Foundation for Underwater Research and Education

For Immediate Release

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ENGINEERING WORKSHOP CONDUCTED FOR INTERNATIONAL SUBMARINE RACES TEAMS

BETHESDA, MD. Oct. 18, 2004 -- More than 60 participants attended a two-day workshop held October 1- 2 at the Naval Surface Warfare Center, Carderock Division, organized by the Foundation for Underwater Research and Education. The workshop provided guidance for teams and individuals interested in participating in the 8th running of the International Submarine Races to be held here June 27 – July 1, 2005.

Capt. Charles Behrle, USN, Division Commander, said he was pleased to be able to host and support the educational and engineering training program. Some 50 universities, colleges, high schools and individual organizations have expressed interest in participating in the 2005 ISR 8 competition. Officials have encouraged potential submarine contestants to learn from the experience of past competitors.

Aspects of propeller design were a major focus of the Carderock site seminar. Dr. Patrick K. Poole, former Naval Academy and Draper Laboratory expert, reviewed the issues of thrust, shape, horsepower-to-shape ratios, loading and hydrodynamics of propellers for human-powered submarines. He noted that in the first ISR race, held at Singer Island, Florida in 1989, many of the teams made propellers out of plywood. Today, with computer-aided design and manufacture, the fastest subs have variable pitch props made of stainless steel, aluminum or other specialty metals. Dr. Poole designed many of the props used in previous races, including the winning Naval Academy entry in 1989.

Various approaches to building a submarine, and hull construction techniques were described during the workshop. Despite the attractiveness of various composite materials, fiberglass and plexiglass remain popular. Also discussed was the turbulence caused by various external appendages, including the pilot's viewing plate and rudders. The methods of achieving neutral buoyancy and the effectiveness of different types of dive planes also were reviewed.

Participants in the workshop learned how human performance can be adversely affected by both the pressure and availability of air and the resistance of air both on the intake and exhaust cycles of breathing on scuba equipment. Buoyancy and trim challenges for the human-powered submarine also were discussed by previous contestant and former NSWC employee David Larrabee. "Without proper buoyancy, even a fast sub will go off course or be unmanageable, and adjustments can't be made underwater," Larrabee said.

ISR Race Operations Director Jerry Rovner urged teams to make maximum advance preparation and arrive ready to get in the water to compete. Contestant Liaison and Head Judge Claude Brancart advised teams to follow the directions in the Contestant Rules and Guidelines to be in compliance with ISR organization and Carderock regulations. The teams were shown videos of previous subraces. Following the tutorials, the participants were given a tour of the model basin and their "pit" staging area by the Chief NSWC Liaison Daniel Dozier.

The workshop was sponsored by the Foundation for Underwater Research and Education headed by Nancy R. Hussey. FURE, together with the ISR Organization, manages the design competition at Carderock and is run entirely by volunteers, including senior Navy personnel, individuals from major corporations, research centers and other interested organizations. ISR major sponsors are the IEEE Oceanic Engineering Society and the Electric Boat Corp.

The International Submarine Races challenge students to compete against the clock in one-and two-person human-powered submersibles. The first ever human-powered submarine races were sponsored by the ISR in 1989; this and the next two events were held in the ocean in Florida. Since 1995, all ISR submarine races have been staged at the David Taylor Model Basin, the Navy's premier hydrodynamic research facility.