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(This section must be signed and returned to Carole.Hedden@AviationWeek.com)

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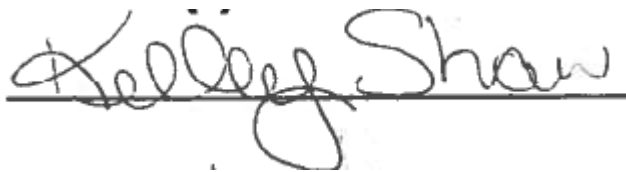
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Gregory Hamilton
President
Aviation Week Network

Acknowledged, agreed, and submitted by



Nominee's Signature

6/22/20
Date

Nominee's Name (please print): **Kelley Shaw**

Title (please print): Director, Navigation and Lifecycle Operation Unit

Company (please print): Northrop Grumman Mission Systems, Navigation, Targeting & Survivability
Division

NOMINATION FORM

Name of Program: F-22 LN-100 Global Inertial Navigation System Fleet Readiness and Modernization Retrofit Program

Name of Program Leader: Laura Hoar, Program Manager; Kimberlee Stevens, Lead Project Manager

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☒ Customer Approved

- Date: 28 May 2020
- Contact (name/title/organization/phone): William Bruce Byles/Sr Program Manager/Lockheed Martin Aeronautics/817-777-8605

☐ Supplier Approved (if named in this nomination form)

- Date:
- Contact (name/title/organization/phone):

CATEGORY ENTERED

Refer to definitions in the document "2020 Program Excellence Directions." You must choose one category that most accurately reflects the work described in this application. **The Evaluation Team reserves the right to move this program to a different category if your program better fits a different category.**

Check one

- | | |
|--|--|
| <input type="checkbox"/> Special Projects | <input checked="" type="checkbox"/> OEM/Prime Contractor Sustainment |
| <input type="checkbox"/> OEM/Prime Contractor Systems Design and Development | <input type="checkbox"/> Supplier System Design and Development |
| <input type="checkbox"/> OEM/Prime Contractor Production | <input type="checkbox"/> Supplier System Production |
| | <input type="checkbox"/> Supplier System Sustainment |

Point Distribution

Executive Summary: Make the Case for Excellence (15 pts)		
Metrics 10 pts Predictive Metrics (10)	Program Volatility/ Uncertainty/Complexity/ Ambiguity 25 pts	Organizational Best Practices & Team Leadership 40 pts
	Describe overall VUCA (10) Cite examples of team response (15)	Innovative Tools and Systems (15) Unique Innovative Processes for People Development/Knowledge Transfer (15) Unique Practices for Customer Engagement (10)
Value Creation (10 pts)		

Abstract

In 150 words or less, why is this program excellent in terms of execution?

(12 pt. Times Roman)

Northrop Grumman exceeded customer expectations by successfully reducing the retrofit time of its LN-100 Inertial Navigation System/Global Positioning System (INS/GPS) for the United States Air Force (USAF) F-22 modernization program from a 90 day turnaround time to an average turnaround time of 18 manufacturing days. This retrofit required identification and incorporation of process changes to reduce turnaround time by more than 50%. Every aspect of the retrofit process was examined and streamlined to support the customer and ensure mission success. The Northrop Grumman “Rapid Pit Stop” team provided solutions and implemented process improvements while ensuring product integrity was not compromised. The “Rapid Pit Stop” team has been recognized by the USAF and their prime contractor, Lockheed Martin, for outstanding support in keeping the F-22 mission capable.

Purpose

Provide a 150-word description of the purpose of this program, spelling out all acronyms and correct acronyms

(12 pt. Times Roman)

The United States Air Force (USAF) requested Northrop Grumman lead a team to reduce the LN-100 Inertial Navigation System/Global Positioning System (INS/GPS) retrofit turnaround time in support of F-22 aircraft modernization and readiness. The need for the decreased retrofit time was driven by limited fleet spares availability, multiple INS/GPS configurations to support, and multiple bases to support. The LN-100 INS/GPS is the primary navigation source for the F-22, and the F-22 requires the GPS for numerous functions of the warfighting system. The survivability and mission capability of the aircraft are dependent upon the LN-100’s ability to maintain high reliability throughout any mission. To support the customer requirement and maintain F-22 fleet readiness, the turnaround time had to reduce from 90 plus

days to 30 days or less. The retrofit program's scope included replacement of the System Processor Card, updates to the Chassis Interconnect, and a series of extensive testing.

Executive Summary: Make the Case for Excellence (Value: 15 pts)

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

(12 pt. Times New Roman)

Northrop Grumman is committed to supporting Lockheed Martin (LM) and the USAF F-22 modernization program to ensure the fleet maintains mission capability in the field. The F-22 is the superlative fifth-generation fighter aircraft of choice for USAF that is deployed worldwide in the most advanced threat environments. With the demand for the F-22 being so significant and diverse, the USAF directed its prime contractor, LM, to challenge their supply base and reduce lead times to support an aggressive F-22 retrofit schedule. This request was flowed down to Northrop Grumman to support a retrofit for the LN-100 Inertial Navigation System/Global Positioning System (INS/GPS). We established the "Rapid Pit Stop" team with the vision to implement change, streamline processes, and initiate new tools that would result in a reduction of the standard 90 day turnaround time to 30 days or less. The Northrop Grumman team used innovative processes to accomplish a reduction of the LN-100 retrofit from 90 days to an actual average of 18 manufacturing (M) days, significantly better than the 30 day requirement.

What makes the "Rapid Pit Stop" team unique is:

- The program relies heavily on partnerships, transparency, and trust.
- Buy-in from the customer and on-site visits from F-22 pilots to discuss our contributions to the mission.
- The team coordinated with Lockheed Martin and USAF to highlight timesaving process changes they could assist us with in order to meet the 30 day requirement.
- Lockheed Martin provides advance notice of hardware delivery, which gives the team 2 to 3 days to prepare for the arrival of the hardware.
- The USAF includes a purple sticker on boxes being returned for retrofit to catch our eyes on receipt. This is in line with the purple folders the team uses to easily identify retrofit systems in the factory.
- We eliminated single points of failure; the team is trained so that each step is 2 to 3 people deep.
- The team's effort goes over and beyond, meeting on personal time to discuss how to consolidate or eliminate steps to process times in their respective areas.
- Equality amongst team members—all ideas were considered, thinking outside the box was highly encouraged, and every team member had a voice. Team members are therefore dedicated to the mission and rarely transition.
- "F-22 Tuesdays" (F-22sday) events where we hear from warfighters, distribute F-22 videos, and celebrate the team accomplishments.

(Do not exceed 10 pages in responding to the following four descriptions; allocate those 10 pages as you deem appropriate, but it is important that you respond to all four sections.)

VALUE CREATION (*Value: 10 pts*)

Please respond to the following prompt:

- **Clearly define the value of this program/project for the corporation beyond profit and revenue**
- **Clearly define the value of this program/project to your customer**
- **Clearly define the value of this program/project to members of your team**
- **Clearly define the contribution of this program/project to the greater good (society, security, etc.)**

(12 pt. Times Roman)

Corporate Value: Northrop Grumman's corporate values are quality, customer satisfaction, leadership, integrity, people, and suppliers. When we as a corporation find ways to answer the customer need for mission-ready hardware, we are seen as a trusted partner. We find ways to solve problems for our customer, and for their customer – the warfighter.

Customer value: The USAF needs to ensure that its aircraft can continue flying and that they are never for want of a part – a Mission Impaired Capability Awaiting Parts (MICAP) situation. When Northrop Grumman learned that F-22s were flying in Syria, we knew the pressure was on. There is an advance threat and F-22s need to be able to stay in the fight. Our ability to come up with ways to reduce turnaround time from 90 days to 18 M truly impressed the customer. This retrofit program was able to meet the surge and support the customer's needs. This allowed the customer to trust in our ability to deliver what they need, when they need it.

Program team value: The team spirit of each contributing individual is a testament to how we value this program. This cross-functional team flows through 11 different organizations. Team members took it upon themselves to ensure that we are 2 to 3 deep in all areas; if somebody were to go on vacation or leave the program, it would continue to thrive. There is a source of pride amongst team members that this program maintain the quick turnaround time and support the customer. Other teams at Northrop Grumman have implemented "Rapid Pit Stop" practices to build their own successful programs. This program team continues to stay engaged with weekly presentations, and with special lunches that can include both Lockheed Martin and F-22 pilots.

Society / Security Value: Our nation's security matters. As a team, we found ways to ensure our warfighters can get what they need ahead of when they need it — that is the security value we bring. When our warfighters are flying into hostile airspace, they need to know where they are and where they are going, and their navigation system ensures they know the way home.

METRICS (Value: 10 pts)

Please respond to the following prompt:

- **How do your predictive metrics drive action toward program excellence?**
(12 pt. Times Roman)

The team tracks hardware queue times, material lead time, material use and attrition, sensor calibration failure rates, and customer flight hours. These metrics ensure that changes are being made and hardware is not stalled in the process. As we see an increasing uptick in deployments and associated flight hours, we have built up the retrofit backlog of calibrated sensor blocks and lay-in material. All queues and associated lead times are reviewed daily, in order to anticipate any potential bottlenecks for each navigation system. There are set times which the team always wants to beat – where there is a “maximum allowable” wait time within the queue before the navigation box will be flagged in the system. Any flagged unit will be immediately addressed as to what is causing the delay and what action is required to move it forward. The team will then address the delay, analyze if it was a one-time incident or systematic, and implement any corrective action needed. The team’s daily tag-ups and open communication, both internal and external, gives them the edge to identify issues and concerns, mitigate risks, and resolve issues before they happen.

DEALING WITH PROGRAM CHALLENGES (VOLATILITY, UNCERTAINTY, COMPLEXITY, AMBIGUITY, OR VUCA)

(Value: 25 pts)

Please respond to the following prompts:

- 10 pts: **Describe overall VUCA faced by your project/program.**
(12 pt. Times Roman)

Retrofits and repairs are driven by aircraft availability combined with average flight hours. Although Northrop Grumman had a contractual quantity of retrofits per month, the team understood the quantities would most likely vary each month and they developed a plan to ensure success. They also took into account the potential volatility of the program to support increased surges, address lessons learned, and incorporate additional process improvements during the slower periods. An example is the recent surge of F-22s deploying to the Middle East, which resulted in a sharp increase in the number of LN-100 INS/GPS systems being returned for both retrofits and repairs. During this surge, the team continued to work together and maintain the average 18 M day turnaround time.

- 15 pts: **Cite specific example(s) and how your team responded.**

One of the more complex portions of this retrofit were failures during calibration. To ensure forward progress and get the retrofits out the door ahead of our commitments, the team reviewed historical failure data on the F-22 LN-100 units. Based on the findings, the team developed a plan and presented the findings to Lockheed Martin and USAF. We requested that the customer procure lay in spares for the sensors as an end-game sensor swap in the event of a failed calibration. Any failed sensor is removed and replaced, and the unit continues to move forward. The unserviceable sensor is sent for triage and repair, and placed back on the shelf for the next requirement. The resulting time savings is up to 7 weeks. By building these extra sensor blocks ahead of need, we ensure we are not for want of a properly calibrated sensor.

ORGANIZATIONAL BEST PRACTICES AND TEAM LEADERSHIP (Value: 40 pts)

Please respond to the following prompts:

- 15 pts: **In executing the program, what unique and innovative practices, tools and systems frame your program and help you achieve program excellence?**

(12 pt. Times Roman)

The success of this program is, and always will be, the buy-in and communication that exists between all of the functional organizations on this program. The program relies heavily on partnerships, transparency, and trust. These aspects apply not only internally, but also with our customer, Lockheed Martin. We know this is working because we are very consistent with our reduced turnaround time and customer satisfaction.

- 15 pts: **What unique and innovative processes and practices are you using to develop people and transfer knowledge and how do you know they are working?**

First, we operate as a team, which means we cannot have a single point of failure anywhere. We accomplished this in two ways: 1) From a manufacturing and retrofit floor perspective, everyone is cross-trained; and 2) From a functional support set of responsibilities, we have 2 to 3 people able to fill in when someone needs to stay home sick or take a much-needed vacation. We intentionally created redundancy in the process by encouraging everyone to know each other's roles. The success has been very apparent with the COVID-19 challenges. As "non-essential" and high-risk people are not available to come into the office, back-up team members have stepped up to keep the program on schedule. This team has the best reputation for success, which leads people to want to join the team. In fact, we have a backlog of volunteers who are wait-listed to join the "Rapid Pit Stop" team.

- 10 pts: What unique practices are you using to engage customers and how do you know?

The team achieves customer engagement through transparency, honesty, and communication. Lockheed Martin is an extension of our team. One of the unique ideas that has been implemented is F-22sday. This event takes place every Tuesday to increase customer engagement and celebrate all things F-22. Videos of the F-22 in flight, pilot interviews, F-22 fun facts, F-22 memorabilia and discussions centered around the F-22 are shared. This weekly event is a way to remind the team how connected we all are, and how each team member is vital to the success of the program. In team spirit, Lockheed Martin is also engaged in F-22sdays, providing videos and articles that are distributed to the team. Implementation of these types of team engagement activities and recognition programs has allowed individuals to recognize and appreciate how their hard work and dedication has contributed to making a difference for our warfighters in the battlefield.

The bond between Northrop Grumman and Lockheed Martin has evolved to becoming solution-oriented, and has led to several key opportunities. As an example, one major area of concern affecting the turnaround time was the lack of lay-in spares for our parallel repair contract. Lockheed Martin advocated for us during their negotiations with the USAF System Program Office, which greatly contributed to getting us one step closer to achieving our goals. Our success could not have been achieved without the support of all our partners. Customer engagement, both internal and external, is the lifeline of the program.

