

OPINION

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September 2020

Future Digitalization of the Aviation Industry Calls for Increased Testing

In aviation, digital technologies and services have taken the cabin by storm, and the digital transformation is now headed for the cockpits, allowing aircrafts to share and receive data online while inflight.

Digital solutions for inflight cockpit connectivity are already available, and it is today possible for aircrafts to receive updated weather forecasts and share real-time information about their position.

In this way, connectivity will make flying more efficient as exchange of data can be used to optimize flight routes. This will help avoid delays, save fuel, reduce environmental impact, and, ultimately, bring down costs.

The many opportunities offered by cockpit connectivity solutions are in stark contrast to the cockpit of today, as all needed information for a flight must be brought on to the aircraft before take-off and communication during the flight is via voice or small text messages. Fortunately, the aviation industry is slowly embracing the connected cockpit. Before the COVID-19 pandemic, carriers were testing new solutions, e.g. Alaska Airlines' trial of NASA's Traffic Aware Strategic Aircrew Requests (TASAR) and Traffic Aware Planner (TAP) technologies.

Cockpit applications are already subject to rigorous testing and certification, and for good reasons. As cockpit applications will come to rely on connectivity, thorough testing of applications behaviour under different link conditions will be important for certification. In other segments relying on satellite connectivity emulated satellite links is already used for verification.

Emulated tests grant full control

Having an aircraft take off is expensive and time-consuming, and more importantly, not a reliable option for verification under different satellite link impairments like latency, fading, and congestion.

An emulated test, on the other hand, is a much more reliable, cheaper and swifter option, because it allows developers to test their application in any scenario – independently from available aircrafts or network conditions. An emulated satellite link gives developers full control of the test set up, enabling them to emulate different kinds of satellite link behaviours, e.g. rough weather, satellite link impairments, handovers, or satellite link drops. This allows developers to thoroughly test the application's performance and usability when exposed to different conditions.

To obtain certification, proof of requirement fulfilment and robustness to abnormal situations must be provided. This is possible with the use of code measurement tools in a fully managed testbed. Developers can measure the test's coverage directly in the code of the application to make sure that all critical code is covered. Measurement tools are used to instrument the source code of the application. During test

execution, these tools will provide data that indicates which parts of the code have been executed and make suggestions for missing test cases.

With the growing market for connectivity in aircrafts – both in the cabin and the cockpit – the demand for more intelligent test solutions is increasing as well. Combining managed and emulated testbeds and visibility into code coverage, end-to-end tests lead to more efficient testing and more accurate test results. This will also shorten the test time and thus new applications' time to market, giving developers a competitive edge. For the airline companies, better testing will lead to a safer journey towards the connected cockpit with reliable applications. With the connected cockpit comes the benefits of updated information, passenger lists, weather reports, connectivity to the traffic airline management all things that ease the pilot's job and make flying safer.

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