

INTELLECTUAL PROPERTY

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

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.

Without limiting the foregoing, you hereby grant to Aviation Week Network, an Informa business, a perpetual, irrevocable, royalty-free, full paid-up, worldwide license to copy, reproduce, distribute, display, publicly perform, publish, republish, post, transmit, disseminate, edit, modify, and create compilations and/or derivative works of the Submissions (or any portion or excerpt thereof) in connection with its or any of its affiliates' business(es). Aviation Week Network agrees not to edit the Submissions in any way that materially alters their overall substantive meaning. Aviation Week Network may freely assign, license, transfer, and/or otherwise convey any or all of the rights and licenses granted hereunder.

Thank you for participating,



Gregory Hamilton
President
Aviation Week Network

Acknowledged, agreed, and submitted by


Nominee's Signature

6/24/20
Date

Nominee's Name (please print): ERIC SINAS

Title (please print): Program Director - Light Aircraft

Company (please print): Bell, a Textron Company

NOMINATION FORM

Name of Program: Bell 407GX Instrument Flight Rules _____

Name of Program Leader: Eric Sinusas _____

Phone Number: 817-280-2968 _____

Email: bthress@bellflight.com _____

Postal Address: 3225 Bell Flight Blvd. Fort Worth, TX 76118 _____

☐ Customer Approved

○ Date: _____

○ Contact (name/title/organization/phone): _____

☐ 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 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

X ☐

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 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)

In terms of execution, the program was one of the first single engine instrument flight rules helicopter certification in the last 20 years. Bell's team developed a certification plan which was approved for execution in September 2018. In Aug 2019, Bell announced the Federal Aviation Administration (FAA) had issued an Instrument Flight Rules (IFR) Supplemental Type Certificate (STC) for the Bell 407GX, an incredible achievement marked in only 11 months.

Secondly in terms of excellence, Bell teams showed their ability to partner cross-functionally with the entire organization, working in tandem as one robust team which included various commercial program engineers, Technology and Innovation flight test and training employees and Bell's Organization Designation Authorization to find solutions and paths forward in order to execute the approved certification plan.

Bell's 407GX is only the second single engine aircraft to certify for IFR operations in the last 20 years. This platform is now also the lowest cost new production IFR solution on the market, bringing a highly-beneficial capability to new operators.

Purpose

Provide a 150-word description of the purpose of this program, spelling out all acronyms and correct acronyms
(12 pt. Times Roman)

The purpose of Bell's 407GXI IFR Certification was to set the bar high for industry safety. In July 2015, Bell played an active role in partnering with industry safety advocates to participate in and published a white paper on why the certification of a single engine IFR Certified aircraft was necessary for operators to ensure safety is the primary consideration. According to research completed by Mike Hirschberg of the Vertical Flight Society, "From 2001 to 2013, there were 194 accidents worldwide for Part 27 single-engine helicopters — with 326 fatalities — involving controlled flight into terrain (CFIT), loss of control after continued flight into instrument meteorological conditions (IMC), or attempts to "scud run" — flying close to the ground to navigate in bad weather." Source: Industry Whitepaper conclusions (FAA database for worldwide accidents)

One of the main reasons for fatal accidents is inclement weather; operators often attempt to fly through bad weather causing them to become disoriented in diminished visibility or strike an obstacle at low altitude. This remains one of the major causes of fatal helicopter accidents and is far more common than engine failures, mechanical failures and systems failures.

For the Bell 407GX i single engine helicopter, this meant finding cost effective ways to provide customers with a safe and practical instrument flight rules (IFR) capable aircraft.

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)

In addition to enhancing safety standards across the industry, by reducing weather-related accidents for single engine helicopters, Bell was committed to designing and delivering not only a safe but cost-effective IFR solution. As part of the vision, Bell knew it would be critical to work closely within the industry and with the regulatory authorities to navigate through challenges that arose and achieve change in regulations leading to ultimate IFR certification on Bell 407GX i.

Another component of the vision was Bell's determination to remain on the mission of providing an IFR solution that was affordable for operators. Bell worked closely with the regulatory authorities to provide the same level of testing requirements with alternate means. For example, Alternate lower cost means (ex: analysis instead of test) to achieve the same levels of reliability / redundancy. An example would be the certification of the existing main electrical bus to the latest 27.1316 and 27.1317 requirements, which neither were part of the original certification basis when the 407 was certified in 1995. Aircraft level High Intensity Radiated Field (HIRF) and Lightning testing can run quite heavy price tags – however because of numerous 407 flight hours in service– Bell was able to complete certification for the modifications to the aircraft's main bus through analysis alone – identifying the critical circuits and proving that they would satisfy the DO-160 requirements levied on clean sheet designs today.

(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**

Foremost, Bell's mission statement includes being industry leaders in terms of safety and vertical lift technology. The Bell 407 IFR program is a testament not only to Bell's commitment and passion for safety for more than eight decades, but its continuous strides to push boundaries of flight and uncover significant solutions that make an impact. Our teams are continuously designing and assessing new concepts to anticipate the evolving needs of our customers around the world.

The value was also considered for the operator, offering enhanced safety through the reduction of weather-related accidents by adding additional equipment to improve reliability and redundancy of critical systems to allow for Instrument Flight Rules operations at the lowest cost available on the single engine market.

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

For new helicopters certified in the last 20 years, the entry level IFR rotorcraft was a 6-8 passenger twin turbine engine, which carries a higher initial price tag as well as direct operating and maintenance costs as compared to a single engine helicopter. By offering a cost-effective solution to operators that require IFR aircraft for their missions, Bell offered additional safety benefits of a twin engine for the price of a single engine.

For many operators, notably on the coast, Mission Readiness can be an issue. For example, when minutes matter, inclement weather or a low flying ceiling, can cause law enforcement and emergency medical responder's aircraft to be grounded. With instrument flight rules, flying is no longer dependent on weather – or not forcing helicopter to fly dangerously close to terrain.

➤ **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 the Bell 407GX single engine helicopter, this meant finding cost effective ways to provide customers with a safe and practical instrument flight rules (IFR) capable aircraft.

One of the main reasons for fatal accidents is inclement weather; operators often attempt to fly through bad weather causing them to become disoriented in diminished visibility or strike an obstacle at low altitude. This remains one of the major causes of fatal helicopter accidents and is far more common than engine failures, mechanical failures and systems failures.

METRICS (Value: 10 pts)

Please respond to the following prompt:

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

Predictive metrics were considered and detailed when developing the certification plan. The program collected metrics including resources and scheduling to ensure the program team could proactively prevent or overcome any obstacles before they negatively impacted the program, schedule or critical certification milestones.

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.

During the pre-design phase of the Bell 407GXI IFR program, Bell participated in an industry-wide whitepaper proposing modifications to six regulations to help bring a cost effective IFR solution to single engine helicopters. This was under review by the FAA and discussions were looking very promising that industry would accept

those modifications. However, when the safety continuum was finally released in 2017, only one of the six recommended modifications was incorporated. Throughout the program, Bell's engineering team worked very closely with the FAA through the issue paper process to ultimately reach agreement to incorporate four of the six recommended changes through alternate means of compliance. The issue paper process required additional testing, reports, analysis and efforts to gain the full confidence of the FAA in the Bell 407GX i IFR certification. Bell remained determined to ensure the program would meet the highest standard of safety and provide the most affordable single engine IFR solution to the industry.

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

(12 pt. Times Roman)

The development and certification of a 3rd axis autopilot with the transport Canada certification agency – an upgraded version of the existing 407GX Bell 2-Axis autopilot – was considered a program within the 407 IFR STC certification with the FAA. TCCA Certification and subsequent FAA validation of the 3rd axis autopilot was a pre-requisite to the overall 407 IFR program schedule.

The intricacies of involving delegates from two different certification agencies at the same time were quite complex. Not only did the program require two completely separate flight test vehicles for separate conformity and system validation and testing purposes (one with the 3rd axis AFCS and one with the full IFR configuration), but it also had to manage expectations of both cert authorities in parallel due to the tight timeline to ensure an August 2019 deadline for IFR certification to compete for the Navy trainer contract was respected.

To achieve this, the program took a collaborative approach to ensure that the FAA's certification delegates were involved every step of the way during the design, development and testing of the autopilot. From flight control computer software Stage of Involvement audits, autopilot flight testing and test report review and approval – the FAA certification delegates became an integral part of the team. Even though at certain points in the program it may have felt that things were not progressing as quickly as they should have, once it came down to certification test and execution, there were no surprises and the submittal of the final autopilot test results became a formality.

The collaborative approach of involving members of both certification authorities helped the program lay out all risks and unknowns for the project at a very early stage, which in turn helped the team focus and prioritize tasks to ensure questions from both authorities would be answered in time for the deadline.

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?

A big portion of the IFR certification was the design and integration/installation of a second generator and generator control unit (GCU) on a brand new electrical bus on the aircraft to meet the redundancy requirements.

From the beginning, with our partner Safran E&P, a full-scale systems integration bench was built and consisted of 2 large scale motors simulating the engine gear pads driving both generators. This systems integration bench not only served as an aircraft representative mockup that was used for several certification tests (like the generator and GCU failure mode tests, electrical load analysis tests and some Garmin software testing), but it allowed for quick vetting of the Safran GCU software modifications so the technical requirements document could be validated quickly and often, without the need of a full scale aircraft to complete testing.

- 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?

When developing changes to the Bell 407 autopilot, an integral part of the program was another mini-scale systems integrated rig with the flight control computer (FCC), actuators and Garmin avionics suite. From a software perspective, each FCC change was extensively vetted on the bench.

This program led us to a realization that our bench lacked the ability to playback real flight test data, as our flight test vehicle was fully instrumented and was capturing critical parameters that were only transferred to the software team via email and excel spreadsheets. Reading and interpolating data proved extremely time consuming. This program came up with the recommendation to utilize a mini-scale flight simulator which would have had the ability to replay flight testing with old and new FCC software changes in real time to vet FCC software gain changes needed to address aircraft handling quality issues. This will make future programs more efficient and have reduced cycle time of correcting aero performance/ handling quality issues.

Finally, since Bell was the first OEM to make use of 4 of the 6 whitepaper recommendations for a more affordable IFR certification program and aircraft, the entire program served as a platform to help other helicopter OEMs push the boundaries and look to use the same alternate methods to certify single engine rotorcraft to collectively improve safety in the industry.

For more than eight decades, Bell has pushed the boundaries of flight. Our teams are continuously seeking new solutions to support our global customers around the world. As our military, technology and innovation, and commercial program teams research and develop revolutionary technologies, there are always lessons learned and more knowledge about the current vertical lift environment acquired - a notable benefit when working with regulatory authorities.

Bell shares the expertise gained during flight testing and program initiatives internally across the enterprise and with industry partners and OEMS.

➤ 10 pts: **What unique practices are you using to engage customers and how do you know?**
(12 pt. Times Roman)

Since the certification of the Bell 407GX_i IFR and a highly visible helicopter accident, there has been a plethora of media interest. Bell has designated spokespeople who can support these requests as well as individuals who attend safety symposiums to educate and discover more about the difference between visual flight rules and instrument flight rules. Bell has also hosted internal webinars for customer facing employees who are now trained to speak to the capabilities and differentiators of the Bell 407GX_i IFR program and retrofit kits.

Since certification, Bell has secured sales of 11 Bell 407GX_i's fitted with IFR kits, plus one IFR retrofit kit.