

AVIATION WEEK

Program Excellence Awards 2022

November 2, 2022

The Watergate Hotel • Washington, DC

Nomination Form

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Thank you for participating,



Gregory Hamilton
President
Aviation Week Network

Acknowledged, agreed, and submitted by



Nominee's Signature

05/25/2022

Date

Nominee's Name (please print): Marcelo F. Consorte

Title (please print): Sr. Program Manager

Company (please print): Embraer Defense & Security Inc.

NOMINATION FORM

Name of Program: A29 – Super Tucano

Name of Program Leader: Marcelo F. Consorte

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Customer Approved

- Date: 05/18/2022
- Customer Contact (name/title/organization/phone): Curran Mulvihill / Sr. Director of Programs / Sierra Nevada Corporation / 720-572-2714

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.

The A-29 Super Tucano is the gold standard for light attack, combat and reconnaissance aircraft. Built in Brazil by Embraer S.A. and in United States by Embraer Defense & Security, Inc. (EDSI) with its partner Sierra Nevada Corporation (SNC), it has been selected by 16 air forces worldwide with more than 260 units delivered. Customers include the United States Air Force (USAF), Brazilian, Colombian, Afghan, Lebanese, and Nigerian Air Forces. The A-29’s versatile, rugged and durable design allows it to perform operations from unpaved runways and at forward operating bases in austere environments and rugged terrain. The A-29 is the first light attack aircraft in the world with a U.S. Air Force Military Type Certificate. In April of 2022, Embraer announced that the worldwide fleet of A-29 Super Tucano aircraft had reached 500,000 flight hours. As part of its unique characteristics and properties, the A-29 Super Tucano is one of the most important vectors against counter insurgency and anti-terrorism actions around the world, leading its segment in a very efficient way. In addition to combat roles, the aircraft is widely used as an advanced trainer.

Embraer is well known for its quality and Cultural pillars, such as “Challenge. Create. Outperform.” The last two years have been very challenging due to the COVID-19 pandemic. Even though the pandemic is worldwide, the waves of infections and the different government approaches to fight the virus added many variables. The EDSI team, customers and suppliers around the world worked hard together to design, test and implement new systems in the A-29 for both the Nigerian Air Force Program (NAF) and AFSOC – Air Force Special Operations Command for USAF. Despite these challenges, EDSI was able to deliver all aircraft on time. The NAF Program needed to be divided in two Certification phases called MFR I and II (Military Flight Release) due to technical/supplier challenges, implementation of all Service Bulletins, and incremental ferry of the 12 aircraft no later than September of 2021 to Nigeria to avoid weather restrictions with transit over the north Atlantic route. Another challenge was added when EDSI received an aircraft order for one additional aircraft for the AFSOC Program late in July 2020, with the requirement that Embraer completes this delivery by October 2021 (a total lead time of 15 months) without delaying the planned deliveries for existing aircraft production programs.

This paper will present the main efforts related to **OEM/Prime Contractor System Production**, demonstrating how EDSI Program Management maintained its focus to achieve customer needs and satisfaction, while also using Embraer’s well established processes and body of knowledge, strong culture of excellence and its corporate methods to mitigate risks, consequently delivering all aircraft on time during the COVID Pandemic.

As a result of EDSI’s improved performance and quality during the past year, the U.S. Government’s Defense Contract Management Agency (DCMA) has kept the EDSI Production Risk rating at LOW/GREEN, while reducing the Government Mandatory Inspection List from around 270 to 39 inspection items during 2021. This indicates the government’s high level of confidence in EDSI quality standards.

We hope you enjoy reading this paper about the amazing achievements of the EDSI team.



Figure 1: Program Milestones

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

Embraer Defense & Security is the leading Aerospace and Defense industry contractor in Latin America and the A-29 Super Tucano is a very important vector of the company's goals. The A-29 is Embraer's first military aircraft built in the U.S. and it complies with the Buy American Act. The A-29 is the 1st Light Air Attack aircraft with a Military Type Certificate. Embraer Defense & Security Incorporated (EDSI) in Jacksonville, Florida, is solely dedicated to A-29 production & "aftermarket" support for direct & Foreign Military Sales (FMS) of the A-29.

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

EDSI provided support to existing FMS programs while producing aircraft for two additional Programs during the recent COVID-19 pandemic. Customer-specific requirements mandated engineering development, testing and systems certifications for both the Nigerian Airforce (NAF) & the USAF Special Operations Command (AFSOC) programs. The A-29 Program Team was focused and committed to achieving customer satisfaction by meeting their requirement and incorporating the customer-driven enhancements into the A-29 certification.

The A-29 Super Tucano production for the NAF comprised of 12 aircraft and were developed with special features to assist the NAF in its fight against violent extremist organizations, including Boko Haram/Islamic State West Africa Province. Equipped with precision targeting, air-to-ground integration comprising the development and integration of new Systems such as a High Definition Electro-Optics Systems, Night Vision Goggles, new Survival Kits and the APKWS rockets – Advanced Precision Kill Weapon System, that upgrades 2.75-inch (70 mm) rockets to a semi-active laser guided precision weapon. The system is a design conversion of unguided rockets, turning them into low-yield precision-guided munitions to help avoid collateral damage.



Figure 2: Main Engineering Developments

This Program also included providing the NAF personnel with an extensive training campaign in support of the partnership between the U.S. and Nigerian governments. The joint structure of air-to-ground integration also supports Nigerian Army and Navy operations. The A-29 is a "game changer" in Nigeria's fight against terrorism and violent extremism, and an ideal aircraft for countries like Nigeria with its low flight hour cost, easy maintainability and 4th generation avionics suite.

The A-29 Super Tucano program for AFSOC comprised of three aircraft which were purchased under the service's light attack experiment to bolster its air advisers' ability to train and equip foreign partners, while improving armed overwatch capabilities.

The A-29 improved the command’s ability to continue addressing the low-intensity, violent extremist fight, while increasing communications with partner nations during conflict. This bolstering of the A-29 capabilities was better suited to protect our allies and any U.S. forces under fire.

- Clearly define the value of this program/project to members of your team

Embraer is known to be an employee-friendly company which respects the employees and values their commitment, dedication and support. This is clear in one of Embraer’s seven core values “Our employees are what makes us fly.” EDSI, established in 2013 solely to support the A-29 FMS Programs, has a very diverse and inclusive team. EDSI continues to be a leader in aerospace in the Jacksonville area, supporting the local economy.

It is also valuable to mention all incentives and support the leadership provided to our teams to attend trainings, workshops, Kaizens, seminars and Project Management boot camps.

Embraer has a rich and historic background in aircraft development, testing and production in tough times. The A-29 Super Tucano is no exception. Embraer worked diligently as a team to support the customers through all aspects of the aircraft life cycle from new business, engineering, supply chain, production and after-market customer support. Embraer worked also with its suppliers to overcome many supply chain impacts, ranging from the raw material and subcomponent availability to export licensing, transportation/shipping and customs clearance at ports. Another of EDSI’s main concerns was employee safety, with zero accidents being reported since mid 2020, while delivering the NAF and AFSOC aircraft on time with the highest quality.



Figure 3: EDSI Site and Program Management Team

- Clearly define the contribution of this program/project to the greater good (society, security, etc.)
(12 pt. Times Roman)

The A-29 Super Tucano is transforming the way nations fight violent extremists. [The Global Terrorism Index 2022](https://reliefweb.int/report/world/global-terrorism-index-2022) from <https://reliefweb.int/report/world/global-terrorism-index-2022>, makes clear that terrorism remains a serious threat, with Sub-Saharan Africa accounting for 48% of total global deaths from terrorism. Four of the 10 countries with the largest increases in deaths from terrorism were also in sub-Saharan Africa, making the Super Tucano the best choice for these areas of conflict.

Nations that face the challenges of airspace/border security and counterinsurgency have found the A-29 to be the right solution for their needs. In many ways, the A-29 is better suited to the range of day-to-day missions than other aircraft in these nations’ air forces. Its ability to fly low and relatively slow, and deliver weapons with pinpoint accuracy, makes it particularly effective in complex environments where there is also a need to avoid collateral damage. General Jeffrey Harrigan, Commander of U.S. Air Forces Europe/Africa, best defined the A-29 in an article released in Nov 2021: “Importantly, the platform itself brings a multitude of capabilities and this is not just about weapons, it is about intelligence, surveillance, reconnaissance, it is about that operability that it provides between the air component and the ground component. And so, it broadens the shared understanding of the force to be able to operate in these different domains.”

Source: https://www.realcleardefense.com/articles/2021/11/03/the_a-29_super_tucano_is_transforming_the_way_nations_fight_violent_extremists_801879.html#!

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)

Predictive Metrics: the Project Management team has used the concepts of CCPM – Critical Chain Project Management largely used by Embraer in the past decade, to monitor the execution of the main milestones of the program, using visibilities such as fever charts to track status of all areas of the program scope, starting with the engineering development of new features required in the contract and continuing into the production status of each aircraft . Figure 4 below shows an example of a fever chart as a predictive metric used to help the program management team take actions as the schedule buffers were consumed. Embraer also used the IPM (Integrated Project Management) tool to monitor the execution of all projects within the scope of the program. Figure 3 below present an example of some of the metrics used by the Embraer PMO team.



Figure 4: Example of Pipeline of Projects, their Fever Charts and IPM tool (Integrated Project Management)

The risks imposed by the COVID-19 pandemic directly affected Embraer with travel restrictions, remote working, absenteeism due to infections, supply shortages and, consequently, increased the risks of the Program. Based on these obstacles, the Program Management team, in collaboration with its Customer/Partner Sierra Nevada Corporation, performed an extensive Quality Improvement plan, aiming to reduce these risks and also to eliminate the pre-existing problems. Part of this plan was the improvement of the Risk Management process to better support predictive actions and the right level of attention of the company board of management. This process took many steps and allowed Embraer to implement a new process and metrics to measure its ability to manage and respond to the risks of the program.

Overview – AS9100D Audit – September 2021

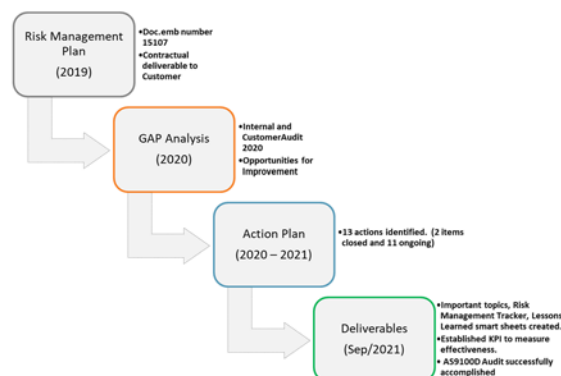


Figure 5: Risk Management Improvement Process supported and approved by External AS9100D Audit

A brand new metric was established during the execution of both the Nigeria and AFSOC programs, aiming to monitor on a monthly basis the risk closure effectiveness, based on the list of risks registered, strategy defined and actions taken. This metric was also able to track the success rate in the closure or reduction of risk levels. All risks closed (even if not successfully) were incorporated in the Lessons Learned Process for evaluation and future actions.

Figure 6 shows an example of this process. In combination with fever charts, by the end of the Programs they have achieved an average effectiveness of 90% over the risks responses, all milestones of the Program were completed and delivered successfully, including the deployment of all aircraft and their associated mission equipment.

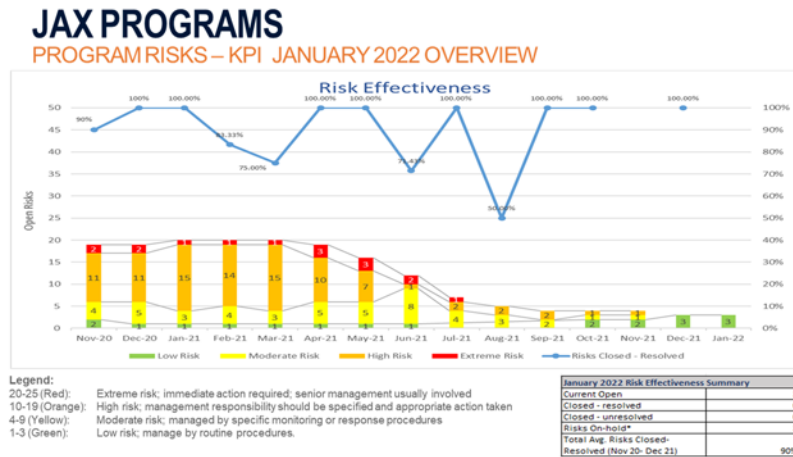


Figure 6: Example of the Risk Performance Index

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.

During the execution of the program, many areas of VUCA were faced due to the impact of COVID-19 on our people and processes. The list of areas and reasons for that are presented below:

- 1) MFR II (Military Flight Release – Phase II): Due to some delays to obtain the licenses and technical data from suppliers, EDSI had to split the Nigeria Program in II phases. This phase was a big challenge once Embraer engineers needed to support SNC with the implementation of Service Bulletins and try-outs against a very critical schedule. SNC had a very important role in this phase, supporting Embraer and EDSI with extra activities and parts rework to complete the try-outs/tests and get the MFR II approved by USG PMO on time. This Phase involved the management and control of thousand of parts, international logistics issues, maintenance teams from SNC, remote support from Embraer in Brazil, availability of ACFT scheduled to support the Nigerian Pilots’ training and the tight schedule to implement the modifications in all 12 AFCT before deployment to Nigeria.
- 2) Logistics: Parts availability was an ongoing challenge. Interruptions to the supply chain caused delays in production, necessitating constant revision of action plans and schedules. These interruptions came in the form of low availability of new parts, delays in shipping, delays in customs processing and reduced ability by vendors to repair parts. The partnership with SNC

helped Embraer and EDSI tremendously by loaning parts from its fleet and negotiating priorities with suppliers.

- 3) People: COVID-19 impacted EDSI with increased absenteeism, resulting in more than seven thousand hours of lost work time. This required revision of the production strategies, including hiring temporary employees and adding a second shift to keep the schedule on track.
- 4) Import/Export Trade Compliance: Many countries, including the U.S., have significantly increased their standard time to approve an export license. It required an enormous effort from our Procurement team and also the Customer to be in contact and monitor the approvals of the Program.
- 5) Customs and Importation: Another area that impacted the program required EDSI to change its normal production flow and accept more “traveled work” from previous stations of the production line until the part became available on the production floor.
- 6) Part Shortages: Parts shortages due to lack of internal components were highly frequent as well, and required Embraer to support its suppliers with backup plans to allow the production to move forward.
- 7) Development: The development of the new Systems in response to COVID-19 significantly increased the complexity of the project due to the travel restrictions and social distancing protocols. Embraer requested support to external entities to allow its engineering team to travel from Brazil to the U.S. to follow and support the flight test campaigns held in the United States.

➤ 15 pts: Explain how your team responded to these challenges.
(12 pt. Times Roman)

The Program Management team had a very important role in this complex and unprecedented situation. Keeping the focus on quality, schedule and customer satisfaction, many initiatives were led by the PMO team to achieve the program goals. The real example was the Quality Improvement Plan developed to support the program goals. In this initiative the PMO team led a comprehensive quality improvement review focused on many areas of the company to support product quality. This plan also took into consideration Customer inputs from involvement in Kaizens organized by EDSI.

With a closed loop and constant evolution model, Embraer and EDSI listened to the Customer’s needs and translated those needs into a project structure.



Figure 7: Quality Improvement Plan focused on Customer Needs

Quality Improvement Plan – Project Structure

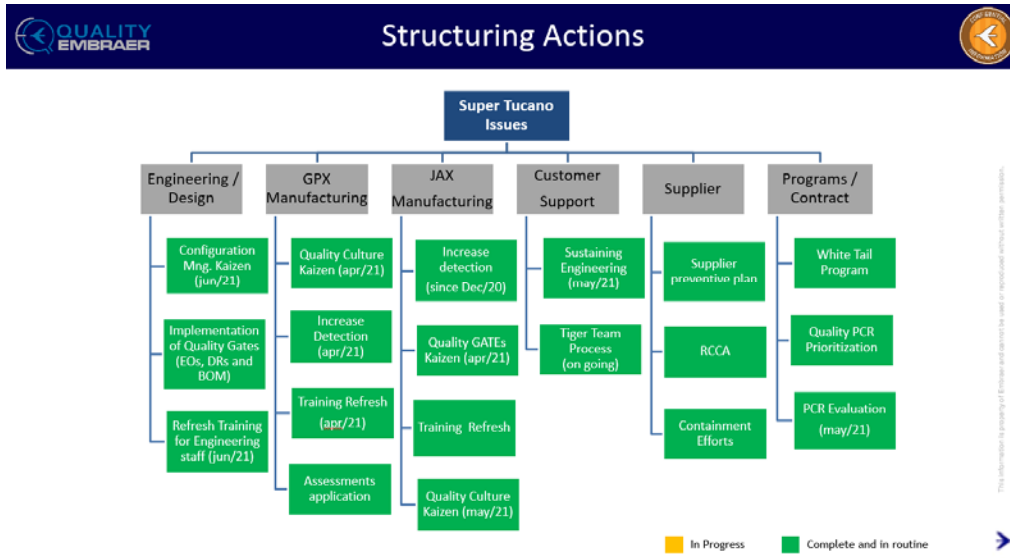


Figure 8: Project Structure – Quality Improvement Plan

This initiative was also followed by Embraer upper management with weekly meetings with program, quality and operations directors, weekly follow-up meetings with the senior vice president of operations – COO, and Monthly follow on meetings with senior vice presidents of the company. The sponsorship of senior leadership was essential for the success of these programs.

Numerous “Kaizens” were performed. Kaizen is a Japanese term meaning "change for the better" or "continuous improvement." It is a Japanese business philosophy regarding the processes that continuously improve operations and involve all employees. These were performed by EDSI with the sponsorship of the Program Management team, often with direct participation of the Customer representatives.

In one of these Kaizens, we focused on “Quality Gates” during the assembly process (prior to the delivery of the aircraft) by reviewing the Quality Gates for all assembly stations, updating the most critical items and removing obsolete issues. This action has improved Quality Gate accuracy and execution time. All findings were included on the SQDC (Schedule/Quality/Delivery/Costs) boards for each production station and shared with production staff.

Kaizen's at EDSI in 1Q21

PROJECTS LIST

80TH KAIZEN WEEK EDSI JAX

SPONSOR: Norman Ramby DIRECTOR: Cristine Mendonça Bloch

ID	Project Name	Leader
1	Flight Control Cables Cycle Time Reduction	Barry Huthchison
2	Quality Inspection Gates	Delone Campbell
3	Results Management	Marcelo Consorte
4	Skin Packing Machine	Fabio Rodrigues

SNC On-Site Inspector, Rich Davis participated in this Kaizen

➤ Additional Kaizen's are being scheduled for EDSI in 2021 & this information is being shared in the Monthly QCAB meeting & materials

➤ EDSI welcomes SNC participation

Figure 9: EDSI 8th Kaizen Week List of Projects performed in the 1st Quarter of 2021

Other examples of initiatives taken in Brazilian and U.S. facilities with focus on Quality Culture, Program Management and leadership sponsorship are demonstrated below.



Figure 10: Quality Culture Week performed in both sites of the Super Tucano – Brazil and USA

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

Beyond the tools and systems already presented and largely used by Embraer and EDSI, such as the IPM, Kaizens, Gembas, Value Stream Maps, 5 Whys and so on, other innovative tools were implemented to support the management of these Programs.

The Milestones Management in the A-29 Super Tucano programs was a challenging process due to the quantity of contractual deliverables, COVID-19 impacts, and locations of Embraer’s divisions and entities throughout Brazil and the United States. Seeking better integration and commitment from the execution areas, the PMO team implemented the use of Smartsheets and Power BI (Business Intelligence) tools to achieve a more collaborative environment, resulting in a new, highly efficient methodology.

To better illustrate the complexity of this process: the A-29 Super Tucano contracts specified Performance Based Payments. So, each single aircraft in production represented many contractual milestones, resulting in approximately one thousand contract line items – all under the responsibility of the Program Management team. The volatility of worldwide operations caused by COVID-19 increased the complexity of managing the completion of the milestones and constantly reporting results and trends to upper management.

In mid 2020, EDSI implemented this new process, transitioning from common spreadsheets to a customized Smartsheet solution. This collaborative methodology also required training and cultural changes inside the organization. The new process allowed the PMO team to control the status of each milestone, following the baseline of the program from inception until invoicing to the customer, which represented the closing of that commitment.

Figure 11 below is an example of five work breakdown structure (WBS) packages and their different stages during Program execution.

Milestones Completion Process Flow & Tracker

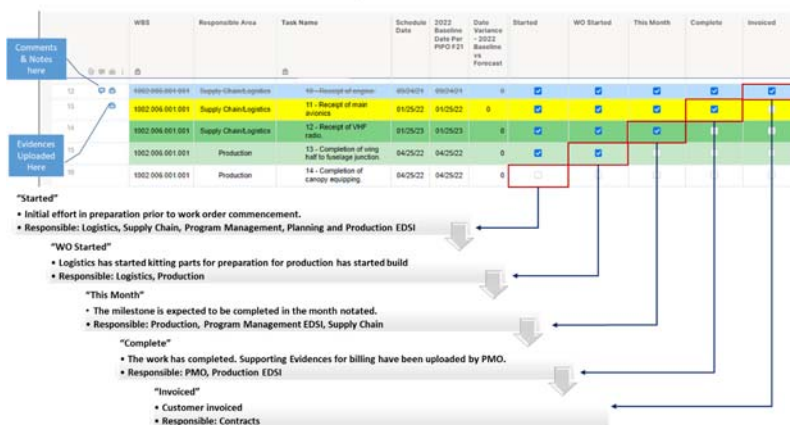


Figure 11: Milestones Completion Tracker – Smartsheets

Once this process was implemented with all involved areas, the Program Management team moved to a second phase: creation of the “Chão de Estrelas” Report (“Field of Stars” a kind of a map of all the “stars” or contractual deliverables of the contract along a timeline). This name came from the Hollywood Walk of Fame, representing all the stars along the path. This second phase was created to meet the main stakeholder’s need, expediting the ability of the Program Management team in preparing reports and visibilities to the upper management. Using the Power Business Intelligence features extracted from the Smartsheet data, it was a very helpful way to provide status of all deliverables, forecasts and their direct impact on company results/goals. It also increased the engagement of the leadership in some critical deliverables because this monitoring process, through preventive indicators and visual management, allowed the Program Management team to identify deviations and risks and assist the EDSI executives in the decision making process. The dashboard presented below is a real example, extracted back in 2021, that shows the panel generated by the “Chao de Estrelas” report and the flexibility the data can be manipulated according to each stakeholder interest.

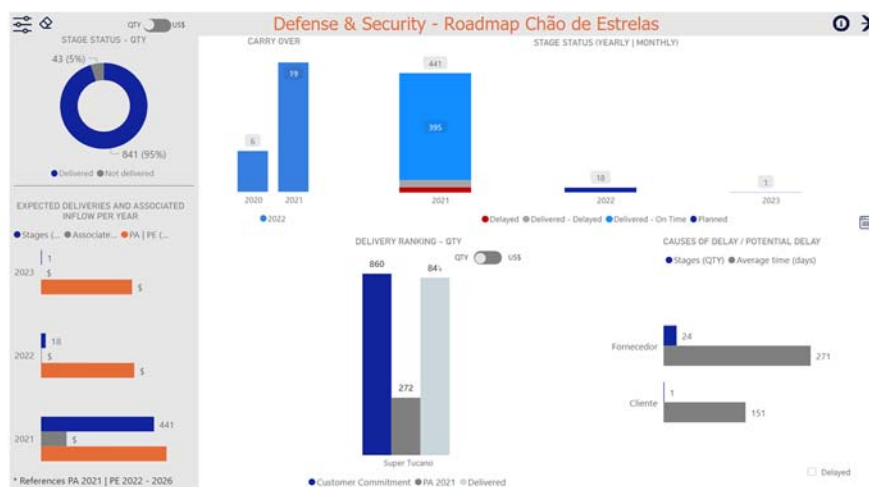


Figure 12: “Chão de Estrelas”- Power BI dashboard

➤ 10 pts: Define how you developed, led and managed people

The COVID-19 pandemic changed the way EDSI, Embraer and the world do business. Although EDSI engineering and administration has been working in a limited capacity from their “home office” for years, we had to go to a full-time home office approach. In addition, Embraer is a Brazilian company,

which provides support to EDSI in Jacksonville. EDSI's A-29 customer, SNC, is based out of Nevada and Colorado, so working with, coordinating and managing activities virtually was not uncommon for EDSI's Program Management team.

Unfortunately, EDSI Production Operations were not able to work from home, which created numerous challenges. Reducing transmission of and exposure to the virus were a key approach to reducing COVID-19 risk. EDSI incorporated and maintained CDC Protocols and met the requirements of the Presidential COVID Executive Order. From 2020 through the 1st quarter of 2022, EDSI had over 35 positive COVID cases and 75 people quarantined with over 8,300 labor hours lost.

Employee development is critical in maintaining a highly skilled and motivated workforce. In addition some training is required to maintain certification and process qualifications. Much of the training became virtual & all "in person" training was performed in small classes to support social distancing requirements.

EDSI had virtual "Genba" meetings with Production, Quality, Engineering, and Supply Chain each morning. These meetings discussed each production aircraft status, non-conformances, work cell schedule performance and constraints. These meetings were beneficial to production continuity and team interaction.

EDSI site leadership replaced weekly staff meetings with short daily tag-up meetings to increase communication flow and to keep people engaged. Work/life balance was always a concern and priority for the employees working from home." Leadership would have weekly one-on-one virtual meetings with employees to touch base, check on health, follow up on action items and projects and perform real-time performance feedback.

➤ 10 pts: **How did you leverage skills and technologies of your suppliers?**
(12 pt. Times Roman)

Since 2019, Embraer has developed a strategic program called Fit for Growth (F4G). This is a program with the main objectives of Excellence in Performance and Efficiency and to add value for the company through new business opportunities and partnerships. It was designed by Embraer Procurement to support the integrated management of suppliers with the different areas of Embraer, ensuring compliance with the these 4 pillars.



The governance process for the F4G program requires Embraer's leadership to meet weekly to discuss supplier performance and opportunities. Quarterly executive meetings between Embraer and supplier leaders present performance results, discuss action plans, process improvements, competitiveness, sustainability, new developments, innovations and potential partnerships.

The program is structured by a multidisciplinary team (WTT – Working Together Team), which works in a collaborative way promoting discussions about main issues, defining common goals and expected outcomes (KPIs). Each WTT has one of the Embraer directors as sponsor to ensure the sustainability of the program and to allocate the right resources as needed. In weekly team meetings the status of main actions are verified to track progress and to determine next steps for each supplier.

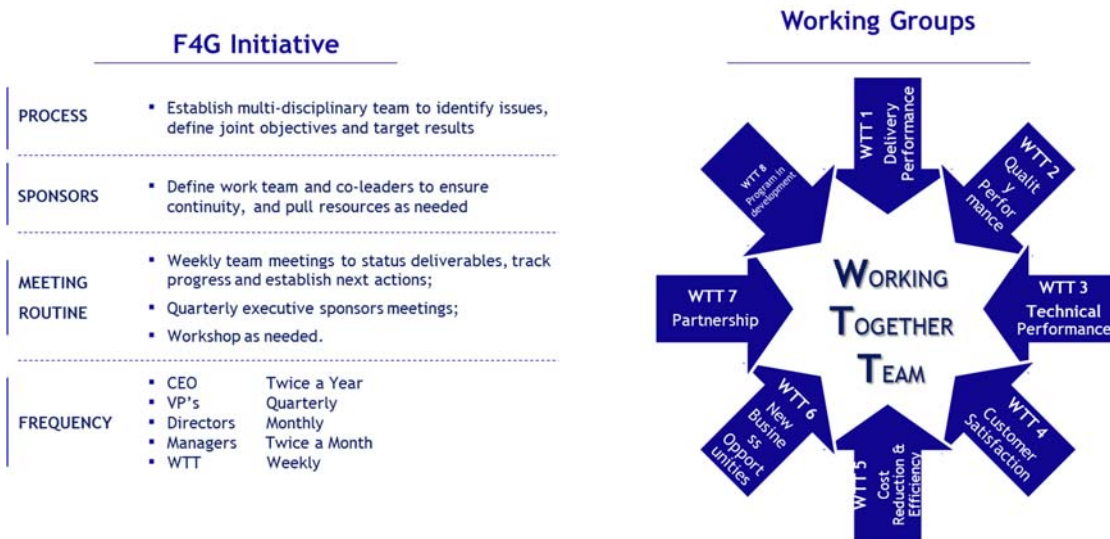


Figure 13: F4G Organization and WTT

Figure 14 shows some of the main suppliers listed in the F4G, and some of them direct involved with parts or services to the A-29 Super Tucano program.



Figure 14: List of Main Suppliers

Conclusion

On behalf of Embraer and EDSI, the Program Management Team would like to thank all members involved in evaluating this paper and reinforce that we are grateful for the opportunity to share our lessons learned, challenges, best practices, and outcomes accomplished in these past unprecedented years. “Challenge. Create. Outperform.” As part of Embraer’s Pillars of Culture, we need to recognize all the amazing people that made this happen and emphasize that “Our People is What makes us Fly.”

Thank you, again, for reading this paper and we hope you have enjoyed this journey with us!

*Program Management Team
Embraer Defense & Security Inc.*