NATO OTAN

Science & Technology Organization
Monthly Newsletter

S&T organization

ISSUE 9 APR 2014

MGen Albert HUSNIAUX, NATO Chief Scientist

In this issue

EDITORIAL BY THE CHIEF SCIENTIST

Dear all,

Time is flying as we implement the decisions taken by the STB during its Spring Meeting.

In the coming days, a workshop is being organized on our road toward defining NATO S&T priorities. Activities in the coming weeks will also be key to generating the content of the 2015 Maritime S&T Business Plan, including a way forward for the research vessels.

Looking at the activities reported by the executive bodies in this newsletter, I can only say that STB decisions are being implemented and that the STO is delivering on the objectives of the NATO S&T Reform. During their upcoming meeting, your Ministers will be presented a Reform status update, with the STO continuing to be "in the green".

The STO Programme of Work continues to be healthy, with next year's programme being built taking into account NATO S&T guidance and in coordination with the NATO S&T stakeholders.

Visibility, exploitation and leverage increase. More and more, stakeholders contact the OCS either to leverage existing knowledge (requests for information) or to look for cooperation opportunities.

I am encouraged by all these positive developments and encourage you to continue to walk along this path of excellence.

Yours,

MGen Albert Husniaux,

NATO Chief Scientist

Making Progress

3 April: Future NATO International Conference – Sofia, Bulgaria

On the 3rd of April, the Chief Scientist attended the Future NATO International Conference where he presented on "NATO S&T: Addressing the Future NATO". During his intervention he described the role of NATO S&T as the engine for innovation, using the current strategic context and relevant NATO S&T examples to illustrate his message.

7-9 April: NATO Transformation Seminar – Paris, France

The STB Chair attended, for the first time, SACT's strategic Transformation Seminar. This event was largely dominated by the Ukrainian crisis and its implications to NATO.
During the seminar, the Chief Scientist delivered the introductory remarks on a session addressing "Capability Challenges in the 21st Century", where he discussed the role of an innovative mindset in preparing for an unknown future.
It is noteworthy that SACT, in his remarks, explicitly mentioned the pivotal role NATO S&T and the STO have in the transformation landscape.

16 April: NAAG Joint Capability Group Ground-Based Air Defence

The Coordination and Outreach Section of the Office of the Chief Scientist presented on the NATO Science and Technology Organisation (STO). The presentation focussed on STO's mission and STO's programme of work, including highlighting those Science and Technology (S&T) activities that are relevant for Ground-based Air Defence. Special attention was given to SCI-241 "Defence against UAV-attacks". The group expressed high interest in the topic, the STO and the upcoming Science and Technology Board symposium on Autonomous Systems in Bratislava in September of this year.

25 April: Connected Forces Initiative: CNAD-C3B Roadmap of Technological Aspects

The Coordination and Outreach Section of the OCS attended a meeting on the update of the CNAD-C3B Roadmap of Technological Aspects of CFI. In the update, the potentially relevant Science and Technology (S&T) activities of the STO were made visible, based upon an earlier analysis by the OCS of the CFI roadmap. It is anticipated that more work is needed in order to optimise interaction processes between STO and CFI staff, to support further exploitation of S&T results.

News out of NATO HQ (Brussels)

MGen Albert Husniaux and several officials involved in S&T generation and exploitation, including the National Armament Director, the Deputy Chief of Staff of the Navy, the Italian STB members and representatives from the Defence General Staff.

4 April: Finnish delegation visits Office of the Chief Scientist

A Finnish delegation informally met the Coordination and Outreach Section of the Office of the Chief Scientist. Finland showed interest in the Science and Technology Organisation and expressed the will to investigate possibilities for closer collaboration with and within the STO. It is anticipated that a Finnish delegation will visit the NATO Chief Scientist personally in the near future.

8-11 April 2014 – PfPC Emerging Security Challenges Working Group meeting – Sofia, Bulgaria

Mr. Carson attended the 4th PfPC Emerging Security Challenges Working Group meeting, as part of the Partnership for Peace Consortium (PfPC) of Defense Academies and Security Studies Institutes. During the meeting, the potential emerging security challenges of demographic change and big data were discussed and analyzed, as well as the possible security and defence policy implications.

14-15 April 2014 - Visit to Italian authorities, Rome, Italy

On 14-15 April, the NATO Chief Scientist, MGen Albert Husniaux, paid a visit to Italian authorities in Rome, meeting several officials involved in S&T generation and exploitation, including the National Armament Director, the Deputy Chief of Staff of the Navy, the Italian STB members and representatives from the Defence General Staff. The meeting was an excellent opportunity to confirm Italy's strong commitment to the STO, both as the Host Nation for the Centre for Maritime Research and Experimentation and as an important contributor to the Collaborative Program of Work.

22 April: NATO HQ collaboration and coordination with USA European Command (USEUCOM)

The Assistant Secretary General Defence Investment (ASG-DI) and the NATO Chief Scientist discussed improving collaboration and coordination with the European Command of the USA in Stuttgart. It was concluded that, also on the basis of an earlier outreach visit of DI and OCS staff, exploitation of NATO S&T would benefit from closer USEUCOM and STO interaction.

23 April: NATO Parliamentary Assembly Staff visits NATO Chief Scientist

On 23 April 2014 the Director of the Science and Technology Committee and the Director of the Defence and Security Committee of the Staff of the NATO Parliamentary Assembly (PA) in Brussels visited the NATO Chief Scientist. In this first meeting it became clear that there are a number of common interests that deserve attention and continuation of the established contacts. The OCS Coordination and Outreach Section has been invited to the NATO PA meeting in Vilnius from 30 May until 2 June 2014. It is anticipated that the OCS will participate in the NATO PA meetings, which take place twice a year, on a regular basis.

25 April: NATO Chief Scientist visits TechUK

On 25 April 2014 the NATO Chief Scientist was invited by TechUK, to expose leading industry organisations to NATO Science and Technology (S&T) and to strengthen industry participation in the STO. The NATO Chief Scientist delivered a comprehensive presentation on NATO's Science and Technology Organisation (STO). The initiative fits in the Framework for NATO Industry Engagement of the Conference of National Armaments Directors (CNAD).

28 April: Countering Improvised Explosive Devices (C-IED)

The S&T Coordination & Outreach Officer gave a briefing to the NATO C-IED Task Force on relevant STO activities, the STO involvement in the NATO-wide C-IED action plan and collaboration with CNAD.

The STO contributions on emerging technologies to counter the IED threat were very well received. Further information on the C-IED initiatives can be obtained in the unclassified portal https://www.c-ied.org/.

News out of Neuilly-sur-Seine

AVT-218 Lecture Series on “Radiation and Gas-Surface Interaction Phenomena in High-Speed Reentry”

7-9 April: AVT-218 Lecture Series on “Radiation and Gas-Surface Interaction Phenomena in High-Speed Reentry”

The AVT-218 Lecture Series was held at the University of Illinois at Urbana Champaign, IL, USA from 7 to 9 April 2014.

High Speed Re-Entry represents a challenge for space exploration programs. At such flight conditions, shock layer radiation becomes a substantial part of the heat-transfer to the wall in addition to the Gas-Surface Interaction (GSI) phenomena, with possible coupling effects.

The objective of this Lecture Series was to focus on the extreme re-entry conditions where the physical phenomena is much more pronounced and starts to interplay. The ground testing capabilities and limitations for high speed re-entry were reviewed with the associated instrumentation. Radiations modelling, as well as the modelling development for GSI in such conditions, were presented. The consistent integration of those high fidelity models into CFD codes were inspected with their reliability to provide accurate ground-to-flight extrapolation.

Read the full story at www.cso.nato.int/page.asp?ID=2042.

7-10 April: 33rd AVT Panel Business Meeting Week, Copenhagen, Denmark

More than 320 engineers, scientists, industry and government representatives from 20 out of 28 NATO Nations, plus three Partner Nations, attended the 2014 Spring PBMW of the AVT Panel.

The Chairman of the AVT Panel, Dr.-Ing. Dennis Goege, during his speech at the Opening Ceremony, highlighted that “Each and every participant of this NATO event is making an impact on the performance of the Alliance”. Furthermore, he expressed his sincere appreciation to the Host Nation Denmark and its Representatives: “The NATO community is thankful for the opportunity to work on our common goals in Denmark”.

Overall, 50 AVT Technical Teams including Task Groups, Program Committees and Exploratory Teams held their meetings during the week.

Furthermore, one AVT event was hosted during the AVT Panel Business Meeting Week - the AVT-221 Specialists’ Meeting on “Design and Protection Technologies for Land and Amphibious NATO Vehicles”.

Apart from the Technical Teams’ and Specialists’ Meetings, a coordination meeting with the Land Capability Group - Land Engagement (LCG-LE – a subgroup of the NATO Army Armament Group) was held with the objective to discuss collaboration opportunities on common topics resulting into new activities sponsored by the AVT Panel and a strong involvement of the LCG-LE. With this approach, results of AVT activities will be directly exploited within other NATO entities such as the NAAG.

The 33rd Panel Business Week was an overall success and the work of the technical teams once again showed the high value of the NATO Science and Technology environment.

Read the full story at www.cso.nato.int/page.asp?ID=2062.

7-10 April: HFM 33rd Panel Business Meeting and HFM-236 Symposium on “Effective Inter-Agency Interactions and Governance in Comprehensive Approaches to Operations”, Stockholm, Sweden.

Almost 50 Panel Members and Partner Nation Representatives attended this PBM.

The HFM-236 Symposium was held from 7 to 9 April 2014. It was designed to identify current Comprehensive Approach-relevant theoretical structures and models, with special regard to comprehensive collaborative arrangements, in order to:

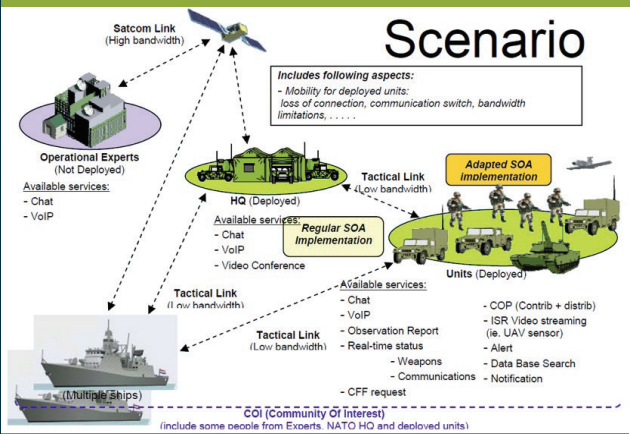
1. identify key advances in inter-agency collaborative approaches that are immediately applicable to the operational context;
2. develop theories to support the further development and operationalization of the comprehensive approach; and,
3. focus further research and development efforts and international research programs.

The 33rd Panel Business Meeting was a success and the work of the focus areas led to 3 new Technical Activity Proposals and 3 new Exploratory Teams.

Read the full story at www.cso.nato.int/page.asp?ID=2182

MORE STO News

www.sto.nato.int



IST-090-RTG-043 Service Oriented Architecture Challenges for Real Time and Disadvantaged Grid

7-10 April: AVT-221 Research Specialists' Meeting (RSM) on "Design and Protection Technologies for Land and Amphibious NATO Vehicles"

AVT-221 was held during the 33rd AVT Panel Business Meeting in Copenhagen, Denmark.

AVT-221, co-chaired by Michael Hönlinger (DEU) and Roger King (USA), sought to investigate best practices used and concepts proposed for vehicles that are capable not only of land operations, but of facilitating manoeuvre throughout a larger theatre of operations including the ability of crossing rivers, tactical swimming in the sea and within littoral areas. The high protection requirements for war fighter safety have increased the vehicle weight such that modern ground vehicles are challenged with integrating a water mobility capability.

The Meeting Proceedings have been pre-released on the CSO website.

Read the full story at www.cso.nato.int/page.asp?ID=2142

April: Completion of the IST-090 Task Group on "Service Oriented Architecture Challenges for Real Time and Disadvantaged Grid"

The Service Oriented Architecture (SOA) paradigm has been chosen by the NATO C3 Board (NC3B) as the method to achieve interoperability at the information infrastructure level. The current technologies used to implement SOA (e.g., Web Services and Data Distribution Services) were not specifically designed to handle the conditions found when working with tactical networks. This fact remains a major impediment to achieving interoperability among the nations in the battle space.

Therefore, the objective of IST-090 was to identify improvements to make SOA applicable at the tactical level, which typically includes communication grids that are disadvantaged by line-of-sight connections, low bandwidth, intermittent availability, etc. The goal was also to investigate how SOA could be used over disadvantaged grids and to build demonstrations that show how the challenges that are posed by disadvantaged grids can be mitigated.

The disadvantaged grids that IST-090 considered are mobile ad-hoc networks that are characterized by line-of-sight connections, low bandwidth, intermittent availability, and etcetera.

IST-090 identified improvements to make the SOA work while using disadvantaged grids and built demonstrations that show how the challenges that arise because of the use of disadvantaged grids in near-real-time, as is the case at the tactical level in military operations, can be mitigated. IST-090 used a concrete military scenario as a global context for the study.

Areas of research included: efficient communication frameworks, mechanisms to reduce needed bandwidth and mechanisms to improve reliability.

IST-090 specifically considered the following technologies: Web Services and Service Discovery, Data Distribution Services, Common Distributed Databases and Cross-layer design.

The results demonstrated that SOA can be applied at lower levels than previously thought.

The Technical Report STO-TR-IST-090 is available from the CSO Website.

News out of Neuilly-sur-Seine (ctd)

April: Completion of the MSG-086 Task Group on "Simulation Interoperability"

Initiated in 2010, MSG-086 was tasked to overcome barriers and issues affecting simulation interoperability. MSG-086 has completed its work during the month of April.

46 interoperability issues were identified by MSG-086 and described in detail.

Based on this investigation, the key finding is that simulation interoperability is not primarily a technical issue, but that simulation interoperability needs to be addressed in a holistic way along the whole simulation environment engineering process. As an example for such a holistic approach, MSG-086 has developed a "Guideline on Scenario Development for (Distributed) Simulation Environments" as a DSEEP (Distributed Simulation Engineering and Execution Process) best practice guide.

Both the Technical Report and the "Guideline on Scenario Development for (Distributed) Simulation Environments" have been pre-released on the CSO website.

The first steps towards transforming the Guideline into a SISO (Simulation Interoperability Standards Organization) standard document have been initiated.

Brigadier-General Dr Stefan Kowitz, Director of the NATO Centre of Excellence Military Medicine (MILMED-COE), Mr René Larose , Director of the Collaboration Support Office (CSO) , Brigadier-General Prof Dr Corinne Roumes, and LtCol Ron Verkerk, the HFM-Panel Executive.

April: Completion of SET-166 Task Group on "Signature Management System for Underwater Signatures of Surface Ships"

Underwater acoustic and electromagnetic underwater signatures expose surface ships to the threat of detection, classification and localization by means of the sensors of hostile vessels and weapon systems. The threat of influence mines in the littoral is of special concern, as appropriate counter measures are often lacking. The underwater signatures of a ship are not fixed values; the signature level seen by a threat will depend on a number of parameters including threat sensor characteristics, the environment and the state of the ship. If a ship´s signature and the threat are known to the ship´s command team then informed operational decisions can be made with knowledge of the likely resultant susceptibility of the ship. An on-board Integrated Ship Signature Management System (ISSMS) will provide the commander with adequate information on current susceptibility and capabilities of the ship. It will provide advice on how to optimize the ship´s configuration and operational settings for a tactical decision that enhances the ship´s mission accomplishment and effectiveness.

The classified Technical Report should be made available to the contributing nations in the near future.

Read the full story at www.cso.nato.int/page.asp?ID=2063

22 April: The Director of the NATO Centre of Excellence on Military Medicine visited the CSO.

On the 22nd of April 2014, Brigadier-General Dr Stefan Kowitz, Director of the NATO Centre of Excellence Military Medicine (MILMED-COE) paid a visit to the CSO. He was welcomed by the Mr René Larose , Director of the Collaboration Support Office (CSO) , Brigadier-General Prof Dr Corinne Roumes, the HFM-Panel Vice-Chair and LtCol Ron Verkerk, the HFM-Panel Executive.

During this visit, Bgen Dr Kowitz learned about the mission of the NATO Science and Technology Organization (STO) and the HFM-Panel in particular.

News out of Neuilly-sur-Seine (ctd)

Possibilities for future cooperation between the HFM-Panel and the MILMED-COE were also discussed. At the end of this successful visit, Bgen Dr Kowitz was invited to sign the CSO "Livre d'Or".

28-30 April: Kick-off of the HFM-247 Task Group on "Human-Autonomy Teaming: Supporting Dynamically Adjustable Collaboration".

HFM-247 had its kick-off meeting at the CSO. This meeting was attended by 17 participants from 5 NATO nations and Sweden.

This Task Group is the follow-on to the successful HFM-170 Task Group and the HFM-217 Workshop on "Supervisory Control of Multiple Uninhabited Systems: Methodology and Enabling Human-Robot Interface Technologies".

During this meeting the attendants made presentations on their national views and drafted the Program of Work for the coming 3 years.

The topics to be covered by this Task Group are:

- Adjustable & adaptive autonomous systems;
- Authority sharing architectures and interface concepts;
- Manned-unmanned team situation awareness and performance;
- Bi-directional conveyance of intent
- Goal-based control;
- Human-autonomy problem solving/cooperative dialog;
- Decision Support Interfaces
- Situation assessment aids, feedback of action impact;
- Predictive/look ahead tools, anticipatory support;
- Intelligent aiding for time-critical team decision making;
- Multi-modal interfaces, intuitive interfaces, natural language interfaces;
- Networked telepresence.

This Task Group should complete its work by December 2016.

Read the full story at www.cso.nato.int/page.asp?ID=2184

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News out of La Spezia

CMRE acoustic communications monitoring station deployed in Sant Feliu de Guíxols during the 2014 MORPH trials. Photo by Jorge Fontes, IMAR-DOP.

11 April – MORPH EC Project 2014 first trials

From 7 to 11 April 2014, CMRE participated in the first 2014 sea trials of the MORPH (Marine Robotic System of Self-Organising, logically Linked Physical Nodes) European Commission project, which aims to test the latest developments in multiple-vehicle coordination and formation flying based on echo-location. The trials occurred off the coast of Girona (Spain) and were led by the ViCOROB - Computer vision and robotics research Institute of the University of Girona.

More than 20 scientists from Germany, Portugal, Italy, France and Spain successfully tested cooperation among autonomous underwater and surface vehicles in executing survey trajectories avoiding existing obstacles. This was a new step forward towards future skills for fleets of marine vehicles: more complex tasks will be experimented in future phases of the Project. This tested capability is relevant to permit safe actions in areas where visibility is low and obstacles are frequent. Vehicles proved to be able to deal better with these challenges in teams, particularly in difficult environments such as, near cliff areas. CMRE acoustic communications technologies played crucial role in allowing wireless navigation in formation flying at this test phase. The ability to share data between submerged vehicles is crucial for the implementation of cooperative control schemes. CMRE is also exploring novel techniques that will allow embedding location awareness into the underwater communications network, solving both the problems of inter-vehicle data exchange and relative positioning.

Read the full story at http://www.cmre.nato.int/news-room/blog-news-archive/42-rokstories/266-morph-ec-project-steps-forward-in-cooperative-capabilities-for-fleet-of-underwater-vehicles

14-15 April - SUNRISE project First Technical Review

On 14-15 April CMRE hosted the SUNRISE project (EC FP7) first technical review meeting. SUNRISE stands for Sensing, monitoring and actuating on the Underwater world through a federated Research Infrastructure Extending the Future Internet. The project is founded on the concept of federating internet-connected networks of underwater communication testbeds, an idea pioneered by the CMRE. Project partners from the collaborating organisations met to present demonstrations and report on progress to an external review panel appointed by the European Commission (EC). A highlight was the live demonstration of the CMRE Littoral Ocean Observatory Network (LOON). The EC reviewers' initial feedback was that they were most impressed with the professional competence and creativity of the project partners and very satisfied with the progress made so far. Important outcomes of the project include recommendations for standards in underwater communication that will support interoperability.

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

MORE STO Technical Publications

www.cso.nato.int/abstracts.aspx

Scientific Publications

Developing a link between MSTPA and Matlab to allow for reactive platform behaviours. Strode, C., Oddone, M., Vasoli, S., CMRE-FR-2014-004, NATO UNCLASSIFIED, March 2014.

Optimal search algorithms for autonomous underwater vehicles equipped with synthetic aperture sonars. Couillard, M., Baralli, F., Willilams, D.P., Vermeij, A., Fox, W.L.J., Dugelay, S., CMRE-FR-2014-005, NATO UNCLASSIFIED, March 2014

Raw data processing of downwelling irradiance and fluorescence from Bio-Argo floats to retrieve chlorophyll a and diffuse attenuation coefficient (Kd) profiles. Pennucci, G., Trees, C., Osler, J., CMRE-FR-2014-006, NATO UNCLASSIFIED, April 2014

A non-myopic, receding horizon control strategy for an AUV to track underwater targets in bistatic sonar scenarios: proposed approach and experimental results from COLLAB13. Ferri, G., CMRE–FR–2014–007, NATO UNCLASSIFIED, April 2014

A review of the state of the art of Brillouin scattering LIDARs to determine vertical ocean profiles of sound speed and temperature. Trees, C.T., Sanjuan Calzado, V., Walther, T., CMRE-FR-2014-008, NATO UNCLASSIFIED, April 2014

NISIDA+: on board data collection for exercise reconstruction and analysis. Vermeij, A., Vasoli, S., CMRE-MR-2014-002, NATO UNCLASSIFIED, April 2014

Mitigation of Ship Electro-Optical Susceptibility Against Conventional and Asymmetric Threats, STO-TR-SET-144, Public Release

SOA Challenges for Real-Time and Disadvantaged Grids, STO-TR-IST-090, Public Release

Training NATO Special Forces Medical Personnel: Opportunities in Technology-Enabled Training Systems for Skill Acquisition and Maintenance, STO-MP-HFM-224, April 2014, Public Release

Measuring and Analyzing Command and Control Performance Effectiveness, STO-TR-HFM-156, April 2014, NATO UNCLASSIFIED

Framework for Semantic Interoperability, STO-TR-IST-094, April 2014, NATO UNCLASSIFIED

Fluid Dynamics Associated to Launcher Developers, STO-EN-AVT-206, April 2014, NATO UNCLASSIFIED

Industry Workshop on Cyber Security Capabilities, STO-MP-IST-096, April 2014, NATO UNCLASSIFIED

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