

## **A NASA *Micro-g Neutral Buoyancy Experiment Design Team Project***

### Students for the Exploration and Development of Space

Thermal Ice Sample Collector (TISC) is a small-diameter thermal boring device capable of retrieving ice samples while completely submerged in conductive fluids. Capable of retrieving and storing up to three 0.5" diameter x 3" long cylindrical samples, the device utilizes several interchangeable parts, and is capable of being welded using a wide range of attachment methods. When activated, TISC will extend one of its sample tubes forward to the surface of the ice, activate the thermal cutting head, and continue to extend the sample tube until it has reached the end of its stroke. Once boring is completed, the device will vibrate to sever the sample's connection to the ice, and the tube (with sample) will retract back into the housing. Once retracted, a spring-loaded cap will seal the sample inside. TISC will fit into a modular cylindrical instrument bay on a submersible "rover" provided by NASA with approximately 10 lbf of buoyancy. The rover will provide power at 12V and 25A and the means to position the device flush against the ice. Command of the device is possible through a designated 2-pin, 5V digital command link that interfaces with existing controllers.

We will describe our experience designing and building our TISC, and then testing it in the simulated microgravity environment of Johnson Space Center's Neutral Buoyancy Laboratory as part of NASA's Micro-g NExT undergraduate challenge.