DIGITAL COPILOT DESIGNED TO IMPROVE SINGLE-PILOT SAFETY

News / Business aviation

In a simulation laboratory at Mitre's Center for Advanced Aviation System Development in McLean, Va., researchers are testing digital copilot technology designed to help single pilots flying complex aircraft in busy airspace. The team's goal is "to bring several of the safety benefits of Crew Resource Management to single-pilot operations," according to Mitre. The research is done in Mitre's Integrated Demonstration and Experimentation for Aeronautics (Idea) lab.

Co-project leaders John Helleberg and Matthew Pollack are experienced general aviation pilots (Pollack is also an instrument flight instructor), and they have been working on the digital copilot for a year. Testing has been done in lab simulators and also in a Cessna 172.

The idea behind the digital copilot is to create foundational technology that runs on a mobile device, which is easy to bring into any aircraft, rather than software or hardware that must be permanently installed. As a federally funded research and development nonprofit corporation, Mitre doesn't create the end product but develops the concept into something that can be demonstrated, then offers it to industry. An example of this is the Idea lab's work on mobile-device-based software to help prevent runway incursions. App developer ForeFlight used those concepts in its Runway Proximity Advisor, which warns pilots audibly and visually when they are approaching a runway while taxiing and when they enter a runway.

© 2015-2026 50SKYSHADES.COM — Reproduction, copying, or redistribution for commercial purposes is prohibited.

“Our goal as a research organization working in the public interest is to do our best to improve general aviation safety and to transition these ideas out to industry where they can do the most good,” said Helleberg. “ForeFlight incorporated the idea as close as it was to the version that we had been testing in our labs. They took some of the concepts that we had developed and put their own flavor on it.”

EASING SINGLE-PILOT WORKLOAD

The digital copilot concept evolved from work done by the General Aviation Joint Steering Committee’s Issues Analysis Team, to identify areas of concern and interest and “issues they wanted addressed,” according to Pollack. Industry research also foundthat accident rates for single pilots flying turbine aircraft are significantly higher than in dual-pilot aircraft. “That helped spur the direction we were headed,” Helleberg said.

The digital copilot research focused on the pilot’s workload when flying alone, such as weather and traffic awareness and searching for information, all while maintaining control and communicating with controllers.

The research began with brainstorming sessions with pilots of various levels of experience. From there, the team prioritized the ideas then built algorithms that could be tested to see how they might help single pilots with their duties. Human-in-the-loop testing was done in the Idea lab’s transport category and general aviation simulators, which also incorporate ATC interaction. The pilots flew twice, first to get exposure to the digital copilot concept and provide feedback, then the second time to assess whether the digital copilot actually improved their workloads. Flight-tests were also done in a Cessna 172 using the digital copilot running on a mobile device mounted in the cockpit.

Although the results so far don’t indicate particular features that offer a clear safety benefit, the Mitre team hopes to quantify safety benefits with more research scheduled during the organization’s 2017 fiscal year. The team is also reaching out to software developers and avionics manufacturers to share the lab’s work.

Some examples of the digital copilot in action can be seen on a video produced by the Mitre team. The focus is on anticipating the pilot’s needs and providing information “at the right time and in the right format.” The pilot can interact with the digital copilot with voice commands, telling it the flight-plan airport before takeoff. The digital copilot can read the checklist, then the pilot has to complete the required action and acknowledge before the next item is read. The digital copilot can call out runway remaining during takeoff. The pilot can tell the digital copilot to call out a reminder at a certain point, for example, 20 miles from destination or when to switch fuel tanks. Pilots can ask the digital copilot for information, such as the ATIS or tower frequency, and the idea here is to avoid the pilot having to look down at a chart. For the fuel tank reminder, there are some mobile apps that include a fuel timer, but a vocal reminder might be better at catching the pilot’s attention.

14 SEPTEMBER 2016

SOURCE: AIN
ARTICLE LINK:
https://50skyshades.com/index.php/news/business-aviation/digital-copilot-designed-to-improve-single-pilot-safety

© 2015-2026 50SKYSHADES.COM — Reproduction, copying, or redistribution for commercial purposes is prohibited.