TEGO

Airbus Initiates Flyable Parts Program

Advantages and Return on Investment

Turning Point for a Global Industry

In 2009, Airbus introduced the aerospace industry's first digital traceability and visibility initiative known as “flyable parts.” This program, which eventually evolved into a mandate, relies upon the implementation of an innovative wireless UHF, battery-less RFID solution for managing digital lifecycle information on essential aircraft components. The financial and procedural advantages of storing, managing, and updating digital information throughout the lifespan of airplane parts were quickly recognized, prompting Airbus to expand the program’s scope and timeline to encompass seats and life vests across all their aircraft. In 2015, the initiative was further accelerated to include all traceable parts on every aircraft. Today, millions of specialized RFID-tagged components are utilized on Airbus, Boeing, and Bell aircrafts. By examining the comprehensive benefits of this solution, it becomes clear why the project was prioritized and established as a global mandate.

PAIN POINTS THAT INITIATED DEVELOPMENT OF FLYABLE PARTS PROGRAM

The idea for the flyable parts program was first conceived in 2006 during a two-day customer focus group organized by Airbus. This event gathered 34 different airlines along with 4 maintenance, repair, and overhaul providers (MROs). Airbus aimed to discover ways to add more value to their services, and the feedback was unmistakable: airlines expressed a need to enhance their aircraft maintenance and inspection processes, looking to Airbus to lead this initiative.

*** Tego Inc was the first Flyable Part solution provider awarded the Airbus’ contract in 2009.**

Need for Automated Digital Data Throughout the Ecosystem

65%

Of the time and effort dedicated to aircraft maintenance involves accurately identifying parts, along with gathering and updating the necessary paperwork for each item being serviced.

Ironically, a minimal amount of the "maintenance activity" is dedicated to the actual repair or service of the component itself. The pain point is evident — accessing maintenance information about a specific part is not straightforward when it is needed the most.

The solution proposed by the focus groups was to provide digital information directly on each critical part, where the data could be accessed by all vendors throughout the item's lifecycle and updated as needed—whenever MRO activities occurred in the field. This effectively resolved the challenges of accessing proprietary data that was often hard to find, cumbersome to reach, and existed in outdated paper-and-pencil formats. Critical and detailed information regarding manufacturing, repairs, and conditions would be available digitally on the asset itself, accompanying it and accessible at the moment of need.

Moreover, the advantages of having digital lifecycle information integrated into the flyable part would benefit all providers within the ecosystem. Airbus not only enabled significant process optimization for airlines but also for MRO organizations tasked with maintaining the aircraft throughout its lifespan. This innovative solution allowed an entire network of providers to access essential data, enhancing their efficiency in performing their roles.

The Business Value of a Flyable Parts Program

The strong business value and promising financial returns associated with implementing a flyable parts program were compelling enough for airlines to not only pinpoint their most critical use cases but also to conduct the initial trials. Four distinct trials were carried out, involving both airlines and Maintenance, Repair, and Overhaul (MRO) organizations. Each trial validated that the initial investment would be recouped within a year, resulting in annual savings amounting to millions.

With customer demand clearly demonstrated and proof of concept achieved, Airbus opted to advance with the testing of their flyable parts program. The company shared specifications with relevant parts suppliers to start integrating digital lifecycle information into select A350 parts, effectively embedding those tagged parts with crucial manufacturing and configuration data. The goal was to tag 3,000 parts on the A350XWB, which was still in development at the time. After the initial aircraft were delivered to customers, the program would be reevaluated to decide on further rollout.

Critical Success Factors

By choosing to start the program with an aircraft still in development, Airbus and parts suppliers gained valuable flexibility on the rollout of their flyable parts program. The controlled rollout was critical to the program's success as everyone who manufactures, uses and maintains airplane parts would need to develop new technology understanding before being required to retrofit existing parts or even existing aircrafts.

Another crucial factor contributing to success was the active involvement of organizations throughout the entire value chain, which ensured synchronized agreement on the type of data to be collected. The data concerning all flyable parts in aviation starts with a Birth Record—the initial information for an item that includes details such as manufacturer, part number, serial number, and expiration date, among others. By collaborating closely with parts suppliers, Airbus was able to guarantee that Birth Records were created at the time of manufacturing. This not only streamlined the process but also improved data authenticity while enhancing visibility and ongoing benefits for the entire value chain.

The Birth Record, as the name implies, marks just the beginning of the data encoded on a flyable part. Over its lifespan—sometimes extending up to thirty years—flyable parts will collect critical data on events, maintenance, repairs, and current conditions. Within the aviation sector, this is documented through Part History Records. In aviation, Part History

Records are added to the part/component during significant events such as installation, removal or repair. By allowing all authorized actors to write digital History Records to the part that requires it, a complete maintenance history becomes available right on the physical part itself. The embedded data solves the dispersed-records problem that was wasting so much time in maintenance efforts.

An additional record type available is the Scratchpad Record. This “electronic sticky note” is a means for anyone to add an informal message to a part. This served as a means to fulfill one of the stated goals from the customer focus group meetings, which was to improve communication between line maintenance and the repair shop. The Part History Records together with the Scratchpad Record create both formal and informal communications channels.

Program Acceleration and Expansion

In October 2012, even though the A350 had not yet flown, Airbus announced they would begin digital tagging of seats and life vests on all their commercial aircraft starting in 2013, thus accelerating the flyable parts program by at least two years. The program was further accelerated in January 2015 by expanding it to include all traceable parts, defined as parts that are serialized, repairable, replaceable, maintainable or life-limited.

The decision to expedite the Flyable Parts initiative stems from the program’s benefits exceeding initial expectations, along with the financial returns already being realized. The tagging of 3,000 parts on the A350 marked an encouraging start, but early expansion forecasts indicated that by 2017, 1.5 million airplane parts would be transformed into flyable components annually. By tagging all traceable parts, Airbus made strides toward its long-term objective of establishing supply chain visibility as the norm for all rotable and traceable items. As a result, by 2019, the number of flyable parts across the fleet was projected to rise to 5.5 million.

The advantages of the flyable parts program impact all participants in the supply and value chain. Parts suppliers have optimized their assembly and delivery processes, enhancing their integration with customers. Airbus benefits from a quicker and more automated receiving process, having eliminated the cumbersome and error-prone paperwork that once burdened operations. Airlines are now receiving aircraft equipped with flyable parts, and have found the advantages so compelling that they are starting to retrofit their existing planes with flyable parts tagging solutions.

Realized Benefits Highlight the Value of the Solution

On the assembly line floor, Airbus leveraged digital information from their suppliers to conduct final inspections of installed flyable parts. These inspections ensure that all components are correctly positioned, of the appropriate type, and that no nearly expired parts had been supplied – a crucial issue that required Airbus' attention.

Previously, the inspection of seats and life vests during final assembly took Airbus 14 hours; this time has now been slashed to just 26 minutes, ***representing an improvement of over 30 times***. With the introduction of additional inspections, verifying the final configuration of an aircraft has become significantly less labor-intensive than previously.

Airlines are reaping numerous benefits as well, particularly in enhancing their line maintenance procedures and achieving much quicker turnaround times for planes at departure gates. Delta Airlines has taken this a step further by cutting maintenance costs through the elimination of unnecessary expiry replacements. The inspection of oxygen canisters located above each seat used to require crews four to eight hours, depending on the aircraft size. Due to the lengthy process, canisters often had to be replaced even when they still had months of serviceable life remaining. Now, with inspection times ***reduced to an impressive 30 to 60 seconds***, Delta is able to fully utilize the canisters' lifespan and is enjoying a reduction of 7,000 labor hours annually.

The remarkable success and notable advantages of the flyable parts program led Airbus to establish Airbus Consultancy Services, aimed at helping others achieve similar outcomes. A prime example in maintenance, repair, and overhaul (MRO) is Airbus's collaboration with TAP Air Portugal (Transportes Aéreos Portugueses) to implement an engine tagging initiative. TAP's Mobile Enabled Engine Repair Application has been integral to their daily engine maintenance routines. Tags affixed to engine components, modules, and subassemblies have enhanced inventory control, facilitated the tracking of parts and their movement, ensured proper assembly verification, and significantly improved overall turnaround time. Initial annual cost savings began at €2.5 million and continue to rise as the program expands and evolves. Furthermore, these savings can be accurately tracked through the system's reporting capabilities.

CONCLUSION

The Birth of a Global Mandate

The Flyable Parts program was initially created to provide value to Airbus' customers, but it quickly transformed into a beneficial initiative for all stakeholders in the value chain. The remarkable productivity gains resulted in cost savings that greatly surpassed initial forecasts. As a result, Airbus accelerated the program's rollout well ahead of the original schedule, underscoring the solution's significance. Following this achievement, both Boeing and Bell Helicopter embraced the Flyable Parts program. Today, it thrives and has established itself as a global benchmark in commercial aerospace.