



The ACES Big Data Connector provides airlines with the option to transfer the ACES data to their own analytical cloud platform and merge it with other corporate data warehouses.

Holding all the ACES

Until now, airlines haven't had the means to record and measure the quality of their cabin environment consistently, with objective data. A new solution from Teledyne Controls focused on cabin air quality data is seeking to solve this problem. *Inflight Editor Alexander Preston asks the questions.*

Inflight: Teledyne Controls has over 50 years of experience with data acquisition, wireless transfer and data analytics. Can you give me an overall view of your product portfolio and explain how the company has been able to respond to and meet the needs of airline customers as data evolves, both in terms of volume, frequency, complexity etc.?

Teledyne Controls: "Our portfolio is designed to help aircraft operators collect, distribute, and utilise their aircraft data in the most efficient way so that they can improve flight safety, operational efficiency,

and compliance. We have been designing data acquisition and recording systems for over 50 years and have a proven portfolio of data acquisition units that operate on approximately 19,000 commercial and military aircraft worldwide. These systems have evolved over the years to accommodate larger volumes of data and more complex data monitoring requirements with increased processing power and enhanced data frames. In the late 1990s, Teledyne Controls was the first to introduce cellular technology as a viable means to transfer large volumes of

data between the aircraft and the airline's ground network. Since then, we have built several generations of wireless data transfer systems, most notably our Wireless GroundLink+ system, that have followed the cellular evolution (2G, 3G, 4G LTE), integrated Wi-Fi connectivity and can interface with broadband networks. These systems have been deployed on over 16,000 aircraft on multiple platforms. We also provide portable data loaders, including our new PMAT XS. Our aircraft data solutions, which complete the full cycle of aircraft data management, have also evolved from installed software applications to comprehensive cloud-based services that address the needs of specific stakeholders at the airlines, such as Safety, Operations, Maintenance and Engineering, and external data consumers, like engine manufacturers."

Inflight: You are about to launch a new product in a new market segment for the company that still leverages the company's core competencies. Can you tell me more about the development of ACES? Was it already part of your product roadmap or an example of reacting to market need? Why launch it now?

Teledyne Controls: "One of our core operating principles is that we listen closely to our customers and then act quickly to bring solutions to their problems. ACES is the

direct result of hearing from multiple airlines about challenges related to cabin air quality and their desire to monitor it comprehensively. Since we are part of Teledyne Technologies Incorporated, which includes a significant set of air quality and gas monitoring businesses, the product is a natural extension of our capabilities. We were able to leverage decades of existing air quality expertise in Teledyne Technologies and decades of expertise at Teledyne Controls in data acquisition, wireless transfer, and analysis to deliver a solution for the aviation market. Once we validated the need for the product, we moved quickly and went from product concept to certification in just over two years. It was recently certified on the 737, and the A320 is next. We're launching it now because it's certified, there's a clear industry need, and we want to help airlines with this problem.

"ACES is part of a broader vision. Teledyne Technologies has evolved into one of the leading sensor companies in the world. In addition to air quality and gas monitoring capabilities, the corporation has a vast array of imaging, electronic measurement, and other sensing technologies. Teledyne Controls is working to bring more and more of those capabilities to the aviation industry, focusing on helping our airline and OEM customers derive safety and operational benefits from data."

Inflight: How does the product work, and how does it integrate or support your existing portfolio? What benefits does it offer airlines, and what deficiencies in knowledge/understanding does it fill?

Teledyne Controls: "As soon as the aircraft is powered, ACES performs continuous air sensing and monitoring and records data that is stored in the ACES onboard units. Upon landing, ACES automatically transmits the data to the ACES Cloud Service (ACS) portal for processing and analysis. Importantly, ACES transmits the data itself without relying on any other aircraft connectivity systems. The transfer happens seamlessly and securely via ACES' built-in wireless module, which works with both cellular (4G LTE) and Wi-Fi networks when the aircraft is on the ground.

"One of the strengths of ACES is that it can operate independently from any of our existing products, but it can also be integrated if desired. For example, the product could also be integrated with our



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existing portfolio to stream data via broadband while in flight.

"ACES fills a huge gap in knowing what is happening on the aircraft. Before ACES, airlines did not have a practical way to comprehensively monitor the air quality in the cabin and flight deck on most aircraft. ACES solves this problem by providing comprehensive and accurate data for every flight, so airlines can continuously verify the air quality in the cabin and have objective data if an air quality event occurs. Finally, by monitoring trends on specific aircraft, airlines can identify and address potential emerging issues to help prevent future incidents.

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Inflight: Is it a line-fit option, or can it be retrofitted? How many sensors are needed on a typical aircraft, and where makes the best locations for placement?

Teledyne Controls: "Right now, the ACES solution is available for retrofit installation and can be purchased using Teledyne's STC. The number of sensors deployed depends on the aircraft type. For example, on popular narrowbody aircraft, we recommend three devices: One in the flight deck and two in the main cabin (fore and aft)."

Inflight: What sort of environmental parameters are recorded, and how can ACES support existing cabin cleaning measures?

Teledyne Controls: "ACES is designed to detect potentially hazardous contaminants that could affect the air quality in the cabin and flight deck. The system records 13 environmental parameters, including data on airborne particulates from 0.3 to 10 microns in size, carbon dioxide, carbon monoxide, ozone, volatile organic compounds and several other parameters.

"ACES can help ensure cabin cleanliness through the recording of particulate and volatile organic compound data with one such purpose being to ensure the effectiveness of HEPA filters. Data can be validated from a central hub, e.g. Operations Control can quickly see the aircraft information via the ACES Cloud Service portal. By utilising the ACES Big Data Connector integration capabilities, which allows the ACES data to be ingested into an operators' analytics platform with other operational data, existing workflows, processes and IT systems can be maintained and enhanced with the relevant data."

Inflight: Is it commercially available now – any feedback from airlines and launch customers lined up?

Teledyne Controls: "ACES has been FAA certified and is commercially available on the Boeing 737. FAA and EASA certifications on the A320 are in progress, and we expect the FAA certification on the A320 in the first half of this year. The system is now installed with our STC partner, a major US Airline, and it has performed extremely well in a variety of on-aircraft and off-aircraft tests. We are getting very positive feedback from numerous airlines and are excited to be bringing this new capability to the industry." ■