NATO Science and Technology Organization (STO)
System Analysis and Studies (SAS) Panel Monthly Update
(January 2024)

Please find below an overview of items of interest for the SAS community covering the month of January and the upcoming period. Please reach out to the SAS Panel Office at sas@cso.nato.int if you are interested in contributing to a research activity or would like more information.

1. Recent SAS events.

- **Dr Ana Barros has been named the recipient of the NATO Operations Research and Analysis (OR&A) Service Award, in recognition of her longstanding and significant contributions to the NATO OR&A community.** The award was presented by Dr Bryan Wells, NATO Chief Scientist, on 12 January at NATO Headquarters in Brussels, Belgium. The NATO OR&A Service Award is the highest individual honour that the NATO S&T community bestows for exceptional dedication and achievement in the art, science and application of OR&A within the NATO sphere. The Chair of the STO System Analysis and Studies (SAS) Panel acts as the custodian of the award, on behalf of the NATO Chief Scientist. Dr Barros has made important scientific contributions to the Alliance for more than 25 years. She has led or participated in several STO research activities, providing scientific and domain expertise, and served as Chair and Vice-Chair of the SAS Panel from 2017-2020. She has also been a member of the programme committee of the NATO OR&A Conference since 2017, and currently acts as an Associate Editor of the STO Review, the newly established STO peer-reviewed journal.

- **The virtual kick-off meeting for SAS-ET-FO Exploratory Team titled Comprehensive Assistance Package for Ukraine Tailored Support Measure - Operational Research and Analysis Support was held on 12 January 2024.** Participants in the meeting shared national perspectives on how an interface between Ukraine and NATO nations/organizations could facilitate operational research and analysis support to Ukraine. The team agreed to identify briefs/presentations on what is Operations Research & Analysis (OR&A), propose a short list of potential analyses that may be relevant to Ukraine, identify Ukrainian centres of decision-making potentially open to OR&A support, articulate concrete problems where OR&A may bring value, and ensure coordination and synchronization with NATO HQ efforts (NATO - Ukraine Council, NATO-Ukraine Joint Analysis, Training and Education Centre, etc.). When the proposed research is approved by the S&T Board, it will commence in fall 2024.

- **The virtual kick-off meeting for SAS-ET-FM Exploratory Team titled Natural Language Processing for Defence: Exploiting the Cutting Edge of Large Language Models for Military Contexts was held on 22 January.** After a brief explanation of STO, it's SAS Panel and the deliverables of an ET by the SAS Panel Office, the team continued with a round of introductions to share interest in the activity and relevant expertise. The team agreed to way to conduct a robust scientific assessment of the latest industry- continue in the next meeting with a deeper dive into respective national expertise and further discuss the best standard large language models. Collecting information and distil the scope of a proposed research activity based on consensus is the ultimate goal of the team.

- **On 22 January, the SAS-161 team on Military Aspects of Countering Hybrid Warfare: Experiences, Lessons, Best Practices briefed the NATO-Ukraine Council (NUC), Defence and Security Sector Committee on its published Technical Reports (Vol I through V).** In the presentation the team highlighted that Ukraine's contributions detail many of the national defence, security, and legislative/regulatory efforts required to continue defensive low intensity conflict and prepare for the possibility of rapid transition to high intensity warfighting. The team also provided an introduction to 8 non-Ukraine case studies examining context-specific

Russian military and non-military behavior. The presentation was concluded with the conclusion that campaign transition is inevitable – it is imperative to look longer term in support of Ukraine – and that the NATO Science and Technology Organization (STO), for example through the System Analysis and Studies (SAS) Panel, can leverage its programmes of work to help address NUC critical topics related to short and longer-term decision making.

- **The kick-off meeting for SAS-HFM-184 Specialist Team titled Carbon Footprint Assessment of Military Organizations and Operations and related Logistics was held on 23-25 January 2024 in Neuilly-sur-Seine, France.** After a round of introductions, the team started the discussions on how it could support the demand for increased Allied awareness concerning the impact of climate change on security. The SAS-HFM-184 team, a good mix of national experts and experts from the NATO Communications and Information Agency, identified as main general tasks a) refine the research description and the programme of work, b) perform a literature review, c) define common definitions and taxonomy, d) explore synergy with other NATO related activities and e) collect best practices within NATO and other Nations. The team agreed to hold monthly virtual meetings to report progress and schedule a small number of in-person meetings in 2024. For more info please contact the Team Leader, Dr Marcus TYNNHAMMAR (marcus.tynnhammar@foi.se).

2. <u>Upcoming SAS events.</u>

- The SAS Panel established the **SAS-195 Research Lectures Series titled "NATO STO Summer School - Decision-Making for the Future". The event will be hosted by the University of the Bundeswehr Munich in the week of 8 July 2024.** Besides several lectures, special emphasis will be given (i) in the analysis of examples of model-based and data-based operations research techniques, (ii) in the effects of new technologies on defense and (iii) serious game applications that can be used in decision-making processes in defense and war gaming. A rather usual subject of discussions in the NATO context is how to promote a generational turnover in the research activities, with particular reference to the scientific context. With this objective, a specific working group, the NATO 2030 Young Leaders Group, was created in 2020 whose main aim is providing fresh thinking on how approaching the emerging security challenges of the decade. The STO itself launched a number of initiatives, such as the SAS-148 Specialist Team on Best Practices in Recruitment and Retention of Early-Career Civilian Scientists for Defence S&T, which analyzed the issue of rejuvenating and establishing a dynamic, highly qualified workforce to addressing emerging challenges. In the last years the Secretary General consulted widely with Allies and engaged, among others, with young people to help shape NATO. The SAS-195 team will organize an educational and scientific knowledge transfer to younger generations (university students or recent graduates) with the goal of increasing the presence of younger generations within NATO (STO) research activities. The technology transfer methodology may serve as a pilot experiment for future summer schools hosted by other nations that may benefit from the experience gained through this first SAS summer school. Registration for the event will open in April 2024 on the STO Events site [here].

- **The virtual kick-off meeting of the SAS-191 Research Technical Course team, organizing the Nordic Pine 2024 exercise on Hybrid Threats to Renewable Energy Systems, is scheduled for 06 February 2024 from 17:00 – 18:00 CET via MS Teams.** The agenda and info to connect will be shared with appointed members closer to date. The exercise itself is scheduled for September 2024 (TBC). The main objective of the team is to organize one multi-day course at three different sites transferring practical knowledge and recent field developments through on-site instructor training or lectures to military decision makers. Renewable energy systems are becoming a growing part of the energy mix in more and more countries around the world. Traditional energy systems based on fossil and nuclear sources are based in mature and well analyzed systems of governmental control, security analysis and experience and is well protected against adversaries. Another objective is to further cooperation between primarily Finland and Sweden but also other Nordic/Baltic NATO-countries (Norway, Denmark, Iceland, Estonia, Latvia, Lithuania). The training objectives are to exercise hybrid incidents towards renewable energy systems within the areas of Cyber / Supply chain / Malign influence. When interested in helping organizing this exercise, the first step is for experts to sign up for SAS-191 via STO's APPOINT platform at

https://scienceconnect.sto.nato.int/tap/signup. For more details please contact the Team Leader, Mr JÖNSSON HANBERG, freddy@totalforsvar.org. This activity will be open to nationals from NATO nations, Australia, Japan and Sweden.

- **The virtual kick-off meeting of the SAS-190 Research Symposium team that will organize a symposium on Enhancing Energy Security Resilience, Capabilities and Interoperability is scheduled for 22 February 2024 from 17:00 – 18:30 CET via MS Teams**. The main objective of the team is to organize a multi-day event dedicated to deeper analysis of the concepts and challenges addressed in SAS-183. Through a Call for Papers, inviting keynote speakers and dedicated workshops, the event will increase the depth and scope of critical areas, with an underlying theme of improving resilience, capabilities, and interoperability. The event will focus on the exchange of ideas and best practices, as well as to highlight the study's accomplishments and more narrowly focus on ways to enhance NATO member states' resilience, capabilities and interoperability in a hybrid warfare/energy security context. When interested in helping organizing this symposium, experts should sign up to SAS-190 via STO's APPOINT platform at https://scienceconnect.sto.nato.int/tap/signup. For more details please contact the Team Leader, Dr Arnold DUPUY, arnold.dupuy@nps.edu. This activity is open to representatives from NATO Nations, NATO Bodies/Agencies, STO Enhanced Opportunity Partners (Australia, Japan, Sweden), Partnership for Peace nations and Global Partners.

- **The virtual kick-off meeting of the SAS-ET-FL Exploratory Team titled AI tools for Operational Planning is scheduled for 26 February 2024 at 14:00 – 17:00 CET and 28 February same times.** The objective of this ET is to formulate a Technical Activity Proposal (TAP) and an associated programme of work for a research activity that will investigate how AI may be best applied in Operational Planning to support defence and security decision making within NATO, its member Nations, and partners. The goal is not to explore tools that will replace military planners, but rather that will increase their productivity and enhance the plans that they produce. When interested in joining this STO research activity, experts should sign up as soon as possible to SAS-ET-FL via STO's APPOINT platform at https://scienceconnect.sto.nato.int/tap/signup. More details can be found in attached document or you can contact the Team Leader, Dr Dragos CALITOIU, Dragos.Calitoiu@forces.gc.ca.

3. Recent SAS Publications.

- **Support Project team SAS-SP-001, to create a Croatian wargaming team as a part of the Croatian armed forces, recently published its report.** As part of the project, the US Centre for Army Analysis has been mentoring the Croatian Defense Academy wargaming team to achieve Initial Operational Capability (IOC) at the operational level introducing strategic wargames. The one-year support project helped scoping and refining a future Croatian wargaming capability, provided training opportunities and helped developing a detailed plan going forward for implementation. The Croatian wargaming team will be used as the core testing and support tool, and will continue development of national military capabilities to successfully fulfil all of the three Croatian armed forces missions (collective defence, support to global peace, support to civilian institutions) in an allied environment. Development of a wargaming capability step by step, starting primarily at the educational level has proven to be a good approach. The project report contains more best practices and recommendations for development of new capabilities and is available on the STO website [here]. Because of its security markings, it is only available to STO account holders from NATO nations, Australia, Japan and Sweden.

- **SAS-144 published its Technical Report titled "Proposed NATO Standards and Guidelines for Conducting Military Surveys".** High-quality evidence from surveys about military policy issues is crucial to the decision making of senior military leaders. While many NATO nations have developed their own survey capabilities, some have relied on commercial contractors, due to limited survey capability and expertise. Yet NATO has no rigorous scientific guidelines for conducting surveys in the military context. This absence invites questions about the quality of survey results across NATO militaries. In response, the SAS Panel established a Research Task Group (reference SAS-144) to identify scientific techniques in conducting surveys and to develop a code of best practices for conducting surveys in a military context, covering topics such as project formulation; sampling

design; data collection, processing, and analysis; results documentation and dissemination. Based on lessons learned from the team members and the literature on survey methodology, the SAS-144 team proposed standards and guidelines that can be applied to surveys of military personnel, military dependents, and civilian employees on military personnel issues or to surveys about defence policies and programs. These standards and guidelines are also useful for surveys1) on foreign and defence policy, tactics, and strategic objectives; and 2) Undertaken in combat zones with NATO or foreign forces, and foreign civilian populations. The proposed standards and guidelines are intended as minimum standards for any military survey conducted by defence analysts or commercial contractors employed by NATO militaries. The proposed standards and guidelines will assist defence analysts and military personnel who need to conduct surveys to improve survey quality, effectiveness, and efficiency; and to support senior military leaders in evidence-based decision making. The publication is available on the STO website [here]. Because of its security marking the report is only available to STO account holders from NATO nations, PfP nations, Australia, New-Zealand and Sweden.

- **SAS-174 published its Meeting Proceedings titled "Are the Major Weapon Platforms Obsolete?"**. The Research Specialists' Meeting, held in May 2023, provided a rich overview of the impact of emerging and disruptive technologies (EDTs) on the relevance of NATO's major weapon platforms while at the same time taking into account recent developments in the conduct of warfare and what the future operating environment would be. Keynotes considered the offensive threat to and the protection of major platforms, and in addition the vulnerability and potential redundancy of them. Arguments were presented that the nature of war is unchanged while changes in tactics and capabilities occur in a constant countering of adversaries' capabilities. Special attention was given to those EDTs that enable a more effective sensing, sense making, decision making and execution loop: Artificial Intelligence (AI), ubiquitous sensor suites, precision weaponry and networking. With respect to AI, keynotes emphasized the need for human-machine teaming and the fact that AI should be assisting humans, not the other way around. A preference should be given to model-based AI which provides causality for decision making, rather than to data-driven AI which only shows correlation. In conclusion, the Specialist Meeting expressed the notion that major weapon platforms remain relevant if they can adapt to the new context, tactics and operating concepts, and adopt capabilities that innovative technologies bring. The publication, which includes a summary and presentations, is available on the STO website [here]. Because of its security markings, most items are only available to STO account holders from NATO nations, Australia, Japan and Sweden.

- **SAS-153 published its Technical Report titled "Best Practices on Cost Estimation of Defence Information and Communication Technology (ICT) Projects".** Information and Communication Technology (ICT) is of increasing importance within most sectors of our societies, and this includes today's Armed Forces. ICT has been advancing at an extraordinary rate, driven by extensive research and development in the commercial sector, and a significant share of defence government allocated funds are spent on ICT. ICT is the theme for several of the trends in the assessment by the of technologies and their potential impact on NATO's military operations. As it is an evolving environment, consisting of a mixture of physical and conceptual systems, accurately estimating the cost of defence ICT can be particularly difficult. The SAS-153 Research Task Group core objective is to understand the challenges relating to accurate cost estimation of defence ICT projects and to identify the best practices to address these. This will provide enhanced cost estimation capabilities for ICT to NATO, Nations and Partners. The SAS-153 report builds on previous SAS work on life cycle costing, including SAS-028, SAS-054, SAS-076 and SAS-069. The team has used a combination of the subject-matter expertise of the group, literature and insight gained from the survey to determine key recommendations and best practices. The publication is available on the STO website [here]. Because of its security marking, most items are only available to STO account holders from NATO nations, Partnership for Peace nations and Global Partners.

- **SAS-161 published its Technical Report titled "Military Aspects of Countering Hybrid Warfare: Experiences, Lessons, Best Practices. Volume 4: Russian use of Economic Instruments of Power".** With a focus on contributing to the long-term military effectiveness of the Alliance, Ukraine, and the individual Ally and Partner

nations, the SAS-161 team applied the fundamentals of net assessment in developing two distinct research streams. The first stream further investigates, from Ukraine's perspective, Russian aggression against Ukraine and Ukrainian institutional responses and preparations up to the full-scale invasion by Russia on 24 February 2022. The second research stream, undertaken by the non-Ukrainian members of the team, develops national or mission-specific case studies investigating Russian behaviors within differing contexts. The case studies in this volume clearly illustrate the security and defence implications related to the specific application of economic instruments of power by Russia.

4. Other items of interest

- **The Joint Analysis and Lessons Learned Centre (JALLC) organizes the NATO Lessons Learned (LL) Conference (NLLC) 2024 (NLLC24) in Lisbon from 16 to 17 April 2024**, with speakers and participants present on-site. In addition, 15 April (afternoon) and 18 April (morning)-as pre-/post-conference days-will offer additional opportunities for staff and leadership to share and discuss LL specific topics and to interact within a LL professional network. The theme for the NLLC24 is: "NATO LL Capability Development in support of NATO 2030 efforts." The registration in CVent will be open from 01 February 2024 and is done in two steps:
  1. Access the event Registration Form via this link: https://eur.cvent.me/oZRxD?locale=en
  2. Within 48 hours after the Registration Form is submitted, the NLLC24 Management Team

- **SCI-MSG-ET-067 on 'Countering Autonomy/AI Threats' will hold its kick-off meeting in Neuilly-sur-Seine, France on 11-12 April 2024.** The objectives of the first meeting is to assess team members' interests and capabilities within this research area, review the Technical Activity Proposal and propose changes, mainly to narrow the topic, to properly inform a future Task Group, and share current and proposed research and projects within this area. Details are given in the TAP. Interested attendees should register by March 25 by informing the Chair, Guillaume GAGNÉ (guillaume.gagne2@forces.gc.ca), and the SCI Panel Executive Assistant, Carlotta ROSSI (carlotta.rossi@cso.nato.int). In your email please specify your full name, nationality and affiliation.

- **Registration is open for the International Conference on Military Communication and Information Systems (ICMCIS), which will take place on 23-24 April 2024 in Koblenz, Germany.** ICMCIS 2024 will be held at Public Release-level and is open to citizens from NATO Nations, NATO bodies and STO Enhanced Opportunity Partners (Australia, Japan, Sweden). Held as an IST Panel activity (IST-205), ICMCIS 2024 is organized by the Federal Office of Bundeswehr Equipment, Information Technology, and In-Service Support (BAAINBw) in Koblenz, with support from Fraunhofer FKIE, NASK and NCIA. The ICMCIS is the largest scientific conference in Europe on military CIS. It provides a forum for exchanging ideas and knowledge on the development and implementation of advanced information and communications technologies (ICTs) for defence and military systems. Registration via the STO Events site [HERE]
  Confirmed Keynote Speakers:
  - Tomas Tauginas, Lithuanian Armed Forces STRATCOM Department
  - Rainer Beeck, German Land Command, CDO Land
  - Andreas Knopp, University of the Bundeswehr Munich
  - Jeroen van den Hoven, Delft University of Technology

- **The STO Collaboration Support Office is recruiting new (temporary) staff members for its Operations & Coordination (OCO) section.** Full job descriptions are available on the NATO employment site https://nato.taleo.net/careersection/2/jobsearch.ftl.
  - Executive Officer OCO – job number 240045 - France-Paris, Application Deadline: 29 Feb 2024, NATO Grade: G17
  - IST Panel Executive Officer – job number 240060 - France-Paris, Application Deadline: 29 Feb 2024, NATO Grade: G17