NATO OTAN

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Monthly Newsletter

S&T organization

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7th NATO Operational Research Analysis Conference

In this issue

EDITORIAL BY THE CHIEF SCIENTIST

Dear all,

This is the last newsletter of 2013, another year has passed at an amazing speed.

Looking back at 2013, the first full year of the STO existence, I would like to express my gratitude and satisfaction for all the hard work of all of you and for all we achieved together.

I'd like to mention a few. The STB delivered a NATO S&T strategy and an implementation plan that encouraged the S&T stakeholders to develop their related action plans. The Centre for Maritime Research and Experimentation continued to deliver top-notch science and technology, while successfully operating in a customer funded business model for its first year. The STO Panels and Group further increased the amplitude and the quality of their programme of work whereas the (S&T) Collaboration Support Office continued to improve the level of executive support, thus enabling that outstanding collaborative programme. The Office of the Chief Scientist amplified the visibility of S&T within the NATO Headquarters, augmenting significantly the density of the interactions between STO's knowledge base and the NATO S&T stakeholders.

The net result is a very healthy programme of work, of which the impact and the exploitation paths have further developed and of which the leveraging power, so important in times of enduring austerity, has grown.

I trust that we will continue on this improvement path in 2014, another year of challenges, after well deserved festive holidays.

I wish you, and your beloved ones, a Merry Christmas and a Happy New Year.

Yours,

MGen Albert Husniaux,
NATO Chief Scientist

Making Progress

2-4 October - 7th NATO Operational Analysis Conference

The 7th annual NATO Operational Research and Analysis (ORA) Conference, held at the NATO Defence College, marked the first year that it had been co-hosted by Allied Command Transformation and the NATO STO. With the theme of 'Planning for the Future', participants engaged in a lively discussion on both what ORA skills and tools are needed to support future planning, as well as what a NATO ORA community of interest should look like.

8 October - Staff-level meeting with EDA R&T Directorate

EDA R&T Directorate and NATO STO staff met on the 8th of October to follow up the staff-to-staff talks aimed to ensure mutual awareness of programmes. The meeting was cordial and both sides are keen to exchange information without prejudice to institutional arrangements.

18 November - MC S&T Focus Session

The Military Committee held its annual S&T Focus Session on the 18th of November at NATO HQ. The NATO Chief Scientist presented the status of the implementation of the NATO S&T Strategy and an S&T perspective on countering the IED threat, based upon the main outcomes of the STB symposium on "Innovation for C-IED" held in Vilnius in September last. During the session the NATO Military Authorities (NMAs) action plan for the S&T Strategy was also discussed.

2 December - Connected Forces Initiative Roadmaps

The Connected Forces Initiative (CFI) is key in maintaining the preparedness of NATO's armed forces, through expanded education and training, increased exercises and better use of technology. The C3 Board and the CNAD held a joint meeting on the 2nd of December to continue developing a roadmap for implementation of the Technological Aspects of CFI. The STO is contributing to this roadmap, which is an excellent opportunity to further improve visibility and impact. More information on http://nhqc3s.nato.int/C3_BOARD-CFI

18-19 December - Workshops on NATO S&T Priorities

On 18 and 19 December, the STO held two workshops to address NATO S&T Priorities setting and to discuss the way forward. Both workshops have attracted strong interest across all stakeholders. Discussions were lively and productive, results will be reported separately.

MGen Albert Husniaux, NATO Chief Scientist

News out of NATO HQ (Brussels)

15-17 October - LCGDSS Meeting

The Land Capability Group on Dismounted Soldier Systems (under the NAAG), held its meeting in Moscow from the 15th to 17th of October. The S&T Coordination & Outreach Officer, LtC P. Dotoli provided a briefing on STO activities on enabling technologies for Soldier Systems, building on the already strong links (mainly through STO Task Groups supporting the LCGDSS, such as SET-173 on manportable energy devices and HFM-238 on Soldier Burden) and highlighting several topics for further collaboration.

10-14 November - NATO Industry Forum and NIAG Meetings

The NATO Chief Scientist attended the NATO Industry Forum, held in Istanbul on 14th November. The NIAG Representative in the STB Dr. R. Esposito gave a briefing on the STO, its links with Industry and the NIAG role in the NATO S&T Strategy.

19-21 November - NATO Maritime Commanders' Conference (MARCOMET)

The Chief Scientist and the Director CMRE participated in the MARCOMET conference which was held in London, United Kingdom. This participation introduced a further opportunity for STO senior management to interact with NATO's high-level maritime community.

3-4 December - Baltic Defence Innovation Conference

The NATO Chief Scientist delivered the keynote speech at the Baltic Defence Innovation Conference which was held in Tallinn, Estonia in December 2013. In his speech the Chief Scientist addressed the challenges and opportunities regarding innovation in the military domain and the role of S&T.

4-5 December - C-IED events

On the 4th of December the S&T Coordination & Outreach Officer gave a briefing to the NATO C-IED Task Force on relevant STO activities and STO involvement in the NATO-wide C-IED action plan. On the following day, Dr. Ernst Krogager (DNK), SCI-250 Chairman, addressed the ISAF C-IED Briefing Day. The event saw a large participation of high level speakers coming from different non-NATO institutions. The STO contribution on emerging technologies to counter the IED threat was very well received.

9 December - CNAD in Permanent Session

Staff of the Office of the Chief Scientist gave a briefing to the CNAD in Permanent Session (attended by the NADREPs), both in PfP and NATO-only formats, presenting results from the 2013 STO Program of Work, the status of implementation of the S&T Strategy and plan for 2014 and onwards. The NADREPs welcomed the more pro-active approach to inform them.

11 December - Join NNAG/NAAG Session

The NATO Chief Scientist and the CMRE Director addressed the NNAG and the NAAG in an exceptional joint session. The two briefings highlighted the support of Collaborative S&T Network to the armaments community and the potential contribution of CMRE to several Smart Defence projects. During the sessions, the results of the Joint MAGs Initiative, held at CMRE in November, were also presented, underlining the significant contribution provided by the CMRE to the success of the exercise.

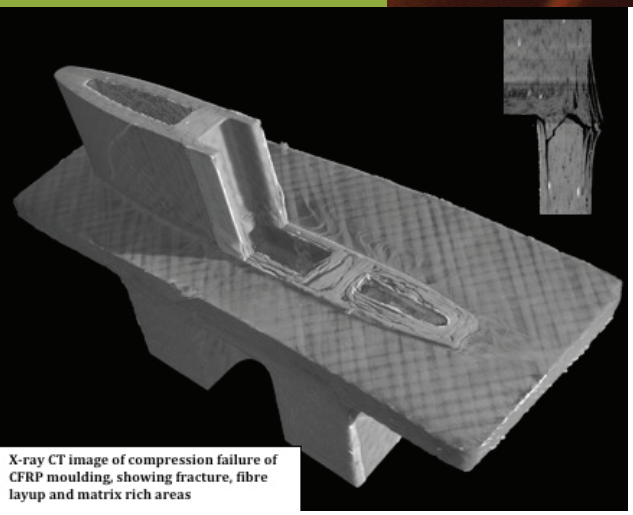
12 December - Civil Emergency Planning Committee

Staff of the Office of the Chief Scientist gave a briefing to the Industrial Resources and Communications Group under the NATO Civil Emergency Planning Committee. This was the first time the STO was presented in detail to this committee and created opportunities to discuss potential collaboration.

13 December - CNAD Ammunition Safety Group

Prof. Adam Cumming (GBR) presented numerous initiatives of the AVT Panel on "greener munitions" to the CNAD Ammunition Safety Group. This topic is gaining relevance, as environmental legislation is becoming more stringent and it is tackling one of the NATO S&T Hard Problems.

News out of Neuilly-sur-Seine



X-ray CT image of compression failure of CFRP moulding, showing fracture, fibre layup and matrix rich areas

4 Nov - AVT Workshop on Advanced Non-Destructive Evaluation Techniques for Polymer Based Composites in Military Vehicles

The NATO STO/AVT Workshop on "Advanced Non-destructive Evaluation (NDE) Techniques for Polymer Based Composites in Military Vehicles " was held in Riga on the 10th and 11th October 2013. This followed on from the preceding workshop on "Understanding Failure Mechanisms of Composites for Sustaining and Enhancing Military Systems Structures" AVT-211.

AVT Workshop on "Advanced Non-Destructive Evaluation Techniques for Polymer Based Composites in Military VehiclesFibre-reinforced polymer composites are nowadays widely used in advanced military platforms and weapon systems. They bring not only weight benefits, but also other aspects, such as good environmental resistance, low magnetic signature and stealth attributes making polymer composites the material of choice for structural design. It is clear that these platforms and systems will be in use for more than 20 years, and supportability of these materials is a major issue. The design standards and defect tolerance vary greatly from traditional materials and the state of the art of NDE needs to be understood by the platform users.

The AVT 224 workshop gave the opportunity for NDE specialists from NATO Nations, Australia + Sweden to present and share their experience on inspecting polymer composite, primarily carbon fiber based. The state of the art of composite NDE inspection at new manufacture and overhaul was established and the emerging technologies from the NATO countries research communities highlighted with the following topics covered.

- Regulatory and design requirements
- Manufacturing and in-service NDT on flat and curved parts
- Capability comparison between Ultrasound, Thermography and Radiography.
- NDT below composite skins
- Bonding defects for attachments, protective layers and repairs with shock waves being used to exploit kissing bonds,
- X-Ray CT imaging to provide detailed knowledge of sample content, especially for porosity.
- Fast coverage methods using Ultrasonic arrays for large areas
- Higher sensitivity methods with fiber orientation measurement and rapid 3D inspection of local damage.

Discussion sessions were held to understand the status of base-lining capability across the lead NDE methods. The final session was used to have syndicate group discussions on the current and required capability with respect to Ultrasonics, Optical, X-ray, Thermography, NDT Modeling and Test pieces. Methods of bridging the gaps were identified.

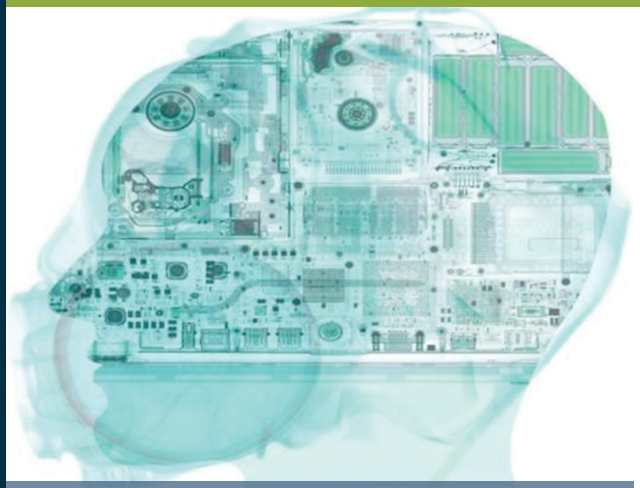
Initial outputs of the workshop are that a register of samples across the nations with evaluation reports, would allow for a greater understanding to be gained by each national service. Common platform users would benefit from having specific NDE forums to avoid having to redevelop inspection processes. The presentations are to be made available via the STO website.

HFM-184 Task Group on Safe Ride Standards for patient Evacuation Using Unmanned Aerial Vehicles (UAVs)

The HFM-184 Research Task Group recently explored all aspects of the state of the art of unmanned aerial vehicles (UAVs) for the further development of UAV technology in the context of medical support to NATO operations. Its Technical Report, which is available from www.cso.nato.int/abstracts.aspx?restrictpanel=2, will serve as a "Handbook for development and use of UAV for patient transport" which will save time and money for research on this technology and provides a solid basis for future development, and shorten the time until this technology will be able to save lives. The NATO nations' medical community is invited to take full advantage of the Task Group's Handbook.

MORE STO News
www.sto.nato.int

News out of Neuilly-sur-Seine (ctd)



IST Symposium on Visual Analytics (credit DSTL)

IST-116-RSY-028 Symposium on Visual Analytics, IST-117-RWS-017 Workshop on Visualization for Analysis and 32nd IST Panel Business Meeting Fall 2013, Shrivenham, Great Britain

The Information Systems & Technology (IST) Panel held its business week from 27th Oct to 1st Nov 2013 at the Defence Academy in Shrivenham, Great Britain. As usual, the week started with activities aimed at promoting exchange of state-of-the-art knowledge among the NATO Science &Technology community. The IST-116-RSY-028 Symposium on Visual Analytics was held on 27th and 28th Oct followed by the IST-117-RWS-017 Workshop on Visualization for Analysis

The Symposium focused on methods by which interactive visualization for analysis can assist decision makers in several domains to explore the possibilities in understanding the always increasing large amounts of heterogeneous data generated by all systems. With 15 speakers and more than 76 attendees from 16 Nations, the Symposium was the occasion of significant interaction between the high qualified speakers and the audience. The exchanges were fruitful and informative. All attendees showed a deep interest and followed on the discussions within the IST-117-RWS-017 Workshop on Visualization for Analysis the 29th and 30th Oct. The workshop consisted of focused discussions to augment and refine understanding of themes derived from the work of the Symposium. It provided a platform for intellectual synergy that intended to generate insights and new approaches to shape future research and development in the topic areas.

22 Nov - SET-202 Specialists Meeting on Naval Platform Signature Management and Protection and 32nd SET Panel Business Meeting, Fall 2013 Oslo, Norway

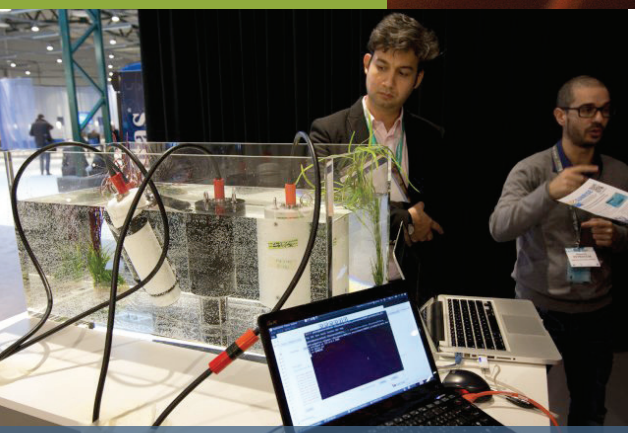
The Sensors and Electronics Technology (SET) Panel held its Fall business week from 21-25 October 2013 at the Akershus Fortress in Oslo, Norway.

SET Specialists Meeting on Naval Platform Signature Management and Protection

As usual, the first two days of the week are devoted to activities aimed at promoting exchange of state-of-the-art knowledge among the NATO S&T community. In particular, the SET-202 Specialists' Meeting (SM)on "Naval Platform Signature Management and Protection" was held from 21-22 October, with contributions from 11 speakers. To foster cooperation across other NATO Panels, Groups, and S&T bodies, the meeting had 2 presentations given by Task Group (TG) Chairs of the SCI Panel and 1 presentation from CMRE. Despite the relatively low number of attendees, 33 participants from 12 Nations, the meeting was very successful. In fact, a very well organized and steered round table at the end of each session enabled significant interaction between the speakers, the panel, and the audience. The exchanges were animated, honest, and informative, with much information conveyed. All participants showed a very deep interest in cooperation and wanted to know how to communicate their information more effectively to NATO military bodies and how their products could be transitioned to NATO systems.

(Photo: The Norwegian Defence Research Establishment)

News out of La Spezia



SUNRISE booth at ICT 2013 in Vilnius (Lithuania).
Photo credits: Marco Merola

30 September – 25 October MANEX'13 sea trial

The Multinational Autonomous Naval Experiment 2013 (MANEX'13) was successfully conducted on board the NATO Research Vessel Alliance from 30 September to 25 October 2013 near the coast of the Island of Elba, Italy.

Part of the CMRE Autonomous Naval Mine Countermeasures (ANMCM) programme, the trial was focused to advance NATO capabilities for mine reacquisition and identification using collaborative autonomous systems, testing in particular various autonomy behaviours for an autonomous underwater vehicle (AUV) with synthetic aperture sonar (SAS), and analysing the performance of modern mine hunting systems to provide Nations guidance on how to optimize the use of their tools.

The experiment led to demonstrate for the first time a complete collaborative end-to-end "system of systems" allowing autonomous completion of all stages of the mine countermeasures missions. This achievement meets the goal of "removing the man from the mine field", through the direct interaction and communication between a mine-hunting autonomous underwater vehicle and an autonomous surface vehicle which communicates with small reacquisition systems with minimal operator input.

MANEX'13 was a multi-national trial involving multiple autonomous vehicles with modern sensors relevant to NATO mine hunting missions. The multi-national component was an outgrowth of the MIAMS (Machine Intelligence for Autonomous Mine Search) Joint Research Project (JRP). The international participants included representatives of six NATO Countries.

8-10 October - 1st Workshop on Military Applications of Glider Technology

The first CMRE Workshop on Military Applications of Glider Technology was held in La Spezia from 8 to 10 October 2013. The workshop explored the applications of underwater glider technology to military operations, including case studies on environmental characterization of denied areas, passive detection of acoustic sources, sustained monitoring and surveillance of marine regions, multistatic acoustic detection. Professional attendees from navies, companies, universities and research centers from 11 NATO Countries took part.

For more information visit http://geos3.nurc.nato.int/portal/web/gliderworkshop13

31 October - SUNRISE project kick-off

The SUNRISE project (EC FP7) was launched in Rome on 31 October 2013. SUNRISE stands for Sensing, monitoring and actuating on the UNderwater world through a federated Research Infrastructure Extending the Future Internet. CMRE is part of the Consortium of partners which work together to develop a federation of underwater testing infrastructures, as yet unavailable anywhere in the world, empowered by novel IoT (Internet of underwater Things) technologies, for marine and ocean monitoring, exploitation and control.

The SUNRISE concept stems from the experience of existing European underwater testbeds operating at the partner sites, and especially from the experience of the Littoral Ocean Observatory Network (LOON) permanent installation created in La Spezia by the NATO STO Centre for Maritime Research and Experimentation (CMRE). Five copies of the LOON throughout Europe and the USA will be built within the SUNRISE project.

For more information visit http://fp7-sunrise.eu/

1 November – Handover at CMRE

On 1 November Rear Admiral (ret) Hank Ort, Royal Netherlands Navy succeeded Dr Dirk Tielbuerger as new CMRE Director. RADM (ret) Hank Ort was appointed after having retired recently from the Netherlands Navy (June 2013). He combines vast maritime experience gained in successive operational and administrative posts, with a genuine affinity for science and technology. In his last military position, RADM (ret) Hank Ort was Chief of Staff of NATO's Maritime Command Northwood. At a time of profound changes in NATO's Command Structure he provided continuity and drive for nearly four years, to complete the change to one maritime headquarter at the helm of the Alliance Maritime Enterprise.

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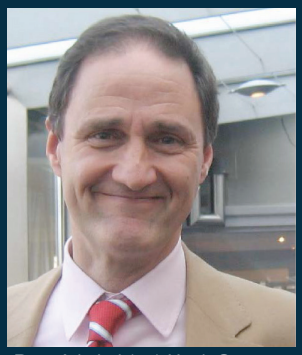

Rear Admiral (ret) Hank Ort
CMRE Director

Laser dazzler being tested as non-lethal capability during TALON 13

News out of La Spezia(ctd)

For more information visit http://www.cmre.nato.int/about-cmre/director and http://www.cmre.nato.int/news-room/blog-news-archive/42-rokstories/241-handover-at-cmre

11-15 November - Joint Capability Group Ground Based Air Defence (JCGGBAD) meeting and Joint Main Armament Group Initiative Table Top Exercise (JMI TTE)

From 13 to 15 November CMRE hosted the 2013 Joint Main Armament Group Initiative Table Top Exercise (JMI TTE) to help the NATO Conference of National Armaments Directors (CNAD) provide advice to NATO decisions makers on military capability requirements and interoperability issues among NATO military forces. The Exercise was preceded on 11 and 12 November by a Joint Capability Group Ground Based Air Defence (JCGGBAD) meeting of the Main Armament Group. Both the events addressed the recently set goals of the "NATO Forces 2020" initiatives, to equip, train, and exercise connected forces so that they can operate, together with other allies – and with partners – in any environment. CMRE successfully adapted a computer-based scenario to investigate how military services interface in joint and combined operations.

21-22 November – TALON 13 demonstration

How could an intrusion in a maritime restricted area, either friendly or hostile, be quickly detected and identified? How could it be efficiently blocked by warning and non-lethal devices? The TALON 13 system presented at the NATO Centre for Maritime Research and Experimentation in La Spezia addressed these questions and features the new trends in the field: in the future port protection will be autonomous, interconnected and rapid, in order to minimize the vulnerability of assets and naval units, also reducing any risk of harm to benign contacts and minimising post-event litigation.

TALON 13 was an international demonstration organized in collaboration with the Italian Navy COMFORDRAG (Mine Countermeasures Maritime Command) and aimed at security professionals. It gathered experience from the integration of multiple types of sensor networks and non-lethal warning devices, in order to implement the "rapid contact designation and warning" concept. During the demonstration a series of possible threats from small boats, underwater vehicles and swimmers/divers were simulated.

TALON showed how it can automatically detect them and react to the tentative intrusion of a unit with hostile intent, by escalating its reaction capabilities from a simple audible warning to the use of non-lethal effectors. The effectors are used first to warn, then to dissuade and slow down, and finally to stop the intruder with an entanglement device, without causing any harm. The system is based on algorithms which fuse data coming from different underwater and land sensors, including radar, sonar and optical. This software is able to set up autonomous reactions, while the human operator keeps the activities under control in real-time by a user-friendly internet browsing window which can be run on mobile devices and does not require a control room in order to function.

The demonstration is part of the CMRE work on deterrence and non-lethal capabilities in maritime security with the NATO Defence Against Terrorism (DAT) programme. During the event a Media Day was also hosted.

For more information visit www.talon2013.org

MORE STO Technical Publications

www.cso.nato.int/abstracts.aspx

Scientific Publications

Processes for Assessing Outcomes of Multi-national Missions, STO-TR-HFM-185, Public release, November 2013.

Management of Heat and Cold Stress - Guidance to NATO Medical Personnel, RTO-TR-HFM-187, Public release, December 2013.

Beyond Time and Space, STO-MP-HFM-231, Public release, December 2013.

Sampling on-demand with fleets of underwater gliders. Ferri, G. CMRE-FR-2013-011, NATO Unclassified, October 2013.

Environmentally sensitive behaviours for collaborating autonomous underwater vehicles in multistatic surveillance networks. Goldhahn, R., Braca, P., LePage, K. CMRE-FR-2013-012, NATO Unclassified, November 2013.

Unmanned systems, autonomy, and side-looking sonar: a framework for integrating contemporary systems into the operational MCM architecture. Percival, A.M., Couillard, M., Midtgaard, Ø., Fox, W.L.J. CMRE-FR-2013-013, NATO Unclassified, December 2013.

Application of the Compressed Sensing theory to ocean field reconstruction. Fortunati, S., Grasso, R., Gini, F., Greco, M.S. CMRE-FR-2013-014, NATO Unclassified, December 2013.

ARTEMIS revisited. Schäfke, A., Strode, C. CMRE-FR-2013-015, NATO Unclassified, December 2013.

The multi-sensor probability hypothesis density: a paradigm for data fusion and target tracking in large sensor networks. Braca, P., Marano, S., Matta, V., Willett, P. CMRE-FR-2013-016, NATO Unclassified, December 2013.

Evaluation of AUV target detection, classification and tracking performance 2011-2013. part I - summary of trial results. Sildam, J., LePage, K.D., Braca, P., Micheli, M. CMRE-FR-2013-017, NATO RESTRICTED, December 2013.

Exploiting environmental information for improved underwater target classification. Williams, D.P. CMRE-FR-2013-018, NATO UNCLASSIFIED, December 2013.

An analysis of co-operative ASW metrics and performance. Strode, C. CMRE-FR-2013-019, NATO UNCLASSIFIED, December 2013

A large-scale analysis of MCM detection performance for surrogate targets in SAS imagery. Williams, D.P. CMRE-FR-2013-020, NATO UNCLASSIFIED, December 2013.

Optimal asset network planning: integration of environmental data and sensor performance for counter piracy. Grasso, R., Braca, P., Osler, J., Hansen, J. CMRE-MR-2013-012, NATO UNCLASSIFIED, December 2013.

Report of the First CMRE Workshop on Military Applications of Underwater Glider Technology. Alvarez, A. CMRE-MR-2013-013, NATO UNCLASSIFIED, December 2013.

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