Joint Analysis, Training and Education Centre (JATEC) Bydgoszcz, Poland

REQUEST FOR INFORMATION

RFI-ACT-JATEC-01-26

This document contains a Request for Information (RFI) call to industry, academia and nations for their input to NATO's regarding a resilient alternative PNT solution that ensure sub-meter navigation accuracy and operational continuity for Allied uncrewed systems in contested electromagnetic environments.
Industry, academia and nations wishing to respond to this RFI should read this document carefully and follow the guidance for responding.

General Information	
Request For Information No.	01-26
Project Title	JATEC's Project #16: "Uncrewed Systems NATO–Ukraine Capability Development"
Due date for questions concerning related information	**5:00 pm CEST 22 July, 2026**
Due date for submission of requested information	**5:00 pm CEST 03 August 2026**
Contracting Office Address	Joint Analysis Training and Education Centre (JATEC) 14 Bronisława Potockiego street 85-309 Bydgoszcz
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References	**A.**
All request for clarifications, questions and responses to this RFI must be sent via email to all Points of Contact reported above. Individuals email will not be accepted and should not be sent. Contracting and Technical POCs must be included in any correspondence.	

1. INTRODUCTION

Joint Analysis, Training and Education Centre (JATEC) is issuing this Request for Information (RFI) to engage with industry to conduct a current state of abilities for commercial industry to provide solutions to specific dilemmas see enclosure 1).

The near-total reliance of uncrewed systems on Global Navigation Satellite System (GNSS) has created a critical vulnerability, leading to unacceptably high attrition rates once platforms cross the line of contact. Leveraging combat-proven insights from Ukraine, JATEC is engaging industry to identify and mature a Two-Layered Navigation Architecture. The Primary Layer must ensure robust Navigation, Position and Timing (PNT) integrity through resilient GNSS technologies, such as Controlled Reception Pattern Antenna (CRPA) technology, integrated inertial systems, or equivalent high-fidelity solutions. However, JATEC is specifically interested in Secondary “Fallback” layers so advanced that they may potentially supersede the need for a CRPA entirely. The goal is to identify how Allied uncrewed systems maintain sub-meter precision and operational continuity in the most severely contested electromagnetic environments, regardless of the specific hardware combination used to achieve it.

While we prioritize mature systems, we welcome technologies currently in a testing-ready phase, provided they demonstrate a clear pathway to mass production. We are particularly interested in innovative, low-cost approaches that balance high-precision drift correction with the stringent affordability and scalability requirements of the current threats to the Alliance, specifically for One-Way Attack (OWA) platforms.

This Request for Information (RFI) does not constitute a commitment to issue a future request for proposal (RFP). The purpose of this Request for Information (RFI) is to gather information from industry regarding existing and emerging capabilities related to resilient and GNSS-independent navigation. The information collected will support JATEC's assessment of potential approaches, technologies, and architectural concepts relevant to NATO capability requirements, including a potential Two-Layered Navigation Architecture. Responses to this RFI will be used solely to inform future analysis and decision-making and do not constitute a commitment to collaborate, select, sponsor, or otherwise engage with any respondent..

Further, respondents are advised that JATEC will not pay for any information or administrative costs incurred in responding to this RFI. The costs for responding to this RFI shall be borne solely by the responding party. Not responding to this RFI does not preclude participation in any subsequent RFP if issued in the future. All information shared with JATEC **might** be shared with contracted third parties in order to support the further review and process as needed. Provision of data, or lack thereof, will not prejudice any respondent in the event that there is a competitive bidding process later.

2. BACKGROUND

2.1. The war of aggression against Ukraine has demonstrated that electronic warfare is no longer a peripheral concern but a decisive factor in tactical and strategic outcomes. Russian forces consistently employ high-power jamming and sophisticated spoofing techniques to saturate the electromagnetic spectrum, effectively neutralizing standard GNSS signals across the frontlines and deep into rear-echelon areas. This denial of PNT data has compromised the operational efficacy of uncrewed systems, transforming once-precise assets into vulnerable targets.

For OWA missions, the reliance on continuous GNSS connectivity has become a critical point of failure. Current operational data suggests that without resilient navigation, platforms operating beyond 100km face unacceptably high attrition rates due to sensor drift and the inability to maintain mission-planned flight paths in signal-denied environments. Establishing an autonomous, GNSS-independent capability is now essential to ensure these assets can perform their mission despite pervasive jamming**.**

JATEC's Project #16 seeks to bridge this critical capability gap by prioritizing the rapid identification and integration of cost-effective, scalable navigation architectures. We advocate for a Two-Layered Approach designed to eliminate single points of failure: a primary layer ensuring GNSS-resilient integrity (often through CRPA-integrated inertial systems), coupled with innovative, passive fallback sensors. Crucially, if a proposed fallback technology demonstrates sufficient precision to maintain mission continuity independently, it may reduce or even remove the requirement for traditional CRPA hardware. These solutions must be modular, affordable for mass deployment, and engineered for immediate battlefield integration to ensure Allied forces maintain a decisive edge in contested environments.

Therefore, JATEC's Project #16 is seeking to explore the availability of a two-layered PNT architecture. This architecture is designed to be platform-agnostic, facilitating the rapid integration of modular, cost-effective technologies into existing platforms. These navigation systems must be scalable, affordable for mass deployment, and capable of maintaining mission continuity in the face of evolving electronic warfare threats.

2.1.1. Layer 1: Resilient Primary PNT

2.1.1.1. This layer ensures high-precision positioning by maintaining GNSS integrity through advanced interference rejection. While this typically utilizes CRPA technology for spatial nulling, effectively "blinding" the platform to jamming sources, JATEC welcomes information regarding any integrated technology that maintains a stable satellite lock in high-noise environments. The objective is to provide a continuous, high-fidelity PNT source as long as the electromagnetic environment permits.

2.1.2. Layer 2: Autonomous Passive Fallback

2.1.2.1. This layer serves as the GNSS-independent "dark" navigator. When electromagnetic interference overwhelms the primary layer's rejection capabilities, the system must seamlessly transition to passive navigation,

such as high-grade Inertial Navigation Systems (INS) enhanced by terrain/scene matching (e.g., Digital Scene Matching Area Correlation (DSMAC)) or other non-emissive sensors. If the precision of this layer is sufficient to meet mission requirements independently, it may be proposed as a primary solution to reduce platform complexity and cost.

This is not a formal request for submissions as part of a procurement; but rather a general request intended to explore whether any possible solutions exist that should be included in one or many alternatives during the development.

3. PROJECT DESCRIPTION

3.1. Vision

3.1.1. The aim of this Request for Information (RFI) is to identify the existence of of resilient, dual-layered PNT architectures capable of maintaining mission integrity in GNSS-denied environments. JATEC seeks to assess and evaluate potential solutions and innovative concepts, prioritizing technologies that can be readily integrated into diverse platforms through a modular and interoperable design.

3.1.2. To ensure broad applicability across the theatre, submitted solutions must be platform-agnostic, allowing for rapid adaptation to various long-range OWA platforms. Our objective is to establish a scalable, cost-effective navigation baseline that prioritizes interference-resilient PNT. This may be achieved through the integration of CRPA technology or, alternatively, through high-precision passive sensors capable of maintaining mission integrity without a GNSS lock. By focusing on modular, adaptable sensors, we aim to provide a navigation suite that is affordable for mass deployment while ensuring operational freedom despite pervasive electronic warfare threats.

3.2. Objectives

3.2.1. In a nutshell: JATEC is looking for systems that can replace a standard GPS module with minimal re-coding or airframe redesign

3.3. Expected Benefits to Respondents

Participants may be invited to collaborate with subject matter experts and frontline end-users. Industry and Academia participants will have the chance to reveal state-of-the-art systems, products, services and technology to assist with identifying available capabilities for further exploration requirements. However, participation/non-participation will not affect future procurement eligibility, , should procurement be initiated.

3.4. Expected Benefits to NATO

Beyond these strategic advantages, Participants will impact on the development of JATEC's future PNT standards and requirements. By contributing to the gap analysis and target architecture, selected partners will play a foundational role in defining the technical

roadmap for next-generation, GNSS-independent capabilities

4. REQUESTED INFORMATION

4.1. The response(s) to this RFI shall be submitted by e-mail.

See Enclosure 1. Submissions must include both the Contracting and Technical POCs listed on page 2. The responses shall not contain proprietary and/or classified information. JATEC reserves the right to seek clarification on submissions.

4.2. Eligibility to Respond:

Only NATO Nations, Industry and Academia that originate or are chartered/incorporated within NATO Nations and Ukraine are eligible to respond to this RFI. Companies from Partner Nations who want to participate should collaborate with a primary company headquartered within a NATO Nation.

4.3. Response Template

4.3.1. Industry respondents are requested to provide their answers using the file QUESTIONNAIRE_RFI_DPI_2026_01 attached with this RFI.

4.3.2. Provide name, mailing address, overnight delivery address (if different from mailing address), designated point of contact (phone number, e-mail).

4.3.3. Respondents can collaborate with other providers, but all companies/organizations must be clearly identified and their role/services clearly stated.

4.3.4. To facilitate a technical evaluation and potential integration assessment, respondents are requested to provide the following information:

4.3.4.1. Technical Specification Profile

4.3.4.1.1. Primary Navigation Tier (High-Integrity PNT)

4.3.4.1.1.1. **Performance Requirement**: Must maintain a stable PNT (Position, Navigation, and Timing) solution in the presence of wide-band noise, localized jamming, and sophisticated spoofing.

4.3.4.1.1.2. **Technical Approach**: While typically achieved via CRPA (Controlled Reception Pattern Antenna) technology integrated with an Inertial Navigation System (INS), JATEC is open to alternative signal-processing or hardware-agnostic technologies that provide equivalent GNSS-interference rejection. By achieving a CEP comparable to GNSS-protected signals, a high-fidelity passive fallback layer renders expensive CRPA hardware unnecessary, thereby simplifying airframe design and accelerating manufacturing for high-demand wartime conditions.

4.3.4.1.1.3. Adaptability: If the Secondary Tier (Layer 2) provides sufficient accuracy to meet mission objectives independently in

denied environments, the requirement for a Primary Tier GNSS-protection hardware suite (e.g., CRPA) may be waived to optimize SWaP-C (Size, Weight, Power, and Cost).

4.3.4.2. Secondary Navigation Tier (Autonomous Fallback)

4.3.4.2.1. **Performance Requirement**: Must provide seamless, GNSS-independent navigation when the Primary Tier is compromised. The system must maintain a flight-path accuracy (Circular Error Probable (CEP)) suitable for terminal strike.

4.3.4.2.2. **Technical Approach**: Seeking non-emissive, passive sensors including - but not limited to - high-grade Inertial Measurement Units (IMU), Terrain Referenced Navigation (TRN), DSMAC, or optical flow sensors.

4.3.4.2.3. **Precision Standard**: Preference will be given to “Dark Layer” solutions that minimize drift over 100km+ distances, potentially serving as the sole navigation source for the entire mission duration.

4.3.4.3. System Integration & Modular Logic

4.3.4.3.1. **Interoperability**: Solutions must be platform-agnostic and utilize open-architecture protocols to allow for rapid integration into existing and future long-range uncrewed platforms.

4.3.4.3.2. **Transition Logic**: The system must include an automated "Health Monitor" capable of detecting GNSS spoofing or denial and

executing an instantaneous, drift-compensated handover between tiers.

4.3.4.3.3. **Scalability**: All components must be optimized for mass production, emphasizing a low-cost per unit to support large-scale, high-attrition operational environments.

4.3.4.4. Interoperability

4.3.4.4.1. **Platform Agnosticism**: Explain how the solution interfaces with existing flight controllers (e.g., MAVLink, STANAG standards, or proprietary APIs).

4.3.4.4.2. **Modular Design**: Detail the physical/software modularity. Can the system be integrated into an existing OWA platform without significant structural modifications?

4.3.4.4.3. **Development Roadmap**: Provide the current TRL (Technology Readiness Level) and a timeline for achieving “combat-ready” status (TRL 8/9).

4.3.4.5. Scalability & Affordability

4.3.4.5.1. **Production Capacity**: Outline the feasibility of scaling production to (insert number, e.g., hundreds/thousands) units per month.

4.3.4.5.2. **Cost Structure**: Provide a high-level cost estimate per unit on a scale, including maintenance and logistics support requirements (if needed).

4.3.4.5.3. **Supply Chain**: Confirm the sourcing of critical components and describe any strategies to mitigate supply chain risks.

4.3.5. Response should include at a minimum a technical description and technical architecture diagram of the proposed implementation. Responses are not required to follow any format, but the following is proposed:

a) Introduction
b) Assumptions
c) Technical / System Requirements
d) Description of Network Implementation & Architecture Views
e) Recommendations

4.3.6. Identify current services your company offers, which most closely match the capabilities, specified in this RFI (or portions of).

4.3.7. Available product brochures, specification sheets, photographs, illustration and technical descriptions that describe your company’s current services are welcome. Companies are encouraged not to include marketing informational materials that do not relate to the services described in this RFI as it will be discarded; however, responses may include URL links to technical

documentation materials (i.e., technical data sheets for products) are welcome.

4.3.6. Response limited to a single main document and enclosures for a total not-to-exceed 15 pages.

4.3.7. The document should be single-spaced, have one-inch margins, assume US letter-size (8 1/2 by 11 inches) page, use 12-point font, and be formatted for compatibility with Microsoft Word or Adobe Acrobat Reader (current versions).

4.3.8. Submissions should be named according to the following convention: <Respondent company name; maximum of 12 characters>_JATEC_RFI_<date in YYYYMMDD format>.<filename extension of 3 or 4 characters>. Provide list of your company's past and current customers to which you have provided or are providing similar services, including a customer/company name and point of contact, phone number, and address/e-mail where they can be contacted.

4.3.9. Responses shall not be classified above NATO UNCLASSIFIED.

4.3.10. The information may be considered in developing any future potential Statement of Work requirements. JATEC will consider selected information for developmental contracts and candidates for testing purposes. The data collected in response to this RFI will be used to develop a report to inform the JATEC leadership. The report will provide an assessment to support a decision as to whether NATO should pursue an Adopt, Buy or Create approach to meet GNSS independent navigation.

4.4. Response Due Date

Responses to this RFI must be received by **1700 CEST on 01 August 2026.** The responses shall not contain any classified information. JATEC reserves the right to seek clarification on submissions.

5. CLARIFICATIONS AND QUESTIONS

Inquiries of a technical nature about this RFI shall be submitted by e-mail solely to the aforementioned POCs. Accordingly, questions in an e-mail shall not contain proprietary and/or classified information. All questions should be submitted by 20 of July 2026 to allow for appropriate response.

6. ADDITIONAL INFORMATION

6.1. Non-disclosure Principles and/or Non-disclosure Agreement (NDA) with Third Party Company.

6.1.1. Please be informed that JATEC may contract a company to conduct the Analysis of Alternatives investigation in support of this project. JATEC will follow nondisclosure principles and possibly conclude an NDA with that company to

protect submitted information from further disclosure. As the third party beneficiary of this nondisclosure, this RFI serves to inform you how JATECHATEC plans to proceed and JATECs intent to protect information from unauthorized disclosure. This requires the third party company to protect the disclosed information using the highest degree of care that the company utilizes to protect its own Proprietary Information of a similar nature, and no less than reasonable care.

6.1.2. The third party company receiving the information shall not, without explicit, written consent of JATEC:

a) Discuss, disclose, publish or disseminate any Proprietary Information received or accessed under nondisclosure principles and subject to an NDA, if an NDA is concluded;

b) Use disclosed Proprietary Information in any way except for the purpose for which it was disclosed in furtherance of the goals of the instant project, collaboration, activity or contract; or

c) Mention the other Party or disclose the relationship including, without limitation, in marketing materials, presentations, press releases or interview.

6.2. Organizational Conflicts of Interest.

Contractor and subcontractor personnel performing work under an JATEC contract may receive, have access to, or participate in the development of sensitive information relating to source selection methodology, cost or pricing information, budget information, and future specifications, requirements or Statements of Work or perform evaluation services that may create a current or subsequent Conflict of Interests (COI). Similarly, companies responding to an JATEC RFI may create a subsequent OCI determination when pursuing future NATO contracts generated from that RFI.

Each individual contracting situation will of course be examined on the basis of its particular facts and the nature of any proposed contract. The exercise of common sense, good judgment, and sound discretion is required in both the decision on whether a significant potential conflict exists and, if it does, the development of appropriate means for resolving it.

Any company either awarded an JATEC contract or responding to a JATECRFI while also anticipating bidding on future NATO contracts relating to this work, should consider having a mitigation plan in place to address or mitigate any OCI concerns now or in the future.

6.3. Handling of Proprietary Information

Proprietary information, if any, should be minimized and clearly marked as such. JATEC will treat proprietary information with the same due care as the command

treats its own proprietary information. JATEC will exercise due care to prevent its unauthorized disclosure. Please be advised that all submissions become JATEC property and will not be returned.

6.4. Exceptions to Obligations. The third party company receiving the information may disclose, publish, disseminate, and use Proprietary Information:

a) To its employees, officers, directors, contractors, and affiliates of the recipient who have a need to know and who have an organizational code of conduct or written agreement with the recipient requiring them to treat the disclosed Proprietary Information in accordance with nondisclosure principles and the NDA (if executed);

b) To the extent required by law; however, the company receiving the information will give JATEC prompt notice to allow JATEC a reasonable opportunity to obtain a protective order or otherwise protect the disclosed information through legal process that is:

- demonstrated in written record to have been developed independently, or
- already in the possession of the company receiving the information without obligation of confidentiality, prior to the date of receipt from JATEC, or
- disclosed or used with prior written approval from JATEC, or
- obtained from a source other than JATEC without obligation of confidentiality; or publicly available when received.

6.5. Any response to this RFI is considered to establish consent to this process. A copy of the NDA, if or when concluded, can be provided on request.

7. SUMMARY

This is a RFI only. The purpose of this RFI is to involve industry, academia and nations and seek, for their input to JATEC. JATEC has not made a commitment to procure any of the items described herein, and release of this RFI shall not be construed as such a commitment, nor as authorization to incur cost for which reimbursement will be required or sought. **It is emphasised that this is an RFI, and not an RFP of any kind.**

ENCLOSURE 1 to
RFI-ACT-JATEC-01-26
DATED 13 APR 26

OPERATIONAL SCENARIO - *OPERATION GHOST WING*

1. **Situation**[1]

a. The ongoing conflict in Eastern Europe and increasing security concerns across the Baltic region have confirmed that electronic warfare (EW) is a decisive factor in modern combat. Adversaries now routinely deploy high-power jamming and sophisticated spoofing techniques to saturate the electromagnetic spectrum, effectively neutralizing standard GNSS signals across vast frontlines and deep into rear-echelon areas. This persistent denial of PNT data has compromised the operational efficacy of uncrewed systems, transforming once-precise long-range assets into vulnerable targets.

b. For long-range OWA missions, the reliance on continuous GNSS connectivity has become a critical point of failure. Operational data confirms that without resilient navigation, platforms operating beyond 100km face unacceptably high attrition rates due to sensor drift and the inability to maintain mission-planned flight paths in signal-denied environments. Establishing an autonomous, GNSS-independent capability is now essential to ensure these assets can reach their targets despite pervasive, high-intensity jamming.

c. JATEC's Project #16 seeks to restore operational freedom by establishing a robust, Two-Layered Navigation Architecture. The mission objective is to identify and accelerate the deployment of systems that ensure continuous PNT integrity, moving beyond single-point failure models. This is achieved by integrating a Primary Resilient Layer, capable of maintaining GNSS connectivity through interference-rejection technologies such as CRPA, with an innovative, Passive "Dark" Layer for autonomous fallback.

d. Crucially, this architecture is designed for optimal efficiency: if a proposed "Dark Layer" technology demonstrates the high-fidelity precision required to navigate contested environments independently, it may supersede the need for primary GNSS-shielding hardware. By prioritizing performance over specific hardware mandates, we ensure that Allied-aligned capabilities remain effective, scalable, and affordable, regardless of the severity of the electromagnetic threat environment.

2. **Mission Objective**

a. Conduct a long-range precision strike mission against a high-value logistical hub located 650km behind the "Line of Contact".

3. **Storyline & Technical Dilemmas**

a. **The Ingress**: Crossing the "Shattered Border" (0–150km)

1) **Narrative**: Brave 1, a Special Operations Force from the Air Force of the Republic of Nordia launches an uncrewed platform from a hidden site within its sovereign territory. As the platform approaches the border of the contested Zorian Federation, it encounters a belt of localized, mobile jamming units.

[1] **Disclaimer**: The scenario metrics serve as indicative challenge benchmarks and should not be interpreted as mandatory pass/fail thresholds or grounds for exclusion.

2) **The Dilemma**: At this stage, the platform relies on its Primary Navigation Layer. The system must successfully distinguish between authentic satellite signals and "high-noise" interference or sophisticated spoofing from ground-based jammers. While this is typically achieved through CRPA spatial nulling, the requirement at this juncture is the integrity of the PNT data stream. The technical dilemma lies in the system's ability to maintain a stable, high-fidelity lock under intense electromagnetic pressure, or, in the absence of a reliable GNSS signal, immediately validate its position against the Passive Fallback Layer to prevent flight-path deviation.

3) **Industry Test Point**: How does your Primary Navigation Layer maintain a stable PNT solution when the interference source (jammer or spoofer) is moving relative to the airframe at 150km/h?

a) Requirement Details:

i) For Hardware-based solutions (e.g., CRPA): Describe the latency and adaptive nulling speed of the logic when tracking high-velocity emitters.

ii) For Signal-processing/Alternative solutions: Explain how your algorithms maintain signal integrity and reject "moving" noise or spoofing profiles without losing lock.

iii) Handover Criteria: At what threshold of signal degradation does your system determine the Primary Layer is compromised and initiate the transition to the Passive Fallback Layer?

b. **The Dead Zone**: The Great Plains of Silence (150–450km)

1) **Narrative**: Deep within Zorian territory, the platform enters a "Wide-Area Denial Zone". The enemy has saturated the region with high-power, multi-frequency spoofing. The GPS signal on the platform's dashboard suddenly reports a position 500km away in the middle of the ocean (spoofing), followed by a total signal "blackout" (jamming).

2) **The Dilemma**: This is the critical Handover Point. The platform must autonomously detect that Layer 1 is compromised without human intervention. It must immediately switch to Layer 2 (The Dark Layer).

3) **Industry Test Point**: Describe the "Health Monitor" that triggers this switch. If the handover takes more than 500ms, the autopilot may execute a violent corrective maneuver based on false spoofed data. How do you ensure a "smooth" transition to inertial/passive navigation?

c. **The Deep Reach**: Navigation by Shadow (450–600km)

1) **Narrative**: The platform is now flying "dark". It has had no GNSS contact for over 2 hours. It is flying over the Vesper Forest, a vast, featureless landscape with few roads or buildings. The Internal Navigation System (INS) is beginning to "drift", creating a circular error of 2 kilometers, meaning the drone might miss its next waypoint entirely.

2) **The Dilemma**: The platform needs a “drift-reset”. However, it cannot send a “ping” or use radar, as Zorian Electronic Support Measures (ESM) will detect the emission and launch interceptors.

3) **Industry Test Point**: How does your Layer 2 perform “Featureless Navigation”? Can your system use subtle terrain contours or magnetic anomalies to reset the INS drift without active emissions?

d. **The Terminal Phase**: The Iron Gate (600–650km)

1) **Narrative**: The platform reaches the target: a massive fuel depot surrounded by Point-Defense jammers. These jammers are designed to “drown out” even the most resilient sensors at close range. The platform must dive from 3,000m to its target with sub-5-meter accuracy.

2) **The Dilemma**: In the final 60 seconds of flight, visual clarity is obscured by smoke and local EW is at its peak.

3) **Industry Test Point**: How does your system maintain terminal guidance when the “scene” no longer matches the pre-loaded satellite imagery due to battle damage or smoke? What is the final “fail-safe” for accuracy?

4. **Instructions for the Participants**:

a. In your submission, please refer to the “Phase 2 Handover” and “Phase 3 Drift-Reset” of this scenario. We are not looking for a “perfect” flight; we are looking for a system that can explain its error-handling logic during these specific dilemmas.

b. This scenario creates a “level playing field” for evaluation and assessment. By using fictional nations (Nordia vs. Zoria), it should be used by companies to focus on the physics and logic of the problem rather than policies, while still addressing the very real lessons identified from deep-strike campaigns currently occurring in Eastern Europe and the Baltic Sea.