

DRAPER

Summer 2018 Projects

Projects located in Cambridge, MA:

Project A (Visualize UAV Data): A Graphic User Interface (GUI) is a platform that users can interact with in order to engage with electronic devices through graphical icons and visual indicators, instead of text-based user interfaces, typed command lines or text navigation. In order to develop and demonstrate navigation software for Unmanned Aerial Vehicles (UAV), a GUI is necessary. For this project, a team of students will have the opportunity to work with a Snapdragon Flight UAV and develop a GUI for visualizing the UAV's navigation software, for both development and demonstrations. Familiarity with and interest in visual design, using Linux systems, MATLAB or Robot Operating Systems (ROS) are a plus.

Project B (Simulation of Novel Space Systems): Miniaturized satellites have reduced the costs associated with satellite construction and launch and created new opportunities in space. In order to survey a space-based target vehicle for condition and its location, extremely small femto-satellites can be employed. For this project, a team of students will investigate novel approaches to space systems that will service satellites, including uncooperative disabled target satellites, using femto-satellites. This will be in collaboration with work conducted by US Naval Academy interns, who will mentor the students in system simulation design. Geometry and Algebra II are required, and Trigonometry/Pre-calculus and Physics coursework are preferred. Some programming experience (MATLAB, Python, or C/C++) is desired but not necessary.

Project C (Sea Condition Buoy): Ocean buoys are instruments used to collect various metrics about ocean conditions, such as water temperature and aspects of the waves they encounter. For this project, a team of students will aim to create a small and affordable buoy that can detect environmental conditions including water temperature, current direction, and wave and swell height. Students should have a familiarity with Physics coursework, and readily be able to employ critical thinking skills. Some programming experience (MATLAB, Python, or C/C++) is desired but not necessary.

Projects located in Reston, VA:

Project D (Turtlebot Test Platform): Turtlebot is a commercial off-the-shelf (COTS) ground robotics platform which consists of a mobile base, a 3D depth camera, and an onboard computer running open-source software known as the Robot Operating Systems (ROS). ROS is an open-source set of software libraries and tools that have been used to build robotics applications and offers a variety of packages for communication, control, and autonomous operation of the Turtlebot platform. For this project, a team of students will build a mature and reliable Turtlebot platform to gather

data and test augmented reality tools, such as the Microsoft HoloLens, for more intuitive and capable human-robot interaction. Students will have the opportunity to demonstrate the performance of the platform by designing scenarios where the Turtlebot must navigate through an environment with unexpected obstacles to a user commanded position. Some programming experience (Python or C/C++) is helpful but not necessary. Familiarity with and interest in ROS and using Linux systems are a plus.