



Technology in action

Technology in action aims to be a window on the STO's program of work and to periodically show the main STO's scientific researches and technology developments that deliver innovative solutions for the Alliance's defence and security needs.

The primary mission of NATO S&T is to maintain NATO's scientific and technological advantage by generating, sharing and utilizing advanced scientific knowledge, technological developments and innovation to support the Alliance's core tasks.

To achieve this goal, Science and Technology Organization takes advantage of 6000 Scientists & Engineers which annually work at more than 300 projects that cover a wide range of fields giving rise to a leading-edge science and technology programme of work.

The STO program of work is comprised of:

- 6Panels:
 - AVT: Applied Vehicle Technology;
 - HFM: Human Factors & Medicine;
 - IST: Information Systems Technology;
 - SAS: System Analysis and Studies;
 - SCI: System Concepts and Integration;
 - SET: Sensors and Electronics Technology;
- 1 Group: NMSG: NATO Modelling & Simulation Group;
- CMRE Centre for Maritime Research and Experimentation:
 - ANMCM: Autonomous Naval Mine Countermeasures;
 - CASW: Cooperative Anti-Submarine Warfare;
 - DKOE: Data Knowledge and Operational Effectiveness;
 - EKOE/MISR: Environmental Knowledge and Operational Effectiveness/Maritime ISR;
 - MUSE: Maritime Unmanned Systems Enablers.

Science and Technology: from Renaissance to Today

Renaissance made its greatest contribution to the rise of modern science and technology. Many theories were created and questioned because of the free thinking space of the Renaissance. It was an era of new ideas, inventions, and reformation, it was a time of innovation and improvement. Leonardo da Vinci was one of the main representatives of the Renaissance and forerunner of modern Science and Technology.

He dreamed up and designed inventions and innovations across a variety of fields: flying machines, weapons of war, water systems, work tools and so on.

Over the centuries, Leonardo's insights and inventions have been developed to the point of achieving the excellence that we can also find in STO's avant-garde successes:

From: Leonardo's "City of the Future " to "Impact of Scarcity of Materials on Military Structural, Mechanical, Propulsion and Power Systems"



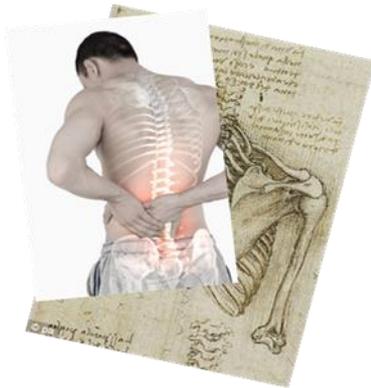
Civil and military high technologies depend on "rare earths" materials. The NATO Science and Technology Organization (STO) has launched a study on 'Impact of Scarcity of Materials on Military Structural, Mechanical, Propulsion and Power Systems' to evaluate the risk of non-availability of materials, the consequences of disruption of supplies on NATO operational effectiveness and to Identify possible mitigation and risk reduction actions .

From: Leonardo's "Aerial Screw " to "Future Rotorcraft Requirements"



Nowadays, the importance of helicopters in military operations is widely recognized. NATO STO formed a task group to develop an advanced rotorcraft technology and increase capability. The task group has individuated three necessary technical activities to be implemented: development of airworthiness strategies for complex systems; reducing helicopter maintenance by 80%; analysis of high speed rotorcraft capabilities

From Leonardo's "Studies of Human Anatomy" to "Reducing Musculo-Skeletal Injuries":



Human Performance is impaired by musculoskeletal injuries (MSI). The NATO STO research task group has identified the need to prevent and reduce MSI by promoting the sharing of information, identifying the causes and associated risk factors for MSI, identifying existing and novel strategies/technologies which may reduce the injury burden.

From: "Leonardo's Vitruvian man" to "Reference Architecture for Human Behavior Modelling (HBM) in Military Training Applications"



The Human behavior modelling (HBM) is a technology that describes decision making and behavior of individuals and small groups. The NATO STO Specialist Team has developed a Reference Architecture (RA) for human behavior modelling of individual players intended for use in military training applications.

From Leonardo's "Self-propelled cart" to "Intelligence & Autonomy (Robotics)"



NATO STO has organized a specialists meeting to discuss about different aspects of intelligent autonomous military robot systems, in particular Environment perception and autonomous navigation; robot motion planning and mobile manipulation; networks robots and multi robot coordination; application scenarios.

From: Leonardo's "Machine gun" to on "Assessment/analysis support to facilitate the introduction of Non-Lethal Weapons (NLW) by addressing line of development obstacles"



The NATO STO research task group is working to introduce some Non-Lethal Weapons as an essential capability to reduce civilian casualties and collateral damage.

From: "Leonardo's Tank" to "Optimized and Reconfigurable Antennas for Future Vehicle Electronic Counter Measures (ECM)"



Electronic Counter Measures (ECM) systems prevent detonation due to Radio Controlled Improvised Explosive Devices (RCIEDs). The NATO STO Team of Experts is improving ECM coverage identifying the need to improve the knowledge on new types of antennas and configurations, establishing the feasibility, performance improvements and limitations for future ECM systems.

From: Leonardo's "Fly Machine" to "Assessment of EO/IR Technologies for Detection of Small Unmanned Aerial Vehicles (UAVs) in an Urban Environment"



Over the past year, there has been a multiplication of small Unmanned Aerial Vehicles (UAVs). They can become a threat because they could be also used for activities such as spying and targeting, so it is important to be able to detect them in advance. For this purpose, the NATO STO Research Task Group has organized a field trial to collect data that will be used for the development of UAVs tracking and recognition algorithms for their detection of in an urban environment.

From: Leonardo's Boat to CMRE Vessels CRV Leonardo and NRV Alliance



The Centre for Maritime Research and Experimentation (CMRE) organizes and conducts scientific research and technology development and delivers innovative field-tested S&T solutions with the employment of two vessels: the NATO Research Vessel (NRV) Alliance and the Coastguard Response Vehicle (CRV) Leonardo.