Enabling Accelerated Decision Making

For analysts from NATO commands and agencies, national defence analysis and research organisations, centres of excellence, academia, and industry

Get ready for an exciting programme with plenty of opportunities for discussion and debate!

Guest Speakers including the NATO Chief Scientist and face-to-face interaction with senior OR&A professionals

Interactive Workshops on Social Network Analysis, Problem Structuring and Futures Assessments

NORTH ATLANTIC TREATY ORGANISATION
ORGANISATION DU TRAITÉ DE L'ATLANTIQUE NORD

NATO Chief Scientist
NATO HQ, 1110 Brussels
Belgium

Supreme Allied Commander, Transformation
Norfolk, Virginia 23551-2490
United States of America

2017 NATO OR&A Conference

Programme

Sunday	**Title**	**Location**
1900-2100	Registration	Foyer
Monday	**Title**	**Location**
0800-0830	Registration	Foyer
0830-0845	Welcome: • Mr Han de Nijs, ACT (NATO) • BGen Henrik Sommer, Assistant Chief of Staff Capability, Engineering and Innovation, ACT (NATO) • Mr Rob Solly, Division Head for Defence and Security Analysis, DSTL (GBR)	Shannon Room (plenary)
0845-0850	Admin: Mr Stuart Orr, DSTL (GBR)	Shannon Room (plenary)
0850-0930	Keynote: Dr Tom Killion, NATO Chief Scientist	Shannon Room (plenary)
0930-0950	New Conference Features for 2017	Shannon Room (plenary)
0950-1030	Break (refreshments)	Foyer
1030-1200	Stream 1: Defence Planning 1.1 Collaboration between Operational Analysts and Military Staff in the NATO Defence Planning Process (NDPP) 1.2 Operational Analysis Support to Alliance Future Surveillance and Control Programme 1.3 Supporting Strategic Decision-Making in the UK Government: Realizing Benefits from the Use of Multi-Methodology	Shannon Room
	Stream 2: Technology/Tools 2.1 The Application of Artificial Intelligence in Operational and Strategic Level Planning 2.2 Big Analytics and Active Learning Applied to Cyber Security	Liffey Room 3-4
	Workshop - Futures Assessed alongside socio-Technical Evolutions (FATE)	Liffey Room 1
1200-1310	Break (lunch)	

1310-1440	Stream 3: Scenarios/Futures 3.1 Speeding Up Scenario Development for Games and Exercises 3.2 Visions of Warfare 2036: A Futurist Prototyping Methodology to Support Long Term Decision Making 3.3 Use of Morphological Analysis in Decision Support	Shannon Room
	Training A – Problem Structuring	Liffey Room 1
	Training B – Social Network Analysis	Liffey Room 2
1440-1520	Break (refreshments)	Foyer
	Enlightenment 1: Dr Tom Killion	Shannon Room
	Enlightenment 2: Dr David Alberts	Liffey Room 3-4
1520-1620	Stream 4: Modelling 4.1 The Mission Command Model 4.2 Modelling and Simulation in Support of the Operations Process: Challenges and a Novel Implementation	Shannon Room
	Training A – Problem Structuring (continued)	Liffey Room 1
	Training B – Social Network Analysis (continued)	Liffey Room 2
1620-1700	Keynote 2: Dr David Alberts, Senior Fellow, US Institute of Defense Analyses	Shannon Room (plenary)
1700-1730	Late registration	Foyer
1730-1900	Icebreaker	Foyer
Tuesday	**Title**	**Location**
0830-0910	Keynote: LGEN Tim Radford, Commander HQ ARRC	Shannon Room (plenary)
0910-0950	Plenary: NATO OR&A Capability Update 0.1 Helping NATO to think differently: The successes and lessons identified of Alternative Analysis 0.2 Invigorating the OR&A Community of Interest	Shannon Room (plenary)
0950-1030	Break (refreshments)	Foyer
	Enlightenment 3: Ms Jacqueline Eaton, Science & Technology Advice, Office of the Chief Scientist (NATO)	Shannon Room
	Enlightenment 4: Ms Sylvie Martel, Chief Operational Analysis, NATO Communications and Information Agency (NATO)	Liffey Room 3-4
1030-1200	Stream 5: Defence Planning II 5.1 Military-Analytic Method to Support Refinement of Force Packages in the NATO Defence Planning Process (NDPP) 5.2 Utility Assessment of Maritime Unmanned Systems in Anti-Submarine Warfare 5.3 A Steady-State Analytical Model To Access The Impact Of Warship Characteristics And Fleet Size On 'Naval Presence'	Shannon Room

1030-1200	Stream 6: Intelligence 6.1 Assessment and Communication of Uncertainty in Intelligence to Support Decision-Making 6.2 A Multi-Methodology Framework for Modelling Opponent Organizations in the Operational Context 6.3 Terror Pattern Analysis	Liffey Room 3-4
	Break (lunch)	
1310-1440	Stream 7: Planning in Complex Environments 7.1 A Framework for Risk Analysis to Support Operational Planning 7.2 Data Farming Decision Support for Operation Planning	Shannon Room
	Stream 8: All Data 8.1 The Importance of Multiple Perspectives and Methods to Enable Military Decision Making 8.2 Exploiting Data from Sensors of Opportunity from Across the Battlespace 8.3 Finite to Fail but Infinite to Venture: Data Collection and Analysis in Complex Environments	Liffey Room 3-4
	Training B – Social Network Analysis	Liffey Room 2
1440-1520	Break (refreshments)	Foyer
	Enlightenment 5: Mr Alan Shaffer, Director, Collaboration Support Office (NATO)	Shannon Room
	Enlightenment 6: Dr Ana Barros, Principal Scientist Defence, Safety & Security, TNO (NLD)	Liffey Room 3-4
1520-1620	Stream 9: Maritime 9.1 Autonomous Mine Hunting Systems 9.2 Rapid Operational Effectiveness Modelling and Analysis to Support Ship Design and Procurement	Shannon Room
	Stream 10: Supporting Decision Making 10.1 How to Build Up OR&A Capability in Support of Military Decision Making. Experiences and Challenges 10.2 Enabling the 1st Step and the Final Mile: The Power of MOD's Science Gateway Network	Liffey Room 3-4
	Training B – Social Network Analysis Training (continued)	Liffey Room 2
1620-1700	Keynote 4: Mr Alan Shaffer, Director, Collaboration Support Office (NATO)	Shannon Room (plenary)
1700	Conference Closure	

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Abstract Booklet

Keynotes

KN1 Conference Opening
Dr. Thomas Killion, Chief Scientist, NATO Science and Technology Organization

KN2 Closing day 1 - Technology Enabled Command and Control (C2) Agility
Dr. David S. Alberts, Senior Fellow, US Institute of Defense Analysis

KN3 Opening day 2
LGEN Tim Radford, Commander HQ Allied Rapid Reaction Corps

KN4 Conference Closure
Mr. Alan R. Shaffer, Director, Collaboration Support Office, NATO Science and Technology Organization

Plenary: NATO OR&A Capability Update

0.1 Helping NATO to think differently: The successes and lessons identified of Alternative Analysis
Ms. Dani Fenning, Ms. Sue Collins, Dr. Bianca Barbu, Operational Analysis Branch, Allied Command Transformation (NATO)

In NATO, Alternative Analysis (AltA) is described as the synthesis of independent, critical thinking and alternative views in a set of easy-to-use techniques that enriches existing decision making processes. AltA offers the opportunity to inject new knowledge or perceptions in a different way alongside more traditional problem solving processes. AltA aids overcoming cognitive biases that can be made when using "on the fly" methods; it presents a useful and viable mitigation for group think, mirror imaging and other pitfalls of decision making. This paper reviews the successes AltA has had in helping NATO to think differently, its lessons identified, the impact it has had on decision making and what the future holds for continued capability development of AltA.

0.2 Invigorating the OR&A Community of Interest
Ms. Jacqueline Eaton, Science & Technology Advice, Office of the Chief Scientist, STO (NATO)

Participants will be invited to share their views about the way the OR&A community should develop. Specifically, what common goal could the community unite to achieve and what should next year's conference look like?

Stream 1: Defence Planning

1.1 Collaboration between Operational Analysts and Military Staff in the NATO Defence Planning Process (NDPP)
Mr. Glenn Richards, Operational Analysis Service Line, NCI Agency (NATO), and CDR Sokratis Karamoutas, Allied Command Transformation (NATO)

During the 2017 NATO Defence Planning Process, a new methodology was developed to derive NATO's capability requirements. This consisted of an initial structural phase to develop a pool of capabilities, followed by a second phase where scenarios were used to 'iteratively stress test' the pool to generate a Minimum Capability Requirement (MCR). This process involved close collaboration between Operational Analysts and military staff to ensure the application of military judgement while preserving analytical rigour. This presentation highlights some of the techniques used to support the development of the MCR and highlights some of the challenges faced in the analyst/military interface.

1.2 Operational Analysis Support to Alliance Future Surveillance and Control Programme

Dr. Dave Allen and Mr. Andrew Wind, Operational Analysis Service Line, NCI Agency (NATO), and Mr. Simon Purton, Operational Analysis Branch, Allied Command Transformation (NATO)

The Alliance Future Surveillance and Control (AFSC) programme identifies the requirements for the follow-on capability to the E-3 Airborne Early Warning and Control System (AWACS). Operational analysis provides support to these long term decisions, applying a broad range of methodologies to address the complicated problem:

- Scenarios are developed to capture the plausible mission tasks that will be required;
- NATO Defence Planning Process (NDPP) methods are applied for defining the requirements;
- Morphological methodology is used for exploring the problem space; and,
- Architectural approaches are used for structuring the potential solutions.

1.3 Supporting Strategic Decision-Making in the UK Government: Realizing Benefits from the Use of Multi-Methodology

Ms. Jane Christie, ESRC CASE Researcher, Kent Business School, University of Kent (GBR)

Despite the prevalence of multi-methodology, evaluation of its use is a recent development. Evidence of its contribution to project success is scarce. In this presentation I shall review preliminary results from my research into its prevalence, forms, practical benefits, challenges, and in particular how reaching better answers for defence decision makers on complex strategic issues is constrained and enabled by time. This is collaborative research at the University of Kent, supervised by Professor John Mingers, and funded by the ESRC and Dstl. It is helping Dstl review how it identifies analysis methods and consider alternative approaches to supporting evidence-based decision-making.

Stream 2: Technology/Tools

2.1 The Application of Artificial Intelligence in Operational and Strategic Level Planning

Maj. Kathleen McKendrick, Course Director, NATO Centre of Excellence Defence Against Terrorism (NATO)

Envisioning the application of artificial intelligence in a future battlefield where sensors and inputs are optimised for machine interpretation, my research paper presents the potential for both automation and autonomous machine decision-making in military planning. A comparative analysis of human and machine limitations shows us that our assumptions about the irreplaceability of human decision-making at the very highest levels of warfare may be misguided. The implications of increased machine involvement in high level military decision making are explored, highlighting the potential and some of the risks.

2.2 Big Analytics and Active Learning Applied to Cyber Security

Ms. Martine Lapierre, CTO Defense, THALES Communications and Security (FRA)

Security Operations Centers (SOC) monitor and detect cyber-attacks by analyzing attack signature and/or expert based rules. The definition of appropriate rules is complex and has limited efficiency yielding the use of machine

learning algorithms. However, massive data labeling by human experts is required for training. Active learning provides an alternative as it automatically detects most relevant data for labeling saving 90% of the labeling effort, while keeping the results accuracy of the model. The present paper shows the result of an active learning algorithm testing for the cyber-security domain. Moreover, the concept "Explainable AI" where the automatic decisions validity is introduced. These results could be applied to the NATO Computer Incident Response Capability and military systems.

Stream 3: Scenarios/Futures

3.1 Speeding Up Scenario Development for Games and Exercises

Dr. Håvard Fridheim and Mr. Stein Malerud, Principal Scientists, Defence Research Establishment (FFI) (NOR)

Scenarios for military table-top games and exercises must be fit for purpose i.e. relevant, challenging, sufficiently detailed, and engaging for participants. Over time, we have observed that customers expect that less time and resources are used for the planning of table-top games, including scenario development. Thus, we have looked at ways to speed up and streamline the table-top game planning process without compromising on the quality of the resulting scenarios. The presentation will cover our structured, multi-methodological approach to scenario development, with examples of how the approach has been used to develop robust scenarios quicker and more efficiently than in the past.

3.2 Visions of Warfare 2036: A Futurist Prototyping Methodology to Support Long Term Decision Making

Mr. Mark Tocher, Defence Planning Policy and Analysis, Allied Command Transformation (NATO)

Von Clausewitz wrote that the nature of war is constant but its character changes to suit contemporary conditions on the battlefield – doctrinal, technological and sociological. A pioneering method for exploring the evolving character of future warfare leverages the storylines of science fiction stories. Allied Command Transformation conducted a proof-of-concept that engaged professional Sci-fi writers to envision the future, and explore and imagine how technology and trends could affect future operations. The resulting anthology provided the foundation for facilitated group discussions amongst defence planners and demonstrated that this new, innovative process would add to a multi-method approach to supporting long-term decision-making.

3.3 Use of Morphological Analysis in Decision Support

Dr. Bianca Barbu and Mr. Simon Purton, Operational Analysis Branch, Allied Command Transformation (NATO)

Today's constantly changing and evolving security environment requires decision makers to consider complex problems, where there are many governing factors. Conventional approaches isolate the essential factors and solve the simplified system. However, often a simplified model will break down when the contribution of the inconsequential components becomes significant. Morphological Analysis considers all components and works backwards from the solution towards the system's inner parts and linkages. Two case studies where it was successfully employed in NATO will be discussed: one supported the identification of a robust definition for expeditionary operations; the other the determination of potential sensors for the Allied Future Surveillance Control programme.

Stream 4: Modelling

4.1 The Mission Command Model

Mr. Nick Bell, Principal Analyst, Dstl Portsdown West (GBR)

The military planning problem is complex, and not an obvious candidate for mathematical optimisation due to the inherent uncertainty and the challenge in defining what optimal means in a military context. A multi-methodology

approach is described applying optimisation (Genetic Programming), in a "Modular Mission Planner" (MMP), to military planning within combat simulations in the form of a new model developed by Dstl. The Mission Command model is a highly innovative tool using the MMP to provide greater automation of campaign level simulation modelling, allowing more responsive support to military planning informing force structural trade-offs.

4.2 Modelling and Simulation in Support of the Operations Process: Challenges and a Novel Implementation

Ir. Bas Keijser, Mr. Guido Veldhuis, Mr. Nico de Reus, Researchers Military Operations, TNO (NLD)

Military interventions aim to influence undesirable conflict dynamics, often in a comprehensive approach. Commanders follow the operations process to translate a desired end state into tactical activities. Modelling and Simulation (M&S)-methods can serve to structure information and derive insights on the problem and interventions. M&S is not frequently used for operational decision-making. We describe eight challenges of using M&S in the operations process and how these are overcome. Together with military analysts, we have tested a concept decision support approach under experimental conditions. We discuss their assessment of the approach and suggest how to develop and implement the approach further.

Stream 5: Defence Planning II

5.1 Military-Analytic Method to Support Refinement of Force Packages in the NATO Defence Planning Process (NDPP)

Mr. Alan Campbell, Operational Analysis Service Line, NCI Agency (NATO)

This paper describes the structured military-analytic method applied to revise Force Packages developed within NDPP Step 2 Phase 1 to align with the final Minimum Capability Requirement (MCR) 2016. The step-wise method incorporates optimisation to minimise the difference, in terms of quantity of forces / capabilities and readiness, between the final MCR and the Force Package-based Structural Model. This is followed by a military subject matter expert refinement to ensure the military validity of the revised structural elements and FPs. The benefits of the approach designed to meet the NDPP demand are also discussed.

5.2 Utility Assessment of Maritime Unmanned Systems in Anti-Submarine Warfare

Mr. Alex Bourque, Centre for Maritime Research and Experimentation, STO (NATO)

This contribution explores the question of how to assess the value of maritime unmanned systems (MUS) in Anti-Submarine Warfare (ASW) missions by developing a methodology that enables decision support for defence acquisitions and R&D investments. It first summarizes the extant of the unclassified literature and briefly introduces methodologies used in the past. In light of this review, it proposes a mixed methodology that does not rely on complex and time-consuming simulations and that enables 'on-the-fly' utility assessments based on national priorities. It concludes by describing the proposed evaluation process and the limitations of the methodology.

5.3 A Steady-State Analytical Model To Access The Impact Of Warship Characteristics And Fleet Size On 'Naval Presence'

Dr. Bart van Oers, Mr. Richard Logtmeijer, Mr. Siebe Otten, Defence Material Organization (NLD)

Naval presence matters, as NATO warships need to be present at the required time and location, as well as for the required duration, in order to operate successfully. Hence, in light of the renewal of NATO navies, it is important to assess the attained naval presence of these future fleets. Still, such estimates are hard, as presence depends on a complex interaction of decisions on ship characteristics, class or fleet size and operational areas of interest, many of which may change in procurement. To address this complex issue, the authors present a novel model

that combines an analytical naval presence estimate with a powerful visualization to interactively explore the impact on presence of choices concerning ship characteristics, class or fleet size and operational areas of interest.

Stream 6: Intelligence

6.1 Assessment and Communication of Uncertainty in Intelligence to Support Decision-Making

Dr. David R. Mandel, Defence Scientist, Socio Cognitive Systems Section, Defence Research and Development Canada (CAN)

Sound intelligence is a prerequisite of effective decision-making. SAS-114 conducts evidence-based research on the assessment and communication of intelligence under uncertainty. Three SAS-114 research areas are showcased. The first examines the verification of forecast accuracy in intelligence. The second examines the communication fidelity of standards for communicating uncertainty in intelligence. The third examines the effect of NATO doctrine for evaluating source reliability and information credibility on analysts' judgments of information accuracy. These diverse examples illustrate how decision-making science can be used to verify and improve the quality of intelligence processes and products to better support command and policy decision-making.

6.2 A Multi-Methodology Framework for Modelling Opponent Organizations in the Operational Context

Dr. Bob van der Vecht, Dr. Ana Barros, Dr. Bert Boltjes, Dr. Bart Keijser, Mr. Nico de Reus, Research Scientists Military Operations, TNO (NLD)

Current violent conflicts take place in a dynamic and volatile societal context, where the complexity leads to unpredictable effects of interventions. In order to be effective, understanding opponent behavior is essential. Therefore, we introduce a generic multi-methodology framework combining Agent-Based Modelling and System Dynamics that allows modeling an opponent organization in its operational context. The framework distinguishes three levels: the macro level contains the society and physical environment, the meso level models organizations and networks, and the micro level for the individual behavior models. The goal is to show the resilience dynamics in response to interventions.

6.3 Terror Pattern Analysis

Mr. Levent Berke Çaplı and Dr.Altan Özkil, Defence Research Applications and Research Center, Atılım University (TUR)

This study focuses on the terror events that occurred between 2010 and 2013 in the Southeastern Anatolia region. The study is based on the suggestion that repetition and patterns of terror attacks exist. It puts forward the idea that specific data gathered by a strong knowledge of a specific theater can be critical to identify terror patterns. Analysis of the data suggests that tactical knowledge of the theater is crucial to shape the need for specific data and analysis methods. Further, a proof of concept and suggestions of future work will be discussed as well as a decision support system.

Stream 7: Planning in Complex Environments

7.1 A Framework for Risk Analysis to Support Operational Planning

Mr. Stein Malerud and Dr. Håvard Fridheim, Principal Scientists, Defence Research Establishment (FFI) (NOR)

A recurring issue in military planning is how to cope with uncertainties associated with the future situation and operational environment. These uncertainties give rise to operational risks; possible negative effects on our own forces and on the achievement of mission goals and objectives. Thus, a thorough risk analysis should be an inherent part of the planning process, addressing vulnerabilities and likely consequences if planning assumptions

fail. This paper presents a framework for identifying and analysing operational risks and vulnerabilities. Different methods and models can be combined in a multi-methodology to support the steps of the framework.

7.2 Data Farming Decision Support for Operation Planning

Dr. Johan Schubert, Deputy Research Director at Swedish Defence Research Agency (SWE)
LTC Stephan Seichter, Bundeswehr Office for Defence Planning (DEU)
Mr. Alexander Zimmermann, Fraunhofer IAIS (DEU)
Dr. Daniel Huber, Fraunhofer IAIS (DEU)
Mr. Daniel Kallfass, Airbus Defence and Space GmbH (FRA)
Dr. Guro K. Svendsen, Norwegian Defence Research Establishment (NOR)

Data Farming is a modelling, simulation and data analysis methodology providing the possibility to examine vast solution spaces. We have developed a decision support tool DFTOP to support decision makers in operation planning. DFTOP is adapted to NATO COPD to develop, analyse, compare and refine courses of action (COA). Our approach opens up new opportunities by examining thousands of alternative COA, revealing significant factors for operational outcomes. This allows the staff to prepare the grounds of the Commander's decision making based on quantitative data. DFTOP was shown in relevant environments at Coalition Warfare Interoperability Experiment 2016 and 2017 which established Technology Readiness Level 6.

Stream 8: All Data

8.1 The Importance of Multiple Perspectives and Methods to Enable Military Decision Making

Ms. Laurie Fenstermacher, Air Force Research Laboratory (USA)

To fully understand situations/events requires going beyond "data" or information fusion to the fusion of perspectives: the "etic" (third person) and "emic" (first person). AFRL research has developed semi-automatic methods to assess these perspectives in discourse (text from open sources, social media): integrative complexity, sentiment/affect expressed by in-group toward out groups (social identity), idea density, and vocabulary diversity. Multiple case studies established the power of "emic" factors for forecasting extremist violence and missile launches. Importantly, combining "etic" (event analysis) factors with "emic" factors results in the best forecasting performance as well as a more nuanced ability to assess courses of action.

8.2 Exploiting Data from Sensors of Opportunity from Across the Battlespace

Mr. Dave Steer, Senior Principal Consultant at QinetiQ (GBR)

The Every Platform a Sensor (EPAS) concept has been investigating how using sensors on "platforms of opportunity" can automatically collect information to support military decision making without affecting the platform mission or crew workload. The EPAS concept was developed as part of the MOD research programme under the Command, Control, Communications and Computers Intelligence, Surveillance and Reconnaissance (C4ISR) Concepts and Solutions (CCS) project framework funded from the C4ISR Decision Support and Experimentation Programme by Dstl. QinetiQ developed a bespoke test harness and algorithms to transform radar track data into textural messages. This innovative approach resulted in a capability that provides new intelligence which can be immediately interpreted by an analyst, rather than a potentially congested track visualisation. The presentation will walk through the approach showing why the capability demonstration was well received by the military stakeholders.

8.3 Finite to Fail but Infinite to Venture: Data Collection and Analysis in Complex Environments

Mr. Robert Grossman-Vermaas, Vice President, Technical Services, Crisis, Conflict and Governance, IBTCI (USA)

As NATO expands its role beyond the traditional interpretations of its original defense articles, its capacity to design and implement agile data collection and intelligence gathering must increase both in scope and content, including using innovative data gathering and analysis techniques. This presentation will seek to address current NATO information collection and analysis gaps drawing upon the author's experiences operating in some of the most fragile and conflict-affected states, from his time as an Operational Analyst at NATO ISAF in Afghanistan, 2006 (and later deployments), to his current function designing and implementing monitoring, evaluation, and assessment activities in Iraq, Syria, Yemen, Somalia, the eastern Democratic Republic of the Congo, the Central African Republic, Afghanistan, and other environments. The author will also support his observations and recommendations to the NATO community drawing on specific examples - or case studies - from recent data collection, analysis, visualization and dissemination activities he has led whilst directing the Conflict, Crisis, and Governance (CCG) practice at IBTCI.

Stream 9: Maritime

9.1 Autonomous Mine Hunting Systems

Mr. Christopher Strode, Centre for Maritime Research and Experimentation, STO (NATO)

Autonomous mine hunting systems are being tested and procured by a number of NATO Navies. These systems typically employ side scan or synthetic aperture sonars to provide images of the mine targets. These sonars are very different from the forward looking sonars typically found on legacy surface platforms. As such both mission planning and mission evaluation must evolve with this new technology. Algorithms are presented here to allow the autonomous vehicles to perform on board evaluation of mine hunting performance. This takes into account sonar coverage, image overlap, and inter-look correlation factors. The evolving evaluation, in the form of a coverage map, will provide operators and planners with regular updates allowing them to monitor mission progress. The evaluation may also be used by the vehicle itself to monitor performance and make appropriate adjustments to mission parameters – e.g. vehicle track and/or sonar settings.

9.2 Rapid Operational Effectiveness Modelling and Analysis to Support Ship Design and Procurement

Mr. Guido Veldhuis, Researcher & Project Leader, TNO (NLD)
Dr. Robbert van Vossen, Senior Research Scientist, TNO (NLD)
Ms. Anna van Velzen, Research Scientist, TNO (NLD)
Mr. Rinze Bruining, Research Scientist, TNO (NLD)
Dr. ir. Guus Beckers, Senior Consultant, TNO (NLD)
Dr. ir. Bart van Oers, Naval architect, Defence Material Organization (NLD)

A tool named Holon was developed to support the Dutch MoD and allies during two phases of the NATO Total Ship Systems Engineering (TSSE) process: the analyses of requirements and the operational validation of ship concepts. Holon is a data warehousing and simulation tool that provides the user with an early insight in the operational effectiveness of ship designs by simulating an operation start to finish. This will lead to a clearer perspective on the operational (im)possibilities of different design choices and can assist in determining the appropriate requirements. Holon supports the user in an iterative workflow that includes the design of ship concepts, development of scenarios, simulation and analyses. In an early design stage, many variations in the ship concept are considered, therefore, Holon does not evaluate a limited set of ship concepts. Instead, it uses a broad range of potential designs. The designs are created by varying all the concept characteristics of interest, such as sensors, weapons, hull and propulsion characteristics. Variations in organic units such as (un)manned vehicles (e.g. Autonomous Underwater Vehicles, helicopters and Rigid-Hulled Inflatable Boats) are also accounted for.

Stream 10: Supporting Decision Making

10.1 How to Build Up OR&A Capability in Support of Military Decision Making. Experiences and Challenges

LtCol. Sten Allik, Chief of Center for Applied Research (EST)

In 2014, Estonian Defence Forces started building up its OR&A capability. Leadership experienced many challenges during the planning process for mid- and long-term plans. In parallel, the defence R&D community noticed this lack of tools and competencies to describe different current or future elements on the battlefield in an adequate way. That pushed them to discover the OR&A path. Still midway through implementation, there are already a number of examples showing OR&A support in the capability development process. Obviously, challenges do exist on the way to form a seamless cooperation between leadership/staffs and R&D community. This brief is to share experience with the OR&A Community.

10.2 Enabling the 1st Step and the Final Mile: The Power of MOD's Science Gateway Network

Ms. Louise Hoehl and Mr. Thomas Scales, Senior Science Gateway Head Office, DST Customer Engagement (GBR)

Good decision-making is enabled by the availability of clear evidence at the right time and place; this requires forethought, skilled staff, and strong communication. This brief will explore the UK Ministry of Defence's 'Science Gateway' network, which provides the interface between technical advice and the staff that need it. This network consists of scientists, analysts and engineers who support the decision-making process by enabling its 1st step - identification and shaping of future needs, and its Final Mile - clear communication and exploitation of the evidence.

Workshop

Workshop - Futures Assessed alongside socio-Technical Environments (FATE)

Dr. Gitanjali Adlakha-Hutcheon, Defence Scientist, Department of National Defence (CAN)

As a defence/strategic planner in the year 2035 – would you like to check out which technologies will thrive (and therefore to plan for) in which type of projected future scenario? If yes, then join the Futures Assessed in socio-Technical Environments (FATE) team workshop. Contribute to the SAS-123 study by providing feedback on their approaches, and telling them what you need to know about assessing technologies in various futures and how the study results can be made more relevant to you. Led by SAS-123.

Training

Training A - Problem Structuring

Mr. Guido Veldhuis, Researcher, TNO (NLD)

Get acquainted with collaborative problem structuring using the group model building approach and experience its potential in a hands-on workshop. The workshop will make you acquainted with using causal loop models for problem structuring. We will discuss both the methodological background of the approach and we will share best-practices for applying the method in group sessions. This will be followed by a "hands-on" problem structuring session in which we will engage the participants to tackle a given topic together. Led by TNO.

Training B - Social Network Analysis

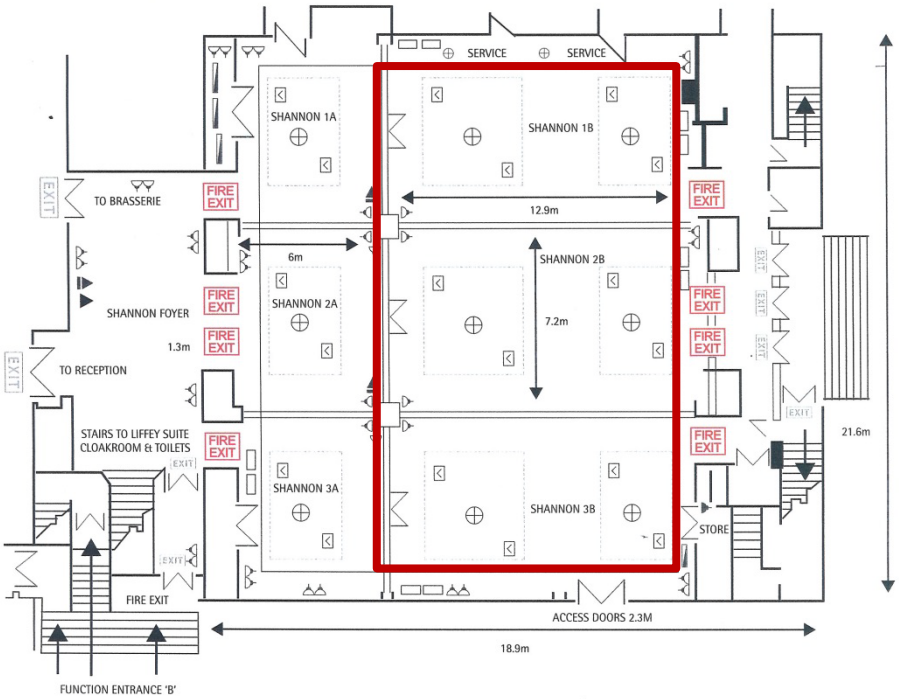
Mr. Clovis Autin, Analyst, Joint Analysis Lessons Learned Centre

Get acquainted with the importance of network structure using Social Network Analysis (SNA) and experience its potential in a practical exercise session. The SNA session will make you acquainted with using Social Network Analysis for understanding network structure. After a short introduction on the different aspects of Social Network Analysis, we will present how to use the software NetDraw and how to import a data set. This will be followed by a practical exercise in which we will engage the participants to analyze a specific data set and identify the key players by using different algorithms integrated within NetDraw. Led by JALLC.

2017 NATO OR&A Conference

Floor Plan

Shannon Suite



Liffey Suite