Searching for Life with Icefin, Georgia Tech and Linden's STFOC

The search for life on other planets starts on earth, of course. In the summer of 2014 a team of scientists from Georgia Institute of technology headed to Antarctica to deploy Icefin – a 10 foot long, 12" diameter, 220 lbs. first of its kind ROV – deep beneath the ice shelf. This mission, funded by NASA and supported by the National Science Foundation was intended to prepare for potential future missions on Jupiter's moon, Europa.

Europa has an outer ice shell, a rocky interior and a subsurface ocean in between. The best chance for life to exist in our Solar System may be here in this remote ocean encapsulated by ice.

Deployment of Icefin with Linden Tether

This research may someday help us learn about life on other planets, but even today it is helping us learn about life in remote places here on earth. What is unique about this vehicle is that it is "a hybrid between the really small probes and the ocean-going vessels, and we can deploy it through bore holes on Antarctica," said Britney Schmidt, an assistant professor in the School of Earth and Atmospheric Sciences at the Georgia Tech, and the principle investigator for the Icefin project.

"What truly separates Icefin from some of the other vehicles is that it's fairly slender, yet still has all of the sensors that the scientists like Britney need," Principal Research Engineer, Mick West said. "Our vehicle has instrumentation aboard both for navigation and ocean science that other vehicles do not." Most vehicles that have explored this area are either small vehicles with a camera only, or very large vehicles that cannot be launched from a bore hole. Icefin fills the gap between these two kinds of

vehicles: able to be deployed easily by small teams in any environment, yet still able to record oceanographic information traditionally done by much larger vehicles.

To tether this vehicle to the surface the team replied on a Linden Photonics 3.5mm STFOC tether. Linden's STFOC tether is used for communication, data retrieval, and emergency recovery purposes. The team had to design for a number of challenges associated with deploying Icefin in such an extreme environment. For example, standard electronics systems are not typically rated to the extreme temperatures found under the Ross Ice Shelf.

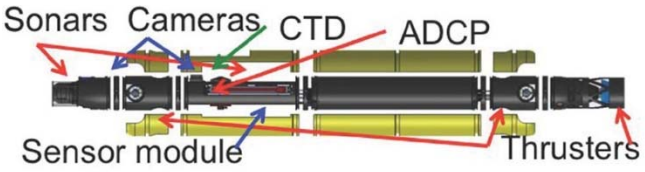

Illustration of the Icefin vehicle's modular design

The Southern Ocean can be as deep as 5,000 meters. Icefin is capable of diving 1,500 meters and can perform three-kilometer-long surveys. Previous vehicles in Icefin's class were rated to a few hundred meters.

"We saw evidence of a complex community on the sea floor that has never been observed before, and unprecedented detail on the ice-ocean interface that hasn't been achieved before," Schmidt said.

Icefin is planned to make its Arctic debut in summer 2016, with a return to Antarctica that fall. And maybe one day 356 million miles away on a moon of Jupiter.

Videos from the mission:
https://www.youtube.com/watch?v=yqtxDb5VUZ4
https://www.youtube.com/watch?v=RHwLMfYfUh8

For more information on Georgia Tech visit http://www.gatech.edu/

For more information on Linden Photonics visit http://www.lindenphotonics.com/