

The Statewide Committee for Research honors Alaska's

# Northern Innovators



## Skip Nelson The Fighter Pilot

*Northern Innovators Hall of Fame Member*

As chief operating officer of an air taxi service in the late 1990s, former Navy Top Gun instructor Skip Nelson knew this: of all the jobs he could have found in North America, being a bush pilot in Alaska was the one most likely to kill him. Somewhere in the state's quiet mountains and river valleys, a pilot died every nine days.

Not only is Alaska one of the most challenging places in the world to fly, radar sometimes loses track of planes out in the void. Take, for example, the route Nelson often flew between Anchorage and Bethel.

"Normally, when you fly that route, you have one radar, Sparrevohn (Air Force Station), about halfway," Nelson says in his modest office in a hangar on the Merrill Field airstrip in the heart of Alaska's largest city. "Once you got 80 to 100 miles west of Sparrevohn, you'd hear (the Bethel) controller say radar service is terminated.

"At that point in time you stepped back 50 years in aviation history. You went from radar control to procedural control — you talk to controllers, tell them where you were. The Bethel tower, not knowing exactly where you were, would for a time close the airport for takeoffs and landings as a safety buffer. It was terribly inefficient and dangerous."

On the first day of 2001, Nelson found himself piloting a flight that traveled decades as well as miles. In a twin-engine turboprop CASA-212 equipped with new FAA technology that sent out a signal from the plane rather than relying on radar to find it, he flew out of radar range. The air-traffic controller in the Bethel tower informed the pilot he could still see the plane on his screen.

"He told me I was under a different control," Nelson says.

Not only was it an advance for aviation, it launched the entrepreneurial former Vietnam fighter pilot into the business of replacing radar with a system called the Automatic Dependent Surveillance Broadcast system.

Nelson's flight using ADS-B — a radio-and-satellite based aircraft tracking system with no moving parts — was the start of something adopted by almost all air services in Alaska and one that the FAA requires all American companies to install by 2020.

The story began in Alaska. In 2000, the Federal Aviation Administration offered 280 aircraft operators flying in the Yukon-Kuskokwim Delta a new air-traffic control system that doesn't rely on people recognizing planes as blips on radar screens. Installed on aircraft, ADS-B sends a digital message every second to FAA ground stations and other planes and helicopters equipped to receive it. Aircraft show up in real time on screens within cockpits and control towers. The system does everything radar does, without requiring radar stations on the ground, their ever-rotating antennas and the people to run them. The FAA concluded that Alaska use of the experimental method cut the workload of air traffic controllers by about 20 percent.

Nelson saw the future in the system, so much that the flight to Bethel altered his vector in life. Following his flight from Anchorage to Bethel, the FAA flew Nelson around the country, showcasing the first pilot to use the replacement for radar. He spoke of the virtues of the new air-traffic control system and the forethought of the FAA for experimenting with it in Alaska.

"If you can make it fly in Alaska, you can make it fly anyplace," he says. "That's why the FAA came up here to do ADS-B. If you make it from here to Bethel, it must be pretty damn good. Because you made it from here to Bethel."

Seizing an opportunity, in 2004 Nelson started ADS-B Technologies LLC, a company devoted to the radar replacement system launched and improved upon in Alaska. After a sluggish start during which he considered taking out a second mortgage on his home to float the business, Nelson and his staff traveled to China in 2005. There, Chinese pilots became the first to use the tracking system outside the U.S. That led to ADS-B Technologies opening two offices in China. A few years later, Nelson and his colleagues went to Tanzania, introducing the system to Africa. He's now touched down on every continent except Antarctica during business trips.

Along with offering consultant services, Nelson's company operating out of the blue hangar has improved on the FAA's technology by developing a space-based system that allows ADS-B to work over the horizon, rather than just where pilots have a direct line-of-sight.

"Just as the signal is about ready to leave the aircraft, we grab it, send it up to a satellite, then on to the FAA," Nelson says. "From the screen in my back room, you can see an airplane flying in South America, or any place with coverage of the satellite."

Nelson said there are small irritations for a high-tech company working in Alaska, such as the need to travel to Seattle to find a patent attorney or the necessity of ordering custom circuit boards from the Lower 48, but he also thinks the word "Alaska" holds a certain weight.

"When we leave this state and tell somebody we did such and such, I started this or I did that, and I finish by saying 'And I did it in Alaska,' you don't buy any more drinks that night," he says. "You certainly never buy a drink when you tell people you're a working pilot in Alaska."