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Thank you for participating,

A handwritten signature in black ink, appearing to read 'G. Hamilton'.

Gregory Hamilton  
President  
Aviation Week Network

Acknowledged, agreed, and submitted by

A handwritten signature in black ink, appearing to read 'Chris Granrud'.

Nominee’s Signature

7/29/2024  
Date

Nominee’s Name (please print): Chris Granrud

Title (please print): Program Manager

Company (please print): Lockheed Martin Corporation, ROTARY AND MISSION SYSTEMS (RMS)

## NOMINATION FORM

Name of Program: Open Systems Interoperable and Reconfigurable Infrastructure Solution (OSIRIS) \_\_\_\_\_

Name of Program Leader: Chris Granrud \_\_\_\_\_

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Customer Approved

- Date: 7/11/2024 \_\_\_\_\_
- Customer Contact (name/title/organization/phone): Ryan Temple / Agreements Officer Representative (AOR) / NIWC Pacific Code 55313 / (714)-334-6651 \_\_\_\_\_

Supplier Approved (if named in this nomination form)

- Date: \_\_\_\_\_
- Supplier Contact (name/title/organization/phone): \_\_\_\_\_

**PLEASE REFER TO PROGRAM EXCELLENCE DIRECTIONS  
AS YOU COMPLETE THIS FORM.**

## SECTION 1: EXECUTIVE SUMMARY

### Make the Case for Excellence

Value: 10 points

#### **What is the vision for this program/project? What unique characteristics and properties qualify this program for consideration?**

The Open Systems Interoperable and Reconfigurable Infrastructure Solution (OSIRIS) program's vision and focus is on the early development, integration and testing of prototypes to define and deliver a state-of-the-art Stand-Alone (SA) Fifth Generation (5G) testbed to the United States Marine Corp (USMC) for continued test and evaluation of future 5G technology. Specifically, the delivered 5G testbed enables our customer to experiment with the prototype testbed, to include integration of variety of systems and applications onto and within the 5G testbed, to further define the expected functionality of the technology. Experimentation and testing results in-turn informs the customer of what requirements/specifications can be written to best maximize the known utility of the technology for the US services to utilize as part of their enhancements, augmentations, or replacement of legacy systems as part of the services continuing drive towards domain dominance and deterrence.

The OSIRIS program rose to a level of excellence deserving of recognition through the program's ability to adapt to dynamic program-level and technical baseline changes based on iterative results of the programs experimentation of a new technology, while maintaining the program's cost and schedule performance, and maintaining a strong collaborative relationship with our customer. What made the OSIRIS program stand out specifically was 1) the use of open systems architectures shared with LM's corporate investments and commercial 5G industry partners and 2) the strategic placement of program personnel with the implementation of Agile methodologies in combination with virtualized collaborate tools.

The OSIRIS program's technical approach to enabling a potential wide range of development and integration while maintaining cost-effective interoperability, scalability, and flexibility was to start with open systems architectures. Prior to the start of the OSIRIS program, Lockheed Martin (LM) had begun a corporate initiative with the forming of the 5G.MIL® Unified Network Solutions group which had already laid the foundation for leveraging shared open systems architectures with strategic 5G partners. The OSIRIS program carried forward the 5G.MIL® industry partnerships to develop a 5G standards-based approach to designing a scalable open architecture solution complementary to available and emerging commercial industry solutions.

The implementation of the collaborative tools mentioned above in addition to several internal LM business management processes and tools for the program to use also aided the program in maintaining and at times reducing program cost and schedule. The combination of agile development processes, which break down efforts into small manageable increments or sprints, and shorter duration rolling wave scheduling, allowed for more accurate program performance measurements using Earned Value Management (EVM) methodologies to perform program performance forecasting and for the LM and customer program management teams to make informed objective decisions.

What makes the OSIRIS program best suited for the OEM/Prime Contractor System Design and Development category is the fact that the program in itself is specifically scoped to develop a new SA 5G capability designed as an open architecture to allow for rapid integration of other 5G systems, disparate legacy systems, and applications for the propose of enabling the USMC to perform experimentation, test, and evaluation of said technology for consideration for future Program of Records (PORs).

## SECTION 2: VALUE CREATION

Value: 15 points

➤ **Clearly define the value of this program/project for the corporation; quantify appropriately**

Currently, the OSIRIS program is the first 5G POR within the corporation that is in full alignment with LM's approach to 5G transition of commercial cellular technologies to the Department of Defence (DoD), which is to complement, enhance and adapt 5G for our DoD customers, leveraging the massive current and planned investments by commercial 5G solution providers. The value from the program's success is important as it enables growth and enhancement of the 5G technology and furthers LM's vision for a multi-tiered 5G network offering that is reliable, resilient, and scalable for our military customers. The program also enables the growth of LM's talent pool for the technology.

➤ **Clearly define the value of this program/project to your customer**

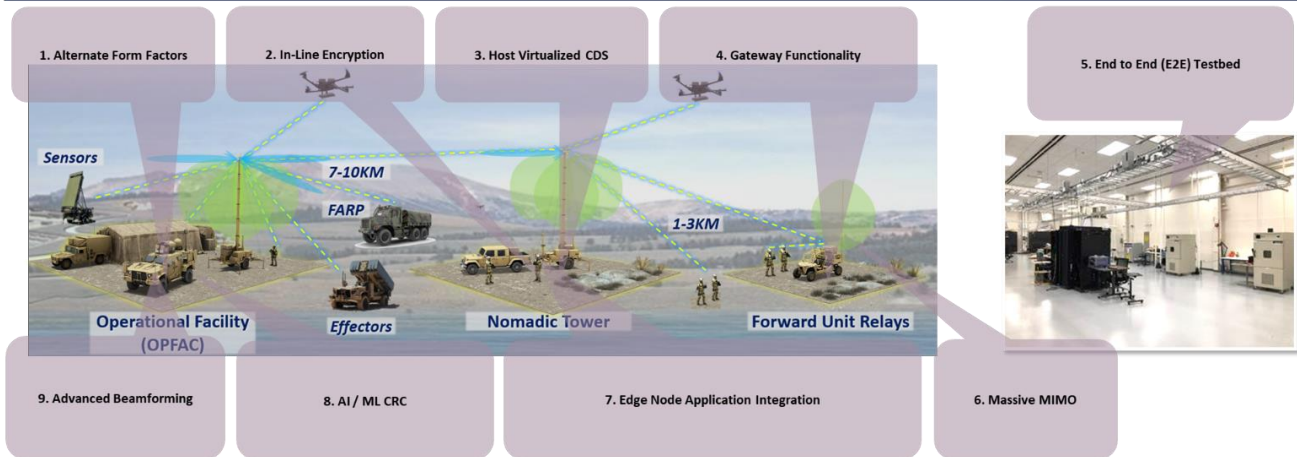
For our customer, the OSIRIS program's value is to create a 5G communications network infrastructure testbed for deployed operations experimentation by OUSD and the USMC. Customer is empowered by the DoD "5G to Next G" initiative to accelerate 5G innovation to further enable USMC EABO to operate in temporary, austere and contested environments – 5G cellular communications can significantly enhance U.S. military operations by providing advanced capabilities in several key areas to include enhanced situational awareness, improved Command and Control (C2), enhanced mobility and flexibility, more streamlined integration of applications, cybersecurity, real-time data analytics, Artificial Intelligence (AI), and resilient and redundant networking infrastructure. Specifically:

- Situational awareness –
  - 5G high-speed data transfer and low latency allows for the rapid transmission of large volumes of data, including high-resolution imagery and video from surveillance drones and satellites. This improves situational awareness by providing commanders with real-time intelligence. The low latency of 5G networks enables real-time video feeds and communication, critical for making timely decisions on the battlefield.
- Improved C2 –
  - In contested environments where traditional communication infrastructure may be compromised, 5G ensures reliable and secure communication channels for C2, enabling seamless coordination across different units. 5G supports the concept of distributed operations by allowing dispersed units to remain connected and coordinated, which is essential in modern warfare scenarios.
- Enhanced Mobility and Flexibility –
  - 5G networks can be rapidly deployed using portable base stations, ensuring that troops in temporary or austere environments have access to high-speed communication networks without the need for extensive infrastructure. 5G also supports the creation of ad hoc networks that can be quickly established and reconfigured as operational needs change, providing flexibility in dynamic combat situations.

- Integration of Advanced Technologies –
  - The military can leverage the Internet of Things (IoT) to connect various sensors and devices, providing a comprehensive picture of the operational environment. This includes environmental sensors, health monitors for soldiers, as well as equipment status trackers.
- Robust Cybersecurity –
  - 5G networks come with advanced security features that protect against cyber threats. Secure communication is vital in contested environments where adversaries may attempt to disrupt or intercept communications. Network slicing technology also allows for the creation of multiple virtual networks within a single 5G physical network, each tailored for specific uses and with customized security measures.
- Real-Time Data Analytics and AI –
  - 5G supports edge computing, allowing data to be processed close to its source rather than in a central server. This is critical for real-time analytics and AI applications that require immediate data processing and decision-making. AI can also be used for predictive maintenance of equipment, threat detection, and operational planning. The high-speed data transfer capabilities of 5G enhance the effectiveness of AI algorithms by providing timely and comprehensive data inputs.
- Resilient and Redundant Communication Networks –
  - 5G networks can be designed with multiple layers of redundancy and resilience, ensuring that communication remains uninterrupted even if parts of the network are compromised. 5G can support the formation of mesh networks where each device acts as a node, providing multiple pathways for data to travel. This enhances the robustness of the communication network in hostile environments.

By leveraging commercial technology and processes to address DoD use cases, the OSIRIS program aims to hasten DoD's adoption of 5G while developing understanding and techniques for mitigating the technology's shortcomings. The OSIRIS program addresses one of multiple prototype project topics released under the DoD 5G Tranche II series of topics on the Information Warfare Research Project Consortium's OTA, however the OSIRIS 5G testbed establishes the 5G infrastructure by which the other 5G Tranche II technologies are to be integrated with and experimented on.

- The OSIRIS Testbed's ability to quickly evaluate emerging 5G technologies reduces integration cycle times and enhances the USMC's ability to efficiently validate 5G communication platforms



- USMC views the OSIRIS Testbed as a much needed capability to evaluate 5G interoperability with existing DOD networks which in turn will enhance USMC capabilities and advance DOD's Joint All Domain Operations concept

### OSIRIS Testbed 5G/FutureG Capabilities

- **Clearly define the value of this program/project to members of your team; quantify if possible**

The value created by the OSIRIS team is significant, both for the customer and for the LM OSIRIS team in that the team is able to apply their honed 5G engineering know-how to bring emerging 5G technology beyond a lab-based system, but now as part of a deployed testbed for our customer. The team has already been part of multiple industry firsts within the 5G community, such as the first deployment of a SA 5G capability as well as the one of the first developments of the 5G Integrated Access and Backhaul (IAB) feature which is currently being experimented in the field. The team's experience from their involvement on the program further enhances their personal careers as well as their expertise in the design and integration phases using best of breed tools and processes employed on the program.

- **Clearly define the contribution of this program/project to the greater good (society, security, etc.)**

The ability for the USMC and the United States military to incorporate available commercial technology for rapid insertion into our country's military force strengthens the US's security and overall deterrence of our adversaries. Specifically, 5G communication technology enhances the DoD's global connectivity, logistical support capabilities, disaster response, and overall military systems interoperability. By leveraging this technology, the United States can strengthen its role in global stability.

### SECTION 3: ORGANIZATIONAL BEST PRACTICES AND TEAM LEADERSHIP

Value: 35 points

- **15 points: Describe the innovative tools and systems used by your team, how they contributed to performance and why**

Some of the tools used to support the program's efficient execution are as follows along with a short description of each:



- JIRA –
  - JIRA is an Agile project management and issue tracking software suite used to plan, track, and support the development of the OSIRIS testbed, focused mostly but not limited to the development and release of the OSIRIS software baseline updates. JIRA also supports the programs management of documentation updates and releases. The use of JIRA on the program enables the team to have a source of tasking to which to reference virtually.
- Confluence –
  - Confluence is an online organized documentation repository the team uses as reference to the program’s knowledge base. Using Confluence has resulted in efficiencies in sharing knowledge across the team as well as relevant reference data for adjacent efforts within LM.
- Tableau –
  - Tableau is used on the program to visualize our program roadmap, schedule, and financial data. The ability for the program and LM leadership to easily interpret our program’s plans and financial comparative analyses allows for quick identification of areas to focus on, greatly reducing the need for the manual generation of graphs and other charts.
- Teams –
  - Teams is a virtual workspace for real-time collaboration and communication, meetings, file, and app sharing. Team’s is used by LM as a corporation as well as by our subcontractors and customer.
- SharePoint –
  - SharePoint is a web-based location to store, organize, share, and access information. SharePoint is used to create separate and shared webpages for the team, customer, and subcontractors on the program.
- VPA –
  - Virtual Program Assistant is an LM developed tool for program management, reporting, and analytics, enabling improved and predictable program performance. VPA leverages enterprise-wide program management applications to compare, compile, and analyze program data to assist the program manager in optimizing program costs and schedules.

➤ **10 points: Define the unique practices and process you used to develop, lead and manage people?**

The OSIRIS program operates as a model hybrid team functioning seamlessly with team members located mainly in San Diego, CA and Valley Forge, PA, however a majority of the team works virtually but with access to the OSIRIS Integration Lab (OIL) located in Valley Forge. In addition to the use of these collaborative tools, the program has morning scrums as a team two days a week, which aids in keeping all members of the team to include our subcontractor partners in-sync, and allows the team members to interact, share knowledge and ideas. As part of our Agile sprint planning, the program conducts a retrospective where the group discusses what is working, not working, and what changes we plan to employ to continuously improvement the program’s overall performance.

Through the execution of the OSIRIS program, there is a focus on identifying and developing key talent as well as assessing currently performing talent on the program so that high-potential employees are identified and provided further opportunities to grow. Key skills are identified which are focused on current and future needs of targeted program opportunities, particularly within the scope of additional 5G technology focused programs. Some of the key skills targeted are individuals with an understanding of wireless communication technologies and 5G protocols, knowledge of network architectures, SW development and cloud computing experience.

Maintaining a strong collaborative relationship with our customer was key to the program's success through the changes required to the program throughout the program's execution. Specifically, the program manager was strategically placed at the customer site at Camp Pendleton, CA, which proved to be beneficial by ensuring the customer expectations and ideas are understood and coordinated with the program team in real-time to quickly adapt to the changing customer direction. The majority of the program's technical team resided in Valley Forge, PA, where many of the technical subject matter experts had gained their experience in 5G technology development from previous IRAD efforts at that location, which proved to be advantageous due to the ability of the technical team to leverage 5G lab assets and the lessons learned from their previous research. Additionally, engineers seeking employment with LM with 5G industry experience in large cellular based companies were prioritized and brought on early in the program to ensure recent related experience could be applied to the planning and execution of the project from the start. Leading up to the start of the program's execution of Integration and Experimentation Phase (Phase 2), the program decided to move the 5G Test and Evaluation (T&E) lead from Valley Forge, PA to Southern California to align additional 5G skillset to where increased 5G related planning and effort would take place to include in-person coordination with the customer team at Camp Pendleton. This combination of customer intimacy and leverage of technical experience from an established 5G development center of excellence proved to be an effective combination to meet the customer's expectations for the program.

➤ **10 points: How did you leverage skills and technologies of your suppliers?**

Prior to the start of the OSIRIS program, LM invoked a corporate initiative (5G.MIL™) which began the process of experimenting with 5G technologies through our pre-existing 5G industry relationships, and broadening to additional 5G industry leaders to develop a concept for a secure 5G Tactical Edge Communications System (5G TECS). Soon after, Jim Taiclet (former CEO of American Tower) became LM's new CEO with a goal of accelerating the company's commercial partnerships around 5G & Beyond 5G (B5G) technologies. Early on the OSIRIS program, 5G technology partners provided developed and emerging technology along with their 5G subject matter expertise bringing forth 5G Network & Multi-access Edge Computing (MEC) Node Deployment software and IAB technology.



## SECTION 4: DEALING WITH PROGRAM COMPLEXITY

(VOLATILITY, UNCERTAINTY, COMPLEXITY, AMBIGUITY, or VUCA)

Value: 25 points

- **10 points:** Describe UNIQUE areas of VUCA faced by your program and why. (Please avoid the issues surrounding Covid-19 pandemic, which was faced by all programs.)

One area of complexity was the anticipated difficulty in developing new commercial technology in coordination with two separate commercial subcontractors and shifting new commercial technologies for government use. The OSIRIS program is made up of roughly 25% scope performed by our subcontractors with a strong dependency on 5G industry partners to deliver planned functionality for the project on schedule. Through a combination of strategic planning, robust project management practices, and advanced technological tools as implemented mitigations ensured that the software and hardware deliveries meet program milestones. Specific areas of mitigation include communicating concise objectives detailed in the program's project planning, effective communication and coordination, robust contract and subcontract management, agile methodologies:

- Concise Project Planning –
  - The program defining objectives and requirements have helped clearly articulate project goals, objectives, and detailed requirements from the outset. This ensured that all parties, including subcontractors, understand the project's scope and expected outcomes. The program also implemented a phased break down of the project into manageable phases with defined milestones. This allowed for periodic reviews and adjustments, ensuring that each phase is completed before moving on to the next.
- Effective Communication and Coordination –
  - The program's use of the Jira and SharePoint toolsets as a centralized shared database for all project communications ensure that all stakeholders, including subcontractors, have access to the latest information. Also, scheduled meetings and progress reports are provided to keep everyone informed and address any issues promptly.
- Robust Contract Management –
  - Clear contractual agreements have ensured that our contract with the customer and with our subcontractors are clear and comprehensive, detailing deliverables, timelines, and responsibilities.
- Agile and Flexible Project Management –
  - The program implemented Agile project management practices to allow for flexibility and adaptability in response to changing requirements or technological advancements and established formal change management processes to smoothly handle the several shifts in commercial technologies or project requirements.

- Integration of Commercial Technologies –
  - Technology assessments of commercial technologies for their suitability in the government context are regularly conducted and shared with our customer to gauge suitability of adoption to meet specific project requirements. Prototyping and testing approaches are defined and conducted before implementation to ensure the technology met the necessary standards and requirements.
- Risk Management –
  - Risk identification mitigation is utilized on the OSIRIS program to help identify potential risks early in the project and develop mitigation strategies, and to develop contingency plans to address unexpected challenges or changes in technology or subcontractor capabilities.
- Government and Industry Collaboration –
  - LM fosters strong partnerships between government agencies and private sector companies, but also with adjacent supporting vendors as part the execution of the program. These collaborative relationships facilitate the transfer and adaptation of commercial technologies

These mitigations were documented in our Statements Of Work (SOWs) and clearly helped keep the program on track. The team followed Agile methodology to monitor progress and provide feedback to vendor development Sprints. By implementing these strategies, the program team is effectively managing this complexity and is on track to ensure a successful project outcome.

➤ **15 points: Explain how your team responded to these challenges. What changes did you make, what were the results?**

The challenge the program overcame beyond the successful development of new 5G technology features was implementing the necessary means to effectively collaborate between the customer team, our team, and subcontractor partners – all of which are geographically dispersed across several locations and needed to have the ability to collaborate and share work products in real-time. The OSIRIS program stands out in this regard by which the program implemented a series of collaborative tools (e.g., SharePoint, Jira, Tableau, etc.) which effectively virtualized our efforts, removing what normally would be logistical and geographic challenges to effective collaboration. This digitization of the program’s products and use of shared on-line software tools greatly enhanced collaboration between program management, the customer team, and the technical team.

An example is automated Tableau pages pulling real time data driven metrics on OSIRIS hosted external customer facing portals with complete JIRA linkage. This provides the customer 24/7 insight into all tasks, sprints, and larger increment plans. The customer can see tasks are planned, in progress and closed. Graphics include timelines with graphs to make it readily digestible at both the engineering and PM levels. This has greatly reduced customer questions and having to reach out to program leads for status. Internally, a Tableau dashboard was created to ingest all financial data and give a weekly updated snapshot of the entire financial state of health of the program, easily visualizing where any over or under runs are occurring. Automation and visualization of key performance and financial data allows the USMC and Lockheed OSIRIS team to seamlessly collaborate between all levels of program stakeholders. The implementation of Agile methodologies combined with automated reporting has created a transparent and efficient process for customer/team communication that manages the iterative and dynamic nature of the program’s work scope.

Another example of how the OSIRIS team was enabled to quickly implement new capability discovered as part the continuing integration of emerging technologies targeting increased performance which changed the capability of the OSIRIS system happened in the Fall of 2023. In October of 2023, a key vendor informed Lockheed Martin that their software capability needed for MEC compute capability would not be delivered in time per the agreed upon contract. This MEC solution drove a particular 5G Core/gNB solution into the OSIRIS baseline. The OSIRIS team evaluated the impacts from the vendor slip and established a new baseline Nov 2023. Implementation began in Dec 2023 and was completed Jan 2024. A new software stack was implemented including a new 5G core / gNB solution as well as an entirely new MEC based solution. Performance of the system no longer being tied to the prior vendors core went from ~900mbps baseband throughput to 5gbps baseband throughput. The RAN stack was not impacted and the ability to host 3rd party containerized applications at the edge was gained. This led to an overall performance, capability, and system stability improvement. This re-baseline was completed at no cost and with no schedule slip incurred by the USMC OSIRIS program, which is very atypical when considering the scope of the change.

## SECTION 5: METRICS

Value: 15 points

### ➤ What are your predictive metrics?

Internally on the OSIRIS program, the program used Virtual Program Assistant (VPA) for program management, reporting, and analytics. VPA is a LM developed foundational Program Management infrastructure hub for program management, reporting, and analytics, enabling improved and predictable program performance. VPA leverages enterprise-wide program management applications to compare, compile, and analyze program data to assist the program manager in optimizing program costs and schedules. Capabilities include:

- Program performance, scorecards, and predictions for EPRS reporting programs.
- Earned Value Management (EVM) Supplier performance across the enterprise, including key suppliers by business area and program.
- Discovery of similar programs to support collaboration and networking.

### ➤ How did you perform against these metrics?

Earned Value Management (EVM) was primarily used to integrate schedule, costs, and scope to measure project performance as well as to aid in analyzing program performance. EVM metrics are used at least monthly to make data informed decisions from past performance indices to preserve program schedule and budget. The program has maintained an overall “green” satisfactory status for much of the program’s existence and for over the past 14 months, specifically a Cost Performance Index (CPI) and Schedule Performance Index (SPI) between .98 and 1.02.

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➤ **How do your predictive metrics drive action toward program excellence? Please provide examples.**

The Key benefits of VPA and the metrics it provides (to include EVM metrics) include the increased speed by which issues and supporting data are identified and made available to management, and for management to gain insight and act quickly to steer the program towards program management goals:

- **Speed**
  - Reduces time spent identifying problem areas, empowering Program Managers to spend less time collecting and processing data and more time strategizing and optimizing performance.
- **Agility**
  - Accelerates readiness and acumen of PMs by implementing data-based decision support, providing broad program insight to bolster the effectiveness of Program and Portfolio Managers.
- **Insight**
  - Provides situational awareness for Program Managers of all program types experiencing information overload on the multiple input channels of program performance.

Because of the tightly coupled planning and monitoring tools employed on the program, the program currently anticipates an underrun of roughly \$160K at program completion.