Thomas Jefferson Unmanned Aerial Vehicle Team

Sponsorship Packet 2019 - 2020

Table of Contents

The Team 3

The Competition 4

First Year Accomplishments 4

Expenses 5

Why Contribute & Sponsorship Benefits 5

Contact Us 6

The Team

The Thomas Jefferson Unmanned Aerial Vehicle (TJUAV) Team seeks to teach students about the basics of aeronautical design, flight, and programming. Students learn basic aviation, aircraft construction, electrical engineering, and computer science through several side projects such as individual construction of radio controlled (RC) planes and lectures by team leads. We work with Unmanned Aerial Systems (UAS) such as fixed wing and multirotor aircraft, flight computers, computer vision, and other technologies to achieve autonomous flight, respond to ground station commands, and detect objects. The UAV Team brings the daunting field of drones and autonomous flight to students in a fun and engaging manner.

Subteams

The TJ UAV team is split into two main subteams: Mechanical and Programming.

Mechanical

The Mechanical subteam is further broken down into the Airframe, Electrical, and Unmanned Ground Vehicle (UGV) divisions.

- Airframe:
    - The airframe team evaluates mission requirements to design and build an airframe, or makes airframe modifications to best meet competition requirements.
- Electrical:
    - The electronics team finds electronic components which they deem necessary to ensure mission success and assembles the UAS circuitry and communications systems. This job is crucial as the electronics must be safe for use by all team members while being highly functional.
- Unmanned Ground Vehicle (UGV)
    - The UGV team designs and builds the UGV drop, descent, and delivery system. This system is the key between aerial and ground interactions in a real-life scenario, in which the UGV will be able to perform various tasks and operate sensory systems once deployed.

Programming

The Programming subteam is further broken down into the Autopilot, Communications, and Imaging divisions.

- Autopilot - programs and tests a system that can fly the aircraft without the need for human intervention
- Communications - designs and programs a method to wirelessly relay data between the ground station and the aircraft
- Imaging - programs an algorithm to capture images in-flight, parse them, and return useful information to the ground station

The Competition

Our main focus is the Association for Unmanned Vehicle Systems International Student Unmanned Aerial Systems (AUVSI SUAS) competition, an international competition with around 75 teams competing in recent years. The competition is held at the Naval Air Station in Patuxent River, Maryland. The mission of the competition is to simulate a search and rescue situation, with target recognition and classification, payload drop and accuracy, and GPS waypoints as major goals. The scoring is divided into three sections:

- 20% is the Technical Paper, where teams provide a technical overview of their system design
- 20% Flight Readiness Review Video, where teams display their system's capability
- 60% is the Mission Demonstration, where teams take their UAS and attempt to achieve the main goals of the competition

First Year Accomplishments

Out of the 75 teams competing at the 2019 AUVSI Competition, TJUAV placed 23rd overall and 18th in Mission Demonstration. The team achieved about 20 minutes of autonomous flight at the competition.

Expenses

Registration
$1,500 AUVSI SUAS Registration

Materials

$2,500	Structural Components (carbon fiber, fiberglass, plastic, etc.)
$1,500	Avionics and Propulsion Hardware (motors and servos)
$1,500	Radios, Telemetry, and Ground Station Hardware
$1,000	Batteries
$1,000	Imaging system
$600-800	Computing hardware

Total Projected Expenses: $9,000

Why Contribute & Sponsorship Benefits

By contributing, you will

- Help provide necessary funds for an elaborate UAS in the future
- Promote the learning of 30+ high school students and the greater community
    - Thomas Jefferson Techstravaganza: Outreach program hosted by Thomas Jefferson High School for elementary and middle school children, we will be hosting a booth at the event to demonstrate the use of RC aircraft and allow children to try them out

Upon any donation, sponsors will receive

- Decal of your logo on our plane
- Your logo on our team shirt
- Your logo on our website
- A thank-you letter detailing what the donated money was used to purchase

Contact Us

Email Address: tjhsstuav@gmail.com
Mailing Address: 6560 Braddock Rd, Alexandria, VA 22312