



NATO UNCLASSIFIED

06 May 2021

NOTICE
NIAG-N(2021)0013

NATO INDUSTRIAL ADVISORY GROUP (NIAG)

NIAG study on Stand-off Anti-Submarine Warfare (ASW) Effector

Exploratory Group meeting to be held virtually on 01 June 2021 starting at 14:30 and estimated to conclude by 16:30

Calling notice

1. A NIAG Exploratory Group meeting to address Stand-off Anti-Submarine Warfare (ASW) Effector will be held on 01 June 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 (Steps 1 and 2).

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 26 May 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 26 May 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 nations only and conducted at up to NATO secret level. Participants in the study must hold a security clearance granting them access to NATO Secret information. Security clearance has to be obtained from national authorities. NATO has no role in the requesting or vetting process.

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 Stand-off Anti-Submarine Warfare (ASW) Effector

*(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, NNAG

(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

STUDY REQUEST – STEP 1

1. Title of Proposed Study: Stand-off Anti-Submarine Warfare (ASW) effector

2. Brief Description of Proposed Study:

This study will investigate solutions to deliver Stand-off ASW (meaning operations from “detect” through to “attack” inclusive) beyond 5 nautical miles from a warship.

3. Background:

ASW is a NATO defence planning priority. The range of heavyweight torpedoes launched by submarines is increasing whilst the acoustic signatures of threat submarines are decreasing. However, the advent of multi-static and low frequency active sonars means it is increasingly feasible to detect and attack submarines at large ranges, especially but not exclusively in a blue water environment. The gap between these detection ranges and ship-launched Lightweight Torpedoes’ (LWT) effective engagement range is significant and may lead to a dependency on airborne ASW units. These (organic) units are limited by weather conditions and are not always available. This can lead to a reduction of ASW effectiveness. A solution is required to fulfil the NATO ambition to return to high-end warfighting.

4. Objectives of the Study:

The objectives are to:

- Identify all-weather weapon systems and associated sensors, deployable from surface ASW units and able to neutralize or cause a mission abort to a submarine at stand-off ranges, available in current industry and at which TRL.¹
- Deliver a comparison matrix of systems.
- Identify NATO interoperability requirements to enable networked sensor and effector capabilities.
- Shape the development of a networked interoperability standard, if required.
- Identify potential opportunities (from an industry perspective) for collaborative development or even acquisition between NATO nations.

5. 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: Yes

6. NATO Priority: High.

This NIAG study is directly related to the NATO Defence Planning Process as the capability requirement is captured in Main Shortfall Areas, Defence Planning Priorities and nations’

¹ Defining ‘all-weather’ and ‘stand-off ASW’ in this context, will be necessary to identify the exact magnitude of the capability gap. The RNLN will propose these definitions for this purpose to the UWWCG.

Targets as part of the need to improve ASW. It also enables options for the maritime Battle Decisive Munitions project to improve lethality and increase resilience.

7. Intended Follow on to the Study:

Depending on the findings, work would be undertaken to develop a NATO standard(s), revise tactical doctrine, and establish a multi-national cooperation initiative.

8. Other NATO Bodies Involved in the Related Area of Work:

- Maritime Operations Working Group (ASW Syndicate) under the Military Committee Maritime Standardisation Board – Leads development of tactical doctrine.
- Centre for Maritime Research and Experimentation – Has undertaken extensive research on ASW sensors and effectors.

9. Current Industrial Involvement with the Sponsor Group:

- Between NNAG (Sponsor Group) and Industry. None.
- Between Sponsor (NL) and Industry. None

10. Proposed Start Date: 2021

11. Desired Completion Date: 2022

12. Study Classification: NATO Confidential, NATO Secret if required.

13. Study Open to Partner industries: NO

14. Final report releasable to: NATO ONLY.

15. Sponsoring Group Point and IS Point of Contact:

Sponsor:

- a. LCdr Jan Willem Griffioen; email: JW.Griffioen@mindef.nl; Tel: +31682113413.
- b. Mr Stefan Schut; email: SWF.schut@mindef.nl; Tel: +31612395126.

IS:

- c. Gregory Ivey; email: ivey.gregory@hq.nato.int
- d. Sean Trevethan; email: trevethan.sean@hq.nato.int;

STUDY AND TASKING REQUEST – STEP 2 – Questions to be addressed:

- What is the Objective of the study in terms of what is to be carried out, why and with what purpose?
- What is/are the operational scenarios to be considered?
- What is the scope of the study to be, as appropriate?
- What is the study to address – specific issues, technologies, documentation, potential follow-on demonstrations or testing, etc. ?
- What is the required output of the study, that is what information and recommendations is the study to deliver in the final report ?
- 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:
- What are the active companies in the sponsor entity that have proper expertise in the field of this study request and that could be invited to participate in this study? Please list POC details.

1. Title of Proposed Study:

Stand-Off Anti-Submarine Warfare (ASW) effector.

2. Brief Description of Proposed Study:

This study will investigate solutions to deliver a Stand-Off ASW effector (meaning operations from “detect” through to “attack” inclusive) beyond 5 nautical miles from a warship.

3. Background:

ASW is a NATO defence planning priority. The effective range of submarine-launched heavyweight torpedoes (HWT) is increasing whilst the acoustic signatures of threat submarines are decreasing. However, multi-static and low frequency active sonars are increasingly able to detect submarines at large ranges, especially in blue water environments. The gap between these detection ranges and the effective engagement range of ship-launched Lightweight Torpedoes (LWT) is significant. Airborne ASW units can attack submarines at stand-off ranges, but they have limitations. They are limited by weather conditions and may not always be available due to maintenance and crew fatigue. Moreover,

the advent of submarine launched anti-air missiles may preclude them from overflying an enemy submarine for a torpedo attack. A solution is required to support the NATO ambition of high-end warfighting.

4. What is the Objective of the study in terms of what is to be carried out, why and with what purpose?

- 1) Identify all-weather weapon systems and associated sensors, deployable from surface ASW units and able to neutralize or cause a mission abort to a submarine at stand-off ranges:
 - Available in current industry, TRL 7-9;
 - Under development, TRL 4-6;
 - Potentially available in future industry, TRL 1-3;
 - Purpose: structurized market survey.
- 2) Provide a comparison matrix of solutions. At least effective range, weather limitations, effectiveness in terms of probability of mission abort, time to effect and cost should be compared, where the implicit assumption of a modern submarine threat is made.
 - Purpose: a standardized matrix comparison of bullet point 1.
- 3) Identify and shape the development of interoperability requirements for all solutions identified under items 1 and 2 to enable networked sensor and effector capabilities.
 - Purpose: within a multi-unit NATO maritime group the solutions must be suited for coordinated deployment. The solutions identified must be investigated to be compliant with current of future interoperability requirements for networked sensor and effector capabilities.
- 4) Identify physical and structural requirements of the (launch) platform to enable deployment of the solutions.
- 5) Identify potential opportunities (from an industry perspective) for collaborative development or even procurement between NATO nations.
 - Purpose: to stimulate a cost-effective solution.

5. What is/are the operational scenarios to be considered?

- a) An ASW surface ship is tracking an enemy submarine with low frequency active sonar (LFAS) at long range. The submarine is closing a NATO high value unit (HVU). The ship is unable to engage the submarine without closing to well within the effective range of submarine-launched HWT, also known as the Torpedo Danger Area (TDA). The stand-off ASW effector is launched based on own ship sensor data to neutralize the threat from outside the TDA.

- b) Unmanned ASW systems are tracking an enemy submarine that is moving towards a NATO HVU. The stand-off ASW effector is launched based on unmanned systems sensor data to neutralize the threat from outside the TDA.
- c) A NATO task group (TG) detects an enemy submarine outside LWT effective firing range. The TG however is within the TDA and poses an immediate and severe risk to the TG. The stand-off ASW effector enables the NATO TG to regain the initiative by attacking the enemy submarine quickly after detection.
- d) A maritime patrol helicopter (MPH) is tracking an enemy submarine at long range. The submarine is closing a NATO HVU. The MPH is unable to close the enemy submarine because she is armed with subsurface launched anti-air missiles. The stand-off ASW effector is launched guided by the MPH tracking data to neutralize the threat.
- e) A NATO ASW surface ship is tracking an enemy submarine at long range with LFAS. This ship is only armed with LWT's, and is unable to engage the submarine without closing to well within the TDA. The stand-off ASW effector is launched from a second ship guided by the sensor data of the NATO ASW surface ship to neutralize the threat from outside the TDA.

6. What is the scope of the study to be, as appropriate?

The scope of the study will be to identify systems or development opportunities for a future proof stand-off ASW effector capability, limited to solutions organic to a maritime taskgroup. The stand-off ASW effector needs to solve the vulnerability of surface combattants caused by the detection and threat-range advantage of modern submarines, described in the scenario's listed in paragraph 5. The future stand-off ASW effector capability shall work in synergy with modern and future ASW sensors and operational concepts.

7. What is the study to address – specific issues, technologies, documentation, potential follow-on demonstrations or testing, etc.?

- The study is to address potential technology that can mitigate the shortfalls, mostly created by operational weather limitations, of traditional stand-off (with regard to the NATO TG/ship) ASW assets (MPH, MPA) to prosecute enemy submarines. This may incorporate enablers such as unmanned systems and sensors, big data exploitation and AI/machine learning techniques.
- Not of interest are traditional airborne ASW concepts such as: MPH's, MPA's. The focus point lies at organic (Surface ship perspective) methods, technologies, weaponries.
- The issues to address are listed in paragraph 4: Interoperability, physical and structural boundary conditions, infrastructure required onboard a surface unit to

enable proposed technologies, the cost of proposed technologies: development, initial investment and per system (including effector) costs.

8. What is the required output of the study, that is what information and recommendations is the study to deliver in the final report ?

Comparison matrix of (potential) solutions (see paragraph 4), system description including physical and structural limitations, indicative ROM life-cycle cost breakdown, steps required to reach operational TRL levels, identification of opportunities of mutual development and/or production and purchase based on abovementioned factors.

9. 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:

Yes.

10. What are the active companies in the sponsor entity that have proper expertise in the field of this study request and that could be invited to participate in this study? Please list POC details.

Active industry: Unknown. Parties that may be invited to participate in the study are the NNAG, the UWWCG and interested NATO nations. The starting point we urge the industry to obtain, is to enter open minded and without bias toward existing/traditional stand-off ASW solutions.

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.