REQUEST FOR INFORMATION (RFI)

DESIGN AGENT TO COMPLETE DEVELOPMENT OF RESILIENT EMBEDDED GLOBAL POSITIONING SYSTEM (GPS)/INERTIAL NAVIGATION SYSTEM (INS) (R-EGI)

1 Description

Request for Information (RFI) Only. This RFI is issued for information and planning purposes only and does not constitute a solicitation. All information received in response to this RFI that is marked as proprietary will be handled accordingly. Responses to this notice are not offers and cannot be accepted by the Government to form a binding agreement. Responders are solely responsible for all expenses associated with responding to this RFI... Not responding to this RFI does not preclude participation in any future RFP, if any is issued.

Section 2 of this request provides context to the information requested in Section 3.

2 Background

This background provides an overview of the Air Force Positioning, Navigation and Timing (AF PNT) need and how this need is driving the various facets of the lifecycle to create resilient AF PNT through the R-EGI program.

2.1 R-EGI Program Background

2.1.1 The Need

The 2018 National Defense Strategy charged the Department of Defense (DoD) to *Reform the Department for Greater Performance and Reliability.* This strategy included the need to accelerate planned upgrades; build robustness and resiliency into existing capabilities; and to integrate new processes/capabilities into current/future Positioning Navigation and Timing (PNT) solutions. Applying this direction, the 2019 U.S. Air Force (USAF) PNT Strategic Plan established a priority to "*Provide robust and resilient PNT materiel solutions to the warfighter".* A key tenet to the capability delivery is to shorten acquisition timelines to facilitate the fielding of adaptable, cost-effective materiel solutions. R-EGI is the near-term materiel solution, planning to head into production with a competitive contract award(s) projected in FY2027.

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For manned and unmanned airborne platforms, the majority of PNT capability is implemented by coupling GPS with an Inertial Navigation System (INS). Before GPS, INS equipment had been coupled/aided using various PNT aiding sources using a federated architecture. This federated architecture had allowed some level of resilience and robustness of PNT sources. However, as GPS receiver technology was miniaturized, it has been embedded into the INS forming a non-federated, tightly coupled Embedded GPS/INS (EGI). Size Weight and Power efficiencies have been gained by embedding GPS in the INS, but much of the resilience found in the older federated systems has been lost.

This loss of resilience, coupled with adversaries understanding of the US's high dependence on GPS, has led to concerns of the impacts as GPS vulnerabilities are exploited. To overcome these concerns, R-EGI aims to modernize and enhance PNT robustness and resiliency by architecting and designing our EGI's as a System-of-Systems aligned with AF Enterprise PNT capability

development efforts creating a Resilient-EGI (R-EGI). This need is formalized in the DoD PNT Strategy (08/2019):

“While GPS will remain the cornerstone PNT capability for the DoD, complementary PNT capabilities must be applied as well using a modular open-system approach to ensure timeliness and affordability in implementation and resiliency in effects.”

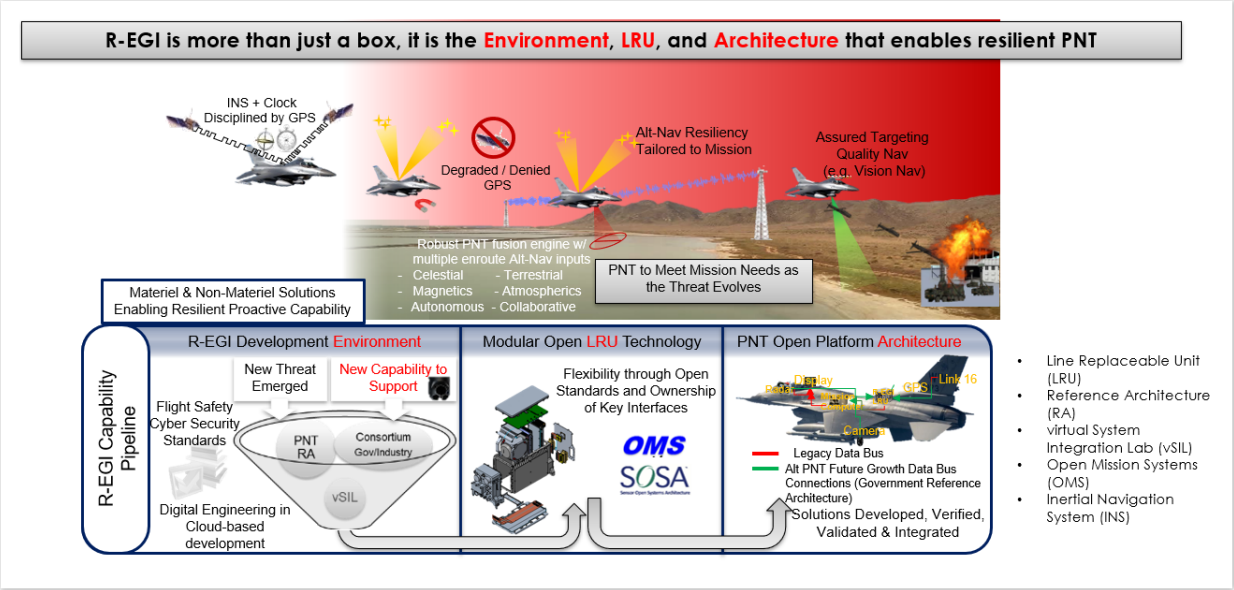
R-EGI provides the efficiencies and performance of a tightly coupled EGI, and R-EGI’s System-of-Systems architecture allows for the efficient integration of complementary and alternative PNT capabilities as was achievable in pre-GPS federated PNT systems. R-EGI also enables the integration of current Robust spaced-based PNT capabilities such as advanced digital anti-jam antennas and M-Code receivers with Regional Military Protect (RMP). It also enables integration of future space-based PNT capabilities being developed in the Navigation Technology Satellite-3 (NTS-3) program.

2.1.2 R-EGI Development Approach

The first R-EGI systems are being develop for and integrated into F-15E/EX aircraft and post-block F-16s. To expedite development, integration and fielding of R-EGI, a different acquisition and lifecycle strategy and approach has been adopted to meet the identified urgent needs. Creating the development environment, having ownership of the LRU design (key interfaces, key technical data, software architecture), and working with platforms to maximize the effectiveness of integration are fundamental tenets to enable R-EGI to be resilient. To optimize agility and responsiveness in an ever-changing threat environment, the AF must own and manage the design of R-EGI and will continuously develop and field enhanced PNT capabilities as an enterprise to address new threats or platform needs.

Executing under a Major Capabilities Acquisition (MCA) authority for Rapid Prototyping, R-EGI has been developing under the guidance of a Design Agent (DA) since 2019. The prototyping authority has covered two phases of development: Proof of Concept demonstrating the ability of a R-EGI to function under an OSA/GRA and Prototype Development which is still underway. The outcome of Prototype Development will be Production Representative Units (PRU) to support verification of the design and its representation in a Level (3) Technical Data Package (TDP).

The verified Level (3) TDP generated from this development effort provides the basis for competitive production of the R-EGI LRU. It is anticipated that one or multiple awards will be made for the manufacturing of the R-EGI LRU with product support aspects that are outlined in section 2.4.2.



2.2 R-EGI Program Office

The R-EGI Program Office is managing the R-EGI Technical Baseline (where Technical Baseline is defined in https://acqnotes.com/acqnote/careerfields/technical-baseline and includes the requirements model, sysML model, key interface IP, etc.) following initial development. The R-EGI Program Office is also managing the production of R-EGI based on the specific R-EGI form factor design and partnering with platforms program offices to identify and incorporate any additional capabilities/accommodations required for successful aircraft integration.

The Technical Baseline will be managed by the AF organically and through Technical Baseline maintenance contracts. Storage and configuration management of the Technical Baseline is in the AF Enterprise Product Lifecycle Management (PLM) system. Development and integration of software capability will be driven from the PLM hosted Technical Baseline and managed by AF Software Maintenance Organizations. Development of software capabilities based on the Technical Baseline will be either performed organically in the R-EGI virtual Systems Integration Laboratory (vSIL) and/or through contracted efforts. These PLM and vSIL environments are/will be cloud-hosted.

The development environment for both integration onto future additional platforms and technology insertion will be handled separate from the manufacturing effort- likely through separate contracts.

The manufacturing of the R-EGI LRU will be executed on a contract type to be determined. R-EGI manufacturers are anticipated to build the LRU based on the Level (3) Technical Data Package. It is anticipated that R-EGI manufacturers will operate within the Digital Environment

of R-EGI to include inputs to the vSIL (e.g. change requests) and Product Lifecycle Management (PLM) systems for life-cycle logistics. Product support elements are outlined below.

2.3 Platforms Supported

The post-block F-16 is the lead platform for the R-EGI effort, with the design of the Large Form Factor LRU influenced by the platform requirements. The production of the R-EGI LRU is to support possible F-16 fielding of R-EGI on the post-block fleet. F-15 LRU design is being run concurrent with F-16 development for a Medium Form Factor LRU. The program is also conducting studies on B-52, AC/MC-130 and F-18 for possible development of R-EGIs for those platforms.

The PNT Program Office anticipates additional platforms turning towards R-EGI upgrades to provide PNT resiliency and M-Code GPS solutions as outlined in the strategies listed above. The coordination between additional platforms and the PNT Program Office is currently underway, but it is anticipated that these platforms will drive additional platform unique production runs supporting their respective fleet implementation strategies.

2.4 Key Production / Product Support Elements

2.4.1 Key Characteristics of R-EGI LRU Functions and Architecture

R-EGI provides PNT state data to platforms to support safety critical functions (e.g., outer-loop light control; positioning and/or guidance for Communication Navigation Surveillance / Air Traffic Management (CNS/ATM) operations; platform attitude information; associated indicators and warnings; and more.) R-EGI must be designed and manufactured with system safety and design assurance to support these safety critical functions as appropriate for platform airworthiness. R-EGI also provides PNT state data to support mission critical weapons and mission systems. To support both safety and mission critical systems and be resilient- R-EGI is designed with a partitioned architecture to host these capabilities as appropriate. In addition, to enable development of AF enterprise-wide PNT capabilities, the R-EGI LRU architecture also includes partitioning between core PNT functions and interfaces and platform-specific functions and interfaces.

2.4.2 Product Support Strategy

Through the 12 Integrated Product Support Elements (IPSEs), the product support strategy for R-EGI is to enable an agile adaptation and integration to a rapidly evolving hostile environment. It is a priority to minimize all sustainment costs and the overall logistics footprint without sacrificing warfighter readiness and capabilities.

With the delivery of a Level (2) and Level (3) TDP, The R-EGI Program Office (PO) will maintain Operational Safety Suitability and Effectiveness (OSS&E) authority to support the mitigation of obsolescence and to maintain configuration control of the LRU. The delivery of the

Level (2) and Level (3) TDPs will enable the Air Force to activate organic maintenance for the R-EGI LRU as well as manufacture and produce the LRU at the best cost to the DoD.

The Maintenance Concept for R-EGI is in work and is expected to include three levels of maintenance: Operational, Intermediate, and Depot maintenance. R-EGI will be procured/integrated on multiple DOD platforms in later Spirals. It is anticipated that the depot workload will be a 70/30 split between Organic and Contractor Logistics Support (CLS). For any possible proprietary conditions then a Public-Private Partnership (PPP) will be considered for Organic Depot Maintenance. During the current prototyping effort, a Level of Repair Analysis (LORA) will be completed by the DA to help inform an Economic Analysis. An Initial Source of Repair Assignment (SORA) and Core Logistics Analysis (CLA) has been completed; dictating that Robins AFB will be the Organic depot for all hardware (HW), software (SW) and SW Crypto. The Depot Source of Repair (DSOR) is currently in the Depot Maintenance Interservice (DMI) phase. The Air Force is projected to be the Primary Inventory Control Activity (PICA) for all supply chain management (SCM) via the 407th SCMS at Robins. Also, The R-EGI LRU expects to be unclassified when keyed.

For Production, a 2-year Interim Contractor Support (ICS) will be needed for Initial Fielding while the product support package is being deployed. ICS shall include on-site support, warranty support, depot maintenance of parts needing repair and will include all spare parts, repair parts, tools, test sets and any other support or test equipment need for O/I/D levels of maintenance. ICS will also include initial Provisioning/Cataloging and Tech Order development/management.

3 Requested Information

This section details information of specific interest to the AF to help inform various aspects of planning taking R-EGI from its current state with most of hardware design complete and work with the current subs to finish their software and integrate that software into the R-EGI box. The result of this effort will be a Level 3 Technical Data package owned by the US Government to release a competitive contract for production, as well as Production Representative units.

3.1 Finish Development of Level (3) Technical Data Package (TDP) for Manufacturing

Ability to work with the following Sub-Contractors to finish the development of both hardware and software for the R-EGI LRU:

Kearfott	IMU and SCNav
GDMS	Chassis, back plane and PRU builds
Collins	GNSSR
Sechan	PRU build for risk reduction
IS4S (current DA)	MCNav

The following questions are oriented towards feedback on completion of design, manufacturing of PRUs and to ensure a sufficient Level (3) TDP is provided for the Production RFP. Interested parties must request the Level (2) TDP from the Contracting Officer (Mr. Todd

Rissmiller). The Level (2) TDP will be furnished upon verification of ability to receive/store ITAR data.

1) Provide an assessment of the vendor's ability and capability complete hardware and software design and integration
    a. Focus on ability to rapidly complete CDR and provide PRUs.
    b. Discuss ability to take another vendor's partial design and software and quickly analyze, plan and complete the project.
    c. State your ability to produce, test and provide to the government multiple PRUs.
    d. What initiatives have you implemented in the past to successfully minimize development timelines? Please provide results of these actions.
2) Describe your plan to work with multiple subs, to possibly include the previous DA, and work together to project completion.
3) Describe your ability to use Agile software development technics to complete the software package and how you will keep the government informed of your progress.
4) Describe how you will keep the government informed of cost and schedule information.
5) Provide an understanding of like products that the company may be currently developing or have produced in the past; Include description of any challenges encountered, as well as mitigation efforts implemented and results
6) Describe your ability and experience in Model Based Systems Engineering tools.
7) Discuss your company's core technical focus areas, as well as your approach to obtaining technical capabilities needed to address this program. Describe current industrial/engineering/software certifications or those expected in the next year.
8) Describe your current security classification (facilities and personnel) and resources available to support this effort.
9) Provide a short description of your facilities both current and planned
10) Provide your intentions/ability to comply with the MOSA requirements of this effort

3.2 Additional Information

Additional relevant information industry would like to provide with respect to the AF development and lifecycle plans to build a resilient PNT capability through the R-EGI program are encouraged and acceptable.

4 Responses

NOTE: If applicable, RFI responders should indicate any proprietary restrictions associated with their solutions.

Responses to the RFI shall be provided by interested parties through briefings or reports within 15 days of this RFI's release. The Government will review all submissions. Depending on the quality and comprehensive nature of the responses, parties may be invited to present their strategies and capabilities during an Industry Day event. If the event occurs, it will take place Spring 2025 at a location to be determined (note: employing VTC/sVTC capabilities are possible options). Such a scenario, each RFI responder must be cleared or could obtain clearance at the SECRET level, as a minimum. The classification of the briefings (physical, electronic, and

verbal) must not extend beyond SECRET. Each RFI responder will be provided separate two-hour time periods to discuss their proposed solution(s) with a panel of DoD key stakeholders representing research laboratories, aircraft and weapon system program offices, and engineering directorates.

THERE IS NO SOLICITATION AT THIS TIME. Contractors/Institutions responding to this market research are hereby notified that participation in this RFI is voluntary and may not ensure participation in future solicitations or contract awards. The Government will not reimburse participants for any expenses associated with their participation in this RFI. Not responding to this RFI does not preclude participation in any future solicitation, if issued.

5 Summary

Parties interested in responding to the RFI or requesting additional information regarding the R-EGI Level (2) TDP, please contact Mr. Todd Rissmiller. Although Contractor name will not be disclosed, all additional information requests will be shared publicly with this RFI on SAM.gov.