

The Statewide Committee for Research honors Alaska's

Northern Innovators



Keith Echelmeyer The Glacier Pilot

Northern Innovators Hall of Fame Member

In the early 1990s, Keith Echelmeyer was flying above a glacier in the Alaska Range in his Piper PA-12, a plane not much longer than a pickup truck. Some of his best ideas popped up as he sat gripping the control stick with his right hand.

What if, he thought, I could measure the elevation of this glacier all along my flight path?

If he could do that, Echelmeyer would be able to compare the glacier's height along that line to the elevation contours on U.S. Geological Survey maps drawn in the 1950s. By flying the same paths, he could compare elevations to find out how much a glacier had changed over time. If he flew the same routes a few years later — pretty agreeable work for someone like him — Echelmeyer, a University of Alaska Fairbanks glaciologist, would get even more information. He wanted hard data to confirm what his eyes were telling him: Alaska's glaciers were shrinking.

Echelmeyer, whose ability to climb unnamed peaks on weekends and return to teach high-level physics on Monday baffled and impressed his envious colleagues, over time created a system to measure those glaciers from his plane. With the help of talented colleagues, he installed in his plane a GPS, rangefinder, gyroscope, compass, a laser that transmitted light to the surface of a glacier, and a receiver that calculated the time it took the beam to return.

NASA scientists had pioneered an upscale version of the laser-rangefinding system that was useful for big ice sheets, like those covering Greenland. But Alaska ice, trapped in narrow mountain valleys, required a more nimble aircraft and someone with the skills to fly it.

When the prototype was ready — it was orders of magnitude less expensive than NASA's system — Echelmeyer lifted the laser rangefinder to the sky. He flew it along the length of a glacier in the mountains south of his Fairbanks home.

During the next 20 years, Alaska glaciers from the loneliest Brook Range valleys to the deepwater fiords of Glacier Bay echoed the rattle of Echelmeyer's plane. He flew small glaciers in the Pacific Northwest, racking up ice profiles. He added miles to his logbook as if his little Piper had flown from Fairbanks to South Africa.

Echelmeyer soared through whiteouts and rainsqualls and blue spring days. They were not all smooth flights. A storm once pinned him and two other researchers on the ice after he landed on the Kenai Peninsula's Harding Icefield. He spent a few sleepless nights in his cockpit, prepared to finesse the plane back to the surface if 60-mile-per-hour winds tried to fly it.

He escaped with a good story from that adventure and gathered many more. He collected mountains of data. When he thought his team had enough repetitions of glacier flights, he entrusted the data to Anthony Arendt, a UAF graduate student working on his Ph.D. After Arendt and a team of glaciologists and technicians extrapolated the data to all glaciers in Alaska and the Yukon Territory, they presented their results.

Representative of many bodies of ice in Alaska, Harding Icefield in 40 years had on average shrunk the height of a five-story building. The majority of the glaciers Echelmeyer had flown from Washington to northern Alaska had thinned overall in a similar manner from the 1950s to the 1990s. And the rate of melting almost doubled during the period of Echelmeyer's airplane measurements, from the 1990s to 2001. Meltwater from those glaciers, most of them in Alaska, contributed about 10 percent to the rate of global sea level rise.

After Arendt and Echelmeyer's study appeared in the journal *Science*, reporters from the Washington Post, USA Today and the BBC quoted the Alaska scientists. There was the black-and-white certainty reporters crave but seldom receive from the cautious world of science — Yes, Alaska glaciers are disappearing. Here's the proof.

Echelmeyer had little time to reflect upon the accomplishment. In 2002, after he flew his plane from Fairbanks to Yakutat for a conference he helped organize, he fell into sudden, violent seizures at a lodge. Hours later, he was on a medevac flight to Providence Alaska Medical Center in Anchorage. There, he learned he had a brain tumor. Doctors said he only had a few months to live.

With the help of his wife Susan Campbell and a team of doctors from the Fairbanks area and Duke University, Echelmeyer fought that tumor for eight years. In that time, he somehow managed to do things he should not have been able to do — he walked, re-learned how to ski, and hiked for two weeks on a backpacking trip in the Brooks Range. Susan was with him for the small victories and the crushing setbacks. In the end, she turned their home into a place of light, with a constant stream of friends and an uplifting air of gratitude.

Echelmeyer passed away there, in front of a window with a view of chickadees at a bird feeder, in October 2010. He was 56 years old. His death, or maybe the brevity of his life, seemed to inspire the glaciologists who worked with him. Martin Truffer learned to fly soon after Keith became sick, as did Chris Larsen, who incorporated new technology to improve upon the glacier altimetry program with the help of seasoned Alaska Bush pilot Paul Claus. Arendt is now occupying the same suite of offices in which Echelmeyer sharpened his crampons. Gudfinna Adalgeirsdottir, who endured the Harding Icefield adventure with Keith, is a professor at the University of Iceland.

When Echelmeyer was at his unmatched peak, he would often push away from the computer and stroll into a hallway, the walls of which he had papered with topographic maps of Alaska. There, he stared, planning his climbs, ski trips and flights. He knew the white slivers on those maps better than anyone else, and, in his life's work, he corrected those maps. Those white slivers are now smaller; some of the withering rivers of Alaska ice are now ocean blue.