AVIATION WEEK
Program Excellence Awards

November 8, 2023
Washington, DC

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Thank you for participating,

Gregory Hamilton
President
Aviation Week Network

Acknowledged, agreed, and submitted by

_____   6/5/23
Nominee's Signature   Date

Nominee's Name (please print): Brian Veduccio _____

Title (please print): Sr. Director of FP&A and Program Finance_____

Company (please print): **General Atomics Aeronautical Systems Inc,**

NOMINATION FORM

Name of Program: **India-COCO, MQ9B preproduction HALE-RPA**

Name of Program Leader: **Mike Connolly**

Phone Number: **805.444.6304**

Email: **michael.connolly@ga-asi.com**

Postal Address: **14200 Kirkham Way, Poway, CA 92064**

Customer Approved

- o   Date: **23MAY2023**

- o   Customer Contact (name/title/organization/phone): **H. Shekhar / CDR / Indian Navy /**

     +91 98187 46068

Supplier Approved (if named in this nomination form)

- o   Date: _____

- o   Supplier Contact (name/title/organization/phone): _____

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

NOMINATION FORM

Name of Program: ___India-COCO, MQ9B preproduction HALE-RPA___ - Category OEM/Prime Contractor System Sustainment".

Name of Program Leader: ___Mike Connolly___

Phone Number: ___805.444.6304___

Email: ___michael.connolly@ga-asi.com___

Postal Address: ___: 14200 Kirkham Way, Poway, CA 92064___

Customer Approved

o   Date: _____ 23 MAY 23 _____

o   Customer Contact (name/title/organization/phone): ___Cdr H SHEKHAR, INDIAN NAVY.___

Supplier Approved (if named in this nomination form)

o   Date: _____

o   Supplier Contact (name/title/organization/phone): _____

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

EXECUTIVE SUMMARY: Make the Case for Excellence
Value: 10 points
Use 12 pt. Times Roman typeface.

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

[LIMIT YOUR NARRATIVE TO THIS PAGE.]

General Atomics-Aeronautical Systems, Inc. (GA-ASI), an affiliate of General Atomics, is a leading designer and manufacturer of proven, reliable Remotely Piloted Aircraft (RPA) systems, radars, and electro-optic and related mission systems, including the Predator® RPA series and the Lynx® multi-mode radar. Having built an aircraft fleet with more than seven million flight hours, GA-ASI provides long-endurance, mission-capable aircraft with integrated sensor and datalink systems required to deliver persistent flight that enables situational awareness and rapid strike. The company also produces a variety of ground control stations and sensor control/image analysis software, offers pilot training and support services, and develops meta-material antennas.

On October 7th, the Indian Navy awarded General Atomics a Direct Commercial Sale (DCS) contract to deploy two MQ-9B Pre-Production aircraft as a Contractor-Owned, Contractor-Operated (COCO) system. New aircraft tails and 77-foot wings were added; significant payload upgrades were integrated; new software was developed; and a new Mission Intelligence System (MIS) was fielded. Once flight testing was completed, the upgraded aircraft, supporting systems, spares and personnel were deployed. The first mission was flown in India on November 18th -- only 41 days after the contract was signed. This rapid effort entailed the first-ever deployment, operation and sustainment of the prototype HALE aircraft -- one which provided up to 33 hours of endurance and a 2,000-mile mission radius to surveil the 14 million-square-mile coverage area, all while supporting two-hour launch and recovery turnarounds.

In May 2022, a follow-on contract was awarded. Dramatic upgrades were implemented, including the addition of a new state-of-the-art Multi-mode Maritime Radar (MMR) and GA-ASI's Detect-And-Avoid System (DAAS). The platform's software also was fully re-baselined and new satellite technology was adopted for improved beyond-line-of-sight operations. GA-ASI applied innovative engineering and program management principles to blaze through acquisition, development, trade compliance, logistics and integration processes in just six months. This effort is a testament to the GA-ASI and Indian Navy team's continual process improvement philosophy. While simultaneously sustaining 99% aircraft availability and delivering 100% of contracted flight hours, the new modifications were completed in November of 2022.

VALUE CREATION
Value: 15 points
Use 12 pt. Times Roman typeface.

Please respond to the following prompts:

- ➢ **Clearly define the value of this program/project for the corporation; quantify appropriately.**
- ➢ **Clearly define the value of this program/project to your customer**
- ➢ **Clearly define the value of this program/project to members of your team; quantify if possible.**
- ➢ **Clearly define the contribution of this program/project to the greater good (society, security, etc.)**

This program contributes to the value of GA-ASIs Leasing and Services Group by leveraging the strengths of a matrixed organization effort to lead the development and execution of a new DSC-COCO global business model. Valuable lessons were learned via cutting-edge innovation, exploitation of an aggressive development program, international logistics and foreign-cultural business environments. The successful delivery, sustainment and continual product enhancement substantiate the conceptual Leasing and Services DCS-COCO business model.

Our vision:
To be a global leader in integrated situational awareness and services.
Our mission:
Meet worldwide needs for situational awareness through innovative ISR solutions and rapid integration of- advanced capabilities.

GA-ASI has been at the forefront of DAAS technology development and standardization over the past decade, with multiple flight demonstrations and deployments of DAAS systems for domestic customers. Implementation of DAAS for the Indian Navy was GA-ASI's first for a foreign customer and involved a
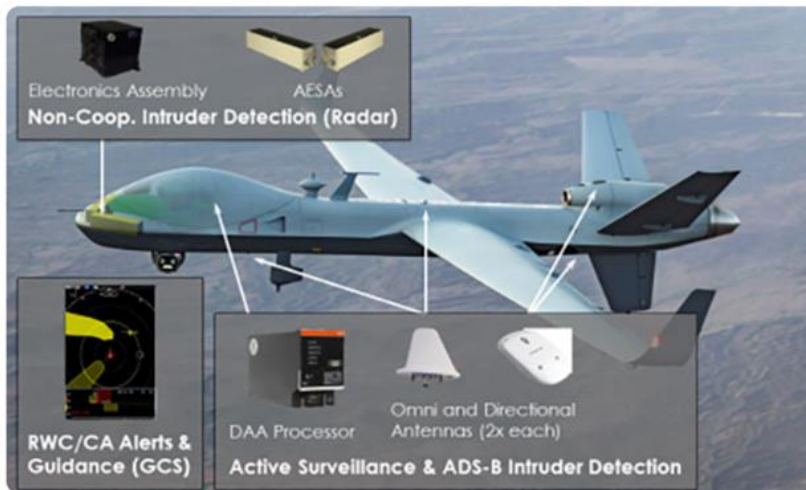
repackaging of the system to fit on the India aircraft, along with multiple hardware changes. This was also the first deployment of the weather mode feature of the DAAS air-to-air radar. Sustained operations in India are leading to further product refinement of GA-ASI's DAAS. Employing multiple sensors that enable the unmanned aircraft to see and avoid both cooperative and non-cooperative air traffic provides value to both GA-ASI and the Indian Navy by increasing our ability to operate among other air traffic more safely. Furthermore, this enhanced safety facilitates operations at higher altitudes, which increase fuel efficiency, endurance and extend the range of the aircraft sensors, improving core mission performance.

This program provides significant value to Indian Navy's surveillance task. GA-ASI is a trusted partner to deliver reliable MQ-9 systems for the Indian Navy. This team ensures that nation-state adversaries' intrusion across internationally recognized borders are identified and kept in check. Even after GA fulfilled India's initial exigent operational needs, GA-ASI continued to serve IMoD with innovative mission capabilities and highly effective payloads such as the new MMR, DAAS, upgraded datalinks and satellite technologies. This yielded a reliable HALE-RPA with the latest innovations that could be rapidly integrated into Indian Navy's surveillance organization and act as a dependable force multiplier. These new payloads better empower India to detect and identify maritime contacts of interest and provide support for ground forces through surface-moving target indication. The new systems also assure the detection and avoidance of other aircraft flying near the aircraft's area of operations. Additional functionality includes the implementation of weather detection systems to allow operations

around the severe weather frequently encountered during monsoon weather patterns. Finally, continually improved logistics and sustainment proved that the aircraft were consistently available for tasking.

GA-ASI recognized that rapidly fielding the newest technologies to support worldwide maritime missions, would **provide value to both the corporation and the customer**. When using typically cumbersome government acquisition processes, equipment is oftentimes obsolete by the time it is finally fielded. However, GA-ASI and the Indian government jointly drove the DCS-COCO MQ-9 program to accelerate the fielding of the latest cutting-edge technologies. RPA innovation, acquisition and operations were expeditiously advanced through commercial developmental and business practices, such as with the integration of the latest Multi-mode Maritime Radar (MMR) and the GA-ASI Detect and Avoid Systems. Ahead of contract execution, a development effort kicked off to explore and complete an extraordinary amount of innovation and integration of hardware, software, payloads, System Integration Laboratory (SIL) testing, aircraft ground checks, Ground Control Station (GCS) upgrades and flight testing through several functional areas. Hardware development included both GA-ASI manufacturing and outside procurements along with drawing releases to continue innovating the MQ-9B Pre-Production aircraft configuration and GCS. Software development and integration included collaboration with a European Original Equipment Manufacturer (OEM) as a first-ever effort. All told, this effort was completed in 11 months, whereas previous similar efforts encumbered by government acquisition bureaucracies took at least 24 months. This proved that the DCS-COCO program can be depended on to field the latest cutting-edge technology safely and reliably at the speed of relevance.

This program contributes considerable value to members of our GA-ASI team. Substantiating this DCS-COCO effort feeds enhanced capabilities and new business opportunities. In addition to the clear financial incentives of success, the proof of concept of a matrixed organization to support the DCS-COCO business was crucial. Many Cross Functional Teams (CFT) built confidence in each other in

pursuit of the common overall project goal of delivering the aircraft on schedule with a degree of six-sima safety tolerance required by RPA operations. Adapting to matrixed organization possesses, the disparate teams harmonized to reliably complete assigned project tasks on time and within scope. This validated that the team could keep pace with the aggressive international project schedule. For example, the Fleet Deployment Services (FDS) and Rapid Action Team (a.k.a. RATWorks) were chartered to provide fast-track acquisition of components in support of developmental programs. Providing material when needed often was still extremely challenging with the acquisition/procurement challenges in the post-COVID 19 environment. Still, team members took enormous

pride in individual effort and expertise to fulfill their vital sub-tasks that contributed to the overall team effort. A chain reaction of confidence and trust between the matrixed teams ensued. The Global Logistics and International Trade Compliance (ITC) teams followed suit by working closely to overcome the challenges of delivering material where and when needed, even in the face of a never-ending series of complex logistical and regulatory challenges. But trust in the matrixed organizational approach was rewarded. The team executed 23 just-in-time deliveries to India from the Flight Operations Facility in California. The freshly developed and tested aircraft materials were vital to preserving the MMR and DAAS upgrades project schedule in India. Moreover, the team cut delivery times from an average of 14 days to three. India needed this capability as soon as it was ready. With such a tight upgrade schedule, the

India program and project managers could confidently assume minimal risk of a work stoppage due to logistical delays. This project demonstrated that the composite DCS-COCO team had gelled. The efforts of acquisition, innovation-development, FOF, ITC, FDS, Global Logistics and Field Operations groups matured into a harmonized CFT that could confidently fulfill deliveries in support of the contractual obligation to the Indian Navy. In summary, with new confidence and carefully arranged individual and team effort, this team showed that the matrixed organization approach to a DCS-COCO business model was achievable, replicable and scalable.

This program contributes to the greater good of society and security. The MQ-9s Intelligence, Surveillance and Reconnaissance (ISR) capabilities are a force multiplier for the Indian Navy to combat nefarious activities of transnational criminal organizations. Piracy, drug smuggling, illegal arms dealing, human trafficking, terrorism and nuclear proliferation all represent serious dangers. Constraining them not only benefits the U.S., India and our allies, but also benefits the safety and security of all civilians on the high seas. Specific examples cannot be provided because of concerns about operational security, but it is clear that the MQ-9 program made a major, frequent impact on safety and security. Furthermore, by exercising the good relations between the United States and Indian governments, the program fortifies a channel to leverage global security successes and build future partnership capacity. This partnership effort continuously reinforces friendship and accommodates continued harmony between two of the most important nations in the world.

The technological advances realized through cooperation between GA-ASI and Indian Navy continue to lead the way toward the enhancement of aviation safety. DAAS, improved command and control data links, weather avoidance and autonomous software prove that RPAs can safely operate within civil airspace, among commercial aircraft. Although these technologies were specifically developed to support military and law enforcement operations, history shows that military advancements often pave the way for civilian application and can be replicated for use by commercial activities. Search and rescue, transportation, scientific exploration, infrastructure inspection, ecological preservation, and disaster mitigation efforts are only a few of the many additional applications for RPAs that use GA-ASI's technologies and practices.

ORGANIZATIONAL BEST PRACTICES AND TEAM LEADERSHIP
Value: 35 points
Use 12 pt. Times Roman typeface.

Please respond to the following prompts:
- ➢ *15 points:* **Describe the innovative tools and systems used by your team, how they contributed to performance and why.**
- ➢ *10 points:* **Define the unique practices and process you used to develop, lead and manage people?**
- ➢ *10 points:* **How did you leverage skills and technologies of your suppliers?**

GA-ASI developed innovative tools and systems from standard workflow products and databases that allowed for complex program and project management. By mastering the use of commercially available program & project management, logistics and cyber security software, proprietary data visualization products were developed to seamlessly provide multifaceted views that provided in-depth data insights. These tools were used to post information to cyber-hardened share drives, while still providing easy remote access. This greatly improved day-to-day workforce collaboration. All material status and data were combined in a visual format that afforded efficient course corrections. Enterprise Resource Planning (ERP) and Materials Requirements Planning (MRP) systems and other data sources combined complex data into an easily understood format that quickly surfaced schedule and logistical issues that

teams could quickly address to avoid or mitigate unacceptable risks. Data could be combined, distilled, disseminated and acted on quickly. The use of these technologies and data products streamlined collaboration by simultaneously allowing globally dispersed teams to instantly interface with each other. The use of these innovative tools and systems facilitated GA-ASI's ability to sustain uninterrupted flight operations while simultaneously integrating the latest technical innovations into the Pre-Production MQ-9B and its associated systems.

Both the initial 2021 delivery and 2022 upgrade efforts required leadership of a new aircraft operating software branch. This required tireless leadership of engineering, program management, FOF and Field Operations personnel to assure all labor, testing, and documentation were completed in order to deliver full performance in the field from the first day. Creative solutions facilitated the engineering team's ability to design the Mission Intelligence System (MIS) and assemble it at the GA-ASI's Southern California Flight Operations Facility, test all software and network functionality and field the first-ever commercially exportable MIS for the company. Additionally, the Mission Payloads and Exploitation (MPEx) and PMO teams led a collaborative effort with the customer to modify the Systems Tasking and Real-time Exploitation (STARE) software to meet Indian Navy-specific needs.

GA-ASI's RATWorks was assembled to handle emerging, high-priority acquisition requirements. The RATWorks system coordinated manufacturing, procurement, quality engineering and functional engineering groups to accelerate material acquisition without causing adverse disruptions to ongoing material resource planning and execution. The small group of multi-disciplined, collocated team members managed fast-track part builds and material procurements to support the India COCO program needs. RATWorks and MPEx groups further matured the system that supported both ordinary and top-priority material requests from the smallest sub-components to Line Replaceable Units (LRU) and composite systems. High-priority markings and filter tasks were maintained in special handling data repositories which were reviewed daily. Protected networks were securely interfaced to make proprietary data available for foreign and domestic business-to-business coordination. RATWorks' systems allowed acquisition teams and suppliers to independently or jointly review and instantly update information. This constant review of the data and known risk watch items minimized wasted time by reducing coordination meetings. Even when periodic review meetings were required, the ability to perform advanced preparations and detailed tasks ahead of the scheduled meetings led to crucial efficiencies.

One specific success involved the complexities associated with integrating the multi-mode maritime radar. The radar is made by a foreign manufacturer and then delivered to a separate foreign customer, necessitating expertly managed import and export controls to function under strict ITC regulations. Certain instances of system deployment required immediate and direct communication between OEM engineers, field operators and site leads. Secure group messaging tools were implemented. The technical data exchanges utilized a secure file transfer protocol to move sample data, test results and software builds back and forth while maintaining cyber-security and compliance with the International Traffic in Arms Regulations. As an example of the value of these new tools, instantaneous and secure communications were instrumental to troubleshooting difficulties encountered while perfecting accurate measurement features of the Inverse Synthetic Aperture Radar (ISAR) diverse modes of operation.

Unique practices and processes were used to develop, lead and manage people. GA's Business Process System was developed as a structured system that controls and manages GA-ASI Business Process Documents (Procedures, Work instructions, etc.) which are used to establish and communicate GA-ASI's policies and objectives, coordinate the organizations activities to meet customer and regulatory requirements and improve its effectiveness and efficiency on a continuous basis. The BPS tool includes the Quality Management System, contract compliance elements and a one-stop shop for departmental processes. By enabling easy on-demand access to these resources the system equips personnel across the

entire organization for success in their responsibility to deploy GA-ASI's business systems to meet contract requirements on time & on budget.

GA-ASI also created the Program Management Resource Center. This center provides quick access to program management support tools used for demand management, development program control support, program planning & control and an Earned Value resource center. It also provides a repository of procedures, templates and support tools to support make or buy decisions, understand the Rapid Acquisition Process and Program proposal, startup, execution, monitoring and control and program closeout. Other examples of resource tools include:

- Manufacturing Automation Platform (MAP) which provides improved visibility to specific business conditions by employing data visualization tools.
- Planning and Estimating Tool (PET) which is used to build and share proposal labor estimates.
- Systems Applications and Products (SAP) Business intelligence Reports that allows users to query data, build reports, and analyze information.
- SAP Resources tool which Includes SAP and Business Intelligence job aids, reference materials, Q&As and much more.
- Smart Tool which supports building and sharing proposal bill of material.

Each of these existing business processes were effectively adapted for the rapid delivery and innovation requirements of the Indian Navy COCO program. This unique application of our processes validated them and led to significant improvements that will ensure GA-ASI can deliver key capabilities at the speed of need for our customers.
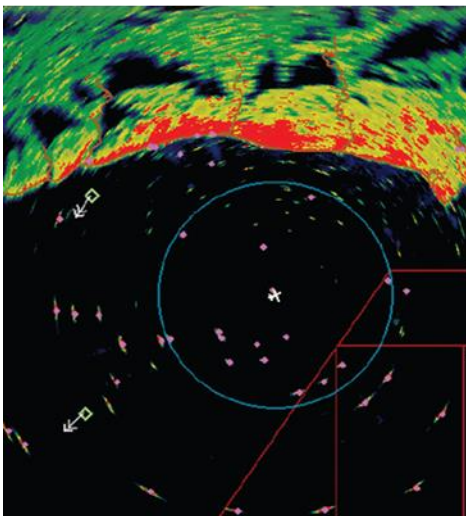
Leveraging skills and technologies of our suppliers was essential. While the radar operators deployed by the program had significant experience operating GA-ASI's proprietary Lynx radar systems, the new MMR came with significantly improved capability and functionality. Leadership by GA-ASI's organic training team ensured that operators provided frequent and detailed feedback on system symptoms and observations, and the OEM engineers provided operational techniques, technical support and guidance, significantly improving operator and system performance.

GA-ASI procurement and MPEx groups worked closely with suppliers to assign and execute expedited equipment deliveries. Leveraging existing supplier company networks and interfaces, material acquisition changes could be seamlessly communicated for fast-track delivery. During the 2022 upgrades, the collaboration between GA-ASI development teams and MMR-OEM personnel was key to success in gaining positive test results and software integration. The MMR-OEM provided support to the

FOF, MPEx and GA-ASI to assist personnel with familiarity, capabilities and performance. Issues were detected and de-bugged to ensure execution of the schedule. This effort and dedication were well received and ensured quick turnarounds with solid solutions. Additionally, MMR-OEM engineers and FSRs made several in-person trips, from Europe to the California FOF, to transfer technology and skills, at a moment's notice. These trips were not only essential to debugging during the development phase but were also essential to ensuring that GA-ASI operators and technicians were up to speed with new and extremely advanced equipment and software, just in time for deployment. Additional training events in the U.S., Europe and India were always extremely opportunistic and dynamic, but the MMR-OEM was able to make the additional trips to continue transferring their skill and technology. This bolstered technicians' and operators' mission system knowledge, skills and abilities to assure that GA was prepared to fulfill Indian Navy's mission requirements. Finally, the GA-ASI MPEx team worked hand-in-hand to leverage MMR-OEM's skills and technologies to ensure proper documentation of debugging as well as jointly develop required reference materials to support the ongoing missions in India.

DEALING WITH PROGRAM COMPLEXITY
(VOLATILITY, UNCERTAINTY, COMPLEXITY, AMBIGUITY, or VUCA)
Value: 25 points
Use 12 pt. Times Roman typeface.

Please respond to the following prompts:
➢ *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.)**
➢ *15 points:* **Explain how your team responded to these challenges. What changes did you make, what were the results?**

The integration of a new MMR and DAAS presented myriad successive **VUCA challenges**. During the initial program roll-out, contracts managers and International Strategic Development (ISD) teams needed to negotiate a full services contract under Indian law in just three weeks. This effort required leadership of both domestic and foreign corporate and government entities. During marathon 24-hour negotiations, customer demands and difficult legal issues were resolved, resulting in the first-ever DCS International COCO contract for GA-ASI. GA Government Affairs, International Trade Compliance (ITC) and the Program Management Office (PMO) teams then led the drafting and coordination for the approval of a Technical Assistance Agreement (TAA) with India, which received United States Government approval in under a month. They led all licensing and classification requirements to ship the aircraft, GCS, Ground Support Equipment (GSE) and all the necessary consumables and spares on time, with zero discrepancies.

Timely material acquisition was a continually uncertain and volatile process. Given the dynamic nature of innovation surrounding the MQ-9B Pre-Production aircraft, working through change management while mitigating schedule impacts needed a small, aggressive and focused group. The RATWorks team was designed to do just that. In one instance, a nose cone could not be delivered in time by an external supplier. The team was faced with a "make or buy" decision. This induced significant risk to the project schedule, because the component required complex timing and coordination between the OEM and multiple engineering and manufacturing groups. RATWorks expeditiously resolved the 'make or buy' decision by acquiring and quickly certifying a 3-D printer to produce the nose cone. Closely monitoring ERP/MRP and working through multiple communication channels with engineering and manufacturing teams, requisite tweaks and changes to the design of the nose cone were rapidly completed. The result was that RATWorks was able to apply their program leadership and exclusive experience with supporting developmental programs to mitigate this significant VUCA.

FOF support at the Mojave Desert test facility during the flight test effort required many long hours and weekends to keep pace with the milestones required for India's sustainment and readiness, and working at

the desert location through the heat of the day was nearly unbearable. Keenly aware of the importance of supporting this highly valuable team, leaders found a way to creatively manage schedules to disperse the workload while simultaneously tackling all the obstacles associated with both the initial delivery and the capability enhancements. This resulted in the on-time and safe completion of the flight test phase through the heat of a Mojave summer.

Obtaining FAA flight test clearance was also an uncertain and volatile struggle. As the flight test phase was ending in the approved airspace over the California high desert, obtaining over-water flight clearances was imperative for the final test activities. FAA authorization would be required to venture into civil airspace. The flight clearance requests were initially denied, and approvals were forecasted to take months due to backlogged priorities of competing U.S. government programs. This was a major challenge for the team, but collaboration and persistence ensured success. GA-ASI flight planning experts were able to work with their FAA counterparts and flight-test directors to imaginatively adjust sortie windows, flight paths and altitudes. Flight clearances that normally require weeks or months were granted in a matter of days. This allowed for narrow flight profiles in which all over-water test card requirements were completed.

Another unique aspect of this project is the fact that the manufacturer of the maritime radar had only operated the radar aboard manned aircraft, and it had to be integrated onto the MQ-9. Developmental collaboration with the radar OEM required a complex Core UAS Control System (CUCS) that allowed remote operation of the radar from a computer in the GCS and subsequent data transfer to the MIS-STARE. Because all the dataflows up and down the aircraft link were impacted by this change, every existing aspect of the system had to be re-evaluated. This required two exhaustive phases of ground and flight testing. All payloads were verified as compatible, and they did not interfere with existing functionality. Furthermore, although the radar was primarily intended for maritime surveillance missions, the program was also geared to support land missions using a different set of radar tools and tactical map data. Unfortunately, the new CUCS was designed around the use of raster display maps in a format that was not readily available within the GA-ASI libraries. Moreover, several operational areas within India were geographically ambiguous, limiting map collections until more detailed tactical map display requirements were determined. Finally, the supplier's scope didn't require them to accommodate existing system overlay maps, so the solution had to accommodate GA's map database to fit the CUCS formatting. Engineers were able to coordinate with purchasing to locate, acquire, test and integrate new maps for the CUCS. They did all this in a matter of three weeks for a process that normally takes many months.

Navigating and interpreting complex International Traffic in Arms Regulations (ITAR) was challenging in the constantly evolving sustainment environment surrounding the deployment and operation of the MQ-9B Pre-production aircraft. However, GA-ASI's ITC group had zero tolerance for anything less than exact adherence to ITAR. This created extreme logistics volatility, which if not resolved, would introduce significant risk to maintaining aircraft availability, flight hour execution and the aircraft upgrade schedules. During the aircraft upgrades, if parts were not delivered to the India in-country integration team on time, the upgrade schedule would be derailed. Because the output of the development phase was to provide innovative improvements to the aircraft and systems, there were incessant alterations to part numbers, installation kits, and software packages. For example, a last-minute change of a single component within a simplified kit that was previously classified required that the entire kit be reclassified. This meant that the simplified kit had to be broken up into an extremely complex list of several hundred parts, each of which needed to be individually classified. Then, each part number had to be individually listed on the Outward Cargo Report (OCR) to ensure ITAR compliance and meet strict U.S. Customs export inspection requirements and approval. The reclassification churn of kits was consistently last minute, resulting in unpredictable project VUCA. Nonetheless, the GA-ASI ITC and

Global Logistics teams consistently came through to keep both day-to-day aircraft sustainment and aircraft upgrade projects on track.

A second ITC issue arose to threaten project timelines just as the 2022 integration effort was starting. A component within one of the new LRUs was manufactured in Germany and required approval by Germany's international trade regulatory agency, known as BAFA. Although the component had been previously cleared, following recent German government elections, the new administration required a complete review of all previously cleared items. The completion date for the approval was not predictable and due to their backlog, BAFA ceased responding to inquiries. This introduced severe VUCA to the integration schedule. However, two key actions mitigated the crisis. First, the GA-ASI PMO, project engineers and Field Operations groups were able to juggle the aircraft integration project schedule in concert with Indian Navy. By taking risks to get ahead on other Work Breakdown Structure (WBS) tasks, work stoppage due to delivery delays of the LRUs was deferred, and the team was able to get ahead in other areas of the WBS project schedule. This was extremely volatile as it involved downing aircraft to shift the work tasks back and forth from one aircraft to another, while still maintaining aircraft availability to execute relentless mission tasking. Through meticulously synchronized joint cooperation between GA and Indian Navy, not a single mission was missed as the integration effort proceeded. Second, GA-ASI worked in concert with DAPM, the European OEM and the U.S. State Department's Directorate of Defense Trade Controls to escalate the issue. Through the joint efforts of all three nations' Diplomatic Corps, the approval request was expedited. After two months BAFA was finally able to catch up on its backlog and approve the export of the component. The LRU was then shipped to the U.S. for an expeditious final check-out during the innovation & development test phase and subsequently arrived in India just in time to keep the aircraft-upgrade integration schedule on track.

A key feature of the radar system is to cross-cue the RPA's imagery turret to slew to a radar target. Although the capability was validated during flight tests at the FOF, once integrated in theater the team was surprised to discover that system ambiguously failed to cue the turret accurately. The controlling software had never been operated in a region in which the elevation model carried negative values, as was the case in India.   The resulting negative integers were unexpected and resulted in volatile system performance. The Indian Navy patiently trusted the GA-ASI and MMR-OEM teams to troubleshoot the anomaly. Through effective coordination by teams in India, the U.S. and Europe the discrepancy was efficiently resolved and yet another expedited software correction kept the project schedule on track.

Finally, the Flight Operations team continuously faced new challenges resulting from unfamiliarity with Indian tropical monsoonal weather patterns and constantly changing Indian Navy mission profiles. Legacy Flight and Ground Operations Manuals designed for overland operations in temperate and desert climates were in use, and the MQ-9 operational culture was initially resistant to change. However, through effective leadership of change management, new-found local flying experience, and the flexibility of the Indian Navy, new procedures and manuals were safely implemented. This resulted in meeting or surpassing required flight hours and readiness metrics, ensuring Indian Navy customer satisfaction.

GA-ASI and its partners faced a never-ending series of VUCA challenges. Each of these were thoroughly embraced and methodically overcome through persistence, creativity and teamwork.
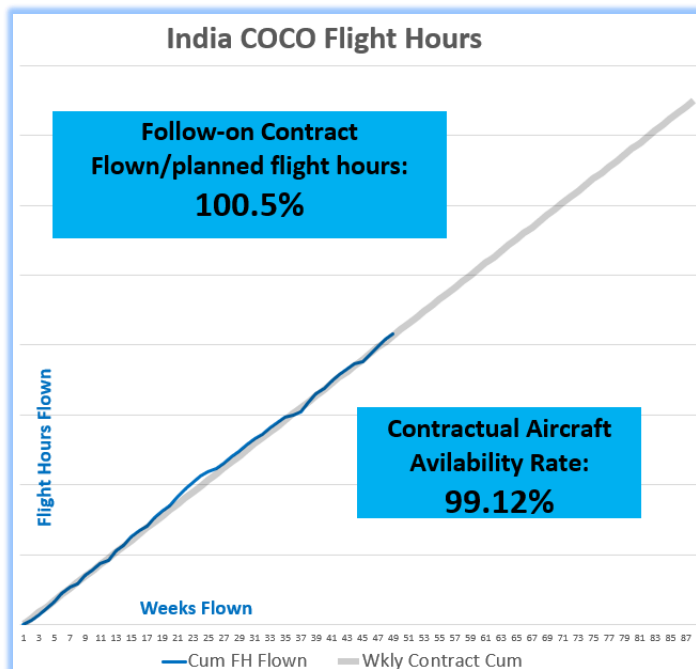
METRICS
Value: 15 points
Use 12 pt. Times Roman typeface.

Please respond to the following prompts, where predictive metrics indicate items that provide a view of how yesterday's actions and today's actions will affect the future timeline, cost or other requirement. Provide charts/graphs that illustrate performance to these metrics:

- ➢ **What are your predictive metrics?**
- ➢ **How did you perform against these metrics?**
- ➢ **How do your predictive metrics drive action toward program excellence? Please provide examples.**

The key metrics for this program are the sustainment of operations at an aggressive rate of flight hour delivery. Our contract requires at least an 80% aircraft availability rate. This rate and the delivery of mission flight hours are required even through the complex aircraft upgrades and inclement weather.

India COCO Flight Hours

Follow-on Contract Flown/planned flight hours: **100.5%**

Contractual Aircraft Availability Rate: **99.12%**

Flight Hours Flown

Weeks Flown

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87

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Due to the rapid fielding and the significant mission demands in India, the program initially experienced sustainment readiness challenges. Field Operations and FDS teamed with the PMO to develop extensive predictive metrics which were used to create a robust sparing model based on prior successes in MQ-1C operations. The sparing model considers forecasted flight hours, historical usage data, shipping lead time, demand variation, and the desired service level to calculate a reorder point and stock objective. As a result, the program was better prepared to meet mission requirements, reduce Aircraft On Ground (AOG) events, and maintain all flight hour and readiness requirements.

During the 2022 upgrades, correctly predicting logistical timelines directly impacted the prediction of the WBS workflow. If not predicted correctly, the result was unacceptable AOG periods. Using Power Business Intelligence (BI) data visualization and project management software, estimated completion dates and workflow schedule dependencies were identified. By meticulously monitoring the risk dataflow deltas between program need dates and estimated completion dates, issues were quickly identified. Logistics teams continually updated detailed data and identified deltas that were rolled into top-level risk profiles to develop overviews that provided instantaneous metrics for program schedule manipulation. Daily review of these top-level risk profiles facilitated preemptive course corrections and empowered CFTs to effectively identify and mitigate issues before they occurred. These efforts led to highly efficient integration of MMR and DAAS capability in the field, where the aircraft were declared operationally capable by the customer just five days after completion.

The successful predictive metrics and efforts described above resulted in program excellence with a sustaining >99% aircraft availability rate, delivery of 100.1% of contracted flight hours and surpassing the 10,000-hour milestone in two years.