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South Pole Station

New experiments installed at the South Pole in January

By Jeffrey Donenfeld, South Pole correspondent

Posted February 8, 2013

January is the last full month of the summer field season at the [South Pole Station](#) , so grantees and support personnel were busy finishing projects before operations begin to wind down in February.

A new experiment was installed last month in the station's Cryogenics Lab, which is being repurposed because there is no longer a need for liquid helium to the super cool the sensors used for certain telescopes. [See previous article — [Full of cold air: South Pole Station makes the most of liquid helium supply.](#)]

The installation of the South Pole Lorentz Invariance Test (SPLIT) is being overseen by [Princeton University](#)  post-doc Marc Smiciklas for principal investigator [Michael Romalis](#) .

SPLIT aims to detect violations in Lorentz Symmetry by measuring the spin of individual atoms of neon inside its bell-jar-enclosed co-magnetometer. Lorentz Symmetry is the fundamental symmetry of the standard model of particle physics, as well as general relativity, which describes gravity.

A violation in this symmetry would suggest that there's a new element to physics which falls outside of what the current standard model can predict.

The SPLIT apparatus arrived in January. One of the main tasks involved alignment of the sensitive laser optics. Smiciklas will work with research associate Andrew Vernaza on developing comprehensive maintenance, testing and operating procedures for the winter.

Another new experiment sprung up in January — a new radar was built at the South Pole as part of the [Super Dual Auroral Radar Network \(SuperDARN\)](#) . SuperDARN consists of more than 20 radars that measure the position and velocity of charged particles in the Earth's ionosphere, the highest layer of the Earth's atmosphere. SuperDARN data provides scientists with information regarding the Earth's interaction with the space environment.



Photo Credit: Jeffrey Donenfeld
The SuperDARN experiment at the South Pole.

The SuperDARN site installation team, led by principal investigator [Bill Bristow](#)  from the [University of Alaska Fairbanks](#) , got right to work, erecting the full array of specialized antennae. In addition to the two-row antenna field, located a short distance from the station, a general electronics, power and maintenance structure was set up at the site.

Near the end of the month, the SuperDARN team finished verification and testing of the new radar, and is now prepared for a winter of transmitting.

Work also continued on a number of other ongoing experiments.

Askaryan Radio Array

The [Askaryan Radio Array \(ARA\)](#)  team finished up a productive season with the final deployment and setup of this season's last site, which is part of a proof-of-concept array to detect high-energy neutrinos. Scientists are interested in the subatomic particles to learn about events in the universe like supernova explosions.

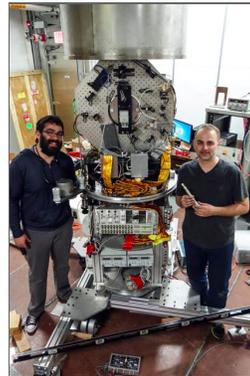


Photo Credit: Jeffrey Donenfeld
South Pole research associate Andrew Vernaza, left, and scientist Marc Smiciklas install the SPLIT experiment in the former Cryogenics Lab.

After the drill team finished drilling the final holes, the ARA deployment team got right to work installing ARA's sensors deep into the ice. After sensors were deployed, data acquisition boxes were installed near the surface of the ice, and connected to the IceCube Laboratory via buried fiber optic cable.



Photo Credit: Jeffrey Donenfeld
ARA team installs cable for the experiment.

South Pole Telescope

January has proven to be a busy and productive month for the [South Pole Telescope](#) and its crew. According to [University of Chicago](#) post-doc Stephen Hoover, he and his team have been working primarily on calibration of the telescope, as well as other final preparations for the upcoming winter season.

In particular, the team spent January collecting "point source" data by looking at the planet Venus. These data are used to assess the shape and other characteristics of the telescope's beam, so that accurate measurements can be made during the winter. So far, the beam has been found to be almost completely Gaussian, or bell-shaped, which is the beam's ideal shape.

The SPT experiment is now looking for signs of inflation, when the universe expanded after the Big Bang, after a five-year project cataloging galaxy clusters in an effort to understand dark energy and other mysteries of the universe.

South Pole Remote Earth Science Observatory

The [South Pole Remote Earth Science Observatory \(SPRESO\)](#) team made a brief appearance at the South Pole to visit the distant SPRESO site. SPRESO, buried in the ice about 8 kilometers away from the station, is a key seismic monitoring station, part of the Global Seismographic Network.

In addition to monitoring seismic activity in the pursuit of earth sciences, SPRESO "also serves as a United States contribution to the International Monitoring System for the nuclear Comprehensive Test Ban Treaty," according to the project description on the web site.

In January, the SPRESO maintenance team completed calibration and testing of key seismic sensors, removed older equipment from the site, as well as installed a few new sensors.



Photo Credit: Jeffrey Donenfeld
Scientists work on the SPUD experiment.

SPUD

The [Small Polarimeter Upgrade for DASI \(SPUD\)](#) team completed a productive season by putting the final touches to prepare the extremely sensitive microwave telescope for winter operation. Like SPT, SPUD is searching the early universe for signs of inflation, which would help confirm that standard cosmological model.

Scientist Abigail Viereggsaid that major upgrades to the sensors took place, including a swap-out of entire focal planes from the five receivers. One of the SPUD receivers was implanted with the refurbished sensor the from now-dismantled [BICEP2](#) telescope. By the end of the month, all five receivers had been closed up, cooled down, and returned to the telescope mount.

In addition to a healthy amount of science progress in January, South Pole also completed a number of station operations and construction projects.

In support of the South Pole's continuing sewage disposal and fresh water requirements, the Rodriguez well (Rodwell) #3 was successfully brought online in January. A bulb of water is melted in the ice sheet to provide the station with a fresh water supply. Meanwhile, Rodwell #2 is being converted to contain the station's sewage outfall.



Photo Credit: Peter Rejcek
Snow drift on the back end of the South Pole Station.

As a result of a bit of differential settling of the ice under the South Pole garage, a routine leveling of the garage support structure took place in January. After inspecting all platform supports, a team led by Josh Miller placed shims underneath the support columns to strategically level the floor that supports the garage structure, walkways and offices.

In order to keep proper airflow passing under the elevated station, which prevents the accumulation of snow under the building, the annual snowscaping took place early in January.

Snowplow operators carefully shaved down the snow berm that had built up in front of the station, providing a smooth downward slope extending from just in front of the ceremonial South Pole all the way under the building. A grid of marker flags was arranged on the berm to measure snow drift and buildup during the winter months.

[South Pole Station Archives](#)



McMurdo Station

McMurdo Station gets in a festive mood for December

By Beth Jennings, McMurdo correspondent

Posted January 12, 2013

December is a festive month all over the world, and [McMurdo Station](#) 🇺🇸 is no exception. The town lacks the frantic pace and commercialism, but it comes to life in its own way for the holiday season.

One of the popular holiday events in town is the Christmas Acoustic Show at the Waste Barn. This show began in 2007 and evolved out of the Zimm Brothers Christmas Show that was previously held at the Coffee House.

The Waste Barn is the central location for sorting and packaging trash on the station, but on this night, the space is transformed into a small club or concert hall, with holiday decor and artwork. Chairs are lined up for the more than 100 people in the audience.



Photo Credit: Peter Rejcek

The annual IceStock festival at McMurdo Station.

Typically, 10 to 12 performers or groups are invited from the community to play. The feel of the event is that of a private party. The music is great but even an off-key note receives equal applause. It's a feeling that you are amongst family when you play in this town.

The other popular musical event of the season is the New Year's Eve outdoor concert, IceStock. The event began in the late afternoon with a chili cook-off and soloists performing on stage. The crowd

slowly formed, as the evening gradually ramped up to full bands that got the crowd moving. There was even a performance by the local dance troupe with a few added extras. Baby New Year was present to help welcome 2013.

Other holiday events included the town Christmas party at the Vehicle Maintenance Facility, complete with Santa and Mrs. Claus on the PistenBully. MAAG, the McMurdo Alternative Art Gallery, always draws local artists and craftsmen to show their works. Every year MAAG also holds an event on stage. This year it was a cabaret show, complete with an illusionist, belly dancer and a burlesque show, amongst other acts.

The McMurdo Community Christmas Choir performed at various events including one at MacOps. MacOps is the radio call sign for the Emergency Management and Station Communication at McMurdo. They run the 24-hour communications center for the station and communicate with the various field camps. On this particular day, MacOps helped to spread holiday cheer around the continent through the high frequency air waves. The South Pole Choir also sang a few songs to some of the field camps.

Each department typically has its own party to celebrate the season. The chapel had Protestant and Catholic services to remind us of the spiritual origin of the season. And, of course, the kitchen served up a feast for the town to enjoy.

[McMurdo Station Archives](#)



Palmer Station

Palmer Station hosts visitors large and small in December

By Sean Bonnette, Palmer correspondent

Posted January 4, 2013

December was full of visitors at [Palmer Station](#) 🇺🇸, from cruise ships and small yachts to humpback and minke whales. The [U.S. Antarctic Program's](#) 🇺🇸 research vessel the [Laurence M. Gould](#) 🇺🇸 also made an appearance.

The month started off with a short, two-day visit from the *Gould*. Aboard the ship was a team that heads the company charged with running the logistics contract for the [National Science Foundation \(NSF\)](#) 🇺🇸, which manages the U.S.

Antarctic Program. Among the group was [Scott Parazynski](#), the chief medical officer and medical director for the contractor organization.

Parazynski is a former [NASA](#) astronaut who flew on five shuttle missions and conducted seven spacewalks, spending more than eight weeks in space and 47 hours outside the vehicle. He also became the first astronaut to successfully climb Mount Everest.



Photo Credit: Sean Bonnette
The NATIONAL GEOGRAPHIC EXPLORER visits Palmer Station.

Shortly after the departure of the *Gould*, Palmer had its first cruise ship visit with the *National Geographic Explorer*. There are only a limited number of such tourist ships that can visit the research station each year. In order to visit, the ship needs to put a request in through the NSF. This keeps station services from being constantly interrupted by a continued stream of visitors.

Cruise ships with less than 200 passengers are able to visit Palmer directly. Station personnel guide the visitors on a walking tour, talking about everything from how fresh water is made to the research under way and recreational opportunities. And, of course, we talk up the famous Palmer brownies that wait in the station dining hall (referred to as the galley), which is turned into a temporary visitor center where guests can interact with station science and support personnel.

If a cruise ship has more than 200 passengers aboard, Palmer personnel will visit the vessel via Zodiac. The passengers are treated to a presentation about the station activities, along with a meet and greet with the station staff and scientists.

The only other cruise ship to visit Palmer during December was the *Le Boreal*. This is part of a special yearly visit when the guests on the cruise donate a gift to the scientists of the [Palmer Long Term Ecological Research \(LTER\)](#) program.

The gift this year was for a Penguin-Cam that will be installed on Torgersen Island. Once the camera is set up, people from around the world will be able to view the Adélie penguin population online. The camera will also allow for scientists to give talks in real-time with classrooms back in the United States and other locations worldwide.

There was also a visit from the ice patrol ship the HMS *Protector*, formerly the MV *Polarbjorn*. The visit from the *Protector* was not just a friendly visit but also an official one. A group from the ship came to station to perform an official [Antarctic Treaty](#) inspection, Palmer's first since the late 1990s. The international team also inspected a visiting yacht. Both the station and the ships passed the inspections.

Shortly after the *Protector* departed station, a ship from the Chilean navy paid an informal, friendly visit. About 30 crewmen came ashore for a tour of the station. The crew left us several gifts, including a book about the Chilean navy, an updated picture of their ship, and several other items from their homeland.

December was also a big month for wildlife. The Adélie eggs on Torgersen have started to hatch, filling the air with chirps from the little chicks. The krill in the waters near Palmer have just exploded, feasting on the phytoplankton blooms.

The abundance of krill has drawn many whales to feed in the area. So far, we have spotted mostly humpback and minke whales. On Christmas day, many of us had an opportunity to observe a pair of humpbacks feeding around Bonaparte Point. The next day, possibly the same two whales were seen feeding just off of the seawater intake pump house, right next to the station.

The holiday celebrations at Palmer were fairly laid back, with a gift exchange and a family style meal. Most people took advantage of the down time to call home and talk to family and friends. It was a quiet and reserved end to a fairly busy month, but it is looking like January will be an even busier month.



Photo Credit: Sean Bonnette
A newly hatched Adélie penguin chick with its parent.



Photo Credit: Sean Bonnette
Humpback whales play near Palmer Station.

[Palmer Station Archives](#)

