Artificial Intelligence in aviation

[Thales Podcast transcript]

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This is Artificial Intelligence. With us to discuss the subject of AI in aviation at Thales are Vincent Mégaides, director of Strategy for Flight Avionics, and Denis Bonnet, Innovation director for Avionics.

Thank you for explaining to us today how AI is becoming an integral part of cockpit avionics systems and is set to make piloting safer and easier whilst also enhancing operational efficiency. Generally speaking, why should we see AI in the cockpit as one of the key drivers for the digital transition of aviation?

Denis Bonnet: As you know, most aircraft are connected. It’s very hard to think about an aircraft flying in the next five years that will not be somehow connected to the ground. In fact, this connection gives us something very new, which is an unlimited access to competing resources and data that are available on the ground, and to share that data between all aircraft and all aerospace stakeholders. And that’s where AI becomes very interesting. With AI we can use and “crunch” that data to develop drastically new functions that could, for instance, optimize trajectories to reduce ecological footprint, that could enable optimal air spaces and avoid congestion and disruption, and the beauty of AI is that it allows this to be improved over time, the system becoming more and more efficient, year after year.

As far as the future of piloting is concerned, how can AI in the cockpit be an invaluable aid? What are the operational benefits and what is the pilot’s role in all of this?

Vincent Mégaides: On the cockpit side, the benefit for the pilot is to have, with the support of technology from AI, decision-making tools in order to provide them with all the analysis and the scenarios they will need to support their decision-making in a complex environment. You have to imagine that now, pilots are working in a very challenging environment in terms of workload, in the sense that you have increasing airspace management situations, you also have to deal with weather conditions, with congested air traffic, and they have a high level of workload to deal with. So AI is a tool to serve the pilot in the sense that it provides them with a scenario and analysis and, in that sense, they can offload tasks from a tactical level, from an analysis level, to really concentrate their focus and their mind on a strategic level, on what is the key decision-making they have to deal with over the flight.

This is all very positive, but are there any risks involved in an increased reliance on AI in the cockpit?

Denis Bonnet: Aerospace is very much about safety and, whatever we design within Thales, we have safety in mind from the beginning. And that is where there is obviously a huge challenge regarding AI, which is not, right now, something that is certifiable from a safety standpoint. And that’s the reason why we see the introduction of AI within avionics in two steps: a first where we will provide AI functions to help the crew in everything related to the efficiency of the flight; and the second most
fascinating one where we are willing to extend AI to help the crew, including in safety decisions, and that’s where we try to leverage on the Thales TrUE AI framework that intends to develop an Artificial Intelligence system that will be both certifiable and explainable, so that the crew can understand what it is willing to do.

**In what way is AI present in the cockpit avionics systems that Thales is either developing or already delivers?**

Vincent Megaïdes: In our current roadmaps we plan to introduce AI on two products we are developing at Thales. The first is our next-generation, digitally-native FlytX avionics suite, and the second is the next-generation Flight Management System. For those two products, we plan to have AI introduced in a seamless way to support the efficiency side of those products, providing assistance and providing analysis to increase the performance levels of those products. To give you an example, on the FlytX avionics suite we plan to have AI supporting the digital bot called “Solo”, a digital assistant that will be there to listen to, for example, the dialogue between the pilots and the air traffic controllers, picking up some key words about their discussion, such as when they discuss radio frequencies planned over their route, and it can propose to automatically tune, with the approval of the pilot of course, which frequency will then be selected over the flight plan, in accordance with what has been discussed between the pilot and the air traffic controller. So, once again, the idea of introducing AI in this product will be to increase the performance side of the product, the efficiency side, but will not be introduced on safety-critical part of the avionics product.

**What is Thales’s role in the AI ecosystem?**

Denis Bonnet: Thales’s position in the aviation business is quite easy to understand. We are a technology provider and we do provide those technologies to OEMs like Airbus, Boeing and so on, so that they can build their own aircraft and their own cockpits. And that’s exactly the way we consider AI, which is a technology that is going to improve our infrastructure. And, as in each of our domains, we partner with academia and startups and, in this particular case, we recently acquired a very interesting start-up called Psibernetix. They are quite well-known because, two years ago, their program called Alpha defeated most of the US fighter pilots it was competing with in a simulated environment. It was seen by those US pilots as being a very, very interesting artificial pilot.

**How should pilots see AI?**

Vincent Megaïdes: We believe that pilots should regard AI simply as a tool. AI is there to provide them with a set of data analyses, a set of scenarios based on complex data, and also to replace them on low-end, repetitive, boring tasks... and ultimately to provide them with decision-making options, and the pilot will always be at the centre of the decision-making mechanisms regarding the major options they have to decide against.

**Could you tell us which aviation market segments are pioneers in the AI field today?**

Vincent Megaïdes: Regarding the different market segments, we believe that the first segment that will massively adopt AI will be urban air mobility, i.e. drone taxis, [and not the commercial air transport sector]. Why? Because urban air mobility means that you will need to develop a framework where you have a complete airspace management called Unmanned Traffic Management, or UTM, in relation with a number of aircraft flying in dense urban environments that will be an order of
magnitude comparable to current numbers of commercial aircraft flying around the globe. So, in order to manage that complexity in a challenging environment, AI will be required both on the UTM side and on the cockpit side of these future flying machines.

**Do AI capabilities on board airliners also extend into the cabin? And, if so, how would these capabilities benefit the passengers?**

Denis Bonnet: When you think about your own experience of flight, from the time you leave your home to the time you arrive at destination, Thales is already providing AI in lots of small areas. For instance, we work with American Airlines to provide AI-powered facial recognition technologies that reduce time spent at LAX Los Angeles airport passport check-in. We also deliver AI-powered features to airlines through their in-flight entertainment systems. Typically, we can provide each passenger with an adapted, personalized experience: the exact set of content you like, personalized offers and a personalized experience, depending on who you are, where you’re going, and so on.

**So the future is bright for AI throughout the aircraft, in particular in the cockpit, am I right?**

Vincent Megaïdes: Yes, the future is bright for AI in the cockpit, and generally speaking in the aircraft. Regarding AI, Thales’s ambition is to be a technological provider to our customers, to our ecosystem, to our partners, to provide them with the tools and all the enablers that they will need to seamlessly introduce AI in their cockpits and in the cabin. And it’s a reality today cabin-side, as previously mentioned by Denis, and it will soon be a reality cockpit-side because today we are preparing the next generation of products that will embed AI as an intelligent assistant to support the pilot’s decision-making process.

Denis Bonnet: But I definitely believe that the most fascinating thing about AI is the next steps where we will be able to deliver, thanks to the Thales TrUE AI framework, Artificial Intelligence that will be certifiable and explainable, so that the crew can really use it for safety purposes. And, above all, we really believe that this AI will be there not to replace the human being, but to help them in making the right decisions to improve safety and efficiency, in an ethical manner.

*Thank you Vincent and Denis.*