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Thank you for participating,

Gregory Hamilton
President
Aviation Week Network

Acknowledged, agreed, and submitted by

Nominee's Signature   6/26/2020
                                                         Date

Nominee's Name (please print): RASA FULLER

Title (please print): Director of Development Program Management

Company (please print): Honeywell

NOMINATION FORM

Name of Program: Micro Power Unit Retrofit Program

Name of Program Leader: Rasa Fuller, Director of Program Development; Laurel Huffman, Senior Development Program Manager

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☐ Customer Approved

- o   Date: N/A

- o   Contact (name/title/organization/phone): N/A

☐ Supplier Approved (if named in this nomination form)

- o   Date: N/A

- o   Contact (name/title/organization/phone): N/A

CATEGORY ENTERED
Refer to definitions in the document "2020 Program Excellence Directons." 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

☐ Special Projects

☐ OEM/Prime Contractor Systems Design and Development

☐ OEM/Prime Contractor Production

☐ OEM/Prime Contractor Sustainment

☒ Supplier System Design and Development

☐ Supplier System Production

☐ 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** Describe overall VUCA (10) Cite examples of team response (15)	**Organizational Best Practices & Team Leadership** **40 pts** Innovative Tools and Systems (15) Unique Innovative Processes for People Development/Knowledge Transfer (15) Unique Practice es for Customer Engagement (10)
Value Creation (10 pts)		

Abstract

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

This team was tasked to develop a new certified hardware product, a Micro Power Unit (MPU), utilizing agile methodology to achieve certification twice as fast as a traditional product. The team created a 'team-of-teams' agile structure and implemented a process of working in two-week sprints and holding agile ceremonies. The team developed an operating system to empower and cross-train and a strategy to efficiently utilize specialized experts. Because of the transparency in this agile structure, the team was able to quickly address and identify financial and scope impacts. Agility assessments provided timely information to apply to continuous improvement efforts to grow and mature as a scrum team. Team members approached the development of this product by questioning traditional methods and establishing new product certification processes to drive speed to market. The agile methodology and its transparency of work has been the framework that has allowed the team to succeed.

Purpose

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

This program will develop and certify a Micro Power Unit (MPU) that will give aircraft owners and operators a new and smarter way to provide power autonomously in any ground environment. This drastically decreases fuel burn while increasing overall aircraft efficiency and hull value. The MPU provides on-board electric power for business and private airplanes, helicopters, and advanced ground vehicles. The MPU's power will operate aircraft systems such as air conditioning, power the flight deck and cabin lighting and electronics, charge the aircraft batteries to ensure full state of charge, and to provide additional power to support main engine starting. By providing power on the ground for the customer wherever they travel, whenever they need it, the MPU will save the customer time and money. The MPU will allow the operator to land in areas where ground carts and other infrastructure are not available, providing power wherever the operator travels.

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?

The MPU team was asked to "do things differently" during this development program. The Micro Power Unit's entry into service is required to be available 30 months after inception, half of the development time a new Auxiliary Power Unit (APU) would take to get to market. This was the first time that Honeywell had used agile on a hardware program of this scope, size, and complexity.

The aerospace commercial market has high barriers to entry due to regulation and certification complexity. APU certification requires extensive documentation and approval of development processes, configuration management, risk analysis, test plans, test setup, test execution and test results. The challenge for this program is to ensure this new MPU product is subject only to those certification requirements that are absolutely necessary, thereby reducing complexity and time to market. This requires both internal and external coordination with technical experts and regulatory authorities.

The agile methodology was identified and implemented as a process to help achieve the necessary speed to market. The team soon discovered that most of the training and experience within the Honeywell community was centered around using agile for developing commercial software and non-regulated hardware. After several false starts, the team adapted what they learned about the agile methodology into a structure and operating system that works for a highly regulated hardware program. The team took the agile processes that worked, adjusted where needed, and established a 'team-of-teams' to support and drive the program to completion.

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.)**

The Micro Power Unit (MPU) is a new product and new technology for Honeywell. The introduction of this MPU will expand the power generation portfolio within the Aerospace division. Currently, Honeywell produces various types and sizes of Auxiliary Power Units (APUs), which provide onboard power for both commercial and military aircraft platforms. These APUs are based on gas turbine engine technology which limits the ability to produce an APU below a certain size. The MPU product addresses those aircraft platforms that have a range of power needs below that served by traditional APUs. These smaller power market platforms in the past were forced to rely on available ground power to run electronics and air conditioning on the ground. The MPU provides an onboard power system for these aircraft that eliminates their reliance on ground power. Additionally, the product will be available for an adjacent military ground vehicle market. These vehicles have traditionally relied on generators that are larger and less efficient than the MPU. This diversification allows Honeywell to navigate the current economic environment by expanding into markets not previously available.

Honeywell also receives value from this particular program because it is creating and vetting out a new agile process for mechanical systems that enables new products to be introduced to the market quickly and with early customer feedback. This ensures the product meets the market needs and only the market needs. The team has developed new ways to increase programmatic efficiency and now has an established team of coaches within every functional area to assist with implementing and executing similar agile operating systems on future programs.

The Micro Power Unit will provide electric power on the ground to operate aircraft systems such as the air conditioning system, power the flight deck and cabin lighting and electronics, charge the aircraft batteries to ensure full state of charge, and to provide additional power to support main engine starting. Smaller aircraft fly into smaller airports that often do not have the necessary external infrastructure to run the aircrafts systems on the ground. If the airport has ground power carts, they are typically in high demand and the operator may have to wait several hours before they become available. The MPU gives the operator the assurance that when they land, they will have the ground power they need as soon as the plane stops. This saves the customer time and money. The MPU can also start the main engine if the batteries go dead, providing a second layer to the aircraft's start reliability and mission readiness. MPU customers will have the ability to fly to new locations they may not have considered viable in the past due to lack of external infrastructure to support their aircraft. It's also important to note that the agile process that this team utilized engaged future customers early in the process to define the minimum viable offering (MVO). The team used prototype demonstrations to gain this feedback. This process ensured that the features that are most valuable to the customer were planned into the offering. It also ensured that extraneous features that did not hold any value to the customer were left out of the offering.

The MPU program is the first highly regulated hardware program at Honeywell to utilize agile methodology. The members of this team are getting the opportunity to blaze new trails, define and adapt new processes, and creatively resolve problems. This has resulted in pride of ownership in the program and the product. As the team members execute this program, they are becoming experts on the best way to manage an agile program on highly regulated hardware. They can now coach others on future teams to drive further program excellence. The team's dedication to the methodology has the added benefit that

each team member has gained an intimate knowledge of the status of the program, the product, and the market, and are comfortable discussing these with all levels of leadership. This is important as the MPU is a highly strategic program for the business and gives the team members access to leadership. For example, bi-weekly demo meetings have the individual team members reporting on what was accomplished in the past two weeks to the Vice President level. In addition, the product owner holds a monthly review with the President of Aerospace who then reports out to the CEO of Honeywell International. Presenting their work in the context of the product and market creates favorable impressions with leaders who may have an opportunity to support career growth. Employees on other teams have expressed a desire to join the MPU program team because they are breaking new ground. And when the program is successfully completed, their achievement will lead to other opportunities to excel within the company.

The MPU program contributes to the greater good in both the military and commercial sectors, serving community, security, and the environment. For the military, this product provides both air and ground support capabilities, allowing the warfighter or security force to access any area required to accomplish their mission, regardless of available power infrastructure. This product is more portable than many of the existing solutions. For advanced military ground vehicles, the current generators in use are larger, heavier, and not as reliable as the MPU will be.

The MPU provides up to an 80% reduction in on-ground fuel burn at airports where a ground cart or main engine would normally be operated to maintain power to aircraft systems, which creates a positive impact to the environment and a reduction in demand on fossil fuels. The MPU also allows a new class of aircraft to reach more remote destinations not previously available to aircraft that depend on ground carts or electrical grid power connections. This allows isolated communities and outposts to be served with more cargo and supplies than can be achieved today. This increases access to medical and other essential services, and can serve to move people more efficiently. And in all parts of the world, in times of disaster, these MPU-equipped aircraft and vehicles can now more effectively go into areas where the infrastructure has been damaged or destroyed and accomplish their humanitarian missions.

METRICS *(Value: 10 pts)*
Please respond to the following prompt:
➢ **How do your predictive metrics drive action toward program excellence?**

The MPU program uses the agile methodology metrics. The velocity metric shows how well the team is tracking to the committed points for the two-week sprint. A few weeks into utilizing the new methodology, the team was able to see the average number of points completed and then begin to predict how much work could be accomplished during a two-week sprint. As the team planned the following sprint, they used the previous sprint's velocity metric to lead discussions around whether an individual or the team was committing to too many points. The team then asked what alternatives were available, such as moving the work to the next sprint, assigning a different resource, or adding a resource to complete the work. The product owner or her delegate helped by making priority calls. By the time the next sprint begins, the team planned and committed to the work they will accomplish in the next two weeks. They understand what resources are required and have a commitment from those resources.

Total burndown of stories to the next release is another metric used to predict whether the team will complete the next Release on time. If the team is not on track to meet the release commitment, then they hold discussions on whether all of the identified work really needs to be done to achieve the minimum

viable offering (MVO), what resources are needed (and available) to complete the work, and if any of the work can be moved to the next release.

As the team began to understand that the agile backlog of stories process did not serve the team's need to better define the order of work, the team implemented an Integrated Master Schedule (IMS) which is not typically used within the agile processes. The IMS helped coordinate and understand the interdependencies between the core team, the Integrated Supply Chain (ISC) Kanban team, the Supplemental Type Certificate (STC) team, and the outside supplier teams helping develop the product. In lieu of the more traditional Cost Performance and Schedule Performance Indices (CPI and SPI), the team used a simplified Earned Value (EV) method of all-or-nothing; once the Work Breakdown Structure (WBS) leg has been completed the work is claimed. The key is to have the WBS leg line up with the stories so that as the work in the sprints are completed, earned value can be claimed in Honeywell's more traditionally structured program management systems.

The agile methodology and metrics, which are tracked and discussed in detail every two weeks, allow the team to course-correct quickly whenever the program moves off plan.

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

The MPU program is developing a business-critical certified mechanical product that Honeywell leaders would like to get to market quickly. One way of driving that speed-to-market involved asking the team to be the first Aerospace mechanical system program to implement the agile methodology. Honeywell's Engines and Power Systems and Program Management Office (PMO) leaders did not have any experience implementing agile on a highly regulated hardware development program. Although they desired a "do different" process, they did not know how agile would work, and their operating systems and oversight processes were firmly entrenched in traditional earned value management systems and waterfall structures. They had not been trained in agile methodologies. While the MPU team and PMO leaders received high-level agile training at the same time, functional and business leaders did not receive the training. The agile guidance for commercial software programs did not meet the needs of the complexity created by a certified hardware program, but the team did not know that at the beginning. As a result, the team went through several iterations of program structure and operating system until it found one that worked well. The team learned what didn't work, continued to extract useful knowledge from agile coaches, and adjusted quickly to keep building toward the right structure, all while keeping the program moving. Business and functional leaders were also following a learning curve, and early on often fell back to traditional monitoring methods which drove churn and interruptions. The team played a large role in educating these leaders on their process, but also found ways to satisfy their needs without sacrificing their agility. The MPU team was asked to do things differently and was able to meld agile methodology with traditional program management elements to create an operating system that is working to get this product to market twice as fast.

Additional complexity comes from the product itself. The MPU is a new product that has never been designed before and as a result, there is no existing engine/platform to lean on for experience, precedents, or lessons learned. Even the regulating authority, the Federal Aviation Administration (FAA) has never

certified this type of product, so their team is learning along with the Honeywell team on the best way to define and certify the MPU.

Volatility was created within the program due to the initial training being pure software agilist teachings. The instructors had no understanding of the complexities of this type of program. The second wave of training came from a new source, but followed along the same lines with no team-level coaching. The third wave of training brought a coach that did not understand the Honeywell organization and made assumptions that aligned with software development. Each wave of training sent the team in different directions and drove structural rework to the plan. The team was able to overcome and move forward by taking time to train their coach, using leadership advocates (Chief Program Manager, Director of Programs) for their desired path, and pushing back on what didn't make sense. In addition to using the elements of agile to manage daily work, the team structurally created a unique 'team-of-teams' and is using an integrated master schedule that allows all teams to understand their interconnectivity and linkage.

As the MPU is a new product that has never been certified by the FAA, the team has dealt with the uncertainty of how the FAA will approve the manufacture of this product for aircraft. To reduce that uncertainty, members of the team have met with different offices of the FAA to determine what the path forward looks like from their viewpoint. A whitepaper was written to explain how Honeywell believes this product deviates from other Auxiliary Power Unit certifications. This paper is currently under review at the FAA. The team plans to keep the FAA in the loop throughout the entire process, which will enable them to work through challenges and eliminate any surprises.

The complexity of the program led to a few false starts in the beginning. The agile trainers and coaches working with the team did not understand the complexity of the organization of functional experts that the program would need to utilize, nor did they understand the certification process under which the hardware must comply. The full team initially was established as a scrum team but quickly realized that not all work fit into the iterative model. The team then established Kanban teams for the other areas that were more task oriented. The final piece that had to be worked out was the field of functional experts supporting the program with specific tasks, at a specific time. The team established a separate sprint called "ET Tasks" for those tasks that needed to be accomplished by the plethora of experts. This sprint was set with tasks and estimated completion dates and is reviewed frequently, but not less than every two weeks during sprint planning. This 'team-of-teams' structure has worked well in keeping the overall program on track.

Another complexity is tied to our supplier-partner who is helping develop this product. This supplier-partner does not have much experience in aerospace and does not understand the certification steps. The joint team utilized the integrated master schedule and daily communications to align their work between Honeywell and the supplier-partner. The team was able to move scope between companies to better support the effort with the right expertise, while still giving the supplier-partner team exposure to the process, enabling them to take on the certification effort on future programs.

Creating a new product development process for a Honeywell program is itself a task of ambiguity and uncertainty as discussed in the previous paragraphs. Agile dictates that a team should consist of 8-12 people, and the agile 80-20 rule says that these team members should be spending 80% of their time on the project. Neither of which seemed to work for the Honeywell organization and the large quantity of experts required to develop this product. The program team found that they consistently had 90 people do work on the program during a two-week sprint. The team had to figure out how to handle this 'tail of experts' which goes against every teaching of agile. The team established a core scrum team that met the

agile principle and ensured that these team members were only committing to their own work during a sprint. The team then set up a separate sprint with work tasks and estimated due dates that were then assigned to experts and highly specialized resources. This allowed visibility to the work and enabled the team to bring in the experts when they were needed for the exact time they were needed and then send them on to other programs. This fit in well with the team-of-teams structure already created. The management operating system (MOS) put in place helped handle the ambiguity, yet kept the program flexible to respond quickly to changing requirements.

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

The MPU program utilizes a hybrid agile methodology. The overall MPU program team is made up of three smaller teams. The core team operates as a Scrum team. The Integrated Supply Chain (ISC) team and the Supplemental Type Certificate (STC) team manage their work through a Kanban board instead of as a scrum. They are more task oriented and their work is not iterative. The scrum team holds several of the agile ceremonies; daily standups, sprint planning, sprint retrospectives, backlog refinement and demo report outs. Two-week sprints keep the team focused with stories defining the work to be accomplished and the definition of done. Jira is the software tool used. It holds the stories used in planning sprints and backlog refinement as well as the Kanban boards. Jira also compiles the agile metrics.

The product owner is engaged in the backlog refinement sessions, defining priorities and discussing with the team their vision of the product. The work is broken down into stories which define a level of effort that should take about a week to complete. The work is planned for the entire release and as a result, some stories are at a high level that will need to be broken down during the backlog refinement session.

In the sprint planning sessions, the team then pulls from the backlog to plan the next two weeks' focus of effort. The stories are assigned points by the team and are broken down if the point level is too high. The points are arbitrary in that they do not relate to hours, but rather to complexity. Over time, the team developed a cadence on what the points mean to the team. The velocity metric helped the team develop how many points the team and an individual can accomplish in two weeks. This drives discussions on whether the team has committed to too many points or not enough points, whether additional resources are needed, or whether some work can be moved to the next sprint. Honeywell has experts in various areas of the certification process. These highly specialized experts come in and out of the program. The team developed a separate sprint that is never opened, but holds the tasks these experts need to complete along with the estimated date of completion. These tasks are also planned during the sprint planning session. Once the sprint is completely planned and points assigned, the sprint is opened in JIRA.

The core program team holds daily standups to quickly communicate what was accomplished the day before and what is planned to be completed during the day. The team reviews the status of stories in JIRA, which are in three categories: not working, in work, or completed. These daily standups help with cross-training as the team members bring up questions, share experience, and discuss help needed. The team's members will set up follow-on conversations. The team has matured to the point of sharing work

or picking up work to help the team complete all of the work committed to within the sprint. The team is holding each other accountable to the sprint commitments.

After the two-week sprint is complete, the team holds a sprint retrospective. The team discusses what went well in the past sprint and what could have been done better. This helps the team to continually improve on the process. Every two weeks the team has a demo report-out to Vice President level leadership. While a typical software program can demonstrate actual product features that they have accomplished each two weeks, this hardware program instead discusses what has been accomplished, what impediments they have run into, and what help is needed to continue to move forward quickly.

Utilization of the agile tools encourage every team member involvement, as well as cross-training and open communication. During the last review of the MPU program with the Engines and Power Systems President, the team received the feedback that leadership was impressed that all team members were knowledgeable and fully engaged in discussion with the president.

The team has engaged potential customers from the very beginning by giving demonstrations of early prototype concepts. The feedback from these demonstrations are then provided back to the team to improve on the MPU design. This has been a continuous cycle which has helped improve the product to ensure it becomes the right Minimum Viable Offering (MVO) and that it has potential customers excited about the product. One customer was willing to fly one of his business jets in from Asia, taking it away from a revenue situation, for a fit check and review of the current design for another feedback loop. This early engagement of customers has resulted in a strong base of customer demand even prior to product launch.