

MIT UAV Team

Email: mit-uav-core@mit.edu

Website: <http://mit.edu/uav>

Address: 256 Massachusetts Avenue, Cambridge, MA 02139

Dear Potential Sponsor:

The MIT Unmanned Aerial Vehicle (UAV) Team formed in fall of 2012 as a means for UAV enthusiasts in the community to come together and acquire the skills needed to develop aerial robots. Our founding members were passionate about learning the basics of UAVs and tackling the challenges that UAVs face today. We are currently a group of around twenty five students, from all different disciplines, backgrounds and levels of experience.



The MIT UAV Team has evolved significantly through these past semesters, taking on several challenges:

- UDB3 controller board development: our first project, which involved programming a flight controller from scratch, and interfacing it with an RC transmitter.
- SkyCall: a project to lead tourists with a UAV.
- MIT Prime: a project to deliver packages from dorm to dorm using UAVs.

- TechFair: a project to display and fly company logos at a tech expo on MIT's campus.
- World Urban Forum: a project to explore applicability of UAVs in disaster relief.

This year, the MIT UAV Team will be entering the International Aerial Robotics Competition (IARC), which is the longest running collegiate aerial robotics challenge in the world. The competition is designed to push the current boundaries of autonomous navigation and challenge teams to be part of the development of new technologies.

The IARC's seventh mission, which began in 2013, is to use a UAV to herd autonomous ground robots to one side of an arena in a GPS-denied environment. The ground robots (autonomous Roombas) drive in a random pattern around the field, and change direction upon contact with the UAV. As a way to increase the randomization of the Roombas' paths, additional Roombas with tall poles attached to their tops, circle the field in a fixed path. If the UAV contacts one of the fixed path Roombas, the team is disqualified.

The team has divided into five subgroups:

- Hardware, which designs and builds the UAVs
- Communications, which sends data packets between the UAV to the ground control station and back
- Computer Vision, which interprets a video stream to locate the UAV in relation to the ground robots and the field
- Bayesian Model, which inputs the computer vision data in a constantly updating model that contains the roomba locations and their predicted paths
- AI/Algorithms, which analyzes the bayesian model and plans a course for the UAV to maximize roomba activation.

Each group is led by one of the core team members, and meets two-three times a week to work together.

The IARC will challenge our team to find a creative and robust solution for this difficult competition of herding other autonomous vehicles, and we hope you can help us in our task. If you would like to learn more about the team or become a sponsor, please contact us at mit-uav-core@mit.edu. We'd love to hear from you and talk further.

Sincerely,
MIT UAV Core Team