Destination Driven

Avionica builds foundation for connectivity future

John Croft Miami

Raul Segredo discovered at an early age three guiding principles essential to creating an aerospace business in the highly competitive connectivity niche: Put the customer first; put yourself in the customer's seat; teach your employees to fly.

Segredo, co-founder, president and CEO of Miami-based Avionica, has incorporated that wisdom into the DNA of his company, which builds ground support equipment, data recorders and connectivity systems for the global aviation industry. The 25-year-old privately held business has 60 employees servicing more than 750 customers globally and is growing at about 15% per year on revenues of about $15 million a year. Customers include United Airlines, FedEx, UPS, Delta Air Lines, FlyDubai, Emirates, Gol, China Airlines and Malaysia Airlines.

That growth is based not only on the relevance of legacy products—largely ground support equipment and recorders—but the increasing need for ubiquitous connectivity on the flight deck as a fundamental aircraft capability. The company's latest product line features both "gatelink" capabilities—connecting the cockpit to the airline at the gate to take advantage of low-cost broadband data transfer through Wi-Fi and 4G—and satellite connections, data and voice, over the Iridium constellation.

The confluence of Segredo's three principles began during his 10-year stint at Gables Engineering, a builder of avionics and controls. He began at age 14 as the kid "sweeping up the floors and tidying the labs." By the time he turned 16, he was learning to write machine code for the microcontrollers that were just starting to emerge in electronics. "I noticed there were no pilots there," says Segredo of his coworkers at the time. "[We] built controller panels for cockpits, and none of us knew what they were for."

Segredo decided to put himself in the customer's seat, figuratively, earning his private pilot's license and becoming "very passionate" about flying. "I have an ethic of hiring people that are aviators as well, because pilots are destination-oriented people," he says of Avionica. Along with subsidizing flight training for employees, the company has on occasion had its own flying club and company aircraft, including a PZL Koliber, a license-built version of the Socata Rallye on which Segredo says about 20 employees learned to fly. While there is currently no company flying club or aircraft, Segredo, who now flies the company's Cessna Citation 501SP business jet, says he recently brought in an instructor to hold a ground school "to get people back into it."

He and a fellow graduate of the University of Miami, Stylian Cocalides (now retired), started Avionica in 1992 based on a common-sense idea to help airlines with the required annual readouts of digital flight data recorders (FDR). Carriers either ship the actual recorder to a readout facility or download and send the data. At Avionica, technicians verify that the recorded data meet certain performance thresholds, investigate any exceedances and, for legacy tape-based machines, make sure that certain commands (speed up, slow down) operate correctly. United Airlines, one of the company's largest readout clients, downloads its recorders and sends the data to Avionica.

When Segredo first looked at the issue, airlines were using disparate tools to read out recorders made by different companies. "What if we took the download software and put it into a regular laptop and changed the cables?" he wondered. "That's the genesis of our ground support line. We take a generic laptop, plug in the right cable and run the software that will operate any of these FDRs."

That simple concept introduced in 1993—applying ingenuity and technology to make life better for the customer—served Segredo well as word-of-mouth led to a building-block approach to other opportunities that ultimately expanded the company's product lines into quick access recorders (QAR) and connectivity equipment.

The company's start in the QAR business came the late 1990s when Delta Air Lines—which used Avionica for FDR readouts—asked for help with a problem. The industry was in the early stages of a seismic shift in safety culture, moving from forensics (wait for an accident then fix what caused it) to predictive safety, where airlines and the FAA would analyze flight data to root out trends pointing to a potential accident.

Delta needed an easy way to read out the flight performance data, called Flight Operations Quality Assurance (FOQA) data, from the aircraft's digital flight data acquisition unit, the device that taps into the various data buses and sends information to the FDR box.

"We had been kicking around this concept of a tiny data recorder that would plug into the provisions Boeing already had in the aircraft, just to test the system and see if it would work," says Segredo. He notes that engineers came up with a variety of prototypes that were round, square or oblong. For the Boeing 737, the device would plug into a connector at the back of the forward closet.

Eastern Air Lines is equipping its Boeing 737s with an Avionica flight deck network system that includes a server, Wi-Fi and 4G wireless gate connection.

JOHN CROFT/AW&ST

After meetings with the FAA at the aircraft certification office in Atlanta, Segredo was given the green light to treat the device as a thumb drive (not requiring certification) and was allowed to try it on a small number of Delta aircraft for a few months. With the miniature QAR, Delta could download the FOQA data using a laptop plugged into the mini QAR. The test went well, and the FAA allowed Delta to equip its entire 737 fleet with Avionica's QAR using a "field approval" rather than a formal supplemental type certificate (STC), a move Segredo says spared the company from having to generate a 3-ft.-tall stack of approval documentation.

He says Delta flew the first-generation recorders for three years and 600,000 flight hours with only one failure before upgrading to the second-generation version, for which Avionica in 2002 gained an STC (that now covers almost 250 aircraft types in an "approved model list") and put all the necessary quality controls in place for a production facility. "We have never looked back in the 17 intervening years," says Segredo. To date, the company has sold about 8,000 mini QARs.

The second-generation mini QAR came about because FedEx wanted more capacity but the same download time, a request that led to a USB port and an Ethernet connection. FedEx later asked for changes that would result in the third-generation mini QAR in 2009, initially with Wi-Fi connectivity and later with 3G and 4G wireless connections over cellular links. Along the way, Avionica built a military version of the mini QAR, which was used for a time by the U.S. Navy to record flight parameters for post-flight playback on Boeing F/A-18 fighter jets based at Patuxent River and Miramar NAS, in Maryland and California, respectively.

Avionica President/CEO Raul Segredo at the controls of his Cessna Citation 501SP business jet.

AVIONICA

While the QAR was evolving, airlines in the mid-2000s were also interested in increasing the usefulness of electronic flight bags (EFB), which were largely being used to hold electronic documents. Miami Air International, a charter operator based in Miami, called on Avionica to connect its EFBs to the external world via satellite, in large part to update charts from anywhere in the world. The resulting "Satlink" product, which connected the aircraft via the Iridium satellite network, took the next step in evolution when Continental Airlines needed communications help for its fleet of 737s in Micronesia.

Because of issues with the legacy communications system—HF—pilots would sometimes have no voice contact to tell controllers in California that they needed to divert around weather. The solution was to use Avionica's system for voice calls over Iridium. In 2013, Avionica came out with its next-generation Iridium satcom (called Satlink Max), which included approval for FANS 1/A capability, meaning aircraft could use the datalink and voice for "safety services" and qualify for lower separation minimums over the ocean. United was the first customer, equipping a Boeing 777. Anthony Rios, Avionica's vice president of sales, says the company has 850 "classic" satcom systems in service and has sold about 200 Satlink Max systems.

A request by Gulfstream during development of the G650 around 2008 set the path for further evolution of the mini QAR. Rios says the airframer had heard about Avionica's ability to connect EFBs to aircraft data via Ethernet and wanted to see if the same configuration could be used to sample data from a group of hydraulic filters that otherwise would require a bundle of wires running to the health-monitoring system at the front of the aircraft. "Three months later, we went to Gulfstream to demonstrate the mini QAR on steroids," says Rios. The beefed-up QAR, with additional inputs, memory and capability, was officially named the remote data concentrator and became a standard component on the G650.

The culmination of recorder and connectivity evolution is housed in Avionica's Onboard Network Server architecture (AviONS). The smal-footprint electronics package includes a remote data concentrator topped with the Wi-Fi and 4G units and an Ethernet connection to the Satlink Max electronics box in the crown of the aircraft, near the L-band antennas.

While Avionica has come far, it does face challenges,; the latest of which is an ongoing lawsuit with Teledyne Controls. According to court documents, the suit revolves around claims that Avionica's connectivity systems infringe on a 2001 patent by Teledyne for "wireless transmission of aircraft performance data, from an aircraft to the ground once an aircraft has landed." Teledyne builds Ground Link, a competing system. Avionica denies the allegations and has asked for a jury trial. Absent a settlement, which could possibly involve Avionica paying a license fee to Teledyne for AviONS, the two will face off in court starting in May 2017.

As with any turbulence, Segredo navigates like a pilot, always keeping his sights on the destination. "I'm an engineer with no formal business training," he says. "I need to cling to pretty simple tenets: If I take care of the customer, the customer will take care of me. Going on 25 years, that theory has always proven out."