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Tender Specification (Document 02)

For the procedure: MARLIN - Maritime Advanced Resilient Link Integration Network
"MARLIN Challenge"

Procedure Number: CAEU-IW/2026-049

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List of Abbreviations

BLOS: Beyond Line-of-Sight

EW: Electronic Warfare

LEO: Low Earth Orbit

UxS: Unmanned Systems (general)

Definitions

Hybrid Fleet: A combination of manned high-value units and unmanned platforms.

Sandbox: A sandbox is an isolated environment in which programs, processes, or experiments can be executed without compromising the actual system or the real environment.

Swarm Capability: Swarm capability is the property of a drone system in which many units autonomously communicate with one another, cooperate, and self-organize to efficiently perform a task together.

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Preamble

The Agentur für Innovation in der Cybersicherheit GmbH – „Innovation for Cybersecurity“ (hereinafter: Cyberagentur) was founded in 2020 by the Federal Government of Germany with the aim of adopting a strategic and cross-departmental perspective in the field of cybersecurity. The sole shareholder of the Cyberagentur is the Federal Republic of Germany—jointly represented by the Federal Ministry of Defence (BMVg) and the Federal Ministry of the Interior (BMI).

The Cyberagentur sees itself as a driving force for an open culture of innovation and risk-taking and for a vibrant ecosystem to promote cybersecurity research. With its mission to promote research and ground-breaking innovations in the field of cybersecurity and related key technologies, all in the area of internal and external security, the Cyberagentur contributes to the technological sovereignty of Germany and its partners in the cyber and information space

The Cyberagentur is the organizer of the "MARLIN Challenge" competition.

1. Other participants

The competition is supported by the German Navy and the German Naval Command (MarKdo).

As a higher command authority directly subordinate to the Federal Ministry of Defence, the Naval Command performs maritime tasks in all military-specific and central areas of the Bundeswehr.

Three major maritime units are subordinate to the Naval Command: Operational Flotilla 1 in Kiel, Operational Flotilla 2 in Wilhelmshaven, and the Naval Aviation Command in Nordholz; in addition, the Naval Support Command in Wilhelmshaven, the training facilities, and the Naval Institute of Maritime Medicine.

2. Background and Objectives of the Competition

The navy of the future relies on a hybrid fleet. Electromagnetic interference threatens existing communication channels. Furthermore, there is a lack of sufficient data transmission rates and data transmission channels at sea. Unmanned systems in particular are quickly rendered inoperable as a result, unable to exchange information or receive commands.

The goal is to find new, technology-neutral solutions for secure connections that extend beyond line of sight (BLOS) while remaining inconspicuous, interference-resistant, and resilient to environmental conditions such as weather and sea state. This challenge offers the opportunity to develop key technologies for future operational capability.

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The German Navy is undergoing a transformation toward a hybrid fleet in order to respond appropriately and flexibly to future threats. Communication links in the operational domain are relevant for this hybrid fleet in four dimensions:

- Between ground stations, such as situation centres on land, and manned units at sea;
- between various manned naval units at sea;
- between a manned unit and its associated unmanned systems (UxS);
- and between multiple UxS, such as a swarm.

To date, the communication infrastructure at sea has relied on radio or satellite communication. In an operational scenario under National and Alliance Defence conditions, however, it must be assumed that these currently available communication means will not be available or will have insufficient data transmission rates. Current satellite communication links are too susceptible to interference for the requirements of a hybrid fleet or lack sufficient data transmission rates; radio links can also be disrupted by electronic warfare (EW) measures. Low Earth Orbit (LEO) satellites such as the U.S. Starlink are a potential solution in this regard. However, this option is also inherently risky, as these satellites are still too unreliable or the corresponding networks have not yet been sufficiently expanded.

Security policy developments in recent years—particularly Russia’s war of aggression against Ukraine and the de facto strengthening of the Russian fleet in the Baltic Sea through modernization efforts—underscore the growing importance of a disruption-free communication option that allows the German Navy to maintain vital communication channels for its hybrid elements even in the event of a crisis. In particular, the use of UxS (swarms) as a key element of a hybrid fleet underscores this necessity.

There is therefore an urgent need to develop new solutions that enable Beyond Line of Sight (BLOS) communication between different units of a hybrid fleet without interference and at high data transfer rates.

This challenge addresses a key aspect of this gap and seeks innovative and disruptive solutions that can serve as a crucial building block for a comprehensive *naval combat communication* solution package. It is aimed at teams capable of developing technologies or concepts to establish interference-free communication between two units—a situation centre on land and a manned unit at sea—and to maintain this communication under the influence of enemy electronic countermeasures.

The goal is a disruptive idea in the form of a scalable communication solution that can be integrated into naval systems, ensuring the German Navy’s operational capability as a contribution to Germany’s defence capability.

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3. Competition Content

The main focus of the “MARLIN Challenge” competition is the development of innovative technological approaches to establish interference-free BLOS communication.

We are seeking solutions capable of:

- a stable communication link between an operations centre on land and a Future Combat Surface System (FCSS) at sea,
- over a distance of at least 30 NM,
- without interference from enemy EW,
- reliably under adverse environmental conditions (weather and sea state resistance), and
- with high data transfer rates for time-critical and data-intensive applications.

The challenge is technology-neutral, and the range of possible solutions may utilize different communication media and relay stations.

Solutions are particularly desired that:

- are flexible in application and, for example, extend the range of applications to include unit-to-unit communication,
- function even while the FCSS is in motion,
- have recognizable dual-use potential.

All technical means that enable the establishment of a stable communication connection are generally permitted. Disruptive technologies and creative approaches that clearly stand out from existing solutions are particularly encouraged, even if they do not meet all of the above criteria. The framework conditions for the Challenge's test phases ensure that third-party communications in territorial waters or in ports are not disrupted.

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4. Competition Process

The competition is divided into six project stages.

In **Stage 1** of the competition, participants have time to develop a written Brief Concept for their idea and submit it via the procurement platform. The requirements for the Brief Concept are detailed in **Section 5**.

In the subsequent **Stage 2** of the competition, all submitted Brief Concepts will be formally reviewed for compliance with the minimum legal and content requirements. A jury of experts comprising representatives from the Cyberagentur, the German Armed Forces (German Navy), and BWI GmbH will then review the submitted Brief Concepts and select the three to six best concepts.

In **Stage 3**, the finalists will further develop their ideas from the Brief Concepts into **Solution Concepts** in the form of a functional prototype (demonstrator) as well as accompanying documentation. The requirements for the prototype and accompanying documents are detailed in **Section 5, Table 2 (Stage 3)**. During Stage 3, the finalists have the opportunity to test their solutions as part of the OPEX FCSS 2026 – Disruption and Detection scenario.

Prior to the final demonstration of the prototypes, technical pre-tests will take place in Eckernförde during **Stage 4**. The pre-tests serve as quality assurance for the subsequent validation under real-world conditions.

The competition concludes in **Stage 5** with the **“Demo Days”** in Eckernförde. Here, the prototypes will be validated under operational conditions in a realistic maritime test environment (“sandbox”) provided by the German Navy.

In **Phase 6**, the judging panel will evaluate the entries, and the competition awards ceremony will take place.

For further details, see **“Terms and Conditions and Information about the Competition (Document 01)”, Section 5.2.”**

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5. Minimum requirements for the submitted Brief Concepts and Solution Concepts

The **Brief Concept** and **Solution Concept** should provide a coherent, comprehensible, and scientifically convincing (brief) presentation of the idea with reference to the key content areas.

5.1 Minimum requirements for Brief Concept

The **Brief Concept (Stage 1)** must comply with the points explained below:

No.	Requirement	Description
1	Scope/Format	Length of the Brief Concept (excluding the cover page, table of contents, bibliography, appendix, and introductions and résumés of the team members): Maximum 10,000 characters, including spaces File format: The submission must be a single, continuous PDF document (searchable). Appendix: In addition to the core concept, a maximum of 3 pages of appendix material is permitted. This is to be used exclusively for supplementary charts, technical diagrams, or photos (e.g., of existing components or test setups).
2	Language	The documents must be written in German or English.
3	Sources	The Brief Concept must cite all necessary sources relevant to the topic presented.
4	Publications	The ideas presented in the submitted Brief Concept have not yet been published elsewhere.
5	Content Requirements	The Brief Concept must address at least the following aspects: Technical approach: Description of how the proposed solution works and its positioning within the current state of the art. Innovation and disruptive potential: Explanation of why the chosen approach has the potential to fundamentally redefine solutions to existing or future maritime challenges. Operational relevance: Description of the added value for the German Navy. Feasibility: Project plan outlining how a functional demonstrator (TRL 4–6) will be developed within the XXX-week work phase for the demo week. Introduction of the project team: Brief description of the expertise of key personnel (max. 1 A4 page) as well as tabular CVs.

Table 1 Requirements for Brief Concepts (Stage 1)

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5.2 Minimum requirements for Solution Concepts

The **Solution Concept (Stage 3)** must be based on the following points:

No.	Requirement	Description
Demonstrator (Hardware/Software)		
1	Functionality	Functional prototype (target maturity level TRL 4–6) suitable for testing in the maritime sandbox. The prototype must be capable of establishing and maintaining the BLOS communication link defined in the task specification under real-world conditions.
Accompanying documentation and materials		
2	Technical documentation	Detailed description of the system architecture and the technical functionality of the prototype . Presentation of the technical added value and disruptive potential compared to the state of the art. Includes an executive summary (maximum one A4 page) that concisely summarizes the innovation and operational benefits. Submission as a searchable PDF document .
3	Presentation materials (Power-Point):	A presentation in .pptx format for the final pitch to the judging panel. Length: Minimum of 5 and maximum of 10 slides. Content: Problem statement, technical approach, results of the sandbox testing, and outlook on scalability.
4	Additional materials (optional)	Additional materials that illustrate how the prototype works (e.g., videos of field tests, screencasts of software interfaces, or CAD models)
5	Language	The documents must be written in German or English.
6	Sources	The Solution Concept must cite the necessary sources relevant to the topic presented.
7	Publications	The ideas presented in the submitted Solution Concept have not yet been published elsewhere

Table 2 Requirements for Solution Concepts (Stage 3)