NEWS IN FOCUS

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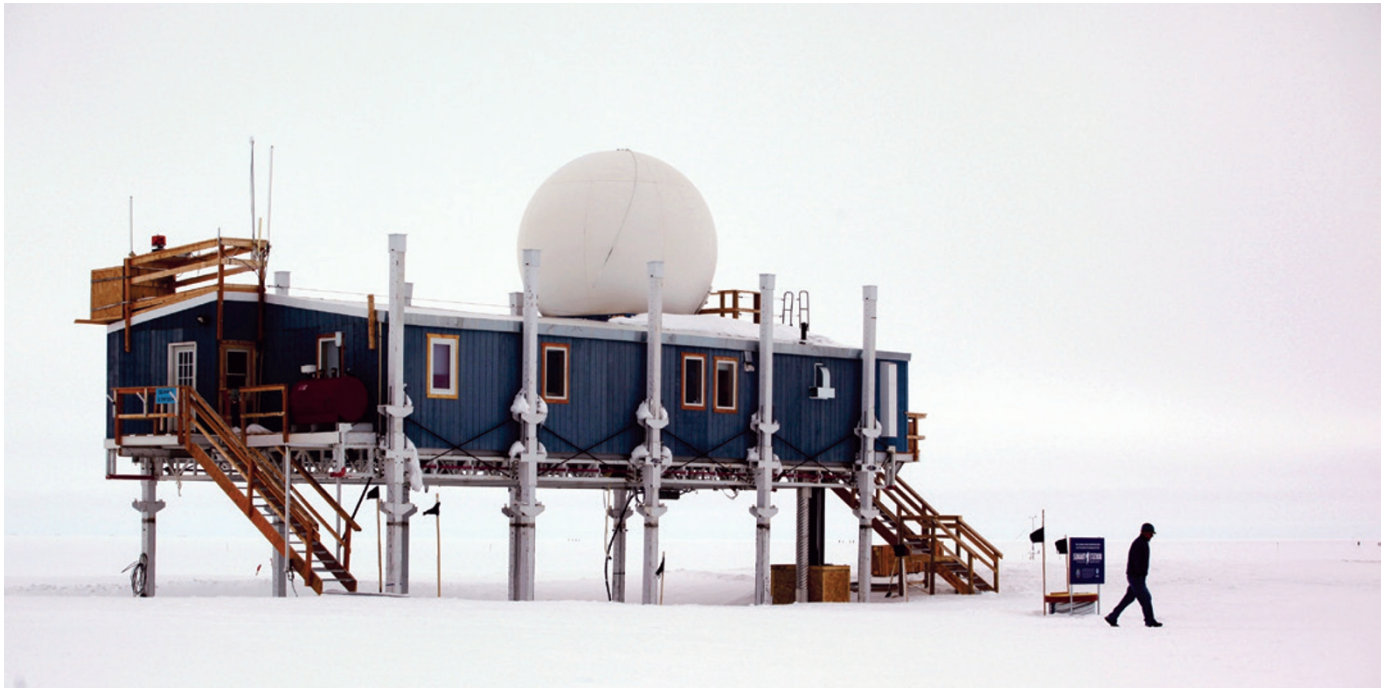

BRENNAN LINSLEY/AP

Summit Station in Greenland, run by the US National Science Foundation, has experienced growing pains as the number of visiting researchers has increased.

FACILITIES

US plans upgrade for ageing Greenland research station

But proposals spur concern that development will pollute the nearly pristine site.

BY ALEXANDRA WITZE

Atmospheric researchers flock to Summit Station, on the peak of the Greenland ice sheet, for purity: at 72 degrees north and 3,216 metres above sea level, the air is about as pristine as can be. This is the premiere spot to grab an air sample uncontaminated by local emissions.

But more researchers are heading to the station these days, and with them come diesel generators, aeroplanes and snowmobiles. When the winds blow in the wrong direction, atmospheric scientists have to note in their data that a 'clean' sample might have been sullied by the very machinery that made its collection possible.

And the problem is about to get worse. By 2017 or 2018, a US–Taiwanese collaboration plans to build a 12-metre radio telescope at Summit. The team says that it will take advantage of Greenland's phenomenal skies and allow them to measure a black hole's shadow with extraordinary precision. It will also require huge increases to staff numbers at the station and the site's power-generation capacity. Station planners must now work out how to balance the need for pristine environmental conditions against the emissions associated with the telescope itself and the station's rising population.

"This is a game-changer for Summit," says Brian Vasel, who manages atmospheric monitoring there and at five other global stations for the US National Oceanic and Atmospheric Administration's Earth System Research Laboratory in Boulder, Colorado. "How do we all play nice when we're at the top of the ice cap?"

Summit was established in 1989, with permission from the Danish and Greenlandic governments, to create a base camp for an ice-core drilling project. In the 1990s, the station began to host other research visitors, mostly atmospheric scientists and glaciologists. Since 2003, it has been occupied year-round.

But the facilities are less than ideal. The station consists of a cluster of poorly insulated ▶

buildings and laboratories, and berths so scarce that many scientists must sleep in tents at the peak of the summer crush, when some 45 researchers may be on site. In winter, at least five technicians must stay to maintain atmospheric measuring equipment. The winter staff will at least double when the radio telescope arrives, as will the station's power needs.

The US National Science Foundation (NSF), which pays for Summit's infrastructure and oversees much of its science, plans to adapt, in part, by spreading out the facilities. The agency has drafted a plan that would put the telescope more than a kilometre away from the current station, move the airstrip further east, and build an atmospheric observatory in the sector designated for clean air and snow measurements.

Greenland's excellent observing conditions make the development worth the trouble, says Paul Ho, an astronomer and former director of Taiwan's Academia Sinica Institute for Astronomy and Astrophysics (ASIAA). Operators also plan to link the telescope with the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile, about 9,000 kilometres away, to produce combined observations much sharper than either facility could produce alone.

In fact, the huge Greenland radio dish was originally built as a prototype for ALMA. In 2011, a consortium led by the ASIAA and the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, obtained the telescope in a controversial deal that saw an instrument built with US funds transferred to an international consortium (see *Nature* **470,** 14; 2011). Parts of the antenna are now in several countries as it gets adapted for polar conditions. Plans call for it to be shipped to Thule, Greenland, in the next few years and then hauled 1,200 kilometres to Summit.

ASIAA is trying to raise US$10 million to $15 million to help pay for the telescope's transport and setup, and a big part of the pitch includes a request for funding green-energy technologies. Ho says that astronomers are aware that the site needs to remain as clean as possible. "We want to preserve that, absolutely. In all ways possible," he says. Still, it is not clear what renewable source would work best. Solar energy cannot provide power during the long Arctic winter. A wind generator has been tested at the site, but the wind is gusty and unreliable.

The real obstacle to improving the station might be cost. The NSF is not releasing specific estimates, but it will probably have to squeeze its current Arctic facilities budget — around $40 million annually — to find money for Summit improvements.

"If we can handle these conflicts and make sure that the emissions don't impact the atmospheric measurements, it will bring a higher profile to Greenland," says Jack Dibb, an atmospheric chemist at the University of New Hampshire in Durham and member of the NSF's scientific advisory group for Summit. "We can do it — if we spend the money." ■

A slashed budget sparked protests in June by government-funded scientists in Canberra.

CSIRO STAFF ASSOCIATION

POLICY

Australian cuts rile researchers

Political scorn on top of shrinking funds creates hostility between scientists and Tony Abbott's government.

BY DANIEL CRESSEY

Australia is booming. The country's economy is strong, and this year the Organisation for Economic Co-operation and Development put the nation at the top of its 'better life' index — an attempt to quantify well-being in industrialized countries.

But many scientists Down Under are not feeling on top of the world. Just over a year since taking office, the coalition government, under the leadership of the Liberal Party's Tony Abbott, has cut several basic-research programmes and put science under the auspices of industry minister Ian Macfarlane — who last month dismissed those who complained about the consolidation as "precious petals in the science fraternity". Last week, another government minister threatened that two key basic-research programmes could be targeted if parliament resists proposed cuts in higher-education funding. This came just days after the Australian Greens party released an analysis produced by the Parliamentary Library showing that government spending on research and development fell to 0.56% of gross domestic product for 2014–15, its lowest level since 1989–90 (see 'Lean years').

"It is getting noticeably more difficult to get funding, with success rates for various fellowship and project grant schemes declining," says Darren Saunders, a medical researcher at the University of New South Wales in Sydney. "There is a very real perception that our current government doesn't value or respect science and scientists as highly as we would like."

The 2014–15 budget, released in May by the current government, cuts millions of dollars in research funding from government agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), which employs thousands