ASTEP Astrobiology Science and Technology Experiment Program



SeaBED, the prototype for JAGUAR, entering the water (Photgraph by Mike Naylor, SSL)



Arctic Ocean (Courtesy WHOI)



JAGUAR undersea vehicle with arm (Model by Stephen Roderick, SSL)



Tube worms are one life form that may live on the Gakkel Ridge (Courtesy of WHOI)

Under funding from NASA, the University of Maryland's Space Systems Lab is working closely with the Woods Hole Oceanographic Institute (WHOI) to develop a submersible capable of autonomously collecting samples from the floor of the Arctic Ocean. The SSL is developing a manipulator arm which will be mounted on WHOI's JAGUAR submersible vehicle. The autonomous undersea vehicle will then descend 5,000 meters to search for hydrothermal vent fields on the Gakkel Ridge, and sample biological organisms from communities that derive energy from chemosynthesis of vent fluids - all without any direct human interaction.

This will be the first mission ever to obtain biological samples autonomously, and the first to return biological samples from the Arctic sea floor. Genetic analyses of the returned samples will help biologists understand how chemosynthetic communities evolve in an isolated ocean basin, and may provide clues to what life might look like elsewhere in the Solar System

Performing a mission of this complexity without human interaction will be necessary for exploration of the icy moons of the outer Solar System such as Europa. The lessons learned from this project will help in making such robotic exploration possible.

