



**NATO UNCLASSIFIED**  
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11 January 2021

**NOTICE**  
**NIAG-N(2021)0004**

**NATO INDUSTRIAL ADVISORY GROUP (NIAG)**

**NIAG study on Command and Control Capabilities in support of Multi Domain Operations – MDC2 (Multi Domain C2)**

**Exploratory Group meeting to be held virtually on 16 February 2021 starting at 14:30 and estimated to conclude by 16:30**

**Calling notice**

1. A NIAG Exploratory Group meeting to address Command and Control Capabilities in support of Multi Domain Operations – MDC2 (Multi Domain C2) will be held on 16 February 2021. In light of the continued COVID-19 crisis, this meeting will be held virtually (more information to follow), starting at 14:30 and estimated to conclude by 16:30.
2. An agenda for the meeting is available at Annex 1.
3. The administrative arrangements for the meeting are set out below; the information describing the aim and the objectives of the study is available in Annex 2 (Step 1).

**REGISTRATION FOR THE MEETING**

4. Industry representatives willing to take part in this study (further called Participants) are invited to contact their NIAG delegation prior to registering for this study.
5. Participants (even if unable to connect to the meeting) are invited to complete two registration processes:
  - 5.1. A registration for the meeting, via the DI portal at <https://diweb.hq.nato.int/>
    - a) Once on the DI Portal, please go to NIAG, then “events registration” located underneath the NIAG logo in the centre of the screen. This will point you to a page listing upcoming events. Click on the event you wish to register for – open the terms and conditions and complete the questionnaire.
    - b) **Please ensure that you complete the registration for the meeting by 09 February 2021.**



5.2. A registration to the NIAG Portal, for the newcomers (not being in possession of credentials to NIAG portal), in order to be granted access to the documents prepared for this study.

- a) This registration requires you to fill in the form that opens at <https://diweb.hq.nato.int/> on the top-right hand side of the page, **Register yourself**. Make sure you **select NIAG as community of interest** (a field towards the end of the registration form).
- b) After you click the 'Submit' button at the end of the registration form, a notification will be sent automatically to our office. The NIAG staff will then approve your access in the following days.
- c) This registration shall also be finalised by 09 February 2021 the latest, in order to allow us time to approve your access to the documentation, in order for you to prepare for the meeting. Please note that the first registration (paragraph 5.1.) does not automatically grant you access to documentation.

## **SECURITY CLEARANCE**

6. The Exploratory Group meeting will be held virtually at unclassified level.
7. The study will be open to industries from NATO and Partner nations within the Interoperability Platform (IP) format, and conducted at 'NATO Unclassified releasable to IP' level.

## **USEFUL INFORMATION FOR THE VIRTUAL MEETING**

8. Documents/presentations will be posted on the Defence Investment Portal. **Participants need to ensure that they have access to this website prior to the meeting.** (see the registration process described in paragraph 5.2.)
9. All participants having registered for this study will receive in due time:
  - 9.1. Connection details for this meeting (landline number to dial in Belgium, the costs for the phone call being borne by participants);
  - 9.2. A link to the collaboration site created for this study where the documentation to be used during the teleconference will be posted;
  - 9.3. A link to an electronic survey that will present the volunteers for the study Management Team and be used to vote.

**STUDY ORGANISATION**

**10.** Industry representatives are invited to consider volunteering for Chairman, Vice-Chairman and Rapporteur roles, which represent the Management Team of the Study Group, and communicate their option to the NIAG Secretary prior to the meeting. A brief description of the management team's role and of the Quick Reaction Team role is available at Annex 3.

**11.** An election for the Management Team will be held under agenda item 5. Only industry participants are entitled to vote, by following the rule of one vote per company and per country.

(signed) Nathalie Van Donghen

**AGENDA for the VIRTUAL Exploratory Group meeting on Command and Control Capabilities in support of Multi Domain Operations – MDC2 (Multi Domain C2)**  
*(all items in italic will be considered as consulted by participants **prior** to the teleconference – only questions and clarifications regarding these will be taken at the meeting, as necessary)*

**1. OPENING REMARKS AND INTRODUCTION**

NIAG Vice-Chairman, and Chairman of the meeting: Mr. Pablo Gonzalez (Indra, Spain)

**2. INTRODUCTION TO NIAG STUDY PROCEDURES**

*(presentation to be posted on the NIAG portal, to be consulted by participants prior to the meeting)*

**3. BACKGROUND AND OBJECTIVES OF PROPOSED STUDY**

Briefing by the Sponsor, Lt Col Olivier JEAN-LOUIS  
*(the briefing will be available on the NIAG portal, to be consulted by participants prior to the meeting. However, the sponsor will brief during the teleconference)*

**4. REVIEW OF DOCUMENTATION REQUIRED FOR THE STUDY**

Document to be discussed during the meeting, defining the study objectives. This document will be amended during the meeting to include industry views and reactions to the 'sponsor' briefing, and when agreed, will represent the basis for CNAD approval of the study. *The initial draft will be uploaded on the collaboration site.*

NIAG Coordinating Officer, Mr. Jean-Sébastien Vautier

*Participants are invited to read this document prior to the meeting to come ready to discuss and exchange under this agenda item.*

**5. NIAG STUDY GROUP MANAGEMENT – ROLES AND RESPONSIBILITIES**

*(presentation to be posted on the NIAG portal, to be consulted by all participants prior to the meeting)*

**6. ELECTION OF STUDY CHAIR, DEPUTY CHAIR AND RAPPORTEUR**

*(the list of participants will be uploaded, with the volunteers for management positions highlighted in yellow)*

Voting will be done electronically during the meeting, only by those being connected at the link to be provided prior to the meeting:

- Participants are allowed to vote only once
- Only one vote per company per nation

**7. STUDY CONTRACTING ARRANGEMENTS, BUDGET & ADMINISTRATION –**

*(presentation to be posted on the NIAG portal, to be consulted by participants prior to the meeting)*

**8. STUDY REPORTING REQUIREMENTS**

*(presentation to be posted on the NIAG portal, to be consulted by participants prior to the meeting)*

**9. DATE OF KICK-OFF MEETING OF STUDY GROUP**

<b>STUDY REQUEST – STEP 1</b>
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**1. Title of Proposed Study:**

Command and Control Capabilities in support of Multi Domain Operations - MDC2 (Multi Domain C2).

**2. Brief Description of Proposed Study:**

The objective of this study is to demonstrate the potential of state-of-the-art technology in enhancing command and control structures. The deliverable will propose potential way ahead to enable the development of enhanced C2 capabilities. Area of interest are, but not limited to, experimentation platforms for speedy decision making in an expected future environment; selection and training of specific commander/staff in a simulated environment; solution for distribution of information in a dispersed HQ.

**3. Background**

**a. Related documents**

- Study on the future of the command post (NATO C2 COE, June 2019) ;
- Multi domain Operations – the future of warfare (Lieutenant-General Thomas J. Sharpy, HQ SACT, June 2020) ;
- Preliminary study on Multi Domain Operations (NATO C2COE, November 2020) ;

**b. Context**

In a future volatile, uncertain, ambiguous, and complex environment, prevailing in operations will mean a force is able to accomplish assigned missions and affect the will of the adversary through a combination of effects in different domains. To meet this objective Multi Domain Operations (MDO) are increasingly seen by Nations as an option. They could provide the ability to generate offensive and defensive effects from all operational domains (Sea, Land, Air, Space and Cyber). This shift to multi-domain operations has many facets that need to be thought through. One of the critical one is determining what a command structure under Multi Domain C2 (MD C2) could look like. MDC2 tools, MDO experts, AI integrated systems,...**what will need to be included in the foundational level of a cross boundary C2 structure?** Multi Domain Command and Control capabilities will need to seamlessly support analysis, fusion and sharing of information **for the benefit of all domains of operation**. Ability to combine collective intent with decentralized execution is also of particular interest. With emerging technologies C2 structures can be improved and provide unprecedented opportunities to

enhance our analysis work in this area. For instance, the amount of data to process and the interconnected events in multiple domains increases the demand for support in the commanders' decision making process. Time efficiency and quality (multi-domain, synchronization and de-confliction) needs to be improved. Thus, the future HQ is expected to host similar functions as are currently done, but the way these functions are supported by technology will probably differ. The main elements foreseen in this future HQ are:

- Distributed information & dispersed physical locations
- Support of non-human intelligent collaborators, or support software (e.g. situational awareness and decision making support)
- Incorporate Artificial Intelligence (AI)<sup>1</sup> based tools for Operations Assessment, risk assessments and course of action selection
- Increased use of technology for a commander and staff within a HQ

#### **4. Objectives of the Study:**

The deliverable will be used as a food for thought to support the requirements process, and later on, the development of Multi Domain C2 capabilities to support future operations.

The study will:

- provide inputs to stimulate reflexion on new technologies in support of Multi Domain Operations in NATO ;
- Identify potential solutions for future C2 systems/tools in support of MDO. Solution proposals will be supported by demo of prototypes, when existing
- propose additional new materials to create the ability to perform MDO in all domains simultaneously when needed ;
- how the dispersion of HQ personnel could affect HQ C2 systems and what measures should be taken to mitigate this risk ;
- Analyse potential effects on the Commander/staff on knowledge creation within a Command Post when AI-algorithms process the bulk of the data.

#### **5. NATO Priority: Medium**

**6. Please indicate whether you would like to be presented with alternative solution options**, taking into consideration that exploring various options may reduce the depth of the study scope:

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<sup>1</sup> Artificial Intelligence (AI) could be fundamental to converging capabilities across all domains. An important implication for future military commanders will be the expected interaction with intelligent support systems that have the ability to explain themselves to ensure trust in the supporting system, either with human staff or a different level of AI-algorithms, is essential for a Commander. This will also have implications for the delegation of authority and assigning tasks during the command and control process.

**7. Intended Follow on to the Study:**

Support capability development process (Operational requirement statement, Analysis of Alternatives).

**8. Other NATO Bodies Involved in the Related Area of Work:** N/A

**9. Current Industrial Involvement with the Sponsor Group:**

**10. Proposed Start Date:** January 2021

**11. Desired Completion Date:** December 2021

**12. Study Classification:** NATO Unclassified

**13. Study Open to Partner industries:** Yes

**14. Final report releasable to:** NATO IP

**15. Sponsoring Group Point and IS Point of Contact:**

Lt Col Olivier JEAN-LOUIS, ACT/CAP DEV/ CAP/OC2/Programme director



**SHORT DESCRIPTION OF THE NIAG STUDY GROUP MANAGEMENT TEAM ROLES**

1. The **Study Group Chairman** is responsible for the carrying out of the study by the Study Group on behalf of the NIAG and for the presentation of the final report. He/she will formulate and direct the study work plan and oversee the administration of the study. The Study Group Chair may call on the NIAG Vice-Chairman, the NIAG Head of Delegation for his nation and the IS NIAG Coordinating Staff Officer to receive advice and assistance as required.
2. The **Deputy Chairman** will assist the Chairman in the management of the study and provide stand-in for the Chairman when and as required.
3. The **Rapporteur** will act as Secretary to the Study Group, supporting the Chair in the administration of the Study Group activities. Normally this will involve assisting with the meeting arrangements, compiling the records of meetings and disseminating information to the SG members. The Rapporteur will also act as the sole interface for the Study Group members regarding NIAG Study processes and procedures. The rapporteur will further communicate with or escalate any unresolved topic to the NIAG secretary as required.

**SHORT DESCRIPTION OF THE QUICK REACTION TEAM'S ROLE**

1. The **Quick Reaction Team** is responsible for assisting the NIAG Study Group in the gathering of information, monitoring the study work, in liaising with other NATO bodies or groups who can provide information and assistance.
2. After delivery of the final report, the Quick Reaction Team is responsible for drafting the "Sponsor Assessment Form" to be considered at the first sponsor group meeting following the final report delivery.
3. This form has then to be provided to the NIAG Coordinating Staff Officer, preferably within 3 months of receipt of the study final report.