NATO OTAN

SCIENCE & TECHNOLOGY ORGANIZATION

COLLABORATION SUPPORT OFFICE

WORKSHOP

BIG DATA CHALLENGES: SITUATION AWARENESS AND DECISION SUPPORT

IST-178

organised by the

Information Systems and Technology Panel

to be held at

Radisson Blu Beke Hotel, Budapest, Hungary

Tuesday 15 October - Wednesday 16 October 2019

This Workshop is open to NATO nations, PfP nations, Mediterranean Dialogue, ICI nations and Global Partners

ENROLMENTS: Participants are requested to enrol on line at
https://events.sto.nato.int
Deadline for enrolments is 1 October 2019
There are no conference fees.

Collaboration Support Office – Point of Contact:

Mrs. Aysegül APAYDIN   Tel: +33 (0)1 5561 2282
IST Panel Assistant   Fax: +33 (0)1 5561 9626

S&T organization **cso**

Background

Information Systems Technology Panel (IST) is one of the seven Panels whose role it is to implement, on behalf of the Science & Technology Board, the STO Mission with respect to Information Systems Technology. The advancement and exchange of techniques and technologies to provide timely, affordable, dependable, secure and relevant information to war fighters, planners and strategists, as well as enabling technologies for modelling, simulation, and training are the focus of this Panel. The Information Systems Technology Panel covers the fields of Information Warfare and Assurance, Information and Knowledge Management, Communications and Networks and Architecture and Enabling Technologies.

Theme - Objectives –Topics

There are many Research Task Groups (RTGs) and Exploratory Teams (ETs) under different NATO Panels and the NATO Modelling and Simulation Group (NMSG) all working on different aspects of defence, military and intelligence challenges, e.g. big data exploration, decision support, mission planning, human factors, medicine, modelling and simulation and visual analytics etc. The IST-178 Workshop invites members of the different RTGs and ETs together in a workshop that will enable them to explore and benefit from each other's work, and to develop collaborations to complement and enhance their respective efforts, as well as facilitating the sharing of data, tasks and tools.

The main objective of this two-day Inter-Panel / Inter-Group Workshop is to provide the means for the RTG/ET members to discuss views, challenges, and work on the use of big data to support the military with obtaining situation awareness and informed decision making.

The aim of the Workshop is to establish a raised awareness of common and different problems, available and foreseen technologies, capabilities and efforts, as well as to support the development of collaborations. This may lead to outcomes such as joint Inter-Panel / Inter-Group collaborations; sharing of data, tools and tasks; and the generation of new research ideas for RTGs and /or ET Technical Activity Proposals (TAPs).

TOPICS:

The theme of this meeting is how the availability of big data may assist the military in understanding the situations they will encounter, and how this may support them in making better decisions. The challenges for development and opportunities for the exploitation of Big Data are likely to vary from domain to domain. This workshop intends to host the discussion for a broad spectrum of potential (military) domains, such as Human Factors, Artificial Intelligence, Information Warfare, Situation Awareness and Decision Support, Visual Analytics and visualization, etc…

WORKSHOP FORMAT and ORGANIZATION:

The workshop will commence with selected presentations to inspire and provide directions for the workshop discussion. We plan an interactive workshop, consisting of several working groups, each with a different theme, topic, and/or domain. The working groups will be arenas for in-depth discussions. Each participant in the workshop will be assigned to a working group, with the aim to have participants from the various communities in each group. These working groups will be formed on the first day. Each working group is to produce a summary report of their discussion, and to present it to the other groups at the end of the workshop. Attendance will be limited to 50 people.

Programme Committee

Programme Co-Chairs

Dr. Margaret VARGA
Seetru Ltd. / Oxford University
United Kingdom
Email: margaret.varga@zoo.ox.ac.uk

Dr. Karel van den BOSCH
TNO Behavioural and Social Sciences
The Netherlands
Email: karel.vandenbosch@tno.nl

Members
Dr. Elena CAMOSSI
Center for Maritime Research & Experimentation
CMRE
Email: elena.camossi@cmre.nato.int
Mrs. Francesca de ROSA
Center for Maritime Research & Experimentation
CMRE
Email: francesca.derosa@cmre.nato.int
Prof. Wim MEES
Royal Military Academy
Belgium
Email: wim.mees@rma.ac.be
Col.Dr.Eng. Nikolai STOIANOV
Defence Institute
Bulgaria
Email: n.stoianov@di.mod.bg
Dr. Cathy BOSCARINO
Defence Research & Development Canada
Canada
Email: cathy.boscarino@drdc-rddc.gc.ca
Dr. Bruce FORRESTER
Defence Research & Development Canada
Canada
Email: bruce.forrester@drdc-rddc.gc.ca
Ms. Valérie LAVIGNE
Defence Research & Development Canada
Canada
Email: valerie.lavigne@drdc-rddc.gc.ca
Prof. Bob MADAHAR
Dstl
United Kingdom
Email: bkmadahar@dstl.gov.uk
Prof. Cyril RAY
IRENav, Ecole Navale
France
Email: cyril.ray@ecole-navale.fr

Mr. Albert PRITZKAU
Fraunhofer-FKIE
Germany
Email: albert.pritzkau@fkie.fraunhofer.de

Dr. Carsten WINKELHOLZ
Fraunhofer-FKIE
Germany
Email: carsten.winkelhorz@fkie.fraunhofer.de

Dr. Andras BENCZUR
Hungarian Academy of Sciences
Hungary
Email: benczur@sztaki.mta.hu

Prof. Tomas KRILAVICIUS
Baltic Institute of Advanced Technology
Vytautas Magnus University
Lithuania
Email: tomas.krilavicius@bpti.lt

Dr. Petter BIVALL
Swedish Defence Research Agency
Sweden
Email: petter.bivall@foi.se

Dr. Liz BOWMAN
US Army Futures Command
United States
Email: elizabeth.k.bowman.civ@mail.mil

Dr. Alexander KOTT
Army Research Laboratory
United States
Email: alexander.kott1.civ@mail.mil

Dr. Kristen LIGGETT
Air Force Research Laboratory
United States
Email: kristen.liggett@us.af.mil

Dr. Michael STREET
NCIA
The Netherlands
Email: michael.street@ncia.nato.int

Ms. Ivana Ilic MESTRIC
NCIA
The Netherlands
Email: ivana.ilicmestric@ncia.nato.int

Science and Technology Organization in NATO

In NATO, Science & Technology (S&T) is defined as the selective and rigorous generation and application of state-of-the-art, validated knowledge for defence and security purposes. S&T activities embrace scientific research, technology development, transition, application and field-testing, experimentation and a range of related scientific activities that include systems engineering, operational research and analysis, synthesis, integration and validation of knowledge derived through the scientific method.

In NATO, S&T is addressed using different business models:

- The Collaborative business model where NATO provides a forum where NATO Nations and partner Nations elect to use their national resources to define, conduct and promote cooperative research and information exchange.

- The In-House delivery business model where S&T activities are conducted in a NATO dedicated executive body, having its own personnel, capabilities and infrastructure.

The Science and Technology Organization - STO

The mission of the NATO STO is to help position the Nations' and NATO's S&T investments as a strategic enabler of the knowledge and technology advantage for the defence and security posture of NATO Nations and partner Nations, by:

- Conducting and promoting S&T activities that augment and leverage the capabilities and programmes of the Alliance, of the NATO Nations and the partner Nations, in support of NATO's objectives;

- Contributing to NATO's ability to enable and influence security- and defence-related capability development and threat mitigation in NATO Nations and partner Nations, in accordance with NATO policies;

- Supporting decision-making in the NATO Nations and NATO.

Acknowledgements

We wish to thank our hosts from Hungary for organising and hosting this event in the facilities they have chosen in their lovely city, Budapest.

http://www.sto.nato.int

IST-178 Workshop on
Big Data Challenges: Situation Awareness and Decision Support
Programme

Tuesday 15 October 2019

08:30 **REGISTRATION**

09:00 **OPENING CEREMONY**
Host Welcome Speech
Introduction: Dr.Eng. Michael WUNDER, Chairman IST Panel
Introduction to the Workshop: Dr. Margaret VARGA, GBR
Dr. Karel van den BOSCH, NLD
Administrative Announcements: LtCol. Attila HAJDU, HUN
SESSION 1 – INTRODUCTION

09:30 **KEYNOTE SPEECH 1:**
Big Data Challenges – Like War
by Dr.Ing. Michael WUNDER, IST Panel Chairman, DEU

10:15 **BREAK**
SESSION 2– AI and MACHINE LEARNING

10:45 **1** Extracting Value from NATO Data Sets through Machine Learning and Advanced Data Analytics
by I.I. MESTRIC, A. KOK, G. VALIYEV, M. STREET, P. LENK, NCIA, NLD, M. RACOVITA, F. VIEIRA, JALLC, PRT

11:15 **2** Living S&T Roadmap for Artificial Intelligence and Big Data for Military Decision Making
by F. DESHARNAIS, DR&D Canada, CAN, A. BARROS, P. KERBUSCH, TNO, NLD

11:35 **3** Exploitation of Sensor Data Using Artificial Intelligence for Battlefield Sensemaking
by V. LAVIGNE, M. MOKHTARI, M. BRETON, E. MARTINEAU, J. FOURNIER, DRDC Canada, CAN

11:55 **4** Ukrainian Conflict in Media: Two Approaches to Narratie Analysis
by T. KRILAVICIUS, J. MANDRAVICKAITE, BPTI, Vytautus Magnus University, LTU

12:25 **LUNCH**

SESSION 3 – HUMAN FACTORS

13:40 **5** Developing Transparent Conversational Agent Systems for Intelligence Analysis
by S. HEPENSTAL, DSTL, GBR

14:10 **6** Determining the Effectiveness of Representing Intrusion Detection System Log Files with Visualization Techniques
by G. THOMAS, K. LIGGETT, Wright Patterson AFB, USA

14:30 **7** Meaningful Human Control of AI-Based Systems: What are the Implications for Situational Awareness and Decision Support?
by F. BUTCHER, DSTL, GBR

14:50 **BREAK & SESSION 4 – DEMONSTRATION**

15:50 **SESSION 5 – BREAKOUT GROUP DISCUSSIONS**

17:05 **SESSION 6 – DAY SUMMARY**

17:25 **END**

19:00 **HOST NATION RECEPTION** *(for all attendees)*

Wednesday 16 October 2019

09:00 **KEYNOTE SPEECH 2:**
What's Next for Visual Analytics?
by Ms. Kristin COOK, Pacific Northwest National Laboratory, USA

SESSION 7 – INFORMATION WARFARE AND SOCIAL MEDIA

09:45 **8** Security Perspectives on Social Media Exploitation
by N. BIETENIECE, NATO STRATCOM COE, V. DRAGOS, ONERA, FRA, B. FORRESTER, DRDC Canada, T. KRILAVICIUS, BPTI, LTU, A. PRITZGAU, Fraunhofer FKIE, DEU

10:05 **9** Propaganda Filters: Tracking Malign Foreign Interventions on Social Media in Real Time
by B. FORRESTER, DRDC Canada, Z. DEVEREAUX, A. BACOVCIN, S. BEDOYA, NEXALOGY, CAN

10:25 **BREAK**

10:45 **10** People, Bots or Cyborgs? Analysis of a Hashtag War
by R. GOOLSBY, US Navy, USA

11:05 **11** Towards Big Data in Tactical Domain
by F-T. JOHNSEN, FFI, NOR

11:25 **12** Assessment of IoT Data Ingest Reliability for Urban Environments
by J.R. MICHAELIS, J. FREEMAN, A. RAGLIN, US Army

Research Lab., USA

SESSION 8 – VISUAL ANALYTICS AND VISUALIZATION

11:45 **13** Storytelling Exploratory Visual Analytics for Counter-Improvised Explosive Device Incidents
by V. LAVIGNE, S. JAYARAM, M. PANGE, DRDC Canada, CAN

12:15 **14** A Preliminary Experimentation for Meteorological Data Visual Analytics
by F.M. PISANO, C. ASSUNTINA, R. GIANPAOLO, CIRA, ITA

12:35 **15** Genomic Data Analysis for Infectious Diseases
by M. VARGA, K. JOLLEY, H. BRATCHER, C. RODRIGUES, J. MACLENNAN, O. HARRISON, F. COLLES, J. BRAY, M. MAIDEN, University of Oxford, GBR

12:55 **LUNCH**

14:00 **SESSION 9 – BREAKOUT DISCUSSIONS**

15:00 **BREAK**

15:20 **SESSION 10 – BREAKOUT GROUPS' PRESENTATIONS**

16:20 **CONCLUDING REMARKS AND WORKSHOP CLOSING**

16:30 **END OF MEETING**