

**North Atlantic Treaty Organization**



**SCIENCE AND TECHNOLOGY ORGANIZATION  
COLLABORATION SUPPORT OFFICE  
BP 25, F 92201 NEUILLY-SUR-SEINE - FRANCE**

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***STO***

***COLLABORATIVE  
PROGRAMME OF WORK AND BUDGET***

***FOR YEAR 2016***

**5 February 2016**

<p>This document constitutes the fully STB approved 2016 Collaborative Programme of Work (CPoW) and Budget.</p>
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## Preface

It is my pleasure to present the NATO Science and Technology Organization's (STO) Collaborative Program of Work (CPoW) for 2016. The CPoW is a collective effort of our collaborative network of roughly 5,000 scientists, engineers, and analysts across the NATO nations. The Collaboration Support Office (CSO) continues to operate a collaborative model for the STO – our job is to support the ability of the NATO nations to work together to conduct military and security relevant scientific research and technology development delivering combat capability for the Nations to the Alliance. I am pleased to have the opportunity to work with the professionals in the CSO office and the greater network.

I contend there is an even greater need to collaborate today than at any time since the dissolution of the Warsaw Pact alliance. The combined effect of a resurgent Russia and security pressures from radical extremists coupled with on-going national austerity measures present new and growing security challenges for the NATO Alliance. When you couple these new challenges with the emergence of new warfare tools, such as cyber capabilities and greatly enhanced electronic warfare capabilities, enabled by rapid advances in nation's ability to process information, the security environment becomes more complex than I remember it being in the past. Two additional elements that add complexity to capability development are the rise of commercial products and capabilities, and the shortening of technological maturation cycle, both of which change the security environment for most nations. The ability to harness commercial opportunity in a military capability is critical for future security. Simply, greater complexity, coupled with the rise of a potential near-peer, and a challenged resource pool leave us all in a situation where more, not less, collaboration is needed.

My vision for the CSO is to continue to be the organization Nation's come to for collaboration. In 2015, the CSO supported over 220 formal activities (task groups, symposia, etc), and we are on track to increase this output in 2016. The CSO facilitates an open dialogue that aligns the defence research and development of the nations and the capability development elements of the NATO structure. We are pushing to enhance the information technology "tools" to enable dramatically enhanced virtual collaboration and meetings – these tools should allow us all to increase our agility and timeliness. We are working hard at shortening the publication process, and at adding greater explanation of our military relevance. We are also working hard at better connecting to the operational and requirements community – the people who need our products, and through this, I see NATO STO increasing field trials and demonstration of more mature technology. .

The core of the resulting CPoW remains the seven Level II Technical Committees of the STO (Advanced Vehicle Technologies, Human Factors and Medicine, Information Systems Technology, NATO Modelling and Simulation Group, Systems Analysis and Studies, Systems Concepts and Integration and Sensors and Electronics Technology) each of which is described later. These seven Level II Committees are led, on a part time basis, by voluntary national contributions and supported by full time military voluntary national contributions and NATO civilian staff from the CSO, all of whom do a great job. We are working hard at enhancing the panels and groups by bringing in more "millennials" – the age demographic we are all building products to support.

I believe we need to strive to "lead the future" through activities like Technology Watch, under which the CSO has identified a number of technologies that could change the security landscape – these include (but are not limited to): hypersonic vehicles, quantum sciences, additive manufacturing, synthetic biology, and human performance monitoring and enhancement to name a few. It is an exciting time to be part of NATO S&T, and even with the challenges, I am confident that the CSO team and Panels and Group are ready to respond to those challenges.



Alan R. Shaffer  
Director, NATO Collaboration Support Office

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## 2016 PANEL BUSINESS MEETINGS

**Table 1: 2016 Panel Business Meetings.**

ACTIVITY		MEETING DATES	MEETING LOCATIONS
AVT	Spring	25-29 April 2016	Tallinn, Estonia
	Fall	26-30 September 2016	Spain (tbd)
HFM	Spring	11-14 April 2016	Bucharest, Romania
	Fall	17-20 October 2016	Brussels, Belgium
IST	Spring	23-27 May 2016	Brussels, Belgium
	Fall	03-07 October 2016	Sofia, Bulgaria
MSG	Spring	13-17 June 2016	Rome, Italy
	Fall	17-21 October 2016	Bucharest, Romania
SAS	Spring	11-14 April 2016	Tallinn, Estonia
	Fall	19-21 October 2016	HQ ACT, Norfolk, USA
SCI	Spring	16-20 May 2016	Loughborough, UK
	Fall	24-28 October 2016	Dresden, Germany
SET	Spring	20-22 April 2016	The Hague, The Netherlands
	Fall	19-21 October 2016	Lisbon, Portugal

## 2016 TECHNICAL PROGRAMME OBSERVATIONS

(as of December 2015)

The STO Collaborative Programme of Work (CPoW) for 2016 includes 253 activities shown in Table 1:

**Table 2: CPoW Composition**

Task Groups	RTG	182
Symposia	RSY	10
Specialist Meetings	RSM	20
Specialist Team	ST	5
Workshops	RWS	14
Lectures Series	RLS	15
Technical Course	RTC	1
Agardograph	AG	5
Long Term Scientific Study	LTSS	1
	TOTAL	253

The 2016 STO Collaborative Programme of Work continues to enhance the linkage between STO activities and the priorities/requirements from our customers and the nations. For 2016, there are 65 new activities. The projected on-going program will also include activities from previous years, therefore, during 2016, the Panels/Group will be managing a total program of over 65 technical activities. With the intent of sharing the developing knowledge, almost all activities (except of 2 activities) in 2016 will be open to Non-NATO nations including Partner for Peace nations, Mediterranean Dialogue nations, Global Partners and Contact nations.

## 2016 BUDGET GENERALITIES

**(Unofficial - for information only)**

The initial projection for 2016 funding is approximately EUR 5,453 million. The S&T Collaboration Support Office expects to be able to support the activities in Table 1 within this sum. The 2016 Collaboration Support Office (CSO) funding requirements under the NATO Budget Committee are presented below.

The 2016 CSO budget estimate will is approximately 5,453 million Euros and is funded by the NATO Military Budget, see Table 2. This amount is in line with the anticipated budget development as stated in the Medium-Term Resource Plan (MTRP), includes some additional one-off projects and sufficient to meet all of the foreseen requirements of the Office.

The STO PoW activities open for NATO Partners under the Partnership for Peace (PfP) and Mediterranean Dialogue (MD) are funded separately under authorizations out of the IMS PfP and Med Dialogue Budgets. These budgets are also delegated to the CSO for control and management.

**Table 3: 2016 CSO Budget projection**

<b>Budget Categories</b>	<b>Projected 2016</b>
Personnel	€3 352 745
Facility Management	€350 000
Operations and Mission Support	€285 000
Publications	€215 000
CIS	€350 000
Collaborative Program of Work	€900 000
<b>Total NATO Funded Effort</b>	<b>€ 452 745</b>

## LECTURE SERIES/TECHNICAL COURSES/SYMPOSIA/WORKSHOPS FOR 2016

The following table provides a forecast of STO Collaborative Program Lecture Series, Technical Course, Symposia and Workshop activities for 2016 for which the broadest possible participation is desired and highly encouraged. To aid in participation planning, the dates and locations for the activities have been included.

**Table 4: Lecture Series/Technical Course/Symposia Forecast for 2016**

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-258 RSM	Specialists' Meeting on "Additive Manufacturing for Military Hardware"	28-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-264 RSM	Specialists' Meeting on "Design, Manufacturing and Application of Metallic Lightweight Material Components for Military Vehicles"	25-27 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-265 RSM	Specialists' Meeting on "Integrated Virtual NATO Vehicle Development"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-266 RSM	Specialists' Meeting on "Use of Bonded Joints in Military Applications"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-267 RWS	Workshop on "Future of Manufacturing for Military Applications"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-268 RSM	Specialists' Meeting on "Advances in Munition Health Management Technologies and Implementation"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-269 RWS	Workshop on "Sea Dumped Munitions and Environmental Risk"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-270 RWS	Workshop on "Validation of Thermal Models for Military Power Systems"	25-29 April 2016	Amsterdam, The Netherlands	NATO UNCLASSIFIED Non-NATO Invited
AVT-271 RWS	Workshop on "Research Directions for First Principles"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-272 RSM	Specialists' Meeting on "Impact of Volcanic Ash Clouds on Military Operations"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-273 RSM	Specialists' Meeting on "Approval of RPAS Operations-Airworthiness, Risk-Based Methods, Operational Limitations"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-274 RLS	Lecture Series on "Unmanned Air Vehicles - Technological Challenges, Concepts of Operations and Regulatory Issues"	Beginning November 2016	Portugal UK Canada Germany	NATO UNCLASSIFIED Non-NATO Invited
AVT-276 RLS	Lecture Series on "Environmental Management of Munitions and Greener Approaches to Design"	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
HFM-272 RSY	Symposium on "Regenerative Medicine – Today and in future":	16-20 October 2016	Brussels, BE	NATO UNCLASSIFIED Non-NATO Invited

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
HFM-273 LTSS	Long Term Scientific Study on “Chemical, Biological and Radiological Defense”	May 2016	CSO Paris	NATO SECRET Non-NATO Invited
IST-127 RSM	Specialists’ Meeting on “Intelligence & Autonomy”	October 2016	Fraunhofer Institute DEU	NATO UNCLASSIFIED Non-NATO Invited
IST-136 RSM	Specialists’ Meeting on “Security Challenges for Multi-domain Autonomous and Unmanned C4ISR Systems (AxVx, Robotic Systems Security)”	21-24 March 2016	La Spezia ITA	NATO UNCLASSIFIED Non-NATO Invited
IST 137 RSM	Specialists’ Meeting on “Secure Future Internet Architectures for Military Applications (SFIAMA)”	April 2016	Rome, NY, USA	NATO UNCLASSIFIED Non-NATO Invited
IST-143 RLS	Lecture Series on “Cyber Security Science and Engineering”	04 April 2016	Sofia, BULGARIA	NATO UNCLASSIFIED Non-NATO Invited
IST-145 RSM	Specialists’ Meeting on “Predictive Analytics”	TBD	TBD	NATO UNCLASSIFIED Non-NATO Invited
IST-148 RSY	Symposium on “Cyber Defence Situational Awareness”	3-7 October 2016	Sofia BGR	Public Release Non-NATO Invited
SCI-283 RSY	Symposium on “Considerations for Space and Space-Enabled Capabilities in NATO Coalition Operations”	17-18 May 2016	Loughborough, United Kingdom	NATO UNCLASSIFIED Non-NATO Invited
SCI-291 RWS	Workshop on “Scenarios for Assessment Methods for Camouflage in Operational Contexts”	1st week of July 2016	Koeln (Amt fuer Heeresentwicklung) DEU	NATO CONFIDENTIAL Non-NATO Invited
SCI-292 RLS	Lecture Series on “Space Domain Awareness Concepts and Approaches to Support NATO Operations”	July 2016	USA Germany Italy Turkey	NATO UNCLASSIFIED Non-NATO Invited
SET-235 RLS	Lecture Series on “Radar and SAR systems for airborne and space-based Surveillance and Reconnaissance”	Spring 2016	Warsaw, Poland Sofia, Bulgaria Lisbon, Portugal Istanbul, Turkey	NATO UNCLASSIFIED Non-NATO Invited
SET-239 RSY	Symposium on “Maritime Radar Surveillance from Medium and High Grazing Angle Platforms”	Fall 2016	Edinburgh, UK	NATO UNCLASSIFIED Non-NATO Invited
SET-241 RSY	9th NATO Military Sensing Symposium	May 2017	Canada or USA	NATO RESTRICTED Non-NATO Invited

Note for activities designated “Non-NATO Invited”: the activity may not be open to Non-NATO members in its entirety. Final determination is contingent on the publishing of the final agenda for each activity.

## APPLIED VEHICLE TECHNOLOGY PANEL

**Panel Chairman: Mr. Michael HUGGINS (USA)**  
**Vice Chairman: Mr. Hans-Ludwig BESSER (DEU)**  
**Panel Executive: Dr.-Ing Dirk ZIMPER (DEU)**  
**Panel Assistant: Ms. Sandra CHEYNE (NATO)**

### Terms of Reference

#### MISSION

The mission of the Applied Vehicle Technology (AVT) Panel is to improve the performance, affordability, and safety of vehicle, platform, propulsion and power systems through the advancement of appropriate technologies.

#### SCOPE

The scope of activity of AVT is to address technology issues related to vehicle, platform, propulsion and power systems operating in all environments (land, sea, air, and space), for both new and ageing systems.

The activities of AVT may be grouped into two broad areas:

#### Vehicle and platform technologies, including:

- Vehicle and platform design
- Configurational fluid dynamics
- Fluid mechanics
- Stability and control
- Noise and vibration control
- Structural loads and dynamics
- Smart structures
- Structural materials
- Manufacturing processes
- Non-structural materials
- Environmental effects
- Affordability, availability, survivability and supportability
- Reliability, maintenance and repair
- Test facilities, techniques, and instrumentation

#### Propulsion and power technologies, including:

- Air breathing engine design (piston, gas turbine, ramjet/scramjet)
- Rocket motors and rocket based combined cycles
- Electric propulsion including hybrid systems
- Engine control and thrust vectoring
- Power generation and storage
- Fuels and combustion
- Power plant materials and structures
- Propellants and explosives
- Operation, condition monitoring, reliability, maintenance and affordability
- Environmental impact
- Test facilities, techniques, and Instrumentation



**Table 5: AVT activities continuing in 2016**

ACTIVITY	TYPE	TITLE
AVT-190	RTG	Plasma Based Flow Control for Performance and Control of Military Vehicles
AVT-191	RTG	Application of Sensitivity Analysis and Uncertainty Quantification to Military Vehicle Design
AVT-196	RTG	Impact of Scarcity of Materials on Military Structural, Mechanical, Propulsion and Power Systems
AVT-198	RTG	Recent developments in noise reduction technologies applied to military vehicles and platforms - foster future innovations.
AVT-203	RTG	Joined Exercise on Aeroelastic Prediction
AVT-204	RTG	Assess the Ability to Optimize Hull Forms of Sea Vehicles for Best Performance in a Sea Environment
AVT-213	RTG	Assessment of Volcanic Ash Effects on Military Platforms
AVT-216	RTG	Evaluation of Prediction Methods for Ship Maneuvering and Control
AVT-217	RTG	Ship Design Guidance for Aircraft Operations
AVT-220	RLS	Structural Health Monitoring of Military Vehicles
AVT-221	RSM	Design and Protection Technologies for Land and Amphibious NATO Vehicles
AVT-225	RTG	Future Technological and Operational Challenges Connected with Application of Synthetic Fuels
AVT-226	RTG	Validation of Thermal Models for Air, Land, Sea and Space Vehicles
AVT-227	RTG	Balancing energy storage with safety in large format battery packs
AVT-229	RSY	Test Cell and Controls Instrumentation and EHM Technologies for Military Air, Land and Sea Turbine Engines
AVT-230	RSM	Advanced Aircraft Propulsion Systems
AVT-231	RSM	Scarcity of Rare Earth Materials for Electrical Power Systems
AVT-232	RTG	Joint Exercise on IR signature prediction
AVT-233	RTG	Aeroacoustics of Engine/Rotor Installation for Military Air Vehicles
AVT-236	RTG	Unified generic model and data-base for early screening and basic layout of a missile propulsion subsystem
AVT-237	RTG	Benchmarks in Multidisciplinary Optimization and Design for Affordable Military Vehicles
AVT-238	RTG	Early stage warship design & procurement for operational effectiveness and affordability
AVT-239	RTG	Innovative Control Effectors for Manoeuvring of Air Vehicles
AVT-240	RTG	Hypersonic Boundary-Layer Transition Prediction
AVT-241	RSM	Technological and Operational Problems Connected with UGV Application for Future Military Operations
AVT-242	RWS	Coated Component Condition Assessment and Remaining Life Prediction for Advanced Military Air Vehicles
AVT-246	RSM	Progress and Challenges in Validation Testing for Computational Fluid Dynamics
AVT-247	RTG	Environmentally Compliant Materials & Processes for Military Vehicles
AVT-248	RTG	Next-Generation NATO Reference Mobility Model (NRMM) Development

ACTIVITY	TYPE	TITLE
AVT-249	RTG	Munitions Related Contamination: Military Live-Fire Range Characterization
AVT-250	RTG	Gas Turbine Engine Environmental Particulate Foreign Object Damage [EP-FOD]
AVT-251	RTG	Multi-disciplinary design and performance assessment of effective, agile NATO air vehicles
AVT-252	RTG	Stochastic Design Optimization for Naval and Aero Military Vehicles
AVT-253	RTG	Assessment of Prediction Methods for Large Amplitude Dynamic Manoeuvres for Naval Vehicles
AVT-254	RTG	Assessment of Plasma Actuator Technologies for Internal Flows
AVT-255	RTG	Unmanned Systems Mission Performance Potential for Autonomous Operations
AVT-257	RSM	Best Practices for Risk Reduction for Overall Space Systems
AVT-258	RSM	Additive Manufacturing for Military Hardware
AVT-261	RLS	Porous media in high temperature and high speed flows
AVT-262	RLS	Space Debris Reentry and Mitigation
AVT-263	RLS	Electric Propulsion Systems: From Recent Research Developments to Industrial Space Applications
AVT-264	RSM	Design, Manufacturing and Application of Metallic Lightweight Material Components for Military Vehicles

**Table 6: AVT activities starting in 2016**

ACTIVITY	TYPE	TITLE
AVT-265	RSM	Integrated Virtual NATO Vehicle Development
AVT-266	RSM	Use of Bonded Joints in Military Applications
AVT-267	RWS	Future of Manufacturing for Military Applications
AVT-268	RSM	Advances in Munition Health Management Technologies and Implementation
AVT-269	RWS	Sea Dumped Munitions and Environmental Risk
AVT-270	RWS	Validation of Thermal Models for Military Power Systems
AVT-271	RWS	Research Directions for First Principles
AVT-272	RSM	Impact of Volcanic Ash Clouds on Military Operations
AVT-273	RSM	Approval of RPAS Operations-Airworthiness, Risk-Based Methods, Operational Limitations
AVT-274	RLS	Unmanned Air Vehicles - Technological Challenges, Concepts of Operations and Regulatory Issues
AVT-275	RTG	Continuous Airworthiness of Aging Systems
AVT-276	RLS	Environmental Management of Munitions and Greener Approaches to Design
AVT-277	RTG	Hazard assessment of exposure to ammunition-related constituents and combustion products
AVT-278	RTG	Risk-based safety assessment of operational airworthiness and certification requirements
AVT-279	RTG	Formation Flying for Efficient Operations

ACTIVITY	TYPE	TITLE
AVT-280	RTG	Evaluation of prediction methods for ship performance in heavy weather
AVT-281	RTG	Cross Domain Platform EO Signature Prediction
AVT-282	RTG	Unsteady Aerodynamic Response of Rigid Wings in Gust Encounters
AVT-283	AG	Advances in Wind Tunnel Boundary Correction and Simulation
AVT-284	RWS	Advanced Wind Tunnel Boundary Simulation

## HUMAN FACTORS AND MEDICINE PANEL

**Panel Chair: BGen Prof Corinne ROUMES (FRA)**

**Panel Vice-Chair: Col Prof Dr Rafael SCHICK (DEU)**

**Panel Executive: Lt Col Frank WESSELS (NLD)**

**Panel Assistant: Ms. Marie LINET (NATO)**

### Terms of Reference

#### MISSION

The mission of the Human Factors and Medicine Panel is to provide the science and technology base for optimizing health, human protection, well-being and performance of the human in operational environments with consideration of mission effectiveness and affordability. This involves understanding and ensuring the physical, physiological, psychological and cognitive compatibility among military personnel, technological systems, missions, and environments. This is accomplished by exchange of information, collaborative experiments and shared field trials.

#### SCOPE

The scope of the HFM Panel is multi-disciplinary and encompasses a wide range of theory, data, models, knowledge and practice pertaining to Health, Medicine and Protection (HMP) and Human Systems and Behavior (HSB). These two domains are complementary and represent the two 'Area' Committees of the HFM Panel:

1. The Health, Medicine and Protection Area provides the scientific basis for establishing an operationally fit and healthy force, restoring health, minimizing disease and injury, optimizing human protection, sustainability and survivability. This encompasses research in the field of military medicine, physiology, psychology and human protection technology. Areas of interest include, among others, medical diagnosis, prevention, treatment and evacuation. HMP also focuses on enhancing human protection research on physiological and physical influences, e.g. of cold, heat, air pressure, noise, vibration, ionizing and non-ionizing radiation, acceleration, motion, biological and chemical effects on the human body, and developing appropriate countermeasures.

2. The Human Systems and Behavior Area provides the scientific basis and explores new technology for optimizing the performance of individuals, teams and organizations and their interaction with socio-technical systems to achieve highly effective mission performance. This encompasses research in the fields of human factors, human systems integration as well as cognitive, psycho-social, organizational and cultural aspects in military action. Contributions on Human Systems Integration cover complexity, total life-cycle affordability, human error and fatigue management, intelligent agents, human cognitive and physical resources management, anthropometry, human-machine interfaces, communication and teamwork, performance assessment, enhancement and aiding, training and function allocation in (semi)automated systems. Contributions on individual and team readiness cover values and ethics,

leadership, multi-national operations, human enhancement and coping with mental, cognitive and physical demands on the individual. Contributions on organizational effectiveness encompass human resource management, training, interoperability, shared decision-making, synchronized situational awareness, resilience, understanding terrorism, psychological operations and coping with new demands on military organizations.

**Table 7: HFM activities continuing in 2016**

ACTIVITY	TYPE	TITLE
HFM-199	RTG	Integration of CBRN Physical Protective Measures to Lessen the Burden on Personnel
HFM-221	RTG	Live-Virtual-Constructive (LVC) Training to Enhance Performance Effectiveness
HFM-222	RTG	Ionizing Radiation Bioeffects and Countermeasures
HFM-226	RTG	Civilian and Military Personnel Work Culture and Relations in Defence Organisations
HFM-230	RTG	Development of Depository of fast and reliable Detection Methods for Zoonotic Agents
HFM-233	RTG	Sensitive Equipment Decontamination Technologies
HFM-234	RTG	Environmental Toxicology of Blast Exposures: Injury Metrics, Modeling, Methods and Standards
HFM-237	RTG	Assessment of Intelligent Tutoring System Technologies and Opportunities
HFM-238	RTG	Reducing the Dismounted Soldiers Burden
HFM-240	RLS	Mild Traumatic Brain Injury: Post Concussive Symptoms in a Deployed Setting
HFM-242	RTG	Technology Alternatives for Medical Training: Minimizing Live Tissue Use
HFM-247	RTG	Human-Autonomy Teaming: Supporting Dynamically Adjustable Collaboration
HFM-248	RTG	Social Media and Information Technology for Disaster and Crisis Response
HFM-250	RTG	Improving Anaesthesia and Sedation through the Battlefield
HFM-251	RTG	Occupational Cardiology in Military Aircrew
HFM-252	RTG	Aircrew Neck Pain
HFM-253	RTG	Medical Chemical Defence against Chemical Warfare Agent Threats
HFM-257	RTG	Modelling and Simulation Technologies for Training Medical/Healthcare Professionals
HFM-258	RTG	The Impact of Military Life on Children from Military Families
HFM-259	RTG	Human Systems Integration Approach to Cyber Security
HFM-260	RTG	Enhancing Warfighter Effectiveness with Wearable Bio Sensors and Physiological Models
HFM-262	RTG	Health Risk Assessment for Chemical Exposures of Military Interest
HFM-263	RTG	The Transition of Military Veterans from Active Service to Civilian Life
HFM-264	RTC	Aerospace Medicine - From the Ground up
HFM-265	RLS	Rotary Wing Brownout Mitigation
HFM-266	RTG	3D scanning for clothing fit and logistics
HFM-267	RWS	Workshop on Advanced Medical Technologies in Training

**Table 8: HFM activities starting in 2016**

<b>ACTIVITY</b>	<b>TYPE</b>	<b>TITLE</b>
HFM-268	RTG	Cross Panel Activity on Environments for Mission Effectiveness Assessment
HFM-269	RTG	Combat Integration Implications for Physical Employment Standards
HFM-270	RTG	Framework for Modelling and Simulation of Human Lethality, Injury, and Impairment from Blast-Related Threats
HFM-271	RTG	Injury assessment methods for vehicle occupants in blast-related events
HFM-272	RSY	Regenerative Medicine – Today and in future
HFM-273	LTSS	Long Term Scientific Study on Chemical, Biological and Radiological Defence

## INFORMATION SYSTEMS TECHNOLOGY PANEL

**Panel Chairperson: Dr. John McCLEAN (USA)**  
**Vice-Chairman: Dr.-Ing Michael WUNDER (DEU)**  
**Panel Executive (acting): Maj Luc DETIENNE (FRA)**  
**Panel Assistant: Mrs. Aysegül APAYDIN (NATO)**

### Terms of Reference

#### MISSION

The mission of the Information Systems Technology (IST) Panel is to advance and exchange techniques and technologies in order to:

1. Improve C3I systems, with a special focus on Interoperability and Cyber Security; and
2. Provide timely, affordable, dependable, secure and relevant information to war fighters, planners and strategists.

#### SCOPE

The scope of responsibility of IST shall include the following domains and disciplines:

##### Information Warfare and Assurance

- INFOSEC
- COMPUSEC
- COMSEC
- TRANSEC
- Information Assurance
- System Assurance

##### Information and Knowledge Management

- Decision Support Architectures
- Data Mining
- Data Warehousing
- Information Fusion
- Information Filtering
- Visualization
- Knowledge-based Systems
- Artificial Intelligence

##### Communications and Networks

- Voice Data and Video over disadvantaged links
- Network Management
- Network Security
- Mobile Communications
- Satellite Communications

##### Architectures and Enabling Technologies

- Software Engineering Technologies
- Computing Technologies
- Requirements Capture
- Modelling and Simulation Technologies
- Modelling and Simulation Architectures and Standards
- Speech and Natural Language Processing
- Groupware and Collaboration Tools

**Table 9: IST activities continuing in 2016**

ACTIVITY	TYPE	TITLE
IST-102	RTG	Meeting Translation for NATO Operations (Speech and Language Processing, Project 8)
IST-108	RTG	Cyber Defence Situational Awareness
IST-118	RTG	SOA Recommendations for Disadvantaged Grids in the Tactical Domain
IST-119	RTG	Maturing and Validation of SILF Feasibility Study
IST-121	RTG	Machine Learning Techniques for Autonomous Computer Generated Entities
IST-124	RTG	Heterogeneous Tactical Networks - Improving Connectivity and Network Efficiency
IST-127	RSM	Intelligence & Autonomy (Robotics)
IST-129	RTG	Predictive Analysis of Adversarial Cyber Operations
IST-130	ST	Method for Architecture Definition and Evaluation in-line with NATO Architecture Framework
IST-132	RTG	Multi-Level Fusion of Hard and Soft Information
IST-136	RSM	Security Challenges for Multi-domain Autonomous and Unmanned C4ISR Systems (AxVx, Robotic Systems Security)
IST-137	RSM	Secure Future Internet Architectures for Military Applications (SFIAMA)
IST-140	RTG	Cognitive Radio Networks - Efficient Solutions for Routing, Topology Control, Data Transport, and Network Management

**Table 10: IST activities starting in 2016**

ACTIVITY	TYPE	TITLE
IST-141	RTG	Exploratory Visual Analytics
IST-142	RTG	Software Defined Network Architectures for the Federated Mission Networks
IST-143	RLS	Cyber Security Science and Engineering
IST-144	RTG	Content-Based Multi-media Analytics (CBMA)
IST-145	RSM	Predictive Analytics
IST-146	RTG	Electromagnetic Environment Situational Awareness for NATO
IST-147	RTG	Military Applications of Internet of Things
IST-148	RSY	Cyber Defence Situation Awareness



## **NATO MODELLING AND SIMULATION GROUP (NMSG)**

**Group Chairman (Acting): Mr. Wim HUISKAMP (NLD)**

**Vice - Chairman: VACANT**

**Group Executive & Head: CDR Federico Santiago PEREZ-DUENAS (ESP)**

**Deputy Head and Scientific Advisor: VACANT**

**Technical Officer: Mr Adrian VOICULET (NATO)**

**Assistant: Ms Ileana GANZ (NATO)**

### **Terms of Reference**

#### MISSION

The mission of the NATO Modelling and Simulation (M&S) Group (NMSG) is to:

1. promote cooperation among Alliance bodies, NATO member nations and Partner nations to maximize the effective utilization of M&S, including: M&S Standardization, education and associated science and technology;
2. coordinate customers, users and suppliers in the five areas of Simulation (Support to Operations, Capability Development, Mission Rehearsal, Training and Education, and Procurement);
3. support customers in defining the operational needs regarding M&S, support users to fulfil these operational needs and support suppliers to provide the simulation assets in the five identified areas of simulation, helping NATO M&S stakeholders and subject matter experts to meet to initiate, coordinate and oversee the implementation of the NATO M&S Master Plan (NMSMP);
4. monitor the degree of consistency with NMSMP in NATO organizations, being the Custodian of the NMSMP;
5. report on those situations (and decisions) in which inconsistency with NMSMP can or will introduce interoperability issues between NATO Members (and Partners).

#### SCOPE

The Group:

1. Is governed by the Strategy and Implementation Plan as approved by the STB;
2. Guides implementation of the M&S Master Plan and promoting best practices in the Alliance;
3. Is NATO's Delegated Tasking Authority for standardization in NATO M&S domain (ref. CNAD Letter DI(2003)243 dated 29 August 2003). Hence, develops, advocates and guides implementation of M&S Standardization documents;
4. Maintains a permanent link with operational people in order to collect operational needs and to validate the work of the Group and disseminate the Group results;
5. Fosters appropriate levels of M&S interoperability and reuse of models and simulations;
6. Develops, advocates and guides programs to facilitate education and information exchange in M&S science and technology, application methods and standards;
7. Identifies, advocates and executes science and technology projects to improve M&S tools, standards, interoperability, network concepts and databases;
8. As required, provides M&S expertise to support pertinent projects of the other STO Level 2 Committees or NATO Bodies and Organizations;

**Table 11: MSG activities continuing in 2016**

ACTIVITY	TYPE	TITLE
MSG-098	RTG	Urban Combat Advanced Training Technology (UCATT) - Architecture
MSG-099	RTG	Urban Combat Advanced Training Technology (UCATT) - Standards
MSG-100	RTG	Resource Discovery and Access
MSG-116	RTG	Simulation for Training and Operation Group (STOG)
MSG-117	RTG	Exploiting Modelling and Simulation to support Cyber Defence
MSG-118	RTG	Development of Common Image Generator Interface (CIGI) v.4 Compliancy Testing Tools
MSG-120	RTG	NATO M&S Glossary of Terms
MSG-122	RWS	Simulation in Support of Coalition Operations
MSG-124	RTG	Developing Actionable Data Farming Decision Support for NATO
MSG-127	RTG	Reference Architecture for Human Behaviour Modelling in Military Training Applications
MSG-128	RTG	Incremental Implementation of NATO Mission Training through Distributed Simulation Operations
MSG-132	RSY	MSG/MSCO Support to International Training & Education Conferences ITEC 2015, I/ITSEC 2015 and CAX Forum 2015
MSG-133	RSY	M&S Support to Operational Tasks Including War Gaming, Logistics, Cyber Defence
MSG-134	RTG	NATO Distributed Simulation Architecture & Design, Compliance Testing and Certification
MSG-135	RTG	NATO M&S Resources/Standards Support Working Group
MSG-136	RTG	Modelling and Simulation as a Service (MSaaS) Rapid deployment of interoperable and credible simulation environments
MSG-137	RWS	Commercial Technologies and Games for Use in NATO - 14th WS
MSG-139	RTG	M&S Use Risk Identification and Management
MSG-141	RLS	C2 to Simulation Interoperability (C2SIMI)
MSG-142	RSY	MSG/MSCO Support to International Training & Education Conferences ITEC, I/ITSEC and CAX Forum 2016
MSG-144	RWS	NATO M&S Standardization Workshop

**Table 12: MSG activities starting in 2016**

ACTIVITY	TYPE	TITLE
MSG-143	RSY	Ready for the Predictable, Prepared for the Unexpected - M&S for Collective Defence in Hybrid Environments and Hybrid Conflicts
MSG-140	RTG	Urban Combat Advanced Training Technology - Live Simulation Standards (UCATT-LSS)
MSG-145	RTG	Operationalization of Standardized C2-Simulation Interoperability
MSG-146	RTG	Simulation for Training and Operation Group-Land (STOG-L)
MSG-147	RTG	M&S Support for Crisis and Disaster Management Processes and Climate Change Implications

## SYSTEM ANALYSIS AND STUDIES PANEL

**Chairman: Mr. Jocelyn TREMBLAY (CAN)**  
**Vice Chairman: COL (Ret) Pavel ZUNA (CZE)**  
**Panel Executive: LTC Timothy POVICH (USA)**  
**Panel Assistant: Ms. Rina TAHAR (NATO)**

### Terms of Reference

#### MISSION

The mission of the System Analysis and Studies (SAS) Panel is:

1. To conduct studies and analyses of an operational and technological nature.
2. To promote the exchange and development of methods and tools for Operational Analysis (OA) as applied to defence problems.

#### SCOPE

The scope of the Panel's activity is as follows:

##### System Analysis and Studies

The Panel will conduct studies, analysis and information exchange activities that explore how operational capability can be provided and enhanced through the exploitation of new technologies, new forms of organisation or new concepts of operation. Such studies will, where appropriate, give explicit consideration to financial and other resource issues. The Panel will be responsive to requests for such studies from a variety of sources, including nations, the Science and Technology Board (STB), the Military Committee, the Conference of National Armament Directors (CNAD), the Main Armaments Groups, Allied Command Operations (ACO), Allied Command Transformation (ACT), the NATO Communications and Information Agency (NCIA), the NATO Industrial Advisory Group (NIAG), and industry. The Panel can also perform studies of a more purely technological nature if such studies are not appropriate for another NATO body.

##### Methodology

The Panel will undertake activities to develop and promote improved analysis methods and techniques to support defence decision-making. This aspect of the Panel's work will focus particularly on the methods required to address the new issues thrown up by the evolving strategic environment and the responses that both individual nations and NATO as a whole are making to it. Activities may include information exchange on OA modelling concepts and best practice, research into new methodological approaches and the development and exchange of models.

**Table 13: SAS activities continuing in 2016**

ACTIVITY	TYPE	TITLE
SAS-092	RTG	Costing Support for Force Structure Studies
SAS-093	RTG	Risk-Based Planning
SAS-094	RTG	Analytical Support to the Development and Experimentation of NLW Concepts of Operation and Employment
SAS-096	RTG	Key Performance Indicators in Measuring Military Outputs
SAS-097	RTG	Robotics Underpinning Future NATO Operations

ACTIVITY	TYPE	TITLE
SAS-104	RTG	C2 Agility: Next Steps
SAS-107	RTG	Factoring Situational Awareness and Communications in Operational Models of Dismounted Combat
SAS-108	RTG	Methods to Support Decision Making for Joint Fires
SAS-109	RTG	Risk Analysis for Acquisition Programs
SAS-110	RTG	Irregular Warfare and Operations Assessment
SAS-111	RTG	Collection and Management of Data for Analysis Support to Operations
SAS-112	RTG	Comparative Analysis of Private-Public Partnership in the Management of Military-Industry Activities
SAS-113	ST	Future Defence Budget Constraints: Challenges and Opportunities
SAS-114	RTG	Assessment and Communication of Risk and Uncertainty to Support Decision-Making
SAS-115	RWS	SMART cooperation on Operation Analysis simulation models
SAS-116	RTG	Military Strategic Level Decision Making within a (future) framework of Cyber Resilience
SAS-117	RTG	Information Operations for Influence (IOI)
SAS-118	RTG	Enhancing Strategic Awareness of Energy Security - A Holistic Approach
SAS-120	RTG	Integration of Women into Ground Combat Units
SAS-121	ST	Hybrid Warfare -A Case Study
SAS-IST-102	RTG	Intelligence Exploitation of Social Media
SAS-127	ST	Hybrid Warfare- A Case Study, NATO Implications

**Table 14: SAS activities starting in 2016**

ACTIVITY	TYPE	TITLE
SAS-119	RTG	Energy and Defence: Reducing Dependencies & Vulnerabilities – Enhancing Efficiency
SAS-122	RTG	Non-Combatant Evacuations: Consular and Military – Operational Research & Analysis
SAS-123	RTG	Futures Assessed alongside Technical Evolutions (FATE)
SAS-124	RTG	Visual Analytics for Communicating Defence Investment Uncertainty and Risk
SAS-125	RTG	Comparative Analysis of Acquisition Processes
SAS-126	ST	Operational Research and Analysis Orientation Course - development of additional content

## SYSTEMS CONCEPTS AND INTEGRATION PANEL

**Panel Chairman: Mr. Bharat PATEL (GBR)**  
**Vice Chairman: MAJ Dr. Benjamin LAUWENS (BEL)**  
**Executive: Lt Col Taylor EDWARDS (USA)**  
**Assistant: Ms. Carlotta ROSSI (NATO)**

### Terms of Reference

#### MISSION

The mission of the Systems, Concepts and Integration (SCI) Panel is to advance knowledge concerning advanced system concepts, integration, engineering techniques and technologies across the spectrum of platforms and operating environments to assure cost-effective mission area capabilities. Integrated defence systems, including air, land, sea, and space systems (manned and unmanned), and associated weapon and countermeasure integration are covered. Panel activities focus on NATO and national mid- to long-term system level operational needs.

#### SCOPE

The scope of Panel activities covers a multidisciplinary range of theoretical concepts, design, development, and evaluation methods applied to integrated defence systems. Areas of interest include:

- Integrated mission systems including weapons and countermeasures
- System architecture/mechanisation
- Vehicle integration
- Mission management
- System engineering technologies and testing

**Table 15: SCI activities continuing in 2016**

ACTIVITY	TYPE	TITLE
SCI-178	RTG	Integration and Interoperability Issues for Dismounted Soldier System Weapon Systems
SCI-201	RTG	Verification and Validation of NATO Network Enabled Capabilities (NNEC)
SCI-223	RTG	Future Requirements and Options for EW Information Exchange
SCI-224	RTG	EO and IR-Countermeasures against Anti-ship Missiles
SCI-229	RTG	Space Environment Support to NATO Space Situational Awareness
SCI-236	AG	Safety and Risk Management in Flight Testing
SCI-237	RTG	Directed Infrared Countermeasure (DIRCM) State of the Art and Flight Testing Methodology
SCI-239	RTG	Countermeasure Concepts Against Future IR/EO Threats
SCI-245	AG	Reduced Friction Runway Surface Flight Testing
SCI-246	RTG	Exploration and Development of Denial and Deception Doctrine to Support NATO
SCI-248	RTG	NATO Vulnerability to Hostile Use of Civilian-Space-based SAR
SCI-255	AG	High Altitude Rotary Wing Flight Testing

ACTIVITY	TYPE	TITLE
SCI-256	RTG	Route Threat Detection and Clearance Technologies
SCI-260	RTG	Platform-level EW Architectures for Joint/Coalition Air Operations
SCI-264	RTG	High Energy Laser Weapons: Tactical Employment in the Shared Battlespace
SCI-266	AG	Application of Digital Data Recorder Standards for Flight Test
SCI-270	RTG	Process Development for D&D Field Trials and Associated Data Analysis
SCI-273	RTG	Guidelines for Toxicity Testing of Smokes, Obscurants, and Pyrotechnic Mixtures
SCI-276	RLS	Systems of Systems Engineering for NATO Defence Applications
SCI-279	RTG	Enabling Technical Considerations for a NATO-Common Space Domain Operating Picture
SCI-280	RTG	System-of-systems approach to task driven sensor resource management for maritime situational awareness (SoSMSA)
SCI-281	RTG	Solutions Advancing Next Generation Radar Electronic Attack
SCI-282	RTG	Countermeasures Against Anti-Aircraft EO/IR Imaging Seeker Threats
SCI-286	RTG	Technology Roadmaps Towards Stand-off Detection in Future Route Clearance
SCI-287	RTG	Assessment Methods for Camouflage in Operational Context
SCI-288	RTG	Autonomy in Communications-Limited Environments

**Table 16: SCI activities starting in 2016**

ACTIVITY	TYPE	TITLE
SCI-283	RSY	Considerations for Space and Space-Enabled Capabilities in NATO Coalition Operations
SCI-285	RLS	Space Domain Effects on NATO Operations
SCI-289	RWS	Distributed RF Operations in Congested Electromagnetic Environment
SCI-290	RWS	Fifth Generation (5G) COMMS and MIMO Challenges in Electronics Warfare
SCI-291	RWS	Scenarios for Assessment Methods for Camouflage in Operational Contexts
SCI-292	RLS	Space Domain Awareness Concepts and Approaches to Support NATO Operations
SCI-293	RTG	Scientific Support to NNAG Above Water Warfare Capability Group
SCI-294	RTG	Demonstration and Research of Effects of RF Directed Energy Weapons on Electronically Controlled Combustion Engines
SCI-295	RTG	Development of Methods for Measurements and Evaluation of Natural Background EO Signatures

## **SENSORS & ELECTRONICS TECHNOLOGY PANEL**

**Panel Chairman: Dr. Murat EREN (TUR)**  
**Vice - Chairman: Dr. Augustus W. FOUNTAIN III (USA)**  
**Panel Executive: Lt. Col. Mauro RODDI (ITA)**  
**Panel Assistant: Ms. Ewelina GLINSKA-LEWIS (NATO)**

### **Terms of Reference**

#### MISSION

The mission of the Sensors and Electronics Technology (SET) Panel is to foster co-operative research, the exchange of information, and the advancement of science and technology among the NATO Nations in the field of sensors and electronics for defence and security. The SET Panel addresses electronic technologies and passive/active sensors as they pertain to Reconnaissance, Surveillance and Target Acquisition (RSTA), Electronic Warfare (EW), Communications, and Navigation and to the enhancement of sensor capabilities through multi-sensor integration and fusion. To fulfil this mission, the SET Panel has three Focus Groups: Radio-Frequency Technology (RFT); Optical Technology (OT); and Multi-Sensors & Electronics (MSE).

#### SCOPE

Research activities of the SET Panel predominantly address phenomenologies related to target signature, propagation and battlespace environments, electro-optic (EO) / radio-frequency (RF)/acoustic/magnetic sensors, antennas, signal and image processing, components, sensor hardening, electromagnetic compatibility, and any other phenomena associated with sensors and electronics that assist NATO warfighters during future warfare and peace-keeping scenarios. In particular, the scope of activity in the SET Panel includes the following disciplines:

#### Phenomenology:

- Target/background signatures;
- Propagation;
- Battlespace environment characterisation;
- Sensor hardening; and
- Electronic protection measures and electromagnetic compatibility.

#### Sensors:

- EO sensors (ultraviolet, laser radar (ladar), lidar, imaging infra-red (IR), IR search and track);
- RF sensors (radar, radiometers, goniometers) and related technologies, including passive RF sensors;
- Acoustic, seismic, magnetic, chemical, and inertial sensors;
- Urban, indoor, and subterranean navigation sensors;
- Terahertz (THz) sensors (from the point of view of military technology, especially in the context of urban warfare and DAT);
- Communications, electromagnetic warfare devices (electronic attack, electronic support measures, electronic intelligence), and dual-use sensors for a wide range of applications (urban/high intensity to security/low intensity).

#### Electronics: Processing:

- Antenna processing and aperture control;
- Signal processing;
- Image processing;
- Multi-sensor fusion;

- Pattern recognition, including automatic target recognition.

Components:

- EO (optics, integrated optics, fibre optics, focal plane arrays, lasers);
- RF (antennas, amplifiers, filters, digital radio frequency memories (DRFMs), monolithic microwave integrated circuits, high-power microwave sources);
- Micro-electronics;
- Micro-mechanics;
- Displays;
- Mechanical, chemical, etc.

Sensor hardening:

- Electronic protection measures;
- Electromagnetic compatibility

**Table 17: SET activities continuing in 2016**

ACTIVITY	TYPE	TITLE
SET-128	RTG	Impact of Wind Turbines on Radar
SET-140	RTG	Super-Resolution and Advanced Signal Processing for EO/IR Sensor Performance
SET-146	RTG	Steering Committee for the NRC(SPS) STANDEX Programme (Stand-off detection of explosives and suicide bombers)
SET-153	RTG	Multi Sensors Integration for Urban Operations
SET-155	RTG	Advancing Sensing Through the Walls (STTW) Technologies
SET-167	RTG	Navigation Sensors and Systems in GNSS Denied Environments
SET-180	RTG	Analysis and Recognition of Radar Signatures for Non-Cooperative Identification of Unmanned Aerial Vehicles
SET-182	RTG	Radar Spectrum Engineering and Management
SET-185	RTG	Maritime Radar Surface Surveillance Techniques and the High Grazing Angle Challenge
SET-186	RTG	Airborne Passive Radars and their Applications APRA
SET-193	RTG	THz technology for stand-off detection of explosives: from laboratory spectroscopy to detection in the field
SET-195	RTG	DMPAR short term solution verification
SET-196	RTG	Multi-channel/Multi-static radar imaging for non-cooperative targets
SET-198	RTG	Visible Laser Dazzle Effects and Protection
SET-199	RTG	Evaluating the Effectiveness of Coordination Methods for Distributed Mobile Sensors
SET-200	RTG	Electromagnetic scattering prediction of small complex aerial platforms for NCTI purposes
SET-203	RTG	Ship radar signature management system accuracy, sensitivity and confidence level
SET-205	RTG	Active Electro-optic Sensing for Target identification and Tactical Applications
SET-206	RTG	Energy Generation for Manwearable/Manportable Applications and Remote Sensors
SET-207	RTG	Advanced situation-specific modelling, sensing and vulnerability mitigation using passive radar technology



ACTIVITY	TYPE	TITLE
SET-208	RTG	Signal processing for implementation in hand-held multi sensor ground penetrating system
SET-209	RTG	Exploitation of Human Signatures for Threat Determination
SET-211	RTG	Naval Platform Protection in the EO/IR Domain
SET-212	RTG	Multi-Function RF Sensors Specification, Test & Evaluation
SET-215	RTG	Model-based SAR Automatic Target Recognition
SET-216	RLS	Cognition and Radar Sensing
SET-218	RTG	Interoperability & Networking of Disparate Sensors and Platforms for ISR Applications
SET-219	RTG	Simulation of Active Imaging Systems
SET-220	RTG	Geospatial Information Extraction From space-Borne SAR-Images for NATO-Operations
SET-223	RTG	Adaptive Radar Resource Management
SET-224	RTG	Coherent Mid-Infrared Fibre Source Technology
SET-225	RTG	Spatial and Waveform Diverse Noise Radar
SET-226	RTG	Turbulence mitigation for Electro Optics (EO) and laser systems
SET-227	RTG	Cognitive Radar
SET-SCI-230	RSM	Reconfigurable and Scalable Multi-Function RF Systems in a Congested EM Spectrum
SET-231	RSM	Multi-Band Multi-Mode Radar

**Table 18: SET activities starting in 2016**

ACTIVITY	TYPE	TITLE
SET-222	RSM	Swarm centric solution for Intelligent Sensor Networks NOT ACTIVE PLANNING
SET-229	RTG	Cooperative Navigation in GNSS Degraded and Denied Environments
SET-232	RTG	Computational Imaging and Compressive Sensing for EO/IR Systems NOT ACTIVE - PLANNING
SET-233	RTG	Acoustic Transient Threat Detection Sensors & Signal Processing for Battlefield Situational Awareness
SET-234	RTG	Environmental limitations of fielded EO-TDAs
SET-235	RLS	Radar and SAR systems for airborne and space-based Surveillance and Reconnaissance
SET-236	RTG	Design and Analysis of Compressive Sensing Techniques for Radar and ESM Applications
SET-237	RTG	Printed Standards for Stand-off Detection
SET-238	RTG	Side-Attack Threat Detection Strategies, Technologies and Techniques
SET-239	RSY	Maritime Radar Surveillance from Medium and High Grazing Angle Platforms
SET-240	RTG	Exploitation of Longwave Infrared Airborne Hyperspectral Data
SET-241	RSY	9th NATO Military Sensing Symposium

## NEW 2016 ACTIVITIES BY TYPE

**Table 19: Lecture Series**

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-274	Unmanned Air Vehicles - Technological Challenges, Concepts of Operations and Regulatory Issues	November 2016	Portugal UK Canada Germany	NATO UNCLASSIFIED Non-NATO Invited
AVT-276	Environmental Management of Munitions and Greener Approaches to Design	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
IST-143	Cyber Security Science and Engineering	04 April 2016	Sofia, BULGARIA	NATO UNCLASSIFIED Non-NATO Invited
SCI-285	Space Domain Effects on NATO Operations	18-19 February 2016	Pratica di Mare, Italy	NATO UNCLASSIFIED NATO Only
		15-16 February 2016	Kalkar, Germany	
		11-12 April 2016	Boulder, CO, United States	
SCI-292	Space Domain Awareness Concepts and Approaches to Support NATO Operations	July 2016	USA	NATO UNCLASSIFIED Non-NATO Invited
			Germany	
			Italy	
			Turkey	
SET-235	Radar and SAR systems for airborne and space-based Surveillance and Reconnaissance	Spring 2016	Warsaw, Poland	NATO UNCLASSIFIED Non-NATO Invited
			Sofia, Bulgaria	
			Lisbon, Portugal	
			Istanbul, Turkey	

**Table 20: Task Groups**

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-275	Continuous Airworthiness of Aging Systems	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-277	Hazard assessment of exposure to ammunition-related constituents and combustion products	In Conjunction with AVT PBW Spring	Amsterdam, The Netherlands	NATO UNCLASSIFIED Non-NATO Invited
AVT-278	Risk-based safety assessment of operational airworthiness and certification requirements	In Conjunction with AVT PBW Spring	Amsterdam, The Netherlands	NATO UNCLASSIFIED Non-NATO Invited
AVT-279	Formation Flying for Efficient Operations	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-280	Evaluation of prediction methods for ship performance in heavy weather	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-281	Cross Domain Platform EO Signature Prediction	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-282	Unsteady Aerodynamic Response of Rigid Wings in Gust Encounters	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
HFM-268	Cross Panel Activity on Environments for Mission Effectiveness Assessment	TBD	TBD	NATO UNCLASSIFIED Non-NATO Invited
HFM-269	Combat Integration Implications for Physical Employment Standards	May 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
HFM-270	Framework for Modeling and Simulation of Human Lethality, Injury, and Impairment from Blast-Related Threats	May 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
HFM-271	Injury assessment methods for vehicle occupants in blast-related events	May 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
IST-141	Exploratory Visual Analytics	26-28 April 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
IST-142	Software Defined Network Architectures for the Federated Mission Networks	first quarter of 2016	FIN	NATO UNCLASSIFIED Non-NATO Invited
IST-144	Content-Based Multi-media Analytics (CBMA)	first quarter of 2016	USA	NATO UNCLASSIFIED Non-NATO Invited
IST-146	Electromagnetic Environment Situational Awareness for NATO	Spring 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
IST-147	Military Applications of Internet of Things	TBD	TBD	NATO UNCLASSIFIED Non-NATO Invited
MSG-140	Urban Combat Advanced Training Technology - Live Simulation Standards (UCATT-LSS)	TBD	TBD	NATO UNCLASSIFIED Non-NATO Invited
MSG-145	Operationalization of Standardized C2-Simulation Interoperability	Feb 2016	Arcueil, FRA	NATO UNCLASSIFIED Non-NATO Invited
MSG-146	Simulation for Training and Operation Group-Land (STOG-L)	18-22 Apr 2016	Vienna, AUT	NATO UNCLASSIFIED Non-NATO Invited
		17-21 Oct 2016	Ankara, TUR	
MSG-147	M&S Support for Crisis and Disaster Management Processes and Climate Change Implications	Mar 2016	Sofia, BGR	NATO UNCLASSIFIED Non-NATO Invited
SAS-119	Energy and Defence: Reducing Dependencies & Vulnerabilities – Enhancing Efficiency	24-26 February 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SAS-122	Non-Combatant Evacuations: Consular and Military – Operational Research & Analysis	first quarter of 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SAS-123	Futures Assessed alongside Technical Evolutions (FATE)	first quarter of 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SAS-124	Visual Analytics for Communicating Defense Investment Uncertainty and Risk	first quarter of 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SAS-125	Comparative Analysis of Acquisition Processes	first quarter of 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SCI-293	Scientific Support to NNAG Above Water Warfare Capability Group	8-10/03/2016	JEWCS, Yeovilton (GBR)	NATO SECRET Non-NATO Invited
SCI-294	Demonstration and Research of Effects of RF Directed Energy Weapons on Electronically Controlled Combustion Engines	first quarter of 2016	CSO Paris	NATO SECRET Non-NATO Invited
SCI-295	Development of Methods for Measurements and Evaluation of Natural Background EO Signatures	first quarter of 2016	CSO Paris	NATO SECRET Non-NATO Invited
SET-229	Cooperative Navigation in GNSS Degraded and Denied Environments	May 2016	CSO Paris	NATO UNCLASSIFIED NATO Only
SET-232	Computational Imaging and Compressive Sensing for EO/IR Systems NOT ACTIVE - PLANNING	TBD	TBD	NATO UNCLASSIFIED NATO Only
SET-233	Acoustic Transient Threat Detection Sensors & Signal Processing for Battlefield Situational Awareness	May 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SET-234	Environmental limitations of fielded EO-TDAs	May 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SET-236	Design and Analysis of Compressive Sensing Techniques for Radar and ESM Applications	May 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SET-237	Printed Standards for Stand-off Detection	January 2016	CSO Paris	NATO UNCLASSIFIED Non-NATO Invited
SET-238	Side-Attack Threat Detection Strategies, Technologies and Techniques	05-07 April 2016	CSO Paris	NATO SECRET Non-NATO Invited
SET-240	Exploitation of Longwave Infrared Airborne Hyperspectral Data	April 2016	CSO Paris	NATO UNCLASSIFIED NATO Only

**Table 21: Specialist's Meetings**

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-265	Integrated Virtual NATO Vehicle Development	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-266	Use of Bonded Joints in Military Applications	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-268	Advances in Munition Health Management Technologies and Implementation	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-272	Impact of Volcanic Ash Clouds on Military Operations	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-273	Approval of RPAS Operations-Airworthiness, Risk-Based Methods, Operational Limitations	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
IST-145	Predictive Analytics	TBD	TBD	NATO UNCLASSIFIED Non-NATO Invited

SET-222	Swarm centric solution for Intelligent Sensor Networks	TBD	TBD	NATO UNCLASSIFIED Non-NATO Invited
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**Table 22: Workshops**

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-267	Future of Manufacturing for Military Applications	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-269	Sea Dumped Munitions and Environmental Risk	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-270	Validation of Thermal Models for Military Power Systems	09-13 October 2016	Amsterdam, The Netherlands	NATO UNCLASSIFIED Non-NATO Invited
AVT-271	Research Directions for First Principles	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited
AVT-284	Advanced Wind Tunnel Boundary Simulation	In conjunction with AVT PBW	In conjunction with AVT PBW	NATO UNCLASSIFIED Non-NATO Invited
SCI-289	Distributed RF Operations in Congested Electromagnetic Environment	Spring 2016	TBD	NATO UNCLASSIFIED Non-NATO Invited
SCI-290	Fifth Generation (5G) COMMS and MIMO Challenges in Electronics Warfare	20-21 April 2016	Netherlands	NATO UNCLASSIFIED Non-NATO Invited
SCI-291	Scenarios for Assessment Methods for Camouflage in Operational Contexts	1st week of July 2016	Koeln (Amt fuer Heeresentwicklung) DEU	NATO CONFIDENTIAL Non-NATO Invited

**Table 23: Symposia**

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
HFM-272	Regenerative Medicine – Today and in future	16-20 October 2016	Brussels, BE	NATO UNCLASSIFIED Non-NATO Invited
IST-148	Cyber Defence Situation Awareness	03-04 October 2016	Sofia, Bulgaria	NATO UNCLASSIFIED Non-NATO Invited
MSG-143	Ready for the Predictable, Prepared for the Unexpected - M&S for Collective Defence in Hybrid Environments and Hybrid Conflicts	October 2016	Ankara, Turkey	NATO UNCLASSIFIED Non-NATO Invited
SCI-283	Considerations for Space and Space-Enabled Capabilities in NATO Coalition Operations	17-18 May 2016	Loughborough University UK	NATO UNCLASSIFIED Non-NATO Invited
SET-239	Maritime Radar Surveillance from Medium and High Grazing Angle Platforms	Fall 2016	Edinburgh, UK	NATO UNCLASSIFIED Non-NATO Invited
SET-241	9th NATO Military Sensing Symposium	May 2017	Canada or USA ,	NATO RESTRICTED Non-NATO Invited

**Table 24: Agardographs**

<b>ACTIVITY</b>	<b>TITLE</b>	<b>MEETING DATES</b>	<b>MEETING LOCATIONS</b>	<b>DISTRIBUTION and PARTNER PARTICIPATION</b>
AVT-283	Advances in Wind Tunnel Boundary Correction and Simulation	25-29 April 2016	Tallinn, Estonia	NATO UNCLASSIFIED Non-NATO Invited

**Table 25: Long Term Scientific Study**

<b>ACTIVITY</b>	<b>TITLE</b>	<b>MEETING DATES</b>	<b>MEETING LOCATIONS</b>	<b>DISTRIBUTION and PARTNER PARTICIPATION</b>
HFM-273	Long Term Scientific Study on Chemical, Biological and Radiological Defence	May 2016	CSO Paris	NATO SECRET Non-NATO Invited