Discover the real sensations of flying with the new-generation active side-stick controller

When you think of flying a plane, you usually imagine a pilot with a control stick or yoke. Climbing, descending, turning... all the real sensations of flying. Today's commercial pilots use a passive side-stick controller to transmit their commands, but they don't get any direct feedback from the airplane. Safran Electronics & Defense is introducing the active side-stick unit (SSU), a controller that reconciles these two worlds. By combining the traditional method, where the pilot's control stick is mechanically linked to the copilot's, and a fly-by-wire system, which led to the development of passive side-stick controllers, the SSU simulates control forces, and allows pilots to rediscover the real feeling of flight. When it came time to put this concept into practice, the SSU design team asked seasoned professionals to test their innovation. Here's a quick look at their initial impressions.

Safran Electronics & Defense

Experienced pilots from major European airlines, members of the IFALPA (International Federation of Air Line Pilots' Associations), helped Safran Electronics & Defense facility carry out full-scale tests of the active side-stick unit. Airbus jets have long made the transition to fly-by-wire controls while retaining passive side-stick controllers, so their pilots are especially aware of the SSU's new features. They enjoy better overall situational awareness, whether concerning actions by the other pilot, feedback from the autopilot, or the aircraft's general behavior. Offering all the efficiency and accuracy of electrical/electronic systems, the SSU gives the pilot very realistic flight control sensations.

Some of the aforementioned new functions offered by the SSU could well change the approach to flying inherent in first-generation flight controls, a product of tradeoffs due to the technical limits at the time.

One of the main advantages of the SSU is coupling the left and right-hand controls, which means that each pilot gets immediate feedback on what the other is doing. According to Pierre Coursimault, a pilot at a French low-cost carrier that operates an Airbus fleet, the current situation means that "during the flare[1], under a given altitude we have to accept what the other pilot does." The SSU is particularly helpful in this case, because it plays a critical role in flight safety. "With the SSU, we can correct an inadequate action by a less experienced pilot, or step in when he reacts too slowly."

A significant safety improvement

The pilots checking our system emphasized the importance of flight safety. As some of them noted – an observation supported by accident statistics – pilots are less and less aware of the aircraft's longitudinal balance, or trim[2]. The SSU used control feedback from the autopilot to help the crew, by providing a visual display of any large changes in the trim. It is also particularly useful if a stall is imminent, because of the "stick-shaker" function, which physically alerts the pilot that the aircraft is approaching unsafe angles of attack.
Ergonomic design and realistic feedback

The technological advances incorporated in this active side-stick unit, based on a patented Safran Electronics & Defense technology, were developed hand in hand with ergonomic concerns to ensure that the pilot experiences neither elbow nor forearm discomfort.

For pilots used to a conventional control stick with fly-by-wire controls, the active side-stick unit turned out to be “a completely natural way to fly,” in the words of Dara Van Langen, a pilot on Embraer regional jets at a major European airline.

In short, the test pilots were unanimous in praising the SSU. Maxime Nomico, an Airbus pilot at a major French airline, called it “impressively realistic, while also enhancing flight safety.” They all hope to see this new system become the standard in commercial aviation.

[1] A maneuver just before landing, in which the pilot moves the plane’s nose slightly up to slow the rate of descent.

[2] The trim system maintains the aircraft’s control surfaces in the position needed to ensure balanced flight.