T Business Model



SMART DEFENCE

Deliverables: Collaborative S&T

Collaborative Networking Environment

Reports & Standards

Technology Demonstrations

Educational Opportunities

A Knowledge & Information Base for NATO and the Nations

Toolbox:

- **SY:** Symposia (>100 people, 3-4 days)
- **SM:** Specialists' Meetings (<100 people, 2-3 days)
- **WS:** Workshops (selected participation, 2-3 days)
- **TG: Task Groups (study group, 3 years max.)**
- **LS:** Lecture Series (junior and mid-level scientists)
- **TC:** Technical Courses
- **ST:** Specialists' Teams (quick reaction)
- **ET: Exploratory Teams**

PoW: Stability & Control prediction methods

- **AVT-161: Assessment of Reliable Stability & Control Prediction Methods for NATO Air Vehicles and Sea Vehicles (2009-2012)**
- **AVT-216: Evaluation of Prediction Methods for Ship Maneuvering and Control (follow-on)**

- **Objectives:** Assess the state-of-the-art in computational fluid dynamics methods
- **RESOURCES funded by 15 Nations**
  - *Labour Cost for 25 active participants (over 3 years)*
  - *Transportation & Shipment Cost*
  - *Production Cost of Wind Tunnel Model*
  - *Wind Tunnel Test Facilities (2 x Europe, 1 x USA)*
- **RESOURCES (direct) funded by NATO**
  - *Editorial & Publication Services, Panel Support*
- **Research Results are available <u>to all NATO Nations!</u>**

PoW: Ship Signature Management (1)

- **SET 144** "Mitigation of Ship E/O Susceptibility against Conventional and Asymmetric Threats"
- **SET 154** "Signature Management System for radar and IR signature of surface ships"
- **SET 166** "Signature Management System for Underwater Signatures of Surface Ships"

DGA TNO [dstl]

- Joint sea trials **RIMPASSE2011** (Radar, IR/EO, Magnetic, Pressure, Acoustic Signature trials) successfully held at WTD71 (DEU) in Sep. '11.
- Participants are analyzing data gathered during the trial, which will be used for the technical report of the 3 TGs.

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Contact us – Stay in touch

- A full-time presence of the Chief Scientist and his Office at NATO HQ
  [PoC @ OCS: dotoli.pierpaolo@hq.nato.int]

- ***Your National Coordinator is the entry-point to the STO/CSO***
  [PoC @ CSO: philippe.soete@cso.nato.int]

- CMRE's capabilities can be used by single NATO nations as customers
  [PoC @ CMRE: miller@cmre.nato.int]

Conclusions

- The World is complex and increasingly interdependent, creating new challenges for Nations and NATO
- S&T through NATO makes the difference, by commonly addressing and anticipating security and defence needs of the Alliance and its member nations
- S&T Cooperation through NATO is dynamic: it is evolving and adapting permanently to the new environment, priorities and challenges
- The STO (either the Collaborative program or the CMRE) provides an attractive framework for the U.S. Navy S&T enterprise

The STO stands ready to maintain the long-lasting engagement with ONR

Thank you for your attention

"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."

Theodore von Kármán (1881-1963)