

AST/RO ends 11 successful years at Pole

By Steven Profaizer

Sun staff

Some things only get better with age. Others just get replaced.

The latter is the case with the Antarctic Submillimeter Telescope and Remote Observatory, or AST/RO. Scientists are currently dismantling the 1.7-meter radio telescope, after almost 11 years of searching the sky, to make room for its larger and more advanced successor, the 10-meter South Pole Telescope.

"It's a little sad to have it all come to an end," said Antony Stark, who has been with the AST/RO project since its beginnings in the 1990s. "But I am excited about the new possibilities with the 10-meter telescope."

Scientists didn't expect AST/RO, intended simply as a prototype for the new telescope, to have the 11-year lifespan it did.

"We couldn't have the 10-meter without AST/RO," Stark said. "A lot of people didn't believe these types of observations could be done. We were allowed to try it with AST/RO because it is small. It gave us a chance to prove the concept."

The South Pole is an exceptional location for radio telescopes because the cold temperatures prevent view-obstructing water vapor from lingering in the atmosphere.

"Unfortunately, it's not as clear as observing from space would be," Stark said. "But it's much cheaper — at least by 500 times."

AST/RO has completed scanning about 10 square degrees of space, which is about 50 times the area of the moon as it appears from Earth. While this represents only 0.001 percent of the sky visible from the South Pole, it was the most interesting 10 degrees the scientists knew to study with this size telescope, Stark said. Scientists will need much larger telescopes to study most of the other "really interesting" areas in the sky with adequate resolution.

Simply put, space is big. Each of the approximately 8,000 square degrees of sky over the Pole potentially contains huge amounts of information, Stark said.

Most of the telescope's efforts have been focused on star-forming regions near the sun and in the center of the Milky Way Galaxy. Even in its final year, AST/RO continued helping scientists learn more about the inner workings of the galaxy. Researchers used the data collected this winter to examine the black hole in the center of the Milky Way by studying the dense gas encircling it and the forces slowly pulling the entire galaxy toward its dark center.

The group's 2005 winter scientists,



Jacob Kooi / Special to *The Antarctic Sun*



Courtesy of Antony Stark / Special to *The Antarctic Sun*

AST/RO sits below a solar eclipse in February 2000. The telescope is being dismantled this season to make way for its 10-meter successor.

AST/RO is lifted by a crane as scientists prepare the telescope to leave the continent.

Andrea Loehr and Steven Parshley, worked with 2004 winter scientist Nick Tothill to perform observations in collaboration with the Spitzer Space Telescope, the largest infrared telescope ever launched into space, as well as many other instruments observing the star-forming regions near the sun.

The data gathered by the telescope also serves to feed computer models trying to help answer some of the mysteries of the cosmos.

"Models by themselves would spin off into fantasy without being tied to the type of observations we help provide," Stark said.

The telescope will leave the South Pole this season, but it is not clear exactly where it is headed.

Stark would like to find a home where AST/RO could continue its work, but finding the financial backing to pay the annual bill, which runs the better part of a million dollars, may keep that from happening.

There are several other possibilities for AST/RO's future, including becoming a training tool for students or being cannibalized for parts to contribute to other projects.

"The likelihood is that we will have to mothball it," Stark said. "We'll extract the parts that are still useful and junk the rest."

NSF-funded research in this story: Antony Stark, Harvard-Smithsonian Center for Astrophysics, <http://cfa-www.harvard.edu/astro>