

AVIATION WEEK

# Program Excellence Awards 2022

November 2, 2022

The Watergate Hotel • Washington, DC

Nomination Form

## INTELLECTUAL PROPERTY

(This section must be signed)

Individuals **outside your company**, including the companies listed above and other third parties, potentially including your competitors and others in your industry, may receive and/or review award submissions. All information submitted should address the program's management, leadership, and processes in a manner that you are comfortable sharing with third parties freely and without restriction, and may not include any classified or proprietary information or materials. Do not include any materials marked Confidential or Proprietary or bearing any similar legend. All responses and other submissions, whether in whole or in part ("Submissions"), shall be deemed not to be confidential, proprietary, and/or nonpublic information of any sort for any purpose.

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Thank you for participating,



Gregory Hamilton  
President  
Aviation Week Network

Acknowledged, agreed, and submitted by



Nominee's Signature

May 24, 2022

Date

Nominee's Name (please print): KONRAD YAPP

Title (please print): PROGRAM DIRECTOR

Company (please print): HONEYWELL INTERNATIONAL INC

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## NOMINATION FORM

Name of Program: IntuVue Radar RDR7000 Supplemental Type Certification (STC) Program

Name of Program Leader: Konrad Yapp

Phone Number: +1-480-318-0855 (Mobile)

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Postal Address: Honeywell International Inc., 111 S 34th St., Phoenix, AZ 85034

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Customer Approved

- Date: May 20, 2022
- Customer Contact (name/title/organization/phone): Natalia Vargas, Manager, Aftermarket Product Planning and PMO, Bombardier, +1-514-591-3188 (Mobile)

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.

**EXECUTIVE SUMMARY: Make the Case for Excellence** (Value: 10 pts)

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

(12 pt. Times New Roman) LIMIT YOUR NARRATIVE TO THIS PAGE.

Every year, thousands of aircraft are impacted by hail, lightning, and turbulence. These inclement weather events are costing business jet operators time & money and significantly reducing passenger comfort. Weather related delays, cancellations and damages are costly to aircraft operators annually. Weather hazards like hail, lightning and wind shear can cost up to \$150,000 in damage repair for an aircraft operator. Therefore, comprehensive information about weather conditions is a critical factor for efficient, reliable, and safe aircraft operations.

For more than 100 years, Honeywell has developed flight safety systems for all types of aircraft and spacecraft and our innovation continues with the latest in the IntuVue™ weather radar family. To address the weather-related flight impacts to our business aircraft customers, Honeywell developed the IntuVue™ RDR-7000, the lightest weight and most technically advanced radar for our business aircraft operators. Ultimately, smoother flights maximize work time and provide a better flight experience for passengers through improved safety, comfort, and reduced anxiety.

Approximately 1 year ahead of the FAA certification of RDR-7000 Radar, Honeywell launched a strategic aircraft certification program with the plan to complete aircraft testing and certification to secure FAA supplemental type certificate (STC) for a total of 14 aircraft platforms in the business aircraft market. This parallel development and testing of product development enabled aftermarket certification (STC) on multiple platforms simultaneously. The RDR-7000 product development program vision was that as soon as the product is developed, it would be available to 14 aircraft platforms quickly (rather than a serial approach). Another key factor in this parallel development is that it allows for product robustness so that the TSO product has less risk when integrated to all the different airframes. The parallel approach offers more immediate availability to a larger customer base and increased revenue opportunities for Honeywell.

Approximately six (6 months) ahead of the FAA certification of RDR7000 Radar, Honeywell launched a strategic aircraft certification program with the plan to complete aircraft testing and certification to secure FAA supplemental type certificate (STC) for a total of 14 aircraft platforms in the business aircraft market. The STC would enable the retrofit, modification and upgrade of the RDR7000 radar, replacing older generation conventional Honeywell radar for up to 4000+ business aircrafts for our customers worldwide.

During the STC program development phase, the program team encountered numerous technical challenges caused by aircraft integration issues which required further iteration of product updates, schedule delay driven by aircraft availability for testing and additional effort require to demonstrate compliance to our regulatory agency (FAA).

Throughout the entire program period of performance, the program team relied on a robust management operating system to manage multiple baseline changes, schedule shifts, while maintaining a spirit agile execution with our partners & suppliers which resulted in a first of type FAA STC approval for the RDR7000, a major new product development in 9 months. The program ultimate success enables Honeywell to offer a state-of-the-art weather radar solution to our business aircraft customers and realizing substantial aftermarket revenue for Honeywell.

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.

VALUE CREATION (Value: 15 pts)

Please respond to the following prompt:

- Clearly define the value of this program/project for the corporation
- 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)*

For more than 100 years, Honeywell has developed flight safety systems for all types of aircraft and spacecraft and our innovation continues with the latest in the IntuVue™ weather radar family, the RDR-7000 Weather Radar for the business aircraft operators of the world. RDR-7000 is based on the industry-proven Honeywell RDR-4000 IntuVue® to replace our legacy conventional radars. It takes the best features from our current radar systems and integrates them into a smaller, lightweight package that is a near drop-in replacement for business jets. The RDR-7000 moves the technology from magnetron-based to solid-state transmitters using pulse compression, for high reliability, reduced weight and power consumption, and advanced coherent processing.

The strategic decision to develop this next generation radar enables Honeywell to start sunsetting the aging magnetron equipped conventional radars found in existing business aircrafts, which are facing obsolete technology with higher material costs to build, higher maintenance costs from lower product reliability. The RDR-7000 is designed with a common hardware platform across various aircraft types and has numerous software enabled options. With this broad and flexible core product development concept, the RDR-7000 STC aircraft certification program was launched six (6) months ahead of product certification with the objective of integrating the core RDR-7000 onto a total of fourteen (14) business aircraft platforms. The success of the RDR-7000 STC program unlocked a tremendous revenue stream for Honeywell to offer this next-generation weather radar to a worldwide customer base in the next 10+ years. This RDR-7000 STC program was a strategic extension to Honeywell Radar product roadmap and has created significant value to Honeywell.

The RDR-7000 was also designed with the customer operator in mind. It is the most intuitive weather radar on the market to operate. It's automatic scanning feature eliminates the need for active pilot adjustments of tilt and/or gain for operation, reducing workload in the cockpit through some of the most stressful periods of inclement weather. Its ground terrain mapping feature improves pilot situational awareness, automatically differentiating between ground and airborne returns and eliminating the need for manual interpretation by the pilot, again simplifying pilot workload through high-stress periods. Instead of focusing on how to manually operate the radar and interpret its returns, RDR-7000 enables pilots to focus on what is most important, which is flying the most comfortable, most efficient, most effective, and safest mission through or around all types of weather.

The RDR7000 radar provides a strong value proposition for our customers in 3 key areas:

### **1. Advanced Technology for better performance**

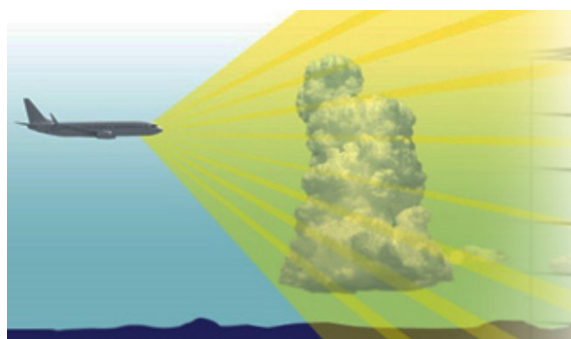
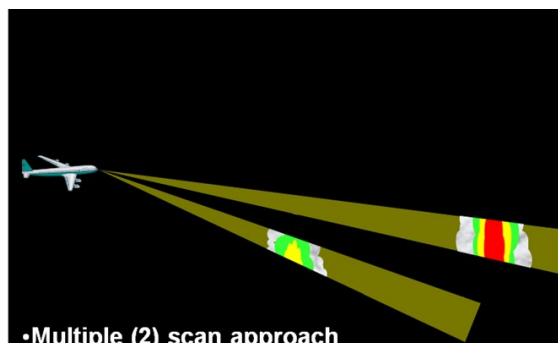
Conventional radar scans a small slice of area in front of the aircraft with reflectivity information only provided in two dimensions. The RDR7000 is the industry's most intuitive weather radar with the most advanced capability to detect, analyze, predict, and avoid hazardous weather. The RDR-7000 is

a fully automated 3D weather radar system which scans weather in +/- 80 degrees lateral, up to 60,000-foot vertical, and out to 320 nautical miles ahead of the aircraft which provides a comprehensive view of a storm. It also leverages advanced software processing to identify hazards like hail, lightning, predictive wind shear and turbulence detection out to 60 nautical miles.

## 2. Reduced Flight Crew workload to ensure safer flight

Conventional Radar is Dependent on Crew Tilt Angle and Gain Adjustment while flying in inclement weather managing state of the aircraft. The RDR7000 radar provide automatic and continuous scans of weather ahead of aircraft without pilot adjustment.

2D manual scan from Conventional Radar vs. 3D automatic scan from IntuVue RDR7000 Radar



## 3. Lower Cost of ownership for operators

The RDR7000 radar provides >50% weight reduction with 80% improvement in reliability over previous generation conventional radar, and offer a near plug and play installation upgrade from conventional radar so aircraft operator's downtime is minimized

The value proposition was supported by our recent voice of the customer (VOC) survey, with the favorable customer pilot feedback as follows:

“The RDR-7000 is hands-down better than conventional weather radar systems I’ve flown. It does everything it’s supposed to do, so I think pilots are going to really want this radar. It’s sort of a “no-brainer”.

“Flying the RDR-7000 during the test phase was a real treat and I can’t wait to take it on our major coast-to-coast or transoceanic trip”.

The RDR-7000 STC program was a highly visible and impactful program to Honeywell. The parallel program approach to our Core product development program enabled aircraft certification via STC on a total of fourteen (14) aircraft platform on a highly accelerated schedule compared to a traditional serial aircraft certification approach. At the inception of the program in 2019, it received ardent executive sponsorship due to its strategic nature and significant value creation for the organization. It was also the flagship program for our aftermarket business and program management organization. At the successful conclusion of the program in 2021, we were able to accelerate schedule and reduced our product time-to-market by approximately 6 months compared to a serially executed STC program. With numerous documented best practices and lessons-learned, this program has since become the model for STC development concurrent to product development.

Because of the strategic importance of this program, it provided a tremendous career experience and growth to all members of my team. The combination of volatility, uncertainty, complexity, and ambiguity faced during all phases of the program challenged and stretched my team's leadership and technical skills to the limit and expanded them via numerous lessons learned that proved to be beneficial to subsequent programs in our organizational portfolio since then. This challenging program has provided pivotal career experience for at least three (3) key team members of my team including myself, and ultimately resulted in career promotion for us all, which is a strong testament to the value our team derived from this program.

While we are extremely proud of the technology of the product we offered to the market, delighted by the shareholder value we created for the organization and pleased with the career achievement resulted from this challenging program, the most meaningful contribution is knowing for a fact that we provided our business jet customers the enhanced safety and comfort of a flight equipped with the Honeywell RDR-7000. In addition, other intangibles but nonetheless important values for our business aircraft customers is the safe and comfortable flight enabled by the RDR-7000 which allows quality work time and a better flight experience for them as they work in their "flying office". From an environmental and sustainability aspect, the >50% weight reduction of the RDR-7000 compared to previous generation magnetron-based radars also contribute to aircraft fuel savings and a reduced carbon footprint on the environment.

**METRICS** (Value: 15 pts)

Please respond to the following prompt:

- 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.

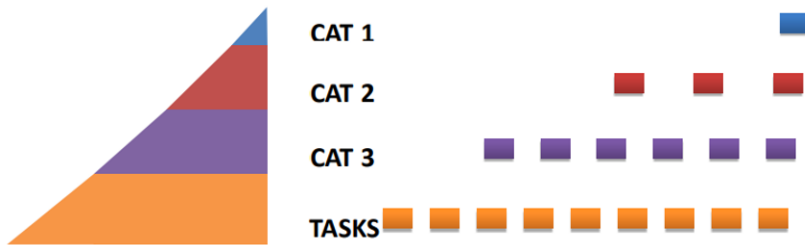
*(12 pt. Times Roman)*

The RDR-7000 STC program utilized two fundamental program management metrics to monitor & control program performance towards achieving its two key objectives, namely on-schedule and on-budget. These objectives are critical to business case realization for the program. These two fundamental program management metrics are tracked and reviewed weekly in our integrated program team meeting for a short-range outlook (SRO) forecast against the current performance month and a longer term 90 days outlook to assess risks to schedule so the team can proactively mitigate them to protect schedule.

To track our program schedule performance, our team used milestone fidelity (MF) measured in %. This is simply a measure of milestone performance relative to plan for program scope of work in our program period of performance, calculated as:  $\text{Milestone(s) Accomplished on Time} / \text{Milestone (S) Planned}$ .

To ensure this is a good predictive metric, we structured our program milestone with a pyramid structure (see figure below) with category (CAT) 1, 2, and 3 milestones in the program. CAT 1 milestones cannot stand on their own without completion of other lower-level CAT 2 milestones that support their completion. The same logic applies to CAT 2 milestones with its supporting CAT 3 milestones. For CAT 3 milestones, lower-level activities/tasks that support their completion are defined and tracked in the program integrated master schedule (IMS). The overall guidance for our program is to have two to five CAT 2 milestones per CAT 1 milestone and similarly two to five CAT 3 milestones per CAT 2 milestone to support the milestones pyramid structure. This milestone structure enabled the program to effectively track progress to detect problems early and minimize risk exposure. For example, if a CAT 3 milestone

is missed, a corrective action is needed to further mitigate any risks to missing downstream CAT 2 and CAT 1 milestones.



The RDR-7000 STC program has the following milestones established in the baseline plan.

Number of CAT 3 Milestones = 58

Number of CAT 2 Milestones = 30

Number of CAT 1 Milestones = 10

Our organizational goal is to achieve CAT 1 milestone fidelity >96% and CAT 2 milestone fidelity >90%. At the conclusion of the RDR-7000 STC program, we achieved the following milestone fidelity which significantly above our goal.

CAT 3 Milestone Fidelity = 91% (53 out of 58 on-time)

CAT 2 Milestone Fidelity = 97% (29 out of 30 on-time)

CAT 1 Milestone Fidelity = 100% (10 out of 10 on-time)

As an example, on how we deploy this milestone methodology to drive schedule performance, we used the milestone structure to track our supplemental type certificate (STC) data package submittal to the FAA as a CAT 1 milestone. The CAT 1 milestone is subsequently supported by three (3) CAT 2 milestones which consist of securing FAA approval of STC certification plan, securing an operator aircraft to support STC certification testing, and completing the STC certification testing. Subsequently, we would have two (2) CAT 3 milestones such as completing the ground test procedures and completing the flight test procedures as predecessors to the completing the STC certification testing as a CAT 2 milestone. When the team is forecasting late in completing the ground test procedure, we would choose to exercise the contingency plan with our aircraft operator to complete more flight tests per day to mitigate the risk of missing our STC certification testing complete milestone (CAT 2) and ultimately protect our final STC data package submittal (CAT 1).

To track our program cost performance, our team used EAC growth measured in actual dollars (\$). The organizational goal is to achieve EAC growth less than or equal to \$0. An initial program baseline spend plan aligned to our total approved budget at completion (BAC) were loaded in our ERP system during the planning phase. Throughout the program execution phase, subsequent estimate at complete (EAC) forecast are generated monthly based on actual spend from the preceding months. If a positive variance at completion (VAR) is uncovered during execution phase, the program team will drive root cause corrective action (RCCA) plan to ensure we mitigate any EAC growth on the program. In reality, they were a few cases where new scope was added to the program. In those instances, the team responded rapidly by exercising a good change control process to ensure these changes were justified which resulted in schedule & cost re-baseline for the program. The program team also met weekly to review spend actuals from the program, and extrapolate the weekly spend using run-rate calculation to determine a

projected monthly actual to support a short-range outlook (SRO) spend forecast on the program. The team would analyze the SRO forecast against our monthly plan and take mitigating actions to prevent any cost overruns on the program. The robust management operating system (MOS) we established on the program coupled with our team rigorous attention to investment management helped the RDR-7000 STC program achieved our goal of EAC growth = \$0.

DEALING WITH PROGRAM COMPLEXITY (VOLATILITY, UNCERTAINTY, COMPLEXITY, AMBIGUITY, OR VUCA) (Value: 25 pts)

Please respond to the following prompts:

- 10 pts: Describe areas of VUCA faced by your program and why.
  - 15 pts: Explain how your team responded to these challenges.
- (12 pt. Times Roman)

The RDR7000 STC program encountered all areas VUCA throughout the program period of performance (POP) as follows:

**Volatility** – With the program scope to complete fourteen (14) aircraft platform supplemental type certificates (STC), one of the primary challenges on the program is to plan and secure all fourteen (14) aircraft platforms on contract with aircraft operators in the market to support the STC certification testing. On a normal market environment, we anticipated some volatility in the plan and therefore planned the risks and its mitigation plan accordingly. To respond to this challenge, our program contracted the service of a 3<sup>rd</sup> party integrating partner to source and secure these aircraft based on their strong relationship with many operators in the business aviation market of the targeted fourteen (14) aircraft types we need for testing. However, the COVID-19 pandemic upended our original plan as we saw many business aircraft operators backed out of their initial interest to participate in our flight test campaign. To further address this unprecedented challenge, we augmented our 3<sup>rd</sup> party supplier by devoting the use of Honeywell U.S sales force in sourcing A/C operators in the market. Throughout the 2020-2021 pandemic waves, we were fortunate and found many operators who took advantage of their under-used aircrafts to participate in the RDR-7000 flight test campaign in exchange for compensation for their aircraft usage.

**Uncertainty** – The program has one (1) aircraft platform which was extremely challenging to secure due to its continuing operation serving in essential industries during the pandemic. A few months were spent sourcing the aircraft and we finally secured an aircraft operator on contract ready to support testing in 2 months in the latter half of 2021. This was our plan A. However, there was an unfortunate outbreak of COVID cases in the operator air base during that time. The aircraft operator enacted a full lockdown of its facility with no visitor allowed for an indeterminate timeline. Confronted with another unprecedented issue, our team exercised a contingency plan (plan B) which included a painstaking search for an alternate aircraft, which we later found but also discovered there were subtle aircraft configuration anomaly that prevented its use. The program experienced a 2-month delay but eventually were able to revert to plan A with the original aircraft operator when the COVID site restriction was lifted from their facility. Because of the unknown unknown nature of this issue, the program was able to justify a program re-baseline.

**Complexity** – One of the more complex technical challenge on the program involved the design of a comprehensive test procedure for a user-modifiable software features of the RDR-7000 system. These



are advanced software features that customer can elect to purchase at a premium price. The inclusion of these upgradable software features for sales was a prudent and flexible business model to target different segment of the market and its customers who sees the value proposition of certain features over others. The successful test and its eventual demonstration to the regulatory agency (FAA) including substantiation for compliance to system safety proved to be a tremendous challenge on the program. To address this challenge which was an “unknown unknown”, our program deployed our management reserve within our approved budget plan to retain additional subject matter experts (SMEs) which helped supported a successful compliance demonstration to the FAA.

**Ambiguity** – One of the most complex technical challenge on the program was an elusive software issue encountered during an aircraft integration flight test. The issue was elusive because the causal relationships were completely unclear. No precedents existed. This is another “unknown unknown” on the program. Our program team approached this issue by swiftly calling an emergency change control board (CCB) review of the software issue. The CCB approved the product team to proceed with a root cause corrective action (RCCA) implementation. A full fault tree analysis was conducted which eventually led to root cause, and the corrective action to fix the software issue resulted in a product development certification update. Because our STC program baseline assumed no further product update is required for successful STC, our program team was able to swiftly process a baseline (schedule/cost) change to address this issue, which was another incident where our STC program team demonstrated excellent baseline change management.

#### ORGANIZATIONAL BEST PRACTICES AND TEAM LEADERSHIP (Value: 35 pts)

Please respond to the following prompts

- 15 pts: Describe the innovative tools and systems used by your team
- 10 pts: Define how you developed, led and managed people
- 10 pts: How did you leverage skills and technologies of your suppliers?

(12 pt. Times Roman)

The program governance framework at Honeywell is the Integrated Product Delivery & Support (IPDS) process. Our team tailored the IPDS process to fit our accelerated program schedule while ensuring uncompromising quality to our deliverables. Our team created an integrated master schedule (IMS) which captured end-to-end dependencies from the Honeywell Core RDR-7000 product certification schedule, our STC partner/integrator schedule, and our respective aircraft operators’ schedule. We used the IMS daily to lead and manage the program to complete all program deliverables to achieve all fourteen (14) aircraft STCs.

We also flowed down our tailored IPDS process discipline to our STC partner/integrator. For example, our team provided preliminary design review (PDR), critical design review (CDR), and test readiness review (TRR) entrance and exit criteria to our STC partner/integrator to ensure the aircraft installation planning, design, testing, and certification scope are completed on-time, on-budget, and on-quality.

To proactively mitigate aircraft integration risks, our systems engineering team also leverage all aircraft platform and product installation specification to develop specific platform integration & testing (PI&T) plans and procedures. The product software team also develop proprietary test software to simulate hazardous weather to test the RDR-7000 functionalities. This innovation is the bedrock for lab testing ahead of actual RDR-7000 installation on an aircraft for a weather-chasing flight mission. The systems engineering team subsequently conducted a rigorous integration testing campaign over a period of two

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months to validate the RDR7000 hardware and software in multiple representative aircraft systems and integration test benches in our Honeywell Aerospace avionics lab facility in Phoenix, Arizona. Our systems test team serve as an extension to the Core RDR7000 product verification & validation (V&V) test team to uncover HW & SW issues so the product team can rapidly resolve and implement updates. The whole team maintain an agile mindset during these crucial test/break/fix iterative cycles. The PI&T effort was instrumental in improving the product maturity of the RDR-7000 system.

Our program team also established a robust management operating system (MOS) with a weekly cadence of internal integrated program team review, STC supplier/partner program status review, bi-weekly leadership escalation review, monthly executive leadership program management review (PMR) to ensure execution excellence throughout the program lifecycle. During the critical integration bench testing phase and subsequently each of the aircraft certification testing, we increased our cadence to a daily 15-30 mins stand-up meeting to cover what was accomplished the previous day, what do we need to accomplish for the day, and what impediments I can help remove for the team that day. These daily stand-ups are agile philosophy that we adopted, and it worked very well for our program.

At the inception of the RDR-7000 STC program, our vision and charter were to accelerate STC certification on all fourteen (14) aircraft platform to enable speed-to-market of our RDR-7000 system. Due to the high impact and high visibility of this program, our leadership team selected a top performing team consisting of a program manager, project managers, project engineers, systems engineers, project control analyst and a contract manager. We had a team of colleagues with very diverse background, skillsets, and career experience. This was a crucial factor in the team selection as we needed diversity of thought and behavior to drive innovation for speed. Majority of the team members are co-located in Phoenix, Arizona, with a project manager based in the same city as our STC supplier/partner for efficient collaboration and alignment, and systems engineering team based in India for additional support. The team members selected to join the program has a proven track record of success leading and supporting complex avionics STC program combined with strong leadership behaviors which include sense of urgency, tolerance for ambiguity, and intelligent risk-taking.

I was extremely privileged to lead a diverse, highly motivated, and independent team. My overall philosophy in leading the RDR-7000 program team was to inspire a shared vision and mission of the program, empower them to take intelligent risk and make decision of what's right for the program, be a role model and coach them as needed, remove impediments along the way so they can continue to excel and grow in their role. For example, we had a project manager with extensive experience in aircraft certification process, so we empowered her to provide extra oversight to our STC supplier/partner. This was beneficial to the program as she provided a thorough review and feedback to make our STC partner/integrator planning artifacts better. In another instance, we had a brilliant systems engineer who is very proficient in project scheduling and aspired to grow into a project engineer role, so I empowered him to augment the lead project engineer in creating and updating our IMS. As the program progress to the crucial platform integration & testing phase in the lab, we also empowered our lead systems engineer to conduct pair testing to develop new test engineers, had him peer-reviewed junior test engineer test reports and be an overall mentor and overseer of the test team.

Aside from our internal program staff, we were also privileged to have selected a supplier/partner with extensive industry experience and subject matter expertise in developing STC certification. Aside from their engineering skills and experience, they also have a certified Maintenance, Repair & Overhaul (MRO) facility who can provide actual installation labor and flight crew to support aircraft flight test. In addition to their engineering, installation and testing capabilities, they also possess a strong relationship with many business aircraft operators from their vast avionics STC certification project experience.

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Because of their vast STC experience, our supplier/partner also maintain a very good relationship with the local FAA certification office. The combination of all the above-mentioned competencies were their competitive advantage which led to our partnership on the RDR-7000 STC program. No program partnership is perfect on a complex program like ours. Our relationship and trust with our STC supplier/partner were tested numerous times through all the program setbacks from COVID-19 related impacts, multiple product integration testing and flight test issues, regulatory agency inquires etc. Nonetheless, our Honeywell program team and our supplier/partner maintained an excellent spirit of solution-oriented collaboration. It is our unwavering sense or shared vision and mission on this program which drove us to achieve all the aircraft STC certification at the conclusion of the RDR-7000 program.

