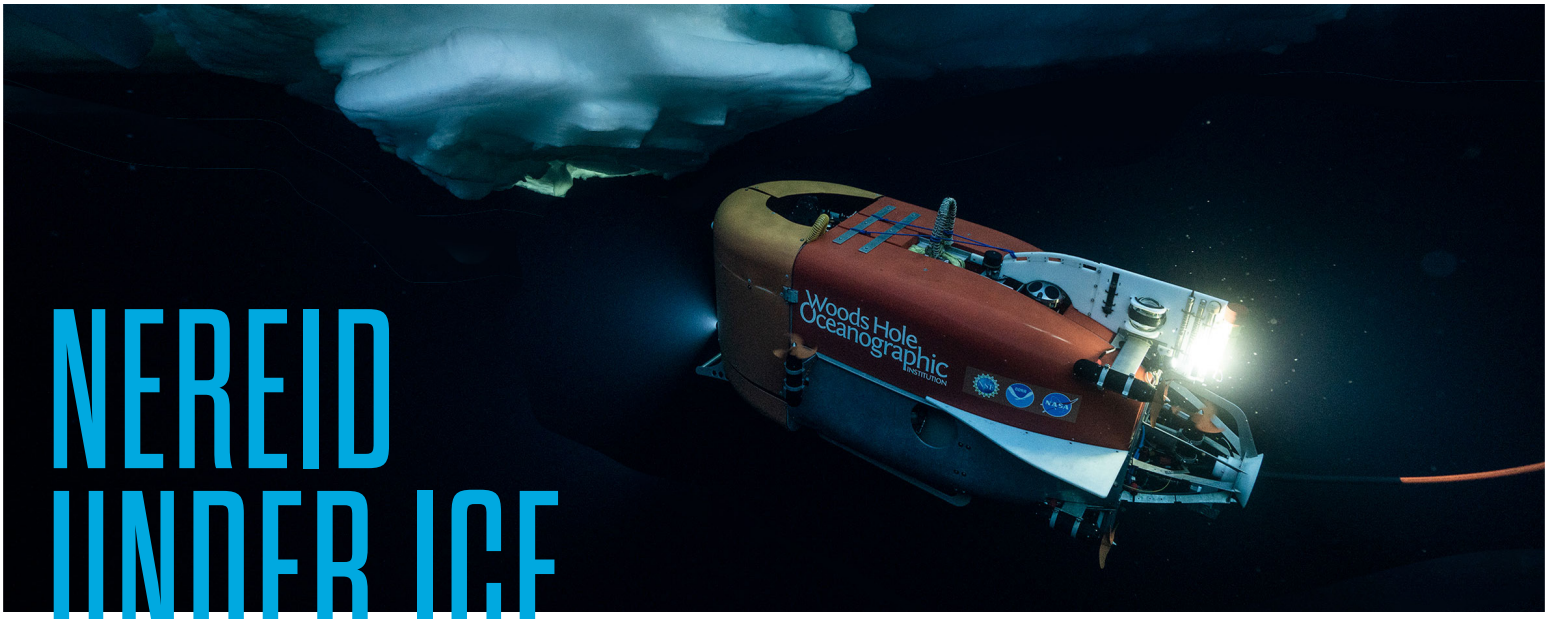

NEREID UNDER ICE

WHAT IS NEREID UNDER ICE?

Nereid Under Ice (*NUI*), is a hybrid remotely operated vehicle (HROV) designed and built at WHOI to explore the harsh and rapidly changing environment under sea ice.

NUI is operated by pilots aboard a surface ship or can navigate on its own. It relays environmental data in real time, including high-definition imagery of what the vehicle sees as it explores, maps, and gathers data. This view allows scientists to direct the vehicle's path and collect data of interest based on their visual feedback.

A key piece of enabling technology is the lightweight, thin fiber-optic tether—similar in diameter to a human hair. This permits the vehicle to travel farther from the ship than a conventional tether would allow. The vehicle can explore heavier ice cover away from the ship or move closer to the calving front of a glacier while still remaining under direct human control. If the tether breaks or becomes entangled, *NUI* is designed to operate as a free-swimming, autonomous vehicle and will return to the ship.

WHY IS EXPLORING UNDER ICE IMPORTANT?

Over the past 30 years, the poles have warmed more than any other region on Earth. As sea ice and shelf ice continue to thin and melt, understanding the rapid changes going on in this sensitive part of the world and its ecosystems becomes even more crucial.

The under-ice environment is home to a unique ecosystem of plants and animals that forms a critical link in the polar food web. The hidden, underwater topography of ice is a difficult variable to measure but informs the efforts of climate modelers to forecast the future of the Arctic and Antarctic, as well as the changes in store for places closer to home.

HOW DO WHOI SCIENTISTS USE NUI?

NUI is built to travel up to 40 kilometers (25 miles) laterally underwater, rather than the few hundred feet of a typical ROV, while still receiving control signals and transmitting data, including high-definition video, back to operators located on a ship. In addition, it also carries a full suite of acoustic, chemical, and biological sensors for investigating the underwater environment, as well as a seven-function electro-hydraulic manipulator arm. The vehicle is rated to dive 5,000 meters (~16,400 feet) beneath the surface to sample or survey the mid-water or sea floor.

While *NUI* was designed specifically to work beneath the ice, the vehicle has also explored other underwater environments, such as Kolumbo Volcano, an active submarine volcano off Greece's famed Santorini island. On that expedition, *NUI* made history by taking the first known automated sample performed by a robotic arm in the ocean.

LEARN MORE:
go.whoi.edu/nui

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