

# A Capstone Project on Robust Dynamic Positioning and Data Acquisition Systems

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The overall goal of the Robust Dynamic Positioning and Data Acquisition System project was to prototype a dynamic positioning system similar to the ones on buoy tenders in the fleet. The primary objective was to maintain a desired heading and position within a certain range. The secondary objectives included robust capabilities (the ability to continue functioning despite motor failures) and data acquisition (to analyze system performance post-testing).

Students built a vessel from scratch out of a salvage drum and an inner tube for buoyancy. The internal construction consists of three tiers containing batteries at the lowest level, an onboard computer at the second level, and control hardware at the top level (micro controllers, H-bridges, and fuse boxes). Students successfully used a light detection and ranging (LIDAR) device to determine the relative position to two stationary poles. They were able to communicate with the onboard computer via either a wired connection or a remote desktop connection through an ad-hoc wireless network. All programming for this project was done in MATLAB(r). Students have completed all project milestones through the application of past courses they have taken in computer control systems, network communication, and digital signal processing at the U.S. Coast Guard Academy.