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Acknowledged, agreed, and submitted by

Nominee's Signature

7/11/2023
Date

Nominee's Name (please print): Matthew A Kotylo

Title (please print): Director of THAAD Production Programs

Company (please print): Lockheed Martin

NOMINATION FORM

Name of Program: Terminal High Altitude Area Defence _____

Name of Program Leader: Matthew Kotylo _____

Phone Number: (972) 977-5383_____

Email: matthew.kotylo@lmco.com _____

Postal Address: _____

_____

☒ Customer Approved

- Date: 7/1/2023
- Customer Contact (name/title/organization/phone): Latonja Martin / Public Affairs Specialist / Missile Defense Agency / 256-450-3239

☐ 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

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.]

The Terminal High Altitude Area Defense (THAAD) Weapon System is a key component of the United States' layered missile defense capability. It is designed to intercept and destroy short, medium and limited intermediate-range ballistic missiles during their terminal phase of flight, both inside and outside the atmosphere, providing critical defense against these types of threats.

The THAAD Weapon System has been deployed to various locations around the world, including Guam, South Korea, and the United Arab Emirates as a defense against missile threats. These operational deployments, THAAD's 100% intercept flight test record, successful tactical engagements, and its accuracy and ability to intercept and destroy a variety of different types of threats, have demonstrated the system's combat effectiveness and reliability.

The THAAD interceptor is also reliably produced at scale to meet the needs of the armed forces. Notably, the interceptor production program recently delivered its 800th interceptor to the Missile Defense Agency (MDA) since production began in 2011. The production program has demonstrated its unwavering commitment to the customer and warfighter by consistently meeting deliveries month over month for more than three years. The production line was scaled for 12-rate capability in 2022 and employs the use of several novel production tools and practices to ensure its continued consistency, resiliency, and on-time performance.

Additionally, the MDA and Lockheed Martin are continually working on upgrading the THAAD Weapon System to meet emerging threats. This includes upgrades to both the system's software and hardware that are incorporated into the production line through a robust transition to production process. Furthering its capability, the THAAD Weapon System has been integrated with PAC-3 Missile Segment Enhancement (MSE). The THAAD/MSE Integration was proven in a March 2022 flight test (FTT-21) where our joint industry and government teams successfully intercepted a threat representative Short Range Ballistic Missile using a PAC-3 MSE missile launched from an organic THAAD battery. Both interceptors leverage advanced Hit-to-Kill technology, which use kinetic energy to destroy incoming warheads. This added capability was then successfully fielded to the warfighter to meet the Army urgent operational need and has plans to deploy globally.

THAAD's ongoing development through planned hardware and weapon system improvements, robust and dependable manufacturing systems, and effectiveness in both testing and tactical environments, will ensure that the system will remain a key component of the United States' missile defense capability for years to come.

DIRECTIONS

- **Do not exceed 10 pages in responding to the following four descriptions**.
    - Allocate these 10 pages as you deem appropriate, but it is important that you respond to all four sections.

- DO NOT REMOVE THE GUIDANCE PROVIDED FOR EACH SECTION.

- Use 12 pt. Times Roman typeface throughout.

- Include graphics and photos if appropriate; do not change margins.

SECTION 2: VALUE CREATION

Value: 15 points

Please respond to the following prompt:

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

As one of the largest programs within Lockheed Martin's Integrated Air and Missile Defense (IAMD) portfolio, the THAAD Weapon System is a significant program for Lockheed Martin, providing substantial value to the corporation in several ways.

One of the key benefits of Lockheed Martin's THAAD program is its ability to leverage capabilities and expertise across multiple business units including Space, Missiles and Fire Control (MFC), and Rotary and Mission Systems (RMS). By integrating capabilities and expertise from these different business units, Lockheed Martin is able to develop and deliver a more advanced and effective weapon system and share technological solutions and operational best practices across units.

Furthermore, the THAAD program provides Lockheed Martin with a platform for continued innovation and technology development. By incorporating new designs and technologies into the THAAD system, Lockheed Martin is able to stay at the forefront of defense capabilities, positioning itself as a leader in the air and missile defense industry.

Additionally, with its expanding customer base among new partner nations, and interoperability with the Ballistic Missile Defense System (BMDS) including other Lockheed Martin products like PAC-3, the THAAD program offers the corporation the potential to expand its presence in new markets and regions.

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

The THAAD Weapon System provides significant value to its customer, the United States, and its allies by providing a robust and effective defense capability against short, medium, and intermediate-range ballistic missiles. With its ability to intercept missiles both inside and outside the atmosphere, THAAD offers a critical layer of defense that enhances the overall security and stability of the region.

One of the key benefits of the THAAD weapon system is its expanding customer base among new partner nations. Countries such as the United Arab Emirates and the Kingdom of Saudi Arabia have recognized the value of THAAD and have invested in the system to enhance their own defense capabilities. This not only strengthens the security and stability of these nations but also contributes to regional security and stability by deterring potential threats and helps offset the need for US for projection.

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

The THAAD Weapon System has a large global footprint, with over 18,000 direct (Lockheed Martin) and indirect (subcontractor) jobs. The THAAD program works with over 740 suppliers that span 42 states. Most recently, Lockheed Martin announced two key subcontracts to industry in the Kingdom of Saudi Arabia for a second source for certain components in the THAAD Weapon System under a Localization Agreement between Kingdom of Saudi Arabia and Lockheed Martin, expanding its supply chain base to a global market.

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

The Terminal High Altitude Area Defense (THAAD) system contributes significantly to the greater good of society and security in various ways, including its role as a proven combat asset, a deterrent to conflict, and a provider of regional security.

- Combat-proven: January 2022 marked the first confirmed military operational use of the THAAD Weapon System with the successful intercept of a hostile inbound medium-range ballistic missile.
- Deterrent to conflict: By demonstrating the capability to intercept and neutralize incoming ballistic missiles, THAAD acts as a powerful deterrent, reducing conflict escalation. Its presence signals commitment to defense and security, fostering geopolitical stability and peace through strength.
- Regional security: THAAD protects allied nations like South Korea and UAE from short- to intermediate-range ballistic missile threats, bolstering regional security cooperation, fostering stronger relationships, and contributing to overall stability for economic growth, social development, and shared values.
- Technological innovation: The development and implementation of THAAD drive technological innovation, pushing boundaries of missile defense. Cutting-edge technologies have applications beyond defense, benefiting various industries and contributing to global advancement of science and engineering.
- Economic benefits and small business inclusion: THAAD supports thousands of direct and indirect jobs in the US, contributes to the nation's GDP, and fosters economic growth. The program engages a diverse supply base, including small businesses, strengthening the defense industrial base, promoting innovation, diversity, and resilience.

SECTION 3: 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**

Collaborative Digital Work Environment

As part of a corporate digital transformation initiative to streamline processes and improve collaboration, the THAAD program has implemented multiple tools.

In 2023, the THAAD program transitioned to Microsoft Teams for an integrated collaboration platform. The integration with other tools has created a virtual workspace to share documents and other resources across product teams, functional teams and business areas, as well as with our suppliers and customer.

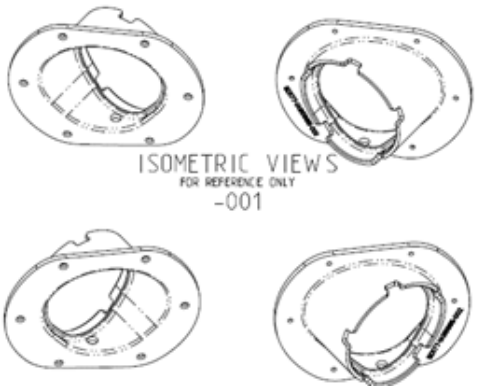
This has allowed the team to work more efficiently with a centralized communication hub streamlining collaboration and ensuring data security with the flexibility to accommodate team members in different geographical locations and workspaces. By leveraging Microsoft Teams, THAAD teams are able to "work in the open" and collaborate more effectively, reducing communication barriers and improving productivity.

Another tool is Manufacturing Process Management (MPM) Link that manages product, process, and resource data in a visual environment. With MPMLink, data duplication is minimized, and a collaborative work environment between design and operations engineers is fostered via a digital thread. This tool which just went live in 2024, is integrated within Windchill, creating consistency in the production of Manufacturing Process Plans (MPP) through the use of a single platform for generation of a manufacturing Bill of Material (BOM) and the digital connection between engineering and manufacturing BOMs. More consistent MPPs and work instruction visualizations will lead to increased process efficiencies and reduced defects. This is the first part of a phased deployment for Next Generation Work Instructions (NGWI).

Additive Manufacturing

The THAAD program has put considerable effort into developing reliable and efficient manufacturing techniques into order to not only improve recurring production costs but also increase throughput, improve performance and reliability. One such area of focus is in the use of Additive Manufacturing (AM) which enables more complex designs to be produced using fewer parts, less time, lower mass, and with reduced labor costs vs traditional manufacturing techniques.

Some of the additively manufactured parts qualified for use on the THAAD program include portions of the flight Interceptor Energetics Harness Line and several metallic housings. The use of AM on the Energetics Hardness Line alone has reduced recurring manufacturing spans for each unit from approximately a week down to just a matter of hours.



The weapon system also leverages over 46 additional AM products such as tools, shop aids and fixtures used during THAAD production and the final assembly process. This trend will continue as the program is currently targeting two additional metalized interceptor flight components as future AM candidates. Those candidates include some complex and difficult-to-manufacture propellant manifolds as well as large exhaust control rings.

The use of AM will continue to be key to the program's future evolution and to ensure that the creation of efficient, complex, lightweight products can be produced at lower cost and still withstand the extreme conditions encountered during critical missile defense missions.

Proactive Obsolescence Monitoring System

The THAAD Weapon System consists of thousands of parts and materials purchased from hundreds of different regional and national suppliers. The constant risk of any one of those parts or materials becoming obsolete unexpectedly has driven the program to incorporate a unique proactive obsolescence management process. Obsolescence has been a key THAAD initiative since first fielding in 2010 since loss (or impending loss) of manufactures/suppliers' items, raw materials or software is a constant threat. As time passes, every qualified design requires technical updates to mitigate obsolescence. In order to enable sustained production and field support over the lifecycle of a dynamic program such as THAAD, a proactive approach decreases risk, and informs opportunities for strategic mitigation planning (i.e. new tech insertions).

The THAAD program has established an Obsolescence Working Group (OWG) which is a dedicated team to gather, report, and validate data at a snapshot in time each quarter. This active surveillance forecasts industry availability of the entire unmasked Bill of Materials (BOM), subcontractors reported current inventories (Supply) and includes Supply vs. Demand analysis reports. Proactive obsolescence management for THAAD includes the following steps:

Technology monitoring: Continuously monitoring advancements in technology and potential replacement components to identify potential obsolescence issues before they arise.

- Risk assessment: Evaluating the risks associated with the use of obsolete components, such as reduced performance, reliability, or safety issues, and determining the urgency of addressing the obsolescence.
- Design alternatives: Exploring design alternatives that can accommodate new components or technologies to mitigate the impact of obsolescence. This may involve redesigning parts of the system or modifying the overall architecture.
- Supply chain management: Maintaining strong relationships with suppliers and monitoring their production capabilities to ensure a steady supply of components and minimize the risk of sudden obsolescence.
- Component lifecycle management: Tracking the lifecycle of components and system elements to anticipate and plan for their eventual obsolescence. This may involve procuring excess stock, identifying alternative sources, or initiating replacement programs as needed.
- Configuration management: Ensuring that any changes to the system, including the introduction of new components, are thoroughly tested and validated to maintain system performance and compatibility.
- Testing and validation: Thoroughly testing and validating the system with the new components to ensure that performance, reliability, and safety are maintained or even improved.
- Configuration control: Implementing a process to manage system changes, ensuring that only approved changes are incorporated, and that the system remains in a known, supportable configuration.

Proactive obsolescence management is essential for maintaining the effectiveness and longevity of complex systems like THAAD. This proactive approach has enabled the program and our government partners to make informed decisions on future redesigns and has helped mitigate multiple production line stoppages. Over the course of the current THAAD production run, proactive obsolescence has helped identify on average 5-10 cases per quarter which has enabled the THAAD system to anticipate and address potential issues before they become critical. This helps ensure that not only are contractual commitments met, but also and more importantly, that the system remains capable, reliable and safe throughout the lifecycle.

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

The THAAD interceptor production program is a complex undertaking that requires the careful and coordinated management of a vast network of production sites and suppliers to be successful. With so many moving parts, it's essential to have a structured approach to managing production and ensuring that all components are consistently delivered to the final integration facility on time and to the required standards. To address this complexity, the THAAD program uses a unique team-of-teams structure that simplifies the Interceptor IPT into three sub-teams called Product Leadership Teams (PLTs), each responsible for managing and overseeing an assigned group of Supplier Management Teams (SMTs) and production sites.

The PLTs are grouped based on the commonality of supporting disciplines and products. For example, all propulsion and ordnance items are covered by a single PLT, which includes a dedicated cross-functional group including propulsion subject matter experts, and a team familiar with unique supplier behaviors and hardware issues. By remaining focused on their assigned hardware segment, the PLT can keep the hardware flowing in accordance with the build schedule, regardless of issues affecting missile items outside their assigned scope.

A key benefit of this structure is increased agility in decision making. By having pre-staged, cross-functional teams that are pre-set and familiar with a fixed group of missile hardware, the THAAD program can respond quickly and effectively to issues as they first emerge, allowing the program to stay on track.

While the team-of-teams approach has shown itself to be a best practice in promoting agility and managing complexity it also has significant cultural benefits. By breaking down the production program team into smaller groups, absent of senior leadership, early career team members feel more comfortable speaking up and contributing to the discussion. This improved interaction speeds their involvement and familiarity with their role and the production objectives they are supporting, leading to increased empowerment and inclusiveness of the team.

Survey data indicates that team members feel more engaged and satisfied with their work experience as they are able to fully contribute. This is an essential factor in maintaining a motivated and high-performing workforce.

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

Supplier Redesigns
There are a number of products requiring redesign where our suppliers have recently leveraged new technology and skills to the benefit of the production program, allowing the system to reduce cost, improve missile performance, and enhance the manufacturing process.

- **ERS -** Affordability while meeting high performance requirements are paramount. The THAAD program has integrated affordability measures to ensure cost/price alignment. The re-designed rate sensor – ERS (Enhanced Rate Sensor) - solution provides uniquely designed technical solutions incorporating a lower cost bill of material driven by higher utilization of commercial piece parts. The transition to this solution has allowed LM to continue to drive cost down on the program while enhancing the manufacturing capabilities of the THAAD interceptor through the newly designed ERS solution.

The primary technical advantage of ERS is its manufacturability. By using a COTS IMU the ERS accomplishes the same mission with significantly fewer parts, thereby reducing touch labor and risk to the product during assembly. Given the COTS IMU's capability, the ERS does not require calibration at the ERS assembly level. The ERS also consumes less power and provides more health status than the legacy product.

- **KVB-T** - Moving away from a Chemical Kill Vehicle Battery (KVB-C) to a Thermal battery (KVB-T) is a more suitable technical solution for the THAAD system requirements. Notably, the KVB-T retains energy for longer durations, reducing post-production maintenance activities required by the KVB-C, and increases reliability under harsh environmental conditions. The performance of thermal battery configuration also better withstand the high temperature environments of the tactical THAAD system which increases the reliability during launch and operation.
- **STE-R** – The program has also invested in re-designed special test equipment (STE-R) by incorporating new technology to reduce the testing span time across multiple of our sub-assemblies increasing throughput to our production rate and significantly improve yields by sharply reducing test equipment related failures.

Additionally, the program embraces opportunities for knowledge sharing and collaboration to share best practices, lessons learned, and innovations. An example of this includes taking key suppliers to one of LMs most advanced factories where they get to see how we build hardware, how that site manages key metrics, and how they manage the business, which includes modernization to shop floor visuals and the use of micro apps for real-time insights into the team's performance. This helps demonstrate how these metrics also help identify areas for improvement, such as reducing touch labor and improving quality.

SECTION 4: 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.)**

THAAD continually faces rapid and unpredictable changes with emerging obsolescence and complex supplier issues. Why not throw in a natural disaster at a critical manufacturing site? Minimizing and responding to VUCA is an ongoing challenge to any production program. THAAD has certainly seen its share and responded.

Supplier resource and quality challenges: The recent global conflicts have increased demand for defense and aerospace products, including missile defense systems, and in particular for a particular supplier providing guidance and control systems to multiple high-rate defense products. The surge in demand placed unique stress on schedules, hardware, technical support, and manufacturing resources. At the same time, a seemingly insignificant change to a commercially supplied part caused high fallout to THAADs unique configuration. This resulted in deliveries falling off track and a backlog of offline failed hardware to quickly pile up. Without a near term corrective action on the horizon and facing a bottleneck of available test equipment to balance between investigation and keeping what hardware was available moving forward to support the production line, something decisive needed to be done in a hurry.

Santa Cruz Facility Wildfire: Lockheed Martin Santa Cruz facility and the employees are close-knit and proud of the unique, important products they manufacture for THAAD Interceptor. In 2020, the Santa Cruz area in California was affected by several wildfires, scorching thousands of acres of land swiftly due to dry conditions and high winds. The fire destroyed structures, forced evacuations, and impacted Lockheed Martin employees. Lockheed Martin's Santa Cruz facility (SCF) felt the heat when majority of the property burned and the testing facility was left inoperable. THAAD production onsite and employees were halted with uncertainty on path to recovery.

Obsolescence: As markets and the pace of technology rapidly increases, shorter product lifecycles for components impact the THAAD program. Obsolescence is usually unpredictable and of varying degrees, resulting in needs of unanticipated redesigns of complex sub-assemblies. As the THAAD interceptor has matured and been in production for several years, several sub-assemblies across supply base began facing obsolescence of key components. The program reached a critical decision point on how to tackle the VUCA and set up process to successfully support redesigns that would effectively cut into production on time.

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

Supplier recovery team: To respond to the emerging threat from the supplier challenges, Lockheed Martin mobilized a cross functional team to go on-site at our supplier's facility to execute a multifaceted recovery effort.

The first step was to get hardware flowing again while a deeper root cause investigation could be performed. The supplier, Lockheed Martin, and the MDA engineering subject matter experts aided with quality engineers worked together to identify and implement an effective screening regiment to effectively weed out hardware likely to fail during final acceptance testing.

Once hardware was flowing, albeit slowed by the added test, the team focused on systemically working through a fault tree to eventually reach root cause. A corrective action requiring a circuit redesign was reached and validated. The team also worked to bring additional redesigned test capacity online to allow the line to surge to recover the volume necessary to support production. Finally, the team put together a detailed burn-down plan to address the pile of offline hardware that had initially failed acceptance test prior to reaching root cause.

Since the team has gone on site, the supplier has successfully tripled test capacity, released engineering for the corrective action, and doubled its delivery throughput.

Wildfire Response: Once safe, a recovery team was able to return on site evaluating the damage extent to buildings, equipment, and hardware. With clear understanding that SCF testing was lost, THAAD leveraged Lockheed Martin's subject matter experts and connected network across business areas to swiftly understand other testing capabilities and re-established THAAD SCF test at a Space facility in Denver, Colorado. Site leadership coordinated with a nearby site to maintain talent while the facility was restored to production-ready condition. The team in Santa Cruz quickly pivoted to reliance on comradery with undeterred focus and vision to meet on-time delivery for THAAD production critical to satisfy the warfighter's needs. The customer was kept highly engaged. Adaptive solutions led production to restart, maintain the vital importance to quality and reliability in the product, and recover schedule resulting in no missed deliveries. No short emphasis on the importance of positive culture and strong leadership plays into how a recovery from natural disaster and VUCA can be successful.

Obsolescence/Transition to Production (T2P): LM has invested in a multi-program approach to rigorously track obsolescence through a centralized database providing the customer with cost benefit. The tracking ability has allowed THAAD to anticipate upcoming obsolescence and redesigns. THAAD program has established a Transition to Production (T2P) team to apply a suite of strategies, best practices, and tools. Key support team across functions and lifecycle are partnered on the vision to reduce future production risk through effectively cutting in redesigns ensuring they are manufacturable. The T2P team is engaged from the very beginning during the identification of redesign effort ensuring the right level of T2P is scoped balancing complexity of design and affordability. THAAD sees the development as a proactive opportunity phase for T2P, driving most return on investment and risk mitigation. Production is the validation of the early T2P investment through successful pathfinder builds, first article inspections, and manufacturing process verification. The customer has partnered with THAAD to maintain focus on the importance of Transition to Production as a solution to the VUCA faced by THAAD centered around obsolescence and unpredictable changes in the defense supply chain.

SECTION 5: METRICS

Value: 15 points
Use 12 pt. Times Roman typeface

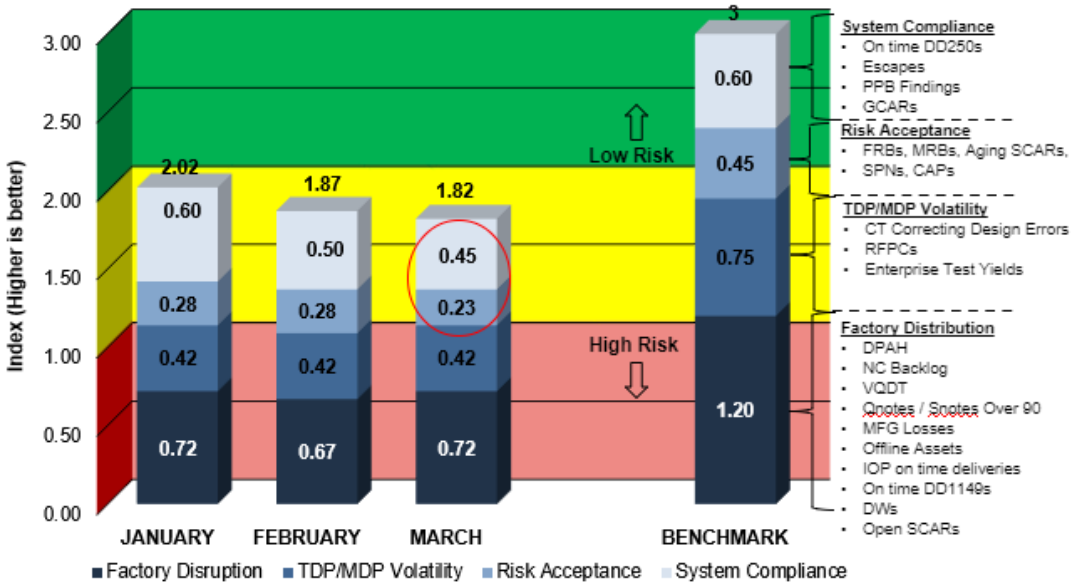
Please respond to the following prompts, where predictive metrics indicate items that provide a view of how yesterday's actions and today's actions will affect the future timeline, cost or other requirement.

Provide charts/graphs that illustrate performance to these metrics:

- **What are your predictive metrics?**

A series of quality initiatives/tools began implementation on THAAD over three years ago to enhance the performance and predictive capabilities of the program. Quality system initiatives were designed to apply principles of organizational resilience theory to a DoD program environment and centered on establishing visibility to compliance to quality systems requirements, the unintentional assumption of program risk through aging non-conforming hardware and unresolved / unimplemented corrective actions, volatility within the technical data package, and disruption to the factory and supply chain due to inefficacies, non-

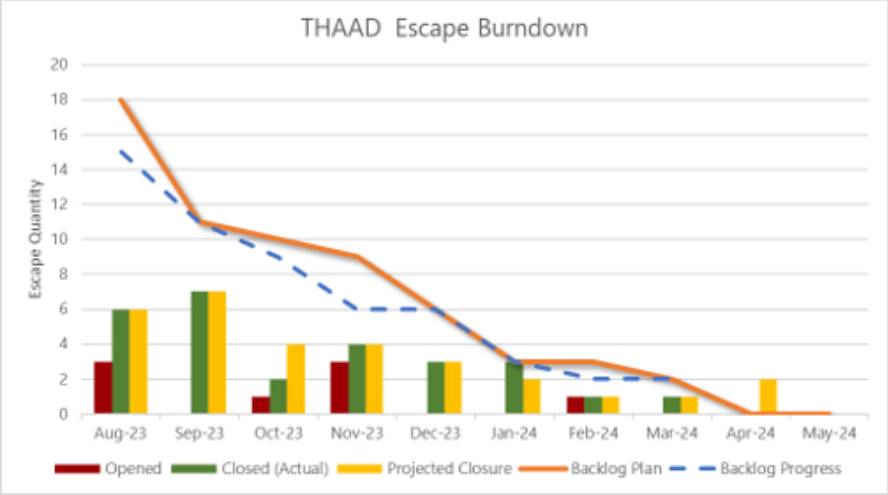
conformances, and late execution. This effort has resulted in the creation of an overall Interceptor Factory Health index.



A graphical representation of the Interceptor Factory Health was developed, providing a clear and concise overview of the performance and status of both internal Lockheed Martin "Make" sites and external "Buy" suppliers. By having this information readily available, it is possible to rapidly identify predictive trends and program areas of concern. This allows for the rapid evaluation of the cause and deployment of necessary resources to support corrective action and recovery. This tool has been instrumental in addressing deficiencies in the Manufacturing Resource Planning (MRP) system at critical suppliers, tracing anomalies within the supply chain, and rectifying errors in the Material Review Board, before impact to prime production schedules or conditions that could lead to a quality escape.

- **How did you perform against these metrics?**

The index is designed to accommodate fluctuations in interdependent sub-elements while still maintaining an accurate overall perspective of Quality system health and predictive risk to program execution. As an example, there were times in 2023 that a number of targeted non-compliance discovery actions were being conducted resulting in the program escape backlog to grow. The index allowed identification of the trend and implementation of focused burn down planning and execution to bring escapes back into an acceptable level.



Similarly, supplier performance metrics indicated particular suppliers were slipping and allowed the establishment of recovery teams to engage with the suppliers before the performance issues could impact prime level integration schedules.

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

One of the most significant improvements achieved through the THAAD health index has been a dramatic reduction in the number of open Failure Review Boards (FRBs). The FRB process is used to document any test failure occurring throughout the product build cycle and provides a structured mechanism to investigate & resolve root cause of the anomaly and all contributing factors, and quantitatively identify associated risk to production & delivered assets. The initially large quantity of FRBs represented risk to the program as resources continued to be applied to ongoing production operations while observed failures hadn't reached root cause. Using health index data to shape & focus technical resources and priority, the program has subsequently reduced the quantity of open FRBs by half. Fewer failure events, a reduction in the amount of resources required to support FRB investigations and increases in factory efficiency levels are all indicators of PHI effectiveness in driving results.

The program health index also allowed the program to reach a point in 2023 in which there were no "red" suppliers impacting the production line, meaning all suppliers were support interceptor integration with no significant risk to prime contract schedules and had all quality health indices within acceptable bounds.

Ultimately, the THAAD Interceptor Factory Health Index has enabled the program to head off disruptions to the production system allowing for a year-over-year increase its prime contract schedule margin and a corresponding reduction in risk to the program and customer.