

MECHANICAL ENGINEERING

**TEAM:** ME 16

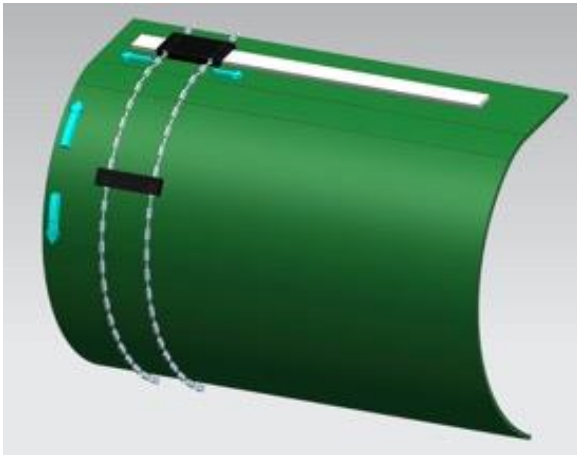
**SPONSOR:** Electric Boat

**ADVISOR:** Professor Chengyu Cao

*From Left: Aidan Boyce, Nick Alzamora, Jesse DeLuca, Professor Cao*

## Cylindrical Positioning System

**GENERAL DYNAMICS**  
Electric Boat



In order to analyze cylindrical objects with any type of sensor, Electric Boat has to spend lots of resources and time using a process that is inefficient and time consuming. These cylinders are a fixed radius of about 17 feet. The solution is a portable, automated system that is placed on the cylinder before analysis to move a sensor along the 3 feet of the cylinder at a time.

Our design is divided into three parts: the track, the rib and the sensor box. The track sits on top of the cylinder and moves across the top of the cylinder. It is made up of two sliders that only slide along this axis. These sliders are both controlled by belts attached to the same motor so they move simultaneously. The rib is attached to these sliders by a connector that allows the user to attach or detach rib sections. The rib goes off the side of the track perpendicularly and down the side of the cylinder that is to be analyzed. The rib is curved to fit the cylinder. Our rib is made out of Aluminum 2052-O allowing the rib to be lightweight, easily machined, and rust-resistant. Eight rib sections together weigh less than 100lbs, allowing the track to remain on the top of the cylinder without the track slipping off the top of the cylinder.



The sensor box is attached to the rib and slides down the rib on 4 wheels. A chain powered by an electric motor and spool moves the sensor box. This motor is also on the track. The box is waterproof, and fits an 8" by 11" by 6" sensor. Both motors are controlled via radio signals, and can be controlled from up to 500 feet away. The positioning system can move the sensor accurately in steps of 1" in both the circumferential axis and along the length of the cylinder.

