

Robotic submarine built for Antarctica expedition

Cheryl Jennings, KGO (San Francisco television), 2-21-11

ALAMEDA -- There is a groundbreaking project underway to explore a place no one has ever seen before. In Alameda, a robotic submarine is being built that will dive into the water beneath the ice of Antarctica. This unique expedition will venture into one of the last unexplored frontiers on the planet.

"It's sort of like going to the moon and it's somewhere where nobody has been," said Ross Powell, Ph.D.

Powell, from Northern Illinois University, will be using this one-of-a-kind robotic submarine on a mission to Antarctica to find out how fast the ice sheet is being melted by the ocean underneath and what's causing it to happen.

"If the ice is flowing faster into the ocean, then it can lose mass more and raise sea levels faster," said Powell.

The sub-ice rover, or "SIR" for short, is being built by D.O.E.R. Marine in Alameda. Powell, Dr. Reed Scherer, and their team will use the SIR to study the glacier ice where it meets sea water, under the floating Ross Ice Shelf. They suspect the ice is melting from underneath.

"It is the warming atmosphere that is warming the ocean, so it is the transfer of the heat that is in the atmosphere into the oceans," said Powell.

Scientists don't know exactly how fast the ice sheets are melting. So, Powell wanted to find out by sending a remote controlled submarine, packed with instruments and high definition cameras, around 2,500 feet under the ice. But, a sub like that didn't exist, until now.

"The engineers are extremely excited about it, it's a real challenge for them and it's really been about three years in the making so far," said Liz Taylor, president of D.O.E.R. Marine.

It's 28 feet long, less than two feet in diameter and weighs 2,200 pounds. It will be sent down a 30 inch wide ice borehole into the ocean.

"When it enters the water below, it has to unfold into the flight mode and be able to go around and the measurements, video and get all the data set back to the surface," said Taylor.

"This is where all of the fiber optic cables come out and go up to the surface to transfer all the data," said Powell.

Getting the SIR through nearly half a mile of glacial ice is another engineering feat. It requires a specially built, giant hot water drill.

"What we do is gather the snow that's around, put it into this big melter and put it through steam heaters and create very hot water and then we run it through it through some pumps, and then put it down with a rubber hose," said Powell.

It will take three days to make a hole for the SIR; it will be under the ice for around 10 days, sending back information in real time. But before the sub ice rover goes to Antarctica, it will be tested in Lake Tahoe.

The mini underwater robot, with a high definition camera, is going to keep an eye on the 28-foot-long SIR machine as it does the work in Lake Tahoe in water that's too deep and too dangerous for divers.

"This will give us a whole new picture because this is the first time we actually get high definition video

footage to see what we're doing," said Gordon Seitz Ph.D., from the California Geological Survey.

Seitz is an engineering geologist with the state of California. He and his team hope the SIR will show them whether earthquake fault lines connect at Lake Tahoe, to help predict the magnitudes of quakes, for public safety.

Powell says the sub ice rover's work in Antarctica could also provide life-saving data about climate change.

"I've got two kids and I'm really concerned about what we're creating for them to deal with in the future," said Powell.

Funding for this project comes from the National Science Foundation and we'll be following its progress.