

ME4823: Cooperative Control of Multiple Marine Autonomous Vehicles 2016 / 4 (Summer)



Next generation autonomous systems will be working together in heterogeneous teams to effectively accomplish their goals. For example, ONR has demonstrated teams of unmanned surface vehicles (USVs) for force protection and maritime security. Similarly, this summer NPS will demonstrate 50-on-50 swarm aerial combat. The CONOPS for programs such as the large diameter unmanned underwater vehicle (LDUUV) and single sortie detect to engage (SS-DTE) call for long-duration, unattended missions with multiple vehicle collaboration.

In this course you will learn how to coordinate the actions of multiple unmanned vehicles working towards these types of mission goals. We will cover the basics of mobile robot control, navigation, planning and search techniques in the context of multi-robot applications.

Approach:

This course is organized around a hands-on project which emulates the SS-DTE mission using a team of unmanned ground vehicles (UGVs). Over the quarter you will learn multi-robot algorithmic methods by deploying the algorithms on real hardware. To support this implementation, the course will introduce a variety of foundational robotics tools including the following:

- Linux computing environment
- Robotic operating system (ROS)
- MATLAB Robotics Toolkit

Prerequisites:

ME3801 or permission of instructor.

Disclaimer:

A majority of the course activities will be done in software: MATLAB and ROS. You are not expected to have any prior knowledge, other than experience with MATLAB; however, you will need to be willing to learn how to use a number of new software tools necessary to develop robot teams.

Contact:

Professor Brian Bingham <bsbingha@nps.edu>