

TAP Air Portugal

Luis Pimentel de Oliveira, TAP Air Portugal's innovation specialist, talks with Lee Ann Shay about a European project he is working on to reduce airline delays due to maintenance, as well as other innovation projects that are applying new technologies to MRO. In Europe, 5.8% of all flights are delayed due to aircraft technical issues that subsequently delay other flights. Those disruptions cost about €2.8 billion (\$3.14 billion) annually.

As an innovation specialist, what do you do?

I joined TAP as an engineer in the aircraft maintenance department. With another colleague, we were faced with the challenge of setting up a Europe-wide project to reduce maintenance-related delays. Our project ended up being a consortium of 12 partners, approved and funded by the European Commission. While working on this, we decided that the scope was too big to just do one project and then go back to our normal jobs. We realized innovation can be something much bigger inside a company. That's when we started to create the innovation department here at TAP.

The European project tackles disruptions caused by technical problems with aircraft in two ways: It either prevent faults from happening on the aircraft in the first place or streamlines maintenance processes. I was more responsible for the work processes for line maintenance issues.

My job for the last few years has been focused on this project, because we are not just working on it but also studying what types of opportunities we could exploit as part of the project's scope. For example, early this year we were able to fully test digitalized line maintenance processes at TAP. My task was not just to coordinate the project but to try to learn what we could do better at TAP to shift from paper-based processes to the next step: a digitalized airline.

Was your project part of the Clean Sky 2 aircraft maintenance research program?

Yes. Clean Sky 2, which is the biggest European aviation research program

so far, is a partnership between 16 major players in the European aviation industry and the European Commission. As a whole, it has about €4 billion (\$4.5 billion) for research. It addresses a multitude of issues, including next-generation engines and aircraft, and there is a work package for maintenance, named Advance, which is the umbrella for the Airmes project. [Airmes focuses on optimizing end-to-end maintenance activities within an operator's environment.]

In Europe, we have an advisory council for major research in aviation, ACARE (Advisory Council for Aeronautics Research in Europe), which provides broad guidelines for aviation research in Europe. In the Flightpath 2050 document, one of the objectives is to have no technically induced aircraft operational disruptions to European air traffic by 2050. This means we need to reduce technical disruptions. Airmes aims to achieve this in two ways. First, we have a work package for prognostics, which will reduce technically induced aircraft disruptions by preventing faults from happening. Second, we are streamlining the processes for line maintenance, which usually tackles most of the unscheduled maintenance events day-to-day. Within the project, we also explored some opportunities in data analytics and steps that can enhance the back office, such as maintenance planning optimization and configuration management.

What are the things that you think will have the most impact, and how will airlines apply them?

We have to take into account that this project tests several things and see if some of the concepts we are testing actually work. It's not something that, af-



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Airmes Project at a Glance

The EC's Airmes project addresses the problem that 5.8% of all flights in Europe are delayed due to aircraft technical issues, which subsequently delay other flights. Those disruptions cost about €2.8 billion annually.

THREE PILLARS

- Prognostics, mobile tools.
- Collaborative environment IT platform.
- Shifting scheduled maintenance to condition-based maintenance.

12 PARTNERS

L Up, Mostert-Ploog & Partners, Onera, TU Delft, Meggitt, PTC, ISQ, Cranfield University, Tekever, Aerospace International Services, Atos, TAP Air Portugal

PROJECT DURATION

Dec. 1, 2015-Nov. 30, 2019

Airmes has received funding from the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation program.



ter it ends in November, will allow us to deliver off-the-shelf processes that are ready to use. In this sense, we tested prognostics solutions with some of the partners. We had some good results but also have some issues that are normal in the exploratory stage. For the optimization of maintenance scheduling, we had very good results and saw improvements. In terms of digitalization of some maintenance processes, we learned a lot. For instance, we need an electronic logbook on the aircraft, which we are working on, and all the systems need to be very integrated, which is one of biggest challenges we found. Integration can be done, but it is very challenging—especially for legacy airlines like TAP.

Can you tell me more about the challenges? Are they more operationally oriented?

For the Airmes project, we did not integrate TAP's own operational systems, because that would not be feasible in the scope of the project. In terms of integration, the main challenges are about how data is produced and stored. We have to think about how people work because electronic work orders are the backbone of all maintenance processes. It's where we produce and store all of the information. After that, we have to manage systems that can read and follow up on the work orders. The challenge is rethinking how people work and how we can produce electronic work orders. This project is a proof of concept.

What was TAP's role? How did it come to be?

CleanSky issued a call, and we bid for it. TAP contacted a multitude of partners from our day-to-day life. Then we built a consortium and bid for the project. The project will end in November, and then we'll do several things: We'll see what other opportunities arise, and we will also consider partnerships we could build to exploit some of the solutions we developed in the scope of this project.

Beyond this European project, at the ap&m Expo in Frankfurt you said that TAP is looking into augmented reality?



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We are testing a virtual reality concept, and we're also working with Honeywell on an augmented reality concept. We tested and learned that virtual reality can be very good for training and work preparation. It could be cost-effective if we have access to the 3D models, and this is a question that has to be explored very seriously with the OEMs. We think there is very good potential for augmented reality but there are still a lot of technical issues that need to be sorted out to make it practical. These usually involve the mismatch between the 3D models and the real world. I think working out these issues will be very hard in the short-to-medium term.

Are you looking at using drones for inspections or other applications?

We had a demonstration, but we're still not very focused on it.

Are there any other innovation projects?

TAP is very involved in the Single European Sky ATM research project. We have others too, but it's too early to discuss them.

You have some automotive experience. How has that crossed over to aviation?

Most of my work with automobiles was in safety research while I was getting my master's degree. The auto industry

TAP Air Portugal is testing an augmented reality prototype as part of a European project to reduce maintenance-related airline delays.

is not as constrained by regulations as the airline industry. In some ways, the automotive industry is moving ahead of aviation. The auto industry has always been focused on maintenance since its foundation. This mindset is just starting in aviation. In some cases, automotive set the pace, but now manufacturers are trying to make cars smarter with autonomous drive and adaptive cruise control. Aviation has had autopilot functionality for years, so perhaps the aviation industry can teach the auto industry to improve how drivers interact with the machine.

What's your favorite part of this job?

Interacting with key users for the tools we're trying to develop, for things we think will shift the way people work. Imagine if you can't have manuals on the aircraft: How do you want them to appear on an iPad? They have to stop and think how it could be—what is optimal? We then show them a prototype and keep iterating. The key to success of evolving a prototype is involving users from the early stages. Don't be too enthusiastic with flashy new things: First understand people's questions and then develop answers. Think of the smartphone: It's not flashy, but it has kept adding features that make people's lives easier, such as images. ☺