



## **The Airbus Flyable Parts Program**

### **Ecosystem Benefits and Returns on Investment**

In 2009, Airbus launched aerospace's first digital traceability and visibility program dubbed "flyable parts". The program mandated that OEMs adopt a novel wireless, battery-less solution\* for managing digital lifecycle information on critical parts of Airbus' A350 airframes. The financial and process benefits of having digital information stored, managed and updated over the life of the airplane asset were so quickly realized that Airbus accelerated the flyable parts program timeline to include seats and life vests on all their aircrafts. In 2015, the program was again accelerated, this time to include all traceable parts on all aircraft. Today there are over 3,000 parts on an Airbus airplane that have digital capabilities. By exploring the end-to-end benefits of the solution, it is easy to see why the project was fast-tracked.

### **The Pain Points and The Benefits**

Conceptualization of the flyable parts program began back in 2006 when Airbus held a two-day customer focus group, which was attended by 34 different airlines and 4 maintenance, repair and overhaul providers (MROs). Airbus was looking for ways to provide additional value to their customers and the feedback was clear: airlines needed to improve their aircraft maintenance and inspection processes and expected Airbus to be able to champion this initiative.

Focus group conversations immediately revealed that during maintenance activities the bulk of the time and effort was spent trying to properly identify parts, as well as retrieving, collecting and updating the paperwork associated with each maintained item. Ironically, very little of the "maintenance activity" was spent actually repairing or servicing the part. The pain point was clear -- maintenance information about a particular part was not easily accessible when it was needed most.

The solution offered was to place digital information directly on each critical part, where the data could be accessed throughout the item's lifecycle and updated as needed - whenever MRO activities occurred in the field. The pain of getting to the proprietary data that was difficult to locate, a hassle to access, and in outdated paper-and-pencil format would be eliminated. Critical, detailed manufacturing, repair and condition information would be made available in digital format on the asset itself, traveling with it, and always at the point of need. Furthermore, the benefits of digital lifecycle information embedded on the asset would extend beyond the immediate need. Airbus not only facilitated significant process optimization for the airlines but also for MRO organizations responsible for

servicing the aircraft throughout its life. It enabled an entire ecosystem of providers along the value chain to access appropriate pieces of the valuable data.

## The Program

The business value and financial returns of the flyable parts program were so convincing that the airlines themselves suggested the most needed use-cases and ran the trials. Four separate trials were run involving airlines and MROs. Each use case and trial demonstrated that an upfront investment would be recouped within one year with yearly savings in the multiple millions.

With customer demand clearly established and proof-of-concept in hand, Airbus made the decision to test their flyable parts program. The company sent specifications to the relevant parts suppliers so they could begin adding digital lifecycle information to A350 parts and embedding those tagged assets with manufacturing and configuration intelligence. The program was to begin tagging 3,000 parts on the A350XWB, which was still in development. Once the first few aircrafts were delivered to customers, the program would be re-evaluated as to whether to consider tagging more items on the A350 and/or start tagging other Airbus aircrafts already in production.

## Critical Success Factors

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

Other critical success factor were the active participation of organizations across the value chain as well as synchronization on the type of data captured. The data on all of aviation's flyable parts begins with a Birth Record – the origin information for an item including manufacturer, part number, serial number, and expiration date just to name a few. By working closely with part suppliers, Airbus was able to ensure that Birth Records were added at the time of manufacturing, thus streamlining the process, improving the authenticity of the data, and adding greater visibility as well as ongoing benefit to the entire value chain.

The Birth Record is, as it suggests, just the beginning of the data encoded on the flyable part. Flyable parts will gather data over a lifecycle's worth of critical events, maintenance and repair and ongoing condition data. In aviation, Part History Records are added to the asset during significant events such as installation, removal or repair. By allowing all authorized actors to write digital History Records to the airplane part that requires it, a complete maintenance history becomes available right on the part itself. The embedded data solves the dispersed-records problem that was wasting so much time in previous 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. One of the stated goals from the customer focus group meetings 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.

## Results and Program 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 their commercial aircraft in 2013, thus accelerating the flyable parts program by at least two years. The program was further accelerated in January 2015 by expanding to all traceable parts, defined as parts that are serialized, repairable, replaceable, maintainable or life-limited.

The stated reasons for accelerating the initiative were that the program’s benefits were exceeding expectations and financial returns were already being realized. Tagging 3,000 parts on the A350 was a good start, but the first expansion meant that by 2017, 1.5 million airplane parts would be turned into flyable parts annually. By tagging all traceable parts, Airbus is realizing their long-term vision of having ‘smart assets’ as the standard for all rotatable/traceable items. That means that by 2019, the total of flyable parts will balloon to 5.5 million across the fleet.

The benefits of the flyable parts program touch all actors in the supply and use chain. The parts suppliers have streamlined their assembly and delivery processes as well as improved their integration with their customers. Airbus has a faster and more automated receiving process and they have eliminated previously burdensome and error-prone paperwork processes. Airlines have been receiving planes that already include flyable parts, and have found the benefits so compelling they have begun to retrofit their existing aircraft with flyable parts tagging solutions.

A few examples of the kinds of benefits being realized would further serve to illustrate the value of the solution.

1. On the assembly line floor, Airbus has taken advantage of the digital information delivered by their suppliers to perform final inspections of installed flyable parts. The inspections verify all items are in place, are of the correct type, and that no one has supplied parts that are nearly expired – a critical problem to address.
2. Inspection of seats and life vests in final assembly used to take Airbus 14 hours. That time has been reduced to 26 minutes, a more than 30x improvement. As additional inspections are brought on line, verifying the final configuration of an aircraft is becoming dramatically less labor-intensive than it was.
3. The airlines are also benefitting in many ways, but perhaps most critically by improving their line maintenance routines and achieving much faster turnaround

times of planes at departure gates. Delta Airlines have taken these operations one step further by reducing maintenance costs through the reduction of unnecessary expiry replacements. Inspecting the oxygen canisters that are installed above each seat on a plane used to take crews four to eight hours depending on the size of the aircraft. It was such a long process that canisters had to be replaced when they still had months of remaining lifetime. Now that the inspection time has been reduced to an astonishing 30 to 60 seconds, the full useful life of the canisters is being utilized and Delta is enjoying a reduction of 7,000 labor hours per year.

The enormous success and the significant benefits of the flyable parts program has prompted Airbus to form Airbus Consultancy Services to help others realize similar benefits. In one illustrative MRO example, Airbus has been working with the TAP airline of Portugal (Transportes Aéreos Portugueses) to launch an engine tagging program. TAP's Mobile Enabled Engine Repair Application has been part of their daily engine maintenance operations for the past three years. Tags attached to engine components, modules and subassemblies are providing gains in inventory control, locating parts and coordinating their movement, verification of proper assembly and significant improvements in overall turnaround time. Yearly cost savings started at 2.5 million euros and continue to grow as the program is expanded and improved. In addition, the savings are accurately measurable using the reporting features of the system.

## Conclusion

The Airbus flyable parts program started as a means to provide additional value to Airbus' customers and has further grown to provide tangible benefits to all actors in the supply and use chain. The sometimes staggering productivity improvements are returning cost savings well beyond what was originally envisioned. Airbus has significantly accelerated the program well beyond the planned rollout providing a testament to the value of the solution.

\* Tego Inc was the first flyable part solution provider awarded Airbus' contract in 2009.