

**NATO INDUSTRIAL ADVISORY GROUP (NIAG)**  
**Provisional list of proposed 2022 studies**

#	Group Sponsor	Study Title	Description of Proposed Study	Expected Study Start/End Dates
1	NAFAG	The challenges of operating VTOL UAS to support maritime operations	VTOL UAS are planned to fulfil several different roles in the future maritime operating environment. The characteristics and benefits of these types of systems are becoming increasingly well-understood through a range of developmental activities including synthetic environment modelling, physical test and evaluation, and operational experience. Early activities have identified a number of challenge areas related to the use of VTOL UAS systems in maritime applications. These appear to stem from a general lack of technical maturity and understanding relating to maritime-specific requirements. The proposed study will identify the principal challenges to the development and implementation of maritime VTOL UAS. The activity will seek to understand the genre-specific aspects which must be addressed in order to permit the widespread and robust adoption of maritime VTOL UAS-enabled capabilities. NATO Class 2 and Class 3 UAS but Class 1 UAS may also be considered where appropriate.	Kick-off meeting by February 2022. Desired completion date by February 2023.
2	NAAG	Embarked Soldier Power/Data Subsystem (NATO RESTRICTED)	The study will develop an integrated ground and aerial platform architecture that enables the powering of the embarked soldier's equipment, charging the soldiers batteries and providing timely and sharable operational situational awareness. The ability to filter and tailor the information shared with the embarked soldiers internal to the platform and from external sources must be considered in designing the data/platform architecture. While in transit the individual soldiers and their leader need updated situational awareness (audio and visual) to ensure maximum effectiveness on dismounting from the platform. To provide these three functions, power, charging of batteries and data the embarked soldier requires a robust universal quick disconnect connector that enables these functions and that is integral to the ground and/or aerial platform.	Kick-off meeting no later than February 2022. Desired completion date by February 2023.
3	NAAG	Development of a non-lethal artillery Electro-Magnetic Pulse (EMP) ammunition	The study will investigate the possible development of a 155 mm artillery grenade aimed at interfering/disabling electronic devices (e.g. transmission systems, computers, navigators, etc..) of the opponents. The grenade, once activated IVO the intended target, should release an electromagnetic impulse capable of neutralizing such electronic devices located in the surrounding area.	
4	NAAG	Development of loitering munition	The study will investigate the possible development of loitering munition (capable of seeking, identifying, monitoring, and engaging objectives) envisaging the integration of explosive charge with existing UAV, in order to contain R&D costs. Evaluate the possible development of a UAV endowed with an ammunition/explosive charge (HAROP type), an ammunition with reduced volume and weight. That will allow the system to orbit around a certain area ensuring adequate surveillance.	Kick-off meeting TBD 2022. Desired completion date within 12 months.
5	NAAG	Development of smart (artificial intelligence) ammunition	The study will investigate the possible development of smart munition integrated with an artificial intelligence (AI) module capable of analyze the battlefield; identify a target in a pre-charged target set and provide appropriate effect, specific for the identified target. For example, discriminate a heavy armored enemy vehicle from an infantry dismounted squad and deliver in the first case a HEAT effect and in a second case an HE fragmentation effect.	Kick-off meeting TBD 2022. Desired completion date within 12 months.

#	Group Sponsor	Study Title	Description of Proposed Study	Expected Study Start/End Dates
6	NAAG	Impact Assessment of the use of Directed Energy Weapon on the field	The proposal aims at studying the usability of Directed Energy Weapons (DEW) for protection of ground-based installations and mitigating the problems arising from such employment. The main objectives are: (1) problems arising from field employment and ergonomics of use. For example, how to manage weapon assignment, not only during the first engagement but also for escalating the reaction. The kill or damage assessment is crucial for ensuring the effectiveness of the overall reaction, with the right weight depending on the threat. The evaluation of the threat and the assignment of the right effector as well as the escalation are crucial for ensuring an effective mission. A suitable damage assessment allows escalating when needed. (2) Another set of problems arises from environmental conditions. For example the impact of dirt and dust on the optics as those elements can cause the immediate self-destruction of the optics. (3) The health management of the system is crucial for ensuring a very low life cycle cost for the DEW systems. Based on the Spontaneous Study Proposal per DI(STR)(2021)0001(CDS)	Kick-off meeting Q1/2 2022. Desired completion date by early 2023.
7	NNAG	Practical Application of Water Mist to Mitigate Weapon Effects (NATO SECRET)	Water mist is known to be effective in mitigating weapon effects such as air blast (overpressure), fires, and thermal loading. The use of currently available fitted water mist systems to mitigate weapon effects is poor. This is due to the lag time between activation and the compartment being filled with mist. The outcome of this review will drive the development and testing portion of this study. Initially it is expected that portions of the system would be tested, i.e. the ability of the close in weapon systems to predict the impact zone on the platform and that the water mist system is both able to attenuate the air blast as well as extinguish secondary fires. Then a complete system test would be required to be undertaken to validate the developments. These outcomes are to be documented to support the production of a STANREC.	Kick-off meeting March 2022. Desired completion date within 24 months.
8	NNAG	AI Support to Internal Battle Damage in Warships	This study will investigate the feasibility of using AI/ML to support ships teams when a warship sustains battle damage (Ship Combat Survivability or SCS). It will specifically look at the following: (1) Exploitation of ships internal platform management systems to automatically reconfigure auxiliary power and systems to maintain operation of key capabilities such as propulsion systems, weapon systems and sensors in maintain a warships ability to fight the external battle. (2) Exploit a ships internal fixed fire fighting and damage control systems to automatically deal with damage, containing fires and floods as appropriate. (3) Provide decision support to Ship's teams when determining internal battle damage priorities and damage repair. (4) Provide decision support to operators as to optimum capability based on damage sustained. i.e. max speed available, weapons available etc.	Kick-off meeting May 2022. Desired completion date within 24 months.
9	NNAG	Specialised Unmanned Surface Vessel for ASuW/AAW Force Protection.	Study the feasibility of developing a surface UxV as a point defence toolbox with sensors, Hard Kill and Soft kill capability in coordination with other specialized HVU UxV's for surface applications to protect the HVU's during its operations in Littoral waters against relevant targets like low RCS fast flyers.	Kick-off meeting March 2022. Desired completion date by June 2023.
10	NNAG	Recording of multi-static (MS) acoustic parameters on different platforms and replay of such MS scenarios (NATO SECRET)	The proposed study will increase the interoperability capabilities between various air, surface and subsurface platforms for the use and exploitation of multi-static acoustics.	Kick-off meeting August 2022. Desired completion date by August 2023.

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11	NNAG	Military Application of Magnetic Refrigeration Technology	To determine the potential applicability of use and particularization of magnetic refrigeration systems for future use on Land, Naval, and Air Force platforms.	Kick-off meeting April 2022. Desired completion within 12 months.
12	C3B	Classified Collaboration in Public Clouds	The study's aim is to progress the modernization of NATO ways of working and increased adoption of cloud-based solutions for collaboration services. Because of the NATO security context, two perspectives are proposed: (1) Investigate solutions for classified (up to NATO Restricted - NR) collaboration leveraging public cloud offering; (2) Explore optimization of the certification effort for cloud-based solutions (up to NATO Unclassified - NU).	Kick-off meeting Q1 2022 subject to funding. Desired completion by December 2022.
13	Life Cycle Management Group (LCMG)	Reliability prediction of electronic equipment	To discuss and propose a common standard or a set of standards or a set of criteria to be used in order to achieve the best solution/s to calculate the electronic equipment reliability data for engineering, safety and IPS purposes (Integrated Product Support).	Kick-off meeting Q1 2022 subject to funding. Desired completion by December 2022.
14	CNAD	Enhancing the security and resilience of supply chains essential to Allied capability development and delivery	Through a series of studies, the NIAG is invited to provide insight on key challenges and opportunities facing industry, Allies and NATO in securing a resilient supply of strategic materials and microelectronics. Industry views will inform the CNAD, and potentially other NATO communities, in taking forward work on this subject.	March 2022 (Phase 1) - Kick-off meeting. Desired completion by March 2023 (Phase 1).
15	ACT/SACT CAP Dev CIS Wireless	Very Low Frequency (VLF) Communication Services NATO Standardization Agreement (STANAG) 4724 and 5030 Interoperability	The NATO VLF Broadcast system, a strategic component of Allied Maritime CIS to support Command and Control (C2) functions for naval operations, includes transmitters in national radio stations located in up to five (5) NATO member nations. This communications system supports NATO C2 capability for allied submarine operations and submarine operational safety when deployed or tasked under the NATO flag. Request industry perspectives on the technological and architectural requirements to achieve full interoperability between STANAG 4724 and STANAGs 5030 VLF Broadcast systems. The study should elaborate on a subsequent NATO Research and Development (R&D) process regarding STANAGs 4724/5030, depending on the possibilities and scope for future improvements.	Kick-off meeting potential March 2022 subject to funding. Desired completion by June 2022
16	ACT	Cognitive Augmentation for Military Applications	Request industry perspectives on the potential opportunities presented by the Cognitive Dimension for NATO Operations. The study will inform NATO's efforts to effectively acquire and preserve cognitive superiority over any adversary, in any part of the spectrum of conflict.	Kick-off meeting January 2022. Desired completion by December 2022.

#	Group Sponsor	Study Title	Description of Proposed Study	Expected Study Start/End Dates
17	ACT/SACT CAP Dev CIS SATOM	Hybrid Military and Commercial Satellite Communication (SATCOM) Operations	Request industry perspectives on the potential opportunities presented to enable Hybrid Military and Commercial SATCOM operations with existing and future technologies and associated CONEMPs to enable NATO Beyond Line-of-Sight (BLoS) Communications both now and within the next 10-year timeframe. The assessment will inform NATO's efforts to introduce Hybrid Military and Commercial SATCOM concepts and technologies into the NATO communications-information infrastructure, including Concept of Operations/Concept of Employment (CONOPS/CONEMP) and the development of a strategy for implementation. The study should also consider challenges associated with Hybrid Military and Commercial SATCOM employment to force realism of detailed opportunities. These challenges may point to gaps that need to be addressed through science and technology efforts. The opportunities would include the technical solutions to enable hybrid deployment of currently employed and programmed Military and Commercial SATCOM capabilities in support of a single Deployed Point of Presence (DPoP) and consider future Terminal Segment technologies that will be able to simultaneously access multiple Military and Commercial SATCOM constellations via a single Satellite Ground Terminal (SGT). The report should address multi-spectral and multi-latency consideration. The study should elaborate on approaches where NATO can influence SATCOM Research and Development (R&D) within industry to increase the likelihood of Commercial off-the-Shelf (COTS) solutions being capable of being utilized for military opportunities in order to avoid lengthy and costly bespoke internal R&D. Finally, the report should discuss opportunities where HAPS could support and/or align to NATO adoption of IoT and 5G networking.	Kick-off meeting Q1 2022 subject to funding. Desired completion by December 2022.
18	ACT/SACT CAP Dev CIS SATOM	High Altitude Pseudo Satellites (HAPS) for NATO Beyond Line of Sight (BLoS) Communications	Request industry perspectives on the potential opportunities presented by fixed wing and airship HAPS technologies for hosting NATO BLoS Communications both now and in <10-year timeframe. The assessment will inform NATO's efforts to conduct innovation, operational experimentation and potentially introduce HAPS technologies into the NATO communications-information infrastructure, including the development of CONEMP statements. The study should elaborate approaches where NATO, can influence HAPS research and development (R&D) within industry and partners to increase the likelihood of Commercial-off-the-Shelf (COTS) and Military-off-the-Shelf (MOTS) HAPS solutions being capable of being utilized for military opportunities in order to avoid lengthily and costly bespoke internal R&D. Finally the report should discuss opportunities where HAPS could support and/or align to NATO adoption of IoT and 5G networking.	Kick-off meeting Q1 2022 subject to funding. Desired completion by December 2022.
19	ACT/SACT CAP Dev CIS Wireless	High Frequency Internet Protocol Based Communication Services NATO Standardization Agreement (STANAG) 5066 and 5070	High Frequency (HF) communications Internet Protocol (IP) based service provision is minimal due to reduced bandwidth. Therefore, a vast majority of these IP-based communications service are only able to be provided via cable or satellite link that offer greater bandwidth/throughput. A technical solution is needed in the Alliance Maritime environment to facilitate the efficient provisions of these IP-based communications services over HF links, both as an alternative to cable or satellite services and to alleviate the increase in bandwidth saturation.	Kick-off meeting potential March 2022 subject to funding. Desired completion by June 2022.

Canadian companies can indicate which studies are of highest interest for your company at: <https://forms.office.com/r/bBqQQyERsU>