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SuperDARN expands to include site in Alaska's Aleutian Chain

Geophysical Institute researchers helped construct the newest SuperDARN radar site in Adak, Alaska, boosting the state's total to three.

Professor Bill Bristow was the lead scientist on the mission to install the system on an island in the middle of the Aleutian Chain. In addition to making sure Adak would work on a practical level and dealing with the logistics of getting equipment from Fairbanks and Seattle to Adak, he pulled on his raingear and helped with the installation of 40 antennas, two radar systems and a control building on 15 acres of Adak land leased from Aleut Enterprise, LLC, a Native corporation.

SuperDARN radars in Alaska reside at Kodiak and King Salmon and now Adak, adding to the more than 20 systems worldwide. The Adak radar's latitude is similar to Berlin, Germany, so the new site is part of the mid-latitude array.

***INSTALLATION**—Kevin Sterne of Virginia Tech connects antenna wires to one of the 55-foot support poles at the Adak site.*

"The purpose of the network is to look at plasma flows in the ionosphere and magnetosphere, mostly in the auroral zone," Bristow said. "Larger storms go equatorward of high-latitude stations. Sites at the lower latitudes allow us to make observations during large magnetic storms."

Jeffrey Spaleta, a GI postdoctoral fellow, and graduate students Alex Morris and Ramin Jafari were on Adak for a few weeks in fall 2012 helping to construct the radar. Joining the team were representatives from Virginia Tech, Dartmouth College and Johns Hopkins University. Groups from the different universities team up to build the radars and then split responsibilities for maintaining them. They all get to use the data.

The Adak SuperDARN radar looks west and east in two bands that cover the skies over most of Alaska and western Siberia. SuperDARN is shorthand for "super dual aurora radar network" and originated in the early 1980s.

By directing the beams from 16 high-frequency transmitters, researchers are able to cover a wide swath out to distances of almost 2,000 miles. When the high frequency signals bounce back to receivers at the site, researchers use the information to map convection patterns in the ionosphere, where the interaction of the solar wind with Earth's magnetic field is reflected. SuperDARN radars enable researchers to use more real data and less computer simulation.

"It's the only direct measure of global-scale electric fields in the atmosphere," Bristow said.

***TEAMWORK**—Jeffrey Spaleta, Kevin Sterne and Nathaniel Frissell of Virginia Tech and Bill Bristow pose in front of the electronics shelter of the completed Adak radar system.*

UAF UNIVERSITY OF ALASKA FAIRBANKS
photos courtesy of Bill Bristow

GLACIOLOGISTS AID MILITARY RECOVERY EFFORT

It's not often that glaciologists help with the recovery of long-lost human remains, but Martin Truffer was recently enlisted for that purpose. The Geophysical Institute professor and Dave Podrasky, a doctoral candidate, came up with key information on a Southcentral Alaska glacier that held plane wreckage and the remains of military men killed in a crash 60 years ago.

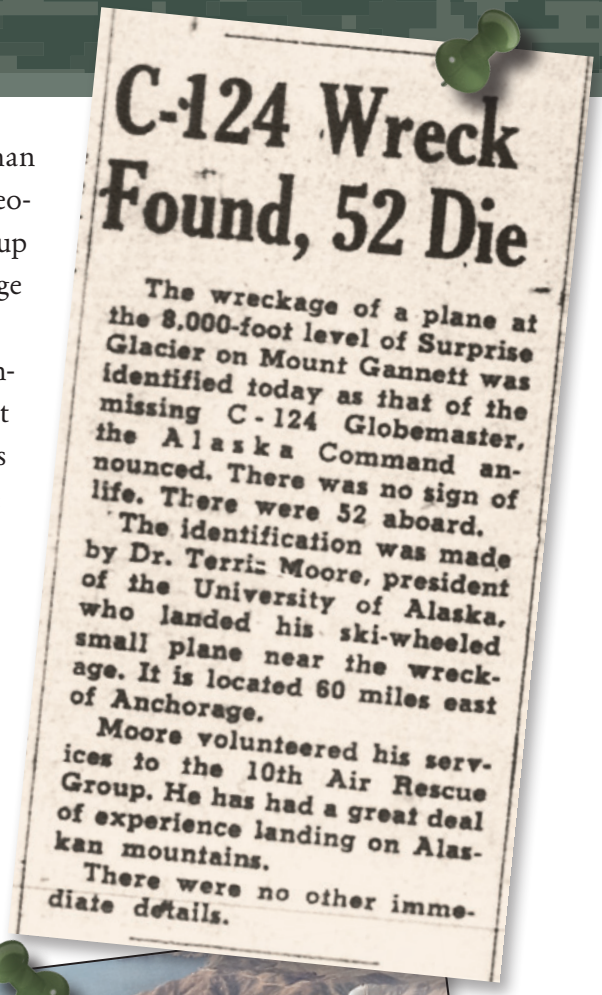
Colony Glacier, about 50 miles east of Anchorage, flows beneath the impact point of a military transport plane that crashed into 10,000-foot Mount Gannett in 1952. Over time, Colony Glacier has churned the accident debris 14 miles downhill, close to the lake into which the glacier calves, Inner Lake George.

In June 2012, Army National Guard pilots flying over the glacier in a Blackhawk helicopter saw aircraft parts on the dirty, cracked-up ice. The wreckage was that of a massive C-124 cargo plane that went down on a flight from Tacoma to Elmendorf Air Force Base in November 1952. Forty-one passengers and 11 crewmembers died in the crash.

As the military planned a recovery mission, coordinators wondered when the glacier might deposit the plane debris into the glacial lake. Could they wait another summer or was 2012 the best time to take action?

Truffer asked Podrasky if he could determine how fast Colony Glacier flows. Podrasky found clear satellite images of the glacier from the summers of 2001 and 2002. By identifying the same crevasses on Colony and seeing how they moved in one year, Podrasky was able to come up with an answer.

"The crash site was just 500-meters-to-one-kilometer from the calving front," said Podrasky, who produced a color-coded map of the glacier's surface speed for the military team. "The glacier is flowing about 300-to-400 meters a year, so it seemed like they did need to go



C-124 Wreck Found, 52 Die

The wreckage of a plane at the 8,000-foot level of Surprise Glacier on Mount Gannett was identified today as that of the missing C-124 Globemaster, the Alaska Command announced. There was no sign of life. There were 52 aboard.

The identification was made by Dr. Terris Moore, president of the University of Alaska, who landed his ski-wheeled small plane near the wreckage. It is located 60 miles east of Anchorage.

Moore volunteered his services to the 10th Air Rescue Group. He has had a great deal of experience landing on Alaskan mountains.

There were no other immediate details.

U. S. Air Force photo

60 YEARS OF AID *— At top is an Anchorage Times article released on Nov. 28, 1952, reporting that the wreckage from a missing aircraft had been identified by then-UA President Terris Moore. The downed military transport plane was a C-124A Globemaster, such as the aircraft pictured above. There were 52 people onboard, and none survived.*

Department of Defense photo by Jamie D. Dobson, U.S. Army

US Army photo/Staff Sgt. Brehl Garza

In the summer of 2012, a specialized eight-person recovery team (left) searched for aircraft wreckage, remains or other personal affects while conducting recovery operations at the crash site on Colony Glacier. A UH-60 Blackhawk helicopter from the Alaska Army National Guard (right) dropped off members of the 3rd Aircraft Maintenance Squadron's Crash Recovery team on Colony Glacier, Alaska on July 10, 2012.

Colony Glacier as seen in August, 1964.

Austin Post photo

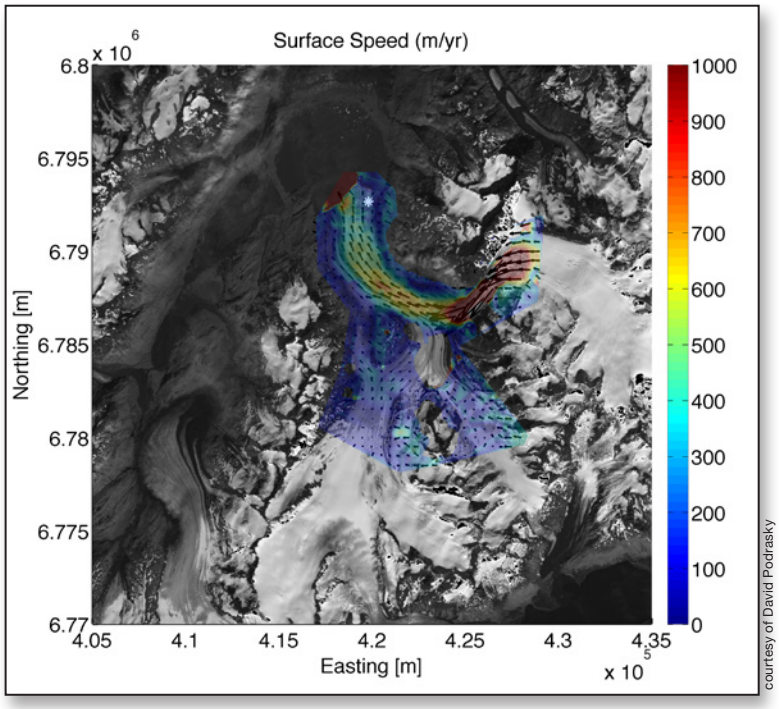
out and start retrieval this summer."

The glaciologists also loaned the recovery team a drill with which to sink a rod deep in the surface of the glacier. By marking the rod with the level of the ice, the recovery groups could see how much glacier was melting near the crash debris.

"In that area, in a warm summer, you can have 30 feet of ice melt," Truffer said. "You should expect that more stuff comes out as the ice melts."

The Joint Prisoner of War/Missing in Action Accounting Command teamed up with Alaska-based military personnel, as well as the Alaska National Guard, to recover the human remains on the glacier. The recovered bones are being analyzed by JPAC before relatives of the dead are notified.

Lt. Col. William Nall of Joint Base Elmendorf-Richardson is part of a team that used the drill loaned by GI researchers. His group is still recovering pieces of the giant aircraft from Colony Glacier.



courtesy of David Podrasky

***GLACIAL SPEED**—David Podrasky, a doctoral candidate at the Geophysical Institute, produced this figure of Colony Glacier surface velocities for the recovery effort. The data helped the recovery team time its retrieval efforts.*

Nall said information from the GI glaciologists was useful to the recovery team. Podrasky's map revealed that 2012 was the best time for retrieval and those on the glacier felt better knowing it crept just a few feet each day and wouldn't swallow them up while they worked.

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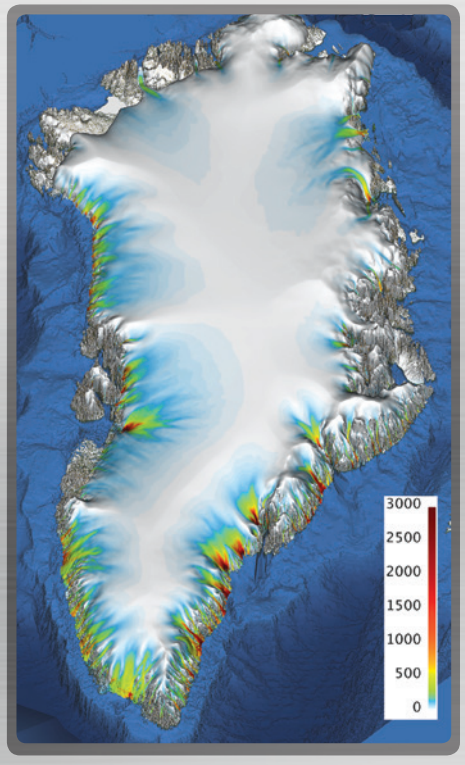
PISM GAINS POPULARITY, CONTINUES TO EVOLVE

When a small team of glaciologists and mathematicians at the Geophysical Institute developed the Parallel Ice Sheet Model in 2003, they had no idea the software program would gain popularity on an international scale.

The model, commonly referred to as PISM, was created to better understand the physics of ice sheets, a process difficult to observe in the field. Researchers incorporated ice physics, the affects of snow, air temperature, ocean temperature and other environmental influences and then offered PISM for free to the world. In 2012, the Max Planck Institute for Meteorology in Hamburg, Germany hosted the first-ever Euro-PISM workshop. The meeting attendees discussed the model from a technical viewpoint, putting emphasis on identifying glitches in the software, recent improvements made to the model and what could be done to further its efficacy in specific research projects. Of the 22 attendees, Associate Professor of Mathematics Ed Bueler, one of PISM's designers and a member of the GI's Snow, Ice and Permafrost group, was the only American.



"Having more international users and co-developers is a step in the right direction, but it goes with a lot of uncertainty, too," Bueler said. "UAF is now the minority user but the majority maintainer," which means that for now, GI programmers perform an irreplaceable function by incorporating all modifications into the PISM software.

Bueler said the team is excited to see how PISM evolves as momentum builds around modeling ice sheet response to climate change.