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NATO SCIENCE & TECHNOLOGY BOARD
2018 STO Collaborative Programme of Work

Note by the Secretary

1. For your information, please find the 2018 STO Collaborative Programme of Work at Enclosure 1.
2. This document lists all Technical Activities that the STO Panels and Group will address in 2018.
3. For ease of reference, this overview information is structured per :
 - Panels and Group (tables 5 through 20);
 - STO themes (tables 21 through 26);
 - Type of Technical Activity (tables 27 through 32).
4. In addition, the document contains information on those Technical Activities that have been approved to commence in 2019.

(Signed)
Dr U. Ehlert
STB Secretary

Enclosure 1: 2018 STO Collaborative Programme of Work

1 Enclosure

Original: English

North Atlantic Treaty Organization



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

STO

***COLLABORATIVE
PROGRAMME OF WORK AND BUDGET
FOR YEAR 2018***

10 JANUARY 2018

This document constitutes the entire STB
approved 2018 Collaborative Programme of
Work (CPoW) and Budget.

Preface:

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Preface

I am very pleased to present the NATO Science & Technology Organization's (STO) Collaborative Program of Work (CPoW) for 2018. The CPoW is the effort of our network of about 5,000 scientists, engineers, and analysts coming from NATO and partner nations. The Collaboration Support Office (CSO) continues to operate this collaborative network 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 leading to operational military capability. I remain grateful to have the opportunity to work with the professionals in the CSO and the greater network of scientists and engineers to deliver the most relevant, technically sound program as possible.

As I stated the last two years, I believe the need to collaborate effectively is growing as security challenges facing our nations continue to grow. The challenges of a resurgent and aggressive Russia, increased pressure from mass migration, and the continued threat of terrorism, have increased the security challenges facing NATO. I believe these challenges will continue, and spur a greater need to collaborate. There are other changes in the Alliance and Network. While there is still continued austerity in the nations, we are beginning to see an increase in many nations' military budgets and a call for "more innovation". We also see continued evolution in the model of technology delivery - one in which industry and government are closely aligned and symbiotic. In spite of these challenges and changes, we continue to deliver a vibrant program of work.

To meet the externally driven conditions, we have made structural changes to the way the CPoW is defined and built. Historically, the program of work had been built from technology opportunities emerging from the Nations - the bottom-up approach. This will continue. But, we have augmented this approach through the introduction of "Themes". Themes are based on operational needs of the Nations, and are multi-disciplinary in nature. The first three themes the network is addressing are: autonomy; military decision making using big data and artificial intelligence; and operations in a contested urban environment. For each of the three, we have seen a strong response - roughly 25% of our CPoW is directly aligned with one of these themes, and we now have 35 discrete autonomy activities, 21 decision making activities, and 18 urban environment activities (including Exploratory Teams to assist and advise the Panel/Group on the technical merit).

In addition, the CPoW has a much more extensive set of demonstrations and field trials planned for 2018. Historically, the CPoW conducted one to two of these events annually. In 2017, we grew to eight demonstrations, and there should be more than twenty in 2018. Together, we are making the technology more accessible to our military customers through the Nations. I believe this is a good thing

My vision for the CSO remains that we are the organization nations come to for collaboration. We have grown to the point where we have 254 activities (task groups, workshops, symposia, etc.) planned for 2018. We are making the information available more rapidly to the nations. The network has responded to our call to increase military relevance and technical quality. My hope is that this trajectory continues. It remains all of our responsibility to provide our warfighters the very best possible military capabilities. Application of technology has been a strength of the Alliance and must remain so in the future—the STO CPoW enables that strength.

The core of the resulting CPoW remains the Technical Committees of the STO (Applied Vehicle Technologies, Human Factors and Medicine, Information Systems Technology, NATO Modelling and Simulation Group, System Analysis and Studies, Systems Concepts and Integration, and Sensors and Electronics Technology). These seven Level-II Committees are led, on a part-time basis, by voluntary national contributions and supported by full-time international military officers and NATO civilian staff from the CSO, all of whom do a great job. Through this structure, we strive to "lead the future" through activities like Technology Watch, under which the network has identified a number of technologies that could change the security landscape - these include: hypersonic vehicles, quantum sciences, additive manufacturing, and synthetic biology.

As I come to the end of my tenure, I wish to thank the CSO staff and network for their dedication to improving the military capabilities resident in our nations. The network has responded, and will continue to do so.



Alan R. Shaffer
Director, STO Collaboration Support Office

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2018 PANEL BUSINESS MEETINGS

Table 1: 2018 Panel Business Meetings.

ACTIVITY		MEETING DATES	MEETING LOCATIONS
AVT	Spring	16-20 Apr 2018	Torino, Italy
	Fall	10-14 Dec 2018	Athens, Greece
HFM	Spring	15-19 Apr 2018	Sofia, Bulgaria
	Fall	14-18 Oct 2018	Portsmouth, United Kingdom
IST	Spring	21-25 May 2018	Warsaw, Poland
	Fall	15-19 Oct 2018	Amadora, Portugal
MSG	Spring	10-20 Apr 2018	Segovia, Spain
	Fall	8-12 Oct 2018	Ottawa, Canada
SAS	Spring	10-13 Apr 2018	Leuven, Belgium
	Fall	15-19 Oct 2018	Zagreb, Croatia
SCI	Spring	7-11 May 2018	Fort Walton Beach, FL, USA
	Fall	8-12 Oct 2018	Utrecht, NLD
SET	Spring	14-18 May 2018	Bucharest, Romania
	Fall	Oct 2018	Budapest, Hungary

2018 TECHNICAL PROGRAMME OBSERVATIONS (as of January 2018)

The STO Collaborative Programme of Work (CPoW) for 2018 includes 254 activities shown in Table 2:

Table 2: CPoW Composition

Task Groups	RTG	198
Symposia	RSY	10
Specialists' Meetings	RSM	14
Specialist Team	ST	5
Workshops	RWS	8
Lectures Series	RLS	9
Technical Course	RTC	3
Agardograph	AG	5
Long Term Scientific Study	LTSS	1
Committee	COM	1
	TOTAL	254

The 2018 STO Collaborative Programme of Work continues to enhance the linkage between STO activities and the priorities/requirements from our customers and the nations. There are 54 new activities for 2018 and 13 new activities already approved and prepared for 2019. The projected on-going program also includes activities from previous years, therefore, during 2018 the Panels/Group will be managing a total program of 254 technical activities. Additionally, the Panels/Group will execute 76 Exploratory Teams to assist and advise on the technical merit or feasibility of a specific proposal for a technical activity. It gives 330 activities total. With the intent of sharing the developing knowledge, all but one activity will be open to non-NATO nations in 2018; including Partnership for Peace nations, Mediterranean Dialogue nations, Global Partners, and Contact nations.

2018 BUDGET GENERALITIES

(Indicative - for information only)

In accordance with the Medium-Term-Resource Plan 2018, the S&T Collaboration Support Office (CSO) has projected a funding requirement of EUR 5,850,000 for 2018. This represents an increase of EUR 325,000 over the 2017 Budget (EUR 5,525,000) and is necessary to meet increased Personnel and CIS cost as well as increased demand in support of collaborative activities. The requested budget is expected to be approved by the North Atlantic Council in December 2017.

Table 3: 2018 CSO Budget Projections per category *

Budget Categories	Projected 2018
Personnel	€ 3 530 000
Facility Management	€ 370 000
Operations and Mission Support	€ 347 000
Publications	€ 210 000
CIS	€ 428 000
Collaborative Program of Work	€ 965 000
Total NATO Funded Effort	€5 850 000

* Note: Allocations to categories may vary pending operational requirements

The majority of the STO Collaborative Program of Work (CPoW) activities are open for NATO Partners under the Partnership for Peace (PfP) and Mediterranean Dialogue (MD) programs. Funding for Partner-related activities within the STO CPoW is provided through the Outreach Budget of the International Military Staff (IMS). The CSO acts as an agent between the Nations and the IMS for Outreach activities.

LECTURE SERIES/TECHNICAL COURSES/SYMPOSIA/ WORKSHOPS/ SPECIALISTS' MEETINGS FOR 2018

The following table provides a forecast of STO Collaborative Program Lecture Series, Technical Course, Symposia and Workshop activities for 2018 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 2018

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-266-SM	Use of Bonded Joints in Military Applications	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-267-WS	Future of Manufacturing for Military Applications	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-274-LS	Unmanned Air Vehicles - Technological Challenges, Concepts of Operations and Regulatory Issues	Spring 2018	Turkey	NATO UNCLASSIFIED Non-NATO Invited
		Fall 2018	USA	
AVT-284-WS	Advanced Wind Tunnel Boundary Simulation	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-303-WS	Corrosion Management	10-14 Dec 2018	Athens, Greece	NATO UNCLASSIFIED Non-NATO Invited
AVT-305-SM	Sensors for Integrated Vehicle Health Management (IVHM)	10-14 Dec 2018	Athens, Greece	NATO UNCLASSIFIED Non-NATO Invited
AVT-306-SM	Transitioning Gas Turbine Instrumentation from Test Cells to On-Vehicle Applications	10-14 Dec 2018	Athens, Greece	NATO UNCLASSIFIED Non-NATO Invited
AVT-321-TC	User Outreach and Promotion for the Unified Generic Model of a Missile Propulsion Subsystem	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
AVT-322-SM	Combustion Products, Exposure and Related Risks	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
AVT-323-SY	Hybrid/Electric Aero-Propulsion Systems for Military Applications	16-20 April 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
AVT-324-SM	Multi-Disciplinary Design Approaches and Performance Assessment Of Future Combat Aircraft	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
AVT-325-LS	(VKI) Flow Characterization and Modeling of Hypersonic Wind Tunnels	June 2018	von Karman Institute for Fluid Dynamics, Belgium	Public Release

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-326-LS	(VKI) 3rd Lecture Series on Uncertainty Quantification in Computational Fluid Dynamics	June 2018	von Karman Institute for Fluid Dynamics, Belgium	Public Release
		tbd	Stanford University, USA	
HFM-240-LS	Mild Traumatic Brain Injury: Post Concussive Symptoms in a Deployed Setting	Jun, Jul, Oct 2018	Estonia Italy Spain	Public Release
HFM-284-LS	Moral Decisions and Military Mental Health	Mar, Sep 2018	United Kingdom The Netherlands	Public Release
HFM-288-WS	Integrated Approach To Cyber Defence: Human In The Loop	16-18 Apr 2018	Sofia, Bulgaria	Public Release
HFM-289-SM	Operation Oriented Simulation of Extreme Flight Conditions	Feb 2018	The Netherlands	Public Release
HFM-296-TC	Aerospace Medicine - A Century of Challenging Boundaries	19-23 Mar 2018	Ramstein, Germany	Public Release
HFM-300-SY	Symposium on Human Autonomy Teaming	15-17 Oct 2018	Portsmouth, United Kingdom	Public Release
IST-143-LS	Cyber Security Science and Engineering	tbd	Slovakia Canada Estonia France	Public Release
IST-160-SM	Big Data and Artificial Intelligence for Military Decision Making	31 May – 01 Jun 2018	Bordeaux, France	Public Release
MSG-159-SY	NMSG Annual Symposium 2018	11-12 Oct 2018	Ottawa, Canada	Public Release
MSG-160-SY	MSG/MSCO Support to International Training & Education Reference Number MSG-166 Conferences ITEC, IITSEC and CAX Forum 2018	15-17 May 2018, 25-28 Sep 2018, 26-30 Nov 2018	Stuttgart, Germany Sofia, Bulgaria Orlando, FL, USA	Public Release
MSG-162-TC	Guideline For Scenario Development	7 Jun 2018, 5 Jul 2018, 15 Oct 2018	Cologne, Germany; Arcueil, France; Ottawa, Canada	Public Release
SAS-141-SY	Deterrence and Assurance within an Alliance Framework	Fall 2018	London, United Kingdom	NATO SECRET, PfP/ Non-NATO Invited
SCI-277-LS	Store Separation and Trajectory Prediction	21-22 May	Spain	Public Release
		24-25 May	Netherlands	
		28-29 May	Sweden	
		19-20 Jun	Canada	
SCI-300-SY	Cyber Physical Security of Defence Systems	8-9 May 2018	USA	NATO UNCLASSIFIED Non-NATO Invited
SCI-308-SM	Resiliency Concepts to Enhance Preservation of NATO Space Capabilities	11-15 Jun 2018	Bucharest, Romania	NATO UNCLASSIFIED Non-NATO Invited
SCI-309-WS	Opportunities/Implications of Large Scale Commercial Small Satellite Constellations to NATO Operations	Second half of 2018	United Kingdom	NATO UNCLASSIFIED Non-NATO Invited

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SET-243-LS	Passive Radar Technology	16-17 Apr 2018	Philadelphia, USA	NATO UNCLASSIFIED Non-NATO Invited
		18-20 Apr 2018	Lawrence, USA	
		3-4 Sep 2018	London, United Kingdom	
		6-7 Sep 2018	Kjeller, Norway	
SET-SCI-254-SM	Counter Passive Radar	19-20 Mar 2018	Portsmouth, United Kingdom	NATO SECRET Non-NATO Invited
SET-255-SM	Military Applications of Extreme Laser Fields	16-18 May 2018	Bucharest Romania	NATO SECRET
SET-259-SM	Vectors in Radar: Opportunities for Operations and the Military	14-15 May 2018	Bucharest, Romania	NATO SECRET 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 publication of the final agenda for each activity.

This table shows the detailed events that will be executed in 2018.

APPLIED VEHICLE TECHNOLOGY PANEL

Panel Chairman: Mr. Hans-Ludwig BESSER (DEU)

Vice Chairman: Dr. David Lecompte (BEL)

Panel Executive: Mr. Christopher MULLER (DEU)

Panel Assistant: Dr. Veronika GUMPINGER(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 2018

ACTIVITY	TYPE	TITLE
AVT-236	RTG	Unified Generic Model and Data-Base for Early Screening and Basic Layout of a Missile Propulsion Subsystem
AVT-239	RTG	Innovative Control Effectors for Manoeuvring of Air Vehicles
AVT-240	RTG	Hypersonic Boundary-Layer Transition Prediction
AVT-247	RTG	Environmentally Compliant Materials & Processes for Military Vehicles
AVT-248	RTG	Next-Generation NATO Reference Mobility Model (NRMM) Development
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-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-274	RLS	Unmanned Air Vehicles - Technological Challenges, Concepts of Operations and Regulatory Issues
AVT-275	RTG	Continuous Airworthiness of Aging Systems
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
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
AVT-295	RTG/ CDT	Demonstration of Innovative Control Effectors for Maneuvering of Air Vehicles
AVT-302	RWS	Paint Removal Technologies for Military Vehicles
AVT-303	RWS	Corrosion Management
AVT-304	RSM	Graphene Technologies and Applications for Defence

ACTIVITY	TYPE	TITLE
AVT-305	RSY	Sensors for Integrated Vehicle Health Management (IVHM)
AVT-306	RSM	Transitioning Gas Turbine Instrumentation from Test Cells to On-Vehicle Applications
AVT-307	RSY	Separated Flow Symposium
AVT-ST-004	RST	Integrated Munition Health Management (imhm): Follow-on Activity To Support Imhm Smart Defence Initiative (sdi)
AVT-ST-005	RST	Technical Support To NATO Future Rotorcraft Requirements
AVT-ST-006	RST	Exploitation Of Additive Manufacturing In NATO

Table 6: AVT activities starting in 2018

ACTIVITY	TYPE	TITLE
AVT-290	RTG	Standardization of Augmented Reality for Land Platforms in Combat Environments
AVT-291	RTG	Range Design and Management for Reduced Environmental Impact
AVT-292	RTG	Munition Health Management Technologies: Effects on Operational Capability, Interoperability, Life-Cycle Cost and Acquisition of Missile Stockpiles of NATO Nations
AVT-293	RTG	Effect of Environmental Regulation on Energetic Systems and the Management of Critical Munitions Materials and Capability
AVT-294	RTG	Towards Improved Computational Tools for Electric Propulsion
AVT-296	RTG	Rotorcraft Flight Simulation Model Fidelity Improvement and Assessment
AVT-297	RTG	Development of a Framework for Validation of Computational Tools for Analysis of Air and Sea Vehicles
AVT-298	RTG	Reynolds Number Scaling Effects on Swept Wing Flows
AVT-299	RTG	Assessment of Anti-Icing and De-Icing Technologies for Air and Sea Vehicles
AVT-300	RTG	Naval Ship Maneuverability in Ice
AVT-301	RTG	Flowfield Prediction for Maneuvering Underwater Vehicles
AVT-308	RTG	Cooperative Demonstration of Technology (CDT) for Next-Generation NATO Reference Mobility Model (NG-NRMM)
AVT-321	RTC	User Outreach and Promotion for the Unified Generic Model of a Missile Propulsion Subsystem
AVT-322	RSM	Combustion Products, Exposure and Related Risks
AVT-323	RSY	Hybrid/Electric Aero-Propulsion Systems for Military Applications
AVT-324	RSM	Multi-Disciplinary Design Approaches and Performance Assessment of Future Combat Aircraft
AVT-325	RLS	(VKI) Flow Characterization and Modeling of Hypersonic Wind Tunnels
AVT-326	RLS	(VKI) 3rd Lecture Series on Uncertainty Quantification in Computational Fluid Dynamics
AVT-ST-007	ST	Modification Of NATO STANAGs to Incorporate Range Characterization

Table 7: AVT activities starting in 2019

ACTIVITY	TYPE	TITLE
AVT-309	RTG	Implication of Synthetic Fuels on Land Systems and on NATO Single Fuel Policy
AVT-310	RTG	Hybrid/Electric Aircraft Design and STAndards , Research and Technology (HEADSTART)
AVT-311	RTG	Availability and Quality Issues with Raw Materials for Rocket Propulsion Systems and Potential Consequences for NATO
AVT-312	RTG	Airworthiness Tools and Processes for Complex Rotorcraft Systems Safety
AVT-313	RTG	Incompressible Laminar-to-Turbulent Flow Transition Study
AVT-314	RTG	Assessment and Reduction of Installed Propeller and Rotor Noise from Unmanned Aircraft
AVT-315	RTG	Comparative Assessment of Modeling and Simulation Methods of Shipboard Launch and Recovery of Helicopters
AVT-316	RTG	Vortex Interaction Effects Relevant to Military Air Vehicle Performance
AVT-317	RTG	Trade-space exploration to support the early stage design of effective & affordable (fleets) of warships
AVT-318	RTG	Low Noise Aeroacoustic Design for Turbofan Powered NATO Air Vehicles
AVT-319	RTG	High Speed Rotorcraft Analysis and Evaluation
AVT-320	RTG	Assessments of Numerical Simulation Methods for Turbulent Cavitating Flows

HUMAN FACTORS AND MEDICINE PANEL

Panel Chair: BGen Rafael Schick (DEU)
Panel Vice-Chair: Mrs Alison Rogers (GBR)
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 Behaviour (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 Behaviour 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 8: HFM activities continuing in 2018

ACTIVITY	TYPE	TITLE
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 Anesthesia 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-266	RTG	3D Scanning for Clothing Fit and Logistics
HFM-268	RTG	Cross Panel Activity on Synthetic 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-273	LTSS	Chemical, Biological and Radiological Defence
HFM-274	RTG	The Impact of Hypobaric Exposure on Aviators and High-Altitude Special Operations Personnel
HFM-276	RTG	Human Factors and ISR Concept Development and Evaluation
HFM-277	RTG	Leadership Tools for Suicide Prevention
HFM-278	RTG	How to Prevent and Counter Radicalisation and Violent Extremism: Responding to the Threat of Western Foreign Terrorist Fighters
HFM-279	RTG	Leveraging Technology in Military Mental Health
HFM-281	RTG	Personalized Medicine in Mental Health and Performance
HFM-283	RTG	Reducing Musculo-Skeletal Injuries
HFM-284	RLS	Moral Decisions and Military Mental Health

HFM-285	RTG	Speech Understanding of English language in Native and Non-Native Speakers/Listeners in NATO with and without Hearing Deficits
HFM-286	RTG	Leader Development for NATO Multinational Military Operations
HFM-287	RTG	Developing a Culture and Gender Inclusive Model of Military Professionalism
HFM-288	RWS	Integrated Approach to Cyber Defence: Human in the Loop
HFM-289	RSM	Operation Oriented Simulation of Extreme Flight Conditions
HFM-290	RTG	Advances In Military Personnel Selection
HFM-291	RTG	Ionizing Radiation Bioeffects And Countermeasures
HFM-292	RTG	Understanding and Reducing Skill Decay
HFM-293	RTG	Digital and Social Media Assessment For Effective Communication And Cyber Diplomacy
HFM-294	RTG	Big Data In The Military: Integrating Genomics Into The Pipeline Of Standard-care Testing & Treatment
HFM-295	RTG	Sexual Violence In Military
HFM-296	RTC	Aerospace Medicine - A Century of Challenging Boundaries
HFM-297	RTG	Assessment of Augmentation Technologies For Improving Human Performance

Table 9: HFM activities starting in 2018

ACTIVITY	TYPE	TITLE
HFM-298	RTG	Injury Thresholds of High Power Pulsed Radiofrequency Emissions
HFM-299	RTG	Pulmonary Screening And Care in Aviators
HFM-300	RSY	Symposium on Human Autonomy Teaming
HFM-301	RTG	Military Diversity: Ethnic Tolerance and Intolerance

INFORMATION SYSTEMS TECHNOLOGY PANEL

Panel Chairperson: Dr.-Ing Michael WUNDER (DEU)

Vice-Chairman: Dr. Eli WINJUM (NOR)

Panel Executive: 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 10: IST activities continuing in 2018

ACTIVITY	TYPE	TITLE
IST-108	RTG	Cyber Defence Situational Awareness **
IST-121	RTG	Machine Learning Techniques For Autonomous Computer Generated Entities **
IST-124	RTG	Heterogeneous Tactical Networks - Improving Connectivity And Network Efficiency **
IST-129	RTG	Predictive Analysis of Adversarial Cyber Operations
IST-132	RTG	Multi-Level Fusion of Hard and Soft Information
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-149	RTG	Capability Concept Demonstrator for Interoperability within Unmanned Ground systems and C2
IST-150	RTG	NATO Core Services profiling for Hybrid tactical Networks
IST-151	RTG	Cyber Security of Military Systems
IST-152	RTG	Autonomous Cyber Defence Agents
IST-157	RTG	Human in the loop Considerations for Artificial Intelligence
IST-158	RSM	Content-based Real-time Analytics of Multimedia Streams
IST-160	RSM	Big Data and Artificial Intelligence for Military Decision Making

Table 11: IST activities starting in 2018

ACTIVITY	TYPE	TITLE
IST-159	RTG	Exploitation of Cyberspace for Intelligence
IST-161	RTG	Efficient Group and Information Centric Communications In Mobile Military Heterogeneous Networks (COM).
IST-162	RTG	Cyber Monitoring and Detection Capability For Military Systems (IWA)
IST-163	RTG	Deep Machine Learning For Cyber Defense (IWA)
IST-164	RTG	Securing Unmanned and Autonomous Vehicles For Mission Assurance (IWA)
IST-165	RTG	High-level Fusion of Hard And Soft Information for Intelligence (AI2S)

NATO MODELLING AND SIMULATION GROUP (NMSG)

Group Chairman: Mr Leigh Gene YU (USA)
As of May 2018: Group Chairman: Ing. Agatino MURSIA (ITA)
Vice - Chairman: Ing. Agatino MURSIA (ITA)
As of May 2018: Vice - Chairman: Dr Robert SIEGFRIED (DEU)
Group 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-II Committees or NATO Bodies and Organizations;

Table 12: MSG activities continuing in 2018

ACTIVITY	TYPE	TITLE
MSG-124	RTG	Developing Actionable Data Farming Decision Support For NATO **
MSG-135	RTG	NATO M&S Resources/Standards Support Working Group
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
MSG-150	RTG	M&S Supporting NATO CD&E
MSG-152	RTG	NATO M&S Professional Corps Development
MSG-154	RTG	Low, Slow, Small Threats Modelling and Simulation
MSG-155	RTG	Data Farming Services (DFS) for Analysis And Simulation-based Decision Support
MSG-156	RTG	Dynamic Synthetic Environments for Distributed Simulation
MSG-157	RTG	NATO M&S Resources/standards Support Team -II
MSG-158	RTG	Operational Requirements for Training Interoperability—2019
MSG-160	RSY	MSG/MSCO Support to International Training & Education Conferences ITEC, I/ITSEC and CAX Forum 2018
MSG-162	RTC	Guideline for Scenario Development

Table 13: MSG activities starting in 2018

ACTIVITY	TYPE	TITLE
MSG-159	RSY	NMSG Annual Symposium 2018
MSG-163	RTG	Evolution of NATO Standards for Federated Simulation
MSG-164	RTG	Modelling and Simulation as a Service - Phase 2
MSG-165	RTG	Incremental Implementation of Mission Training Through Distributed Simulation for Joint And Combined Air Operations
MSG-166	RSY	MSG/MSCO Support to International Training & Education Reference Number MSG-166 Conferences ITEC, I/ITSEC and CAX Forum 2019

SYSTEM ANALYSIS AND STUDIES PANEL

Chairman: COL (Ret) Pavel ZUNA (CZE)
As of April 2018: Chairman: Dr. Ana MARTINS BOTTO DE BARROS (NLD)
Vice Chairman: Dr. Ana MARTINS BOTTO DE BARROS (NLD)
As of April 2018: Vice Chairman: Mr. Espen SKJELLAND
Panel Executive: LTC Timothy POVICH (USA)
Panel Assistant: Mr. Jeroen GROENEVELT (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 14: SAS activities continuing in 2018

ACTIVITY	TYPE	TITLE
SAS-092	RTG	Costing Support for Force Structure Studies **
SAS-096	RTG	Key Performance Indicators in Measuring Military Outputs **
SAS-107	RTG	Factoring Situational Awareness And Communications In Operational Models Of Dismounted Combat **

ACTIVITY	TYPE	TITLE
SAS-110	RTG	Operations Assessment in Complex Environments
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-114	RTG	Assessment and Communication of Risk and Uncertainty to Support Decision-Making
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-119	RTG	Energy and Defence: Reducing Dependencies & Vulnerabilities – Enhancing Efficiency
SAS-120	RTG	Integration of Women into Ground Combat Units
SAS-123	RTG	Futures Assessed alongside Socio-Technical Evolutions (FATE)
SAS-124	RTG	Visual Analytics for Communicating Defence Investment Uncertainty and Risk
SAS-125	RTG	Comparative Analysis of Acquisition Processes
SAS-128	RTG	Modelling Personnel Flows; Identifying Potential Solutions to Recruiting and Retention Challenges
SAS-129	RTG	Gamification of Cyber Defence/ Resilience
SAS-130	RTG	Course of Action Analysis in the 21st Century
SAS-131	RWS	Threshold Concepts for and by Smaller Forces
SAS-132	RTG	Models and Tools for Logistics Analysis
SAS-133	RTG	Assessment/Analysis Support to Facilitate the Introduction of NLW by Addressing Line of Development Obstacles
SAS-134	RTG	Modelling the Transformation of Resource Inputs into Defence Outputs and Outcomes
SAS-135	RTG	Analysis of Factors Involved in Interalliance Biometric Sharing
SAS-136	RTG	Optimization of Investment in Simulation-Based Military Training
SAS-137	RSY	Integration of Women into Ground Combat Units
SAS-142	ST	Development of an Internet Exploitation Grading System

Table 15: SAS activities starting in 2018

ACTIVITY	TYPE	TITLE
SAS-138	RTG	Methods for Forecasting Attrition and Force Strength: Quantifying and Reporting Uncertainty for Managing Risk in Military Personnel Planning
SAS-139	RTG	NATO Analytical War Gaming - Innovative Approaches for Data Capture, Analysis and Exploitation
SAS-140	RTG	Directed Energy Weapons Concepts and Employment
SAS-141	RSY	Deterrence and Assurance Within an Alliance Framework
SAS-143	RTG	Agile Multi-Domain C2 of Socio-Technical Enterprises in Hybrid Operations

SYSTEMS CONCEPTS AND INTEGRATION PANEL

Panel Chairman: Dr Ric SCHLEIJPEN (NLD)
As of May 2018: Panel Chairman: Dr. Karin STEIN (DEU)
Vice Chairman: Ms Caroline WILCOX (CAN)
As of May 2018: Vice Chairman: Mr. Allan CHAN (USA)
Executive: Lt Col Ryan SNIDER (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 16: SCI activities continuing in 2018

ACTIVITY	TYPE	TITLE
SCI-229	RTG	Space Environment Support to NATO Space Situational Awareness **
SCI-236	AG	Safety and Risk Management in Flight Testing **
SCI-245	AG	Reduced Friction Runway Surface Flight Testing **
SCI-260	RTG	Platform-level EW Architectures for Joint/Coalition Air Operations
SCI-277	RLS	Store Separation and Trajectory Prediction
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 Toward Stand-off Detection in Future Route Clearance
SCI-287	RTG	Assessment Methods for Camouflage in Operational Context

ACTIVITY	TYPE	TITLE
SCI-288	RTG	Autonomy in Communications-Limited Environments
SCI-291	RWS	Scenarios For Assessment Methods For Camouflage In Operational Contexts**
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
SCI-297	RTG	Distributed EW Operations in the Modern Congested RF Environment
SCI-298	RTG	Identification and Neutralization Methods and Technologies for C-IED
SCI-300	RSY	Cyber Physical Security of Defence Systems
SCI-301	RTG	Defeat of Low Slow and Small (LSS) Air Threats
SCI-302	RTG	DIRCM Concepts and Performances
SCI-304	RTG	Optimized and Reconfigurable Antennas for Future Vehicle Electronic Counter Measures

Table 17: SCI activities starting in 2018

ACTIVITY	TYPE	TITLE
SCI-303	AG	Ag-300 V.33 Flight Test Techniques for the Assessment of Fixed-wing Aircraft Handling Qualities
SCI-305	COM	Flight Test Technical Team (FT3)
SCI-306	AG	Ag-300 V.34 Reduced Friction Runway Surface Flight Testing: Issue 2
SCI-307	RTG	FAMOS Framework for Avionics MissiOn Systems
SCI-308	RSM	Resiliency Concepts to Enhance Preservation of NATO Space Capabilities
SCI-309	RWS	Opportunities/Implications of Large Scale Commercial Small Satellite Constellations to NATO Operations
SCI-310	RTG	Expanded Countermeasure Methods Against IR Anti-Ship Threats in Varied Parameter and Scenario Engagements Using all-digital Tools Sets
SCI-311	RTG	Collaborative Space Domain Awareness Data Collection and Fusion Experiment
SCI-312	RTG	EO-IR Countermeasures

SENSORS & ELECTRONICS TECHNOLOGY PANEL

Panel Chairman: Dr. Augustus W. FOUNTAIN III (USA)

Vice - Chairman: Prof. David BLACKNELL (GBR)

Panel Executive: Lt Col Francesco SANTORO (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 the development and enhancement of both passive and active sensors, as well as electronic technology capabilities, multi-sensor integration and fusion as they pertain to Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR), Remote Sensing, Electronic Warfare (EW), Communications, and Navigation. To fulfil this mission, the SET Panel is organized into three Focus Groups: Radio-Frequency Technology (RFT); Optical Technology (OT); and Multi-Sensors and Electronics (MSE).

SCOPE

The research activities of the SET Panel predominantly address topics related to target signatures, 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 may assist NATO war-fighters during future warfare and peace-keeping scenarios. In particular, the scope of activity in the SET Panel includes but is not limited to the following disciplines:

Phenomenology:

- Target/background signatures;
- Propagation and scattering;
- Battlespace environment characterisation;
- Sensor hardening;
- 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, radar imaging, ATR and NCTR) 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 (counter measures, electronic attack, electronic protection, 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 and non-cooperative 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 18: SET activities continuing in 2018

ACTIVITY	TYPE	TITLE
SET-205	RTG	Active Electro-optic Sensing for Target Identification and Tactical Applications
SET-207	RTG	Advanced Situation-Specific Modelling, Sensing and Vulnerability Mitigation Using Passive Radar Technology
SET-211	RTG	Naval Platform Protection in the EO/IR Domain
SET-215	RTG	Model-based SAR Automatic Target Recognition
SET-217	RTG	Assessing and Modelling the Performance of Digital Night Vision Image Fusion
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-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

ACTIVITY	TYPE	TITLE
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-240	RTG	Exploitation of Longwave Infrared Airborne Hyperspectral Data
SET-242	RTG	Passive Coherent Locators on Mobile Platforms
SET-243	RLS	Passive Radar Technology
SET-245	RTG	Radar Based Non-Cooperative Target Recognition (NCTR) in the Low Airspace and Complex Surface Environments
SET-246	RTG	Short Wave Infrared Technology: a Standardized Irradiance Measurement and Compatibility Model to Evaluate Reflective Band Systems
SET-249	RTG	Laser Eye Dazzle – Threat Evaluation and Impact on Human Performance
SET-250	RTG	Multi-Dimensional Radar Imaging
SET-251	RTG	Radar Signature Management – Benefit To Ships
SET-252	RTG	Development of a Validation Model of a Stealth UCAV
SET-255	RSM	Military Applications of Extreme Laser Fields

Table 19: SET activities starting in 2018

ACTIVITY	TYPE	TITLE
SET-SCI-254	RSM	Counter Passive Radar
SET-256	RTG	Interoperability & Networking of Disparate Sensors and Platforms for ISR Applications
SET-258	RTG	DMPAR Deployment and Assessment in Military Scenario
SET-259	RSM	Vectors in Radar: Opportunities for Operations and the Military
SET-260	RTG	Assessment of EO/IR Technologies for Detection of Small UAVs in an Urban Environment
SET-261	RTG	Dismounted Soldier System Based on Smart Textiles and Wearable Sensors

Table 20: SET activities starting in 2019

ACTIVITY	TYPE	TITLE
SET-257	RLS	Compressive Sensing Techniques for Radar and ESM Applications

THEMATIC APPROACH

1. Themes are urgent multi-disciplinary topics described as a military capability (or group of capabilities) that Nations need to be able to accomplish. Themes will be cross-panel in nature and are meant to identify areas where NATO should increase S&T as well as lead to the establishment of new Communities of Interest across the Panel/Group structures.
2. In the Spring of 2017, three Themes were identified:
 - a. Autonomy,
 - b. Artificial Intelligence and Big Data for Military Decision Making, and
 - c. Operations in a Contested Urban Environment.
3. The tables below list the current activities that support these Themes. The second table for each topic lists the Exploratory Teams (ETs) for each Theme. ETs are approved at the Panel/Group level when a particular expertise is required to assist or advise on the technical merit or feasibility of a specific proposal for a technical activity.

Table 21: Autonomy

ACTIVITY	TYPE	TITLE
AVT-255	RTG	Unmanned Systems Mission Performance Potential for Autonomous Operations
AVT-274	RLS	Unmanned Air Vehicles - Technological Challenges, Concepts of Operations and Regulatory Issues
AVT-278	RTG	Risk-Based Safety Assessment of Operational Airworthiness and Certification Requirements
AVT-279	RTG	Formation Flying for Efficient Operations
HFM-242	RTG	Technology Alternatives for Medical Training: Minimizing Live Tissue Use
HFM-257	RTG	Modelling and Simulation Technologies for Training Medical/Healthcare Professionals
HFM-259	RTG	Human Systems Integration Approach to Cyber Security
HFM-260	RTG	Enhancing Warfighter Effectiveness with Wearable Bio Sensors and Physiological Models
HFM-268	RTG	Cross Panel Activity on Synthetic Environments for Mission Effectiveness Assessment
HFM-279	RTG	Human Factors and ISR Concept Development And Evaluation
HFM-279	RTG	Leveraging Technology in Military Mental Health
HFM-297	RTG	Assessment Of Augmentation Technologies For Improving Human Performance
HFM-300	RSY	Symposium on Human Autonomy Teaming
IST-147	RTG	Military Applications of Internet of Things
IST-149	RTG	Capability Concept Demonstrator for Interoperability within Unmanned Ground Systems and C2
IST-152	RTG	Autonomous Cyber Defence Agents
IST-157	RTG	Human in the Loop Considerations for Artificial Intelligence
IST-162	RTG	Cyber Monitoring and Detection Capability For Military Systems (IWA)

IST-163	RTG	Deep Machine Learning For Cyber Defense (IWA)
IST-164	RTG	Securing Unmanned and Autonomous Vehicles for Mission Assurance (IWA)
MSG-145	RTG	Operationalization of Standardized C2-Simulation Interoperability
MSG-154	RTG	Low, Slow, Small Threats Modelling and Simulation
MSG-165	RTG	Incremental Implementation of Mission Training through Distributed Simulation for Joint and Combined Air Operations
SAS-133	RTG	Assessment/Analysis Support to Facilitate the Introduction of NLW by Addressing Line of Development Obstacles
SAS-140	RTG	Directed Energy Weapons Concepts and Employment
SCI-288	RTG	Autonomy in Communications-Limited Environments
SCI-294	RTG	Demonstration and Research of Effects of RF Directed Energy Weapons on Electronically Controlled Combustion Engines
SCI-301	RTG	Defeat of Low Slow and Small (LSS) Air Threats
SET-229	RTG	Cooperative Navigation in GNSS Degraded and Denied Environments

Table 22: Autonomy - Exploratory Teams

ACTIVITY	TITLE
HFM-ET-164	Health and Readiness in a Complex Environment
HFM-ET-167	Development of Autonomous Medical Systems for Tactical Evacuation
HFM-ET-169	Closed Loop (automated) Control of Medical Devices
SET-ET-100	Swarm-Centric Systems
SET-ET-101	Mobile Quantum Sensors for Navigation, Timing, And Gravitation
SET-ET-107	Automated Scene Understanding for Battlefield Awareness

Table 23: Big Data and Artificial Intelligence for Military Decision Making

ACTIVITY	TYPE	TITLE
AVT-252	RTG	Stochastic Design Optimization for Naval and Aero Military Vehicles
HFM-248	RTG	Social Media and Information Technology for Disaster and Crisis Response
HFM-276	RTG	Human Factors and ISR Concept Development and Evaluation
HFM-286	RTG	Leader Development for NATO Multinational Military Operations
HFM-293	RTG	Digital and Social Media Assessment for Effective on Communication and Cyber Diplomacy
HFM-294	RTG	Big Data in the Military: Integrating Genomics into the Pipeline of Standard-Care Testing & Treatment
IST-132	RTG	Multi-Level Fusion of Hard and Soft Information
IST-141	RTG	Exploratory Visual Analytics
IST-144	RTG	Content-Based Multimedia Analytics

IST-159	RTG	Cyber Intelligence and Social Media
IST-160	RSM	Big Data and Artificial Intelligence for Military Decision Making
IST-165	RTG	High-Level Fusion of Hard and Soft Information for Intelligence
SAS-111	RTG	Collection and Management of Data for Analysis Support to Operations
SAS-139	RTG	NATO Analytical War Gaming - Innovative Approaches for Data Capture, Analysis and Exploitation
SAS-142	ST	Development of an Internet Exploitation Grading System
SAS-143	RTG	Agile Multi-Domain C2 of Socio-Technical Enterprises in Hybrid Operations
SET-256	RTG	Interoperability & Networking of Disparate Sensors and Platforms for ISR Applications
SET-257	RLS	Compressive Sensing Techniques for Radar and ESM Applications

Table 24: Big Data and Artificial Intelligence for Military Decision Making - Exploratory Teams

ACTIVITY	TITLE
AVT-ET-183	Tamper Protection Technologies
AVT-ET-185	Goal-Driven, Multi-Fidelity Approaches for Military Vehicle System-Level Design
SET-ET-103	Airborne Maritime Radar Based Submarine Periscope Detection and Discrimination at High Gazing Angles

Table 25: Operations in a Contested Urban Environments

ACTIVITY	TYPE	TITLE
AVT-282	RTG	Unsteady Aerodynamic Response of Rigid Wings in Gust Encounters
AVT-310	RTG	Hybrid/Electric Aircraft Design and STAndards , Research and Technology (HEADSTART)
AVT-314	RTG	Assessment and Reduction of Installed Propeller and Rotor Noise from Unmanned Aircraft
AVT-318	RTG	Low Noise Aeroacoustic Design for Turbofan-Powered NATO Air Vehicles
AVT-323	RSY	Hybrid/Electric Aero-Propulsion Systems for Military Applications
HFM-262	RTG	Health Risk Assessment for Chemical Exposures of Military Interest
HFM-273	LTSS	Chemical, Biological and Radiological Defence
IST-150	RTG	NATO Core Services Profiling for Hybrid Tactical Networks
MSG-140	RTG	Urban Combat Advanced Training Technology - Live Simulation Standards (UCATT-LSS)
MSG-146	RTG	Simulation for Training and Operation Group-Land (STOG-L)
MSG-156	RTG	Dynamic Synthetic Environments for Distributed Simulation
MSG-158	RTG	Operational Requirements for Training Interoperability—2019
SET-245	RTG	Radar Based Non-Cooperative Target Recognition (NCTR) in the Low Airspace and Complex Surface Environments
SET-260	RTG	Assessment of EO/IR technologies for detection of small UAVs in an urban environment

Table 26: Operations in a Contested Urban Environments - Exploratory Teams

ACTIVITY	TITLE
HFM-ET-164	Health and Readiness in a Complex Environment
SAS-ET-DU	Programmatic Approach To Operations in Contested Urban Environment
SCI-ET-041	UAV Swarms For Electronic Warfare In Urban Environment
SET-ET-106	Remote Intelligence of Building Interiors (RIBI)

NEW 2018 ACTIVITIES BY TYPE

Table 27: Lecture Series

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-325	(VKI) Flow Characterization and Modeling of Hypersonic Wind Tunnels	Jun 2018	von Karman Institute for Fluid Dynamics, Belgium	Public Release
AVT-326	(VKI) 3rd Lecture Series on Uncertainty Quantification in Computational Fluid Dynamics	Jun 2018	von Karman Institute for Fluid Dynamics, Belgium	Public Release
		tbd	Stanford University, USA	

Table 28: Task Groups

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-290	Standardization of Augmented Reality for Land Platforms in Combat Environments	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-291	Range Design and Management for Reduced Environmental Impact	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-292	Munition Health Management Technologies: Effects on Operational Capability, Interoperability, Life-Cycle Cost and Acquisition of Missile Stockpiles of NATO Nations	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-293	Effect of Environmental Regulation on Energetic Systems and the Management of Critical Munitions Materials and Capability	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-294	Towards Improved Computational Tools For Electric Propulsion	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-296	Rotorcraft Flight Simulation Model Fidelity Improvement and Assessment	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-297	Development of a Framework for Validation of Computational Tools for Analysis of Air and Sea Vehicles	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-298	Reynolds Number Scaling Effects on Swept-Wing Flows	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-299	Assessment of Anti-Icing and De-Icing Technologies for Air and Sea Vehicles	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-300	Naval Ship Maneuverability in Ice	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-301	Flowfield Prediction for Maneuvering Underwater Vehicles	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
AVT-308	Cooperative Demonstration of Technology (CDT) for Next-Generation NATO Reference Mobility Model (NG-NRMM)	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
HFM-298	Injury Thresholds of High Power Pulsed Radiofrequency Emissions	1 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release
HFM-299	Pulmonary Screening and Care in Aviators	1 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release
HFM-301	Military Diversity: Ethnic Tolerance and Intolerance	1 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release
IST-159	Exploitation of Cyberspace for Intelligence	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	NATO RESTRICTED Non-NATO Invited
IST-161	Efficient Group and Information Centric Communications in Mobile Military Heterogeneous Networks (COM).	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	Public Release
IST-162	Cyber Monitoring and Detection Capability For Military Systems (IWA)	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	Public Release
IST-163	Deep Machine Learning for Cyber Defense (IWA)	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	Public Release
IST-164	Securing Unmanned and Autonomous Vehicles For Mission Assurance (IWA)	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	Public Release
IST-165	High-level Fusion of Hard and Soft Information for Intelligence (AI2S)	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	NATO UNCLASSIFIED Non-NATO Invited
MSG-163	Evolution of NATO Standards for Federated Simulation	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	Public Release
MSG-164	Modelling and Simulation as a Service - Phase 2	5-9 Feb 2018	Bydgoszcz POL	Public Release
MSG-165	Incremental Implementation of Mission Training Through Distributed Simulation for Joint And Combined Air Operations	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	NATO SECRET
SAS-138	Methods for Forecasting Attrition and Force Strength: Quantifying and Reporting Uncertainty for Managing Risk in Military Personnel Planning	7-9 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release
SAS-139	NATO Analytical War Gaming - Innovative Approaches for Data Capture, Analysis and Exploitation	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	NATO/PfP SECRET Non-NATO Invited
SAS-140	Directed Energy Weapons Concepts and Employment	2 nd quarter 2018	CSO Facility, Neuilly/Seine, France	NATO/PfP SECRET Non-NATO Invited

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SAS-143	Agile Multi-Domain C2 of Socio-Technical Enterprises in Hybrid Operations	22-25 Apr 2018	CSO Facility, Neuilly/Seine, France	Public Release
SCI-307	FAMOS Framework for Avionics MissiOn Systems	Apr 2018	CSO Facility, Neuilly/Seine, France	NATO RESTRICTED
SCI-310	Expanded Countermeasure Methods Against IR Anti-Ship Threats in Varied Parameter and Scenario Engagements Using all-digital Tools Sets	1 st quarter 2018	CSO Facility, Neuilly/Seine, France	NATO SECRET
SCI-311	Collaborative Space Domain Awareness Data Collection and Fusion Experiment	10-12 Apr 2018	CSO Facility, Neuilly/Seine, France	NATO UNCLASSIFIED Non-NATO Invited
SCI-312	EO-IR Countermeasures	1-2 Mar 2018	CSO Facility, Neuilly/Seine, France	NATO SECRET
SET-256	Interoperability & Networking of Disparate Sensors and Platforms for ISR Applications	Feb – Mar 2018	CSO Facility, Neuilly/Seine, France	NATO UNCLASSIFIED Non-NATO Invited
SET-258	DMPAR Deployment and Assessment in Military Scenario	Mar 2018	CSO Facility, Neuilly/Seine, France	NATO CONFIDENTIAL Non-NATO Invited
SET-260	Assessment of EO/IR Technologies for Detection of Small UAVs in an Urban Environment	Feb 2018	CSO Facility, Neuilly/Seine, France	NATO RESTRICTED Non-NATO Invited
SET-261	Dismounted Soldier System Based on Smart Textiles and Wearable Sensors	Feb 2018	CSO Facility, Neuilly/Seine, France	Public Release

Table 29: Specialists' Meetings

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-322	Combustion Products, Exposure and Related Risks	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
AVT-324	Multi-Disciplinary Design Approaches and Performance Assessment of Future Combat Aircraft	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	
SCI-308	Resiliency Concepts to Enhance Preservation of NATO Space Capabilities	11-15 Jun 2018	Bucharest, Romania	NATO UNCLASSIFIED Non-NATO Invited
SET-SCI-254	Counter Passive Radar	Spring 2018	Portsmouth West, United Kingdom	NATO SECRET Non-NATO Invited
SET-259	Vectors in Radar: Opportunities for Operations and the Military	14-15 May 2018	Bucharest, Romania	NATO SECRET Non-NATO Invited

Table 30: Workshops

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SCI-309	Opportunities/Implications of Large Scale Commercial Small Satellite Constellations to NATO Operations	Second half of 2018	United Kingdom	NATO UNCLASSIFIED Non-NATO Invited

Table 31: Technical Course

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-321	User Outreach and Promotion for the Unified Generic Model of a Missile Propulsion Subsystem	16-20 Apr 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 Dec 2018	Athens, Greece	

Table 32: Symposia

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-323	Hybrid/Electric Aero-Propulsion Systems for Military Applications	16-20 April 2018	Torino, Italy	NATO UNCLASSIFIED Non-NATO Invited
		10-14 December 2018	Athens, Greece	
HFM-300	Symposium on Human Autonomy Teaming	15-17 Oct 2018	Portsmouth, United Kingdom	Public Release
MSG-159	NMSG Annual Symposium 2018	Fall 2018	Ottawa, Canada	Public Release
MSG-166	MSG/MSCO Support to International Training & Education Reference Number MSG-166 Conferences ITEC, I/ITSEC and CAX Forum 2019	May/Sep 2019	Tbd	Public Release
		Nov 2019	Orlando, FL, USA	
SAS-141	Deterrence and Assurance within an Alliance Framework	Fall 2018	London, United Kingdom	NATO SECRET PfP, Non-NATO Invited

Table 33: Agardograph

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SCI-303	Ag-300 V.33 Flight Test Techniques For The Assessment Of Fixed-Wing Aircraft Handling Qualities	20-21 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release
SCI-306	Ag-300 V.34 Reduced Friction Runway Surface Flight Testing: Issue 2	20-21 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release

Table 34: Committee

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SCI-305	Flight Test Technical Team (ft3)	20-21 Mar 2018	CSO Facility, Neuilly/Seine, France	Public Release

NEW 2019 ACTIVITIES BY TYPE

(FIRST MEETING)

Table 35: Task Groups 2019

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
AVT-309	Implication of Synthetic Fuels on Land Systems and on NATO Single Fuel Policy	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-310	Hybrid/Electric Aircraft Design and STAndards , Research and Technology (HEADSTART)	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-311	Availability and Quality Issues with Raw Materials for Rocket Propulsion Systems and Potential Consequences for NATO	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-312	Airworthiness Tools and Processes for Complex Rotorcraft Systems Safety	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-313	Incompressible Laminar-to-Turbulent Flow Transition Study	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-314	Assessment and Reduction of Installed Propeller and Rotor Noise from Unmanned Aircraft	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-315	Comparative Assessment of Modeling and Simulation Methods of Shipboard Launch and Recovery of Helicopters	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-316	Vortex Interaction Effects Relevant to Military Air Vehicle Performance	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-317	Trade-Space Exploration to Support the Early Stage Design of Effective & Affordable (Fleets) of Warships	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-318	Low Noise Aeroacoustic Design For Turbofan Powered NATO Air Vehicles	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	
AVT-319	High Speed Rotorcraft Analysis and Evaluation	May 2019	Slovakia	NATO UNCLASSIFIED
		Oct 2019	Norway	
AVT-320	Assessments of Numerical Simulation Methods for Turbulent Cavitating Flows	May 2019	Slovakia	NATO UNCLASSIFIED Non-NATO Invited
		Oct 2019	Norway	

Table 36: Lecture Serious 2019

ACTIVITY	TITLE	MEETING DATES	MEETING LOCATIONS	DISTRIBUTION and PARTNER PARTICIPATION
SET-257	Compressive Sensing Techniques for Radar and ESM Applications	Mar 2019	Birmingham, United Kingdom	NATO UNCLASSIFIED Non-NATO Invited
		Apr 2019	Pisa, Italy	
		2019	Dayton, OH, USA	