

BACKGROUND

The origins of the project can be traced back to a defunct DARPA (Defense Advanced Research Projects Agency) competition wherein participants were required to design and implement a portable UAV that would fly a designated mission profile for under \$10,000. The competition was shuttered after none of the competing teams were able to fully meet requirements. UAV Forge was then later restarted as a senior design project here at UCI as a continuation of efforts to develop an aerial system that could satisfy all competition requirements.

OVERVIEW

UAV Forge is a research project dedicated toward the design, fabrication, and testing of unmanned aerial vehicles (UAV) in addition to developing the software required to operate them. The primary application for these UAVs is to provide surveillance / reconnaissance capability to frontline users in a law enforcement or military context without endangering personnel.

OBJECTIVE

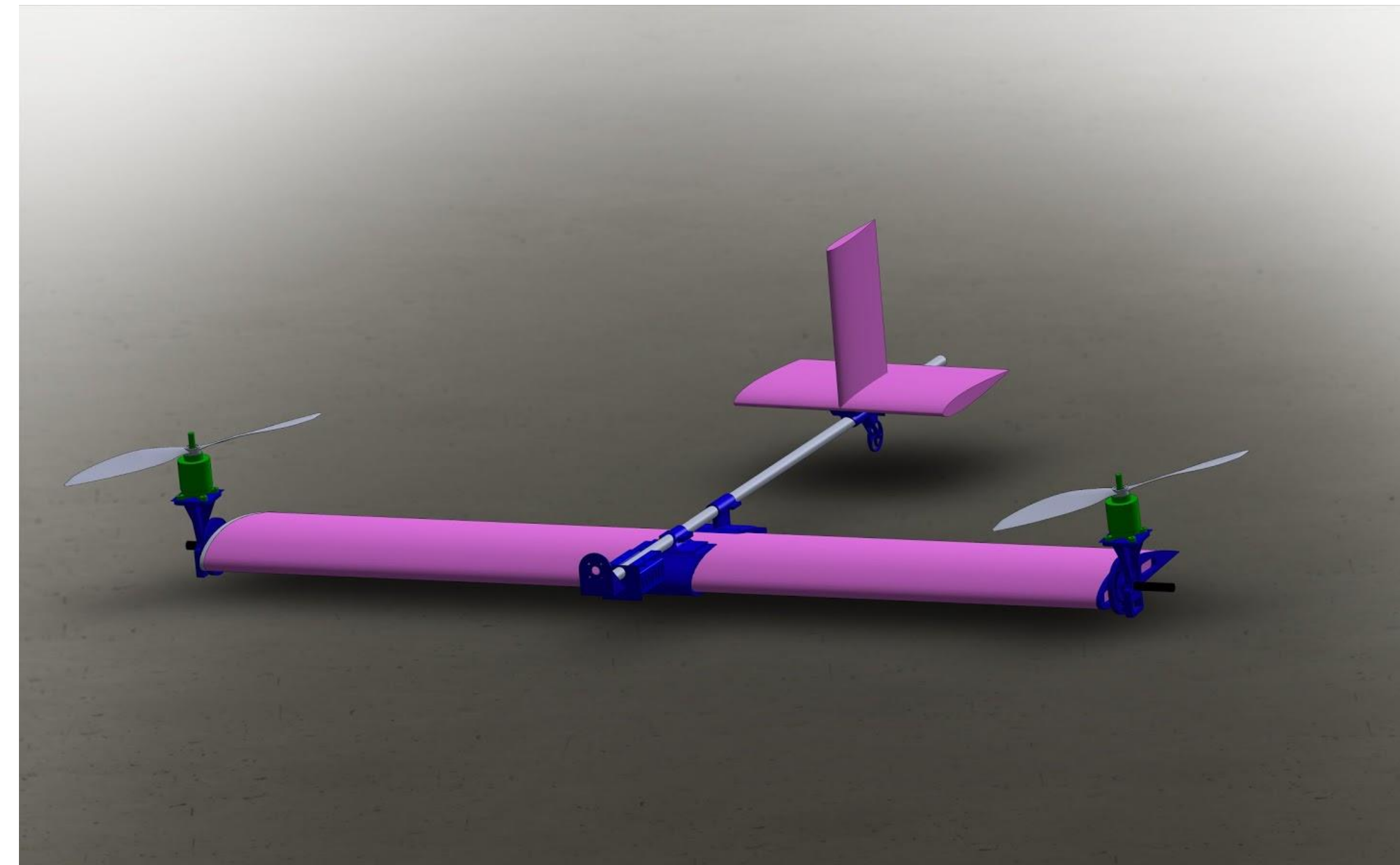
Our objective is simple: create a flight vehicle system that will adequately satisfy the DARPA competition requirements.

REQUIREMENTS

The project requirements closely mirror the original DARPA competition specifications. As such, major requirements include:

- VTOL (Vertical Take-Off / Landing) capability
- Autonomous waypoint navigation
- Obstacle avoidance mechanism
- Observation system (Real-time video or photograph transmission)
- 2.0 mile range
- Vehicle control user interface

INNOVATION



In order to best satisfy the range and VTOL requirements, we have settled upon a tiltrotor configuration for our flight vehicle. This presents unique aeromechanical challenges such as control system synthesis, tilt mechanism design, and CG placement.

PROGRESS

Experimental Flight Platforms



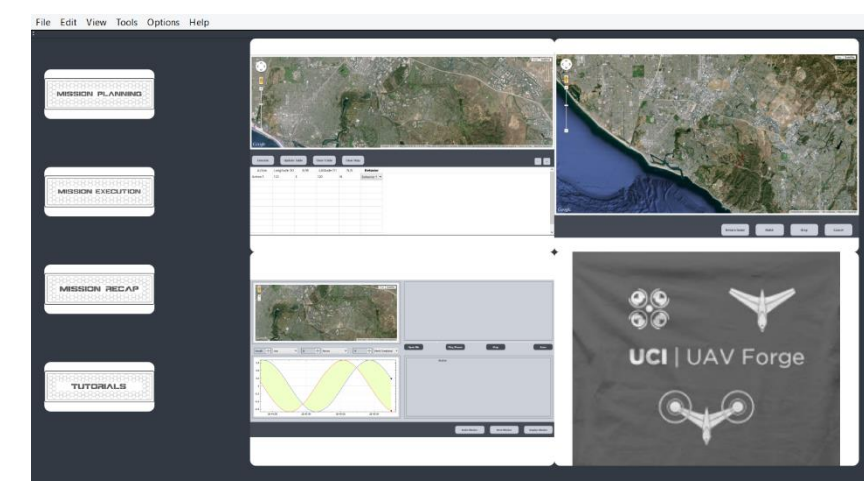
Quadcopter



Fixed-Wing Plane



Quadcopter-Tilt Hybrid



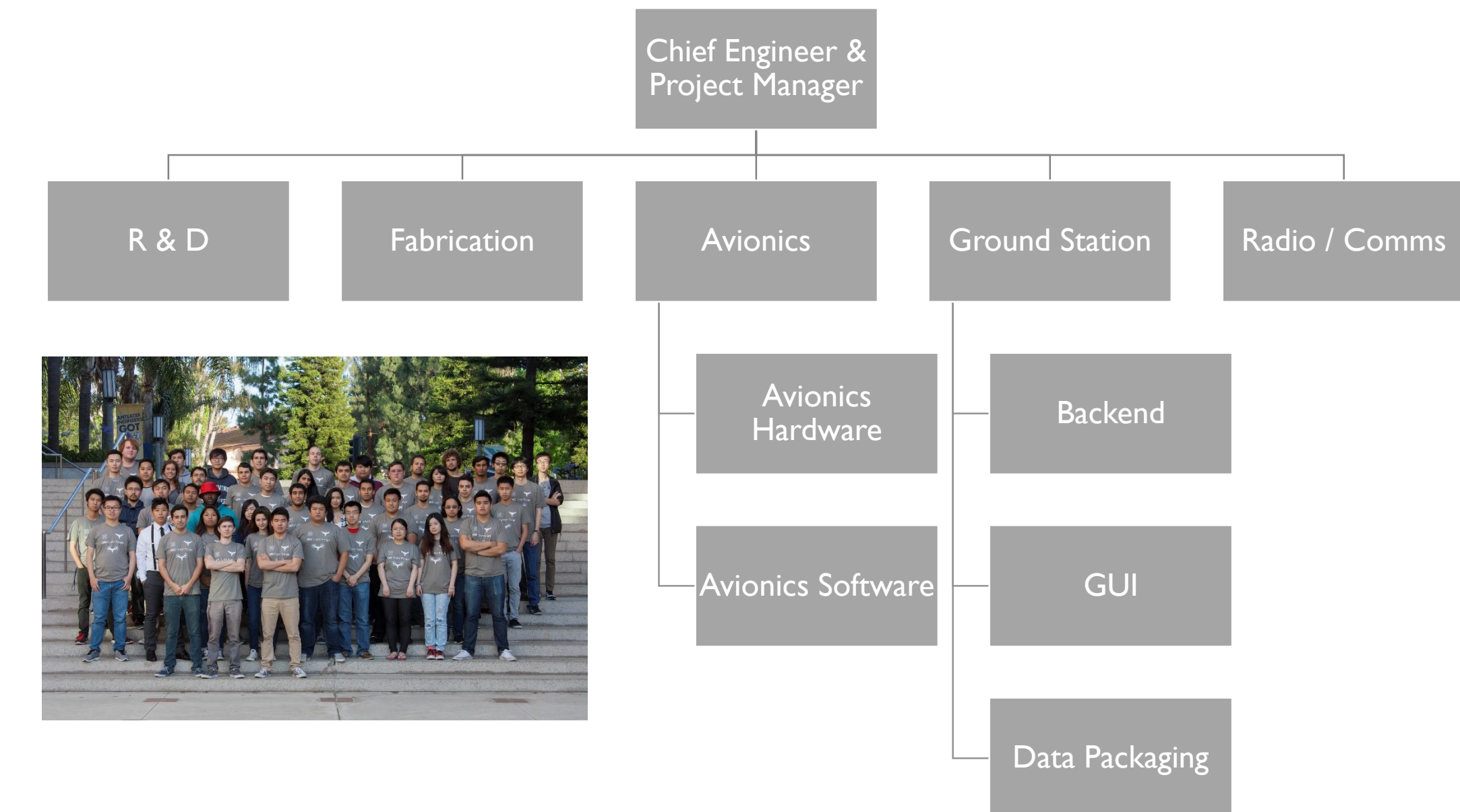
Ground Station Software

In the past year, our Ground Station team has implemented mission planning interface featuring:

- Waypoint planning
- Google maps integration
- Post-mission telemetry analysis

PROJECT DETAILS

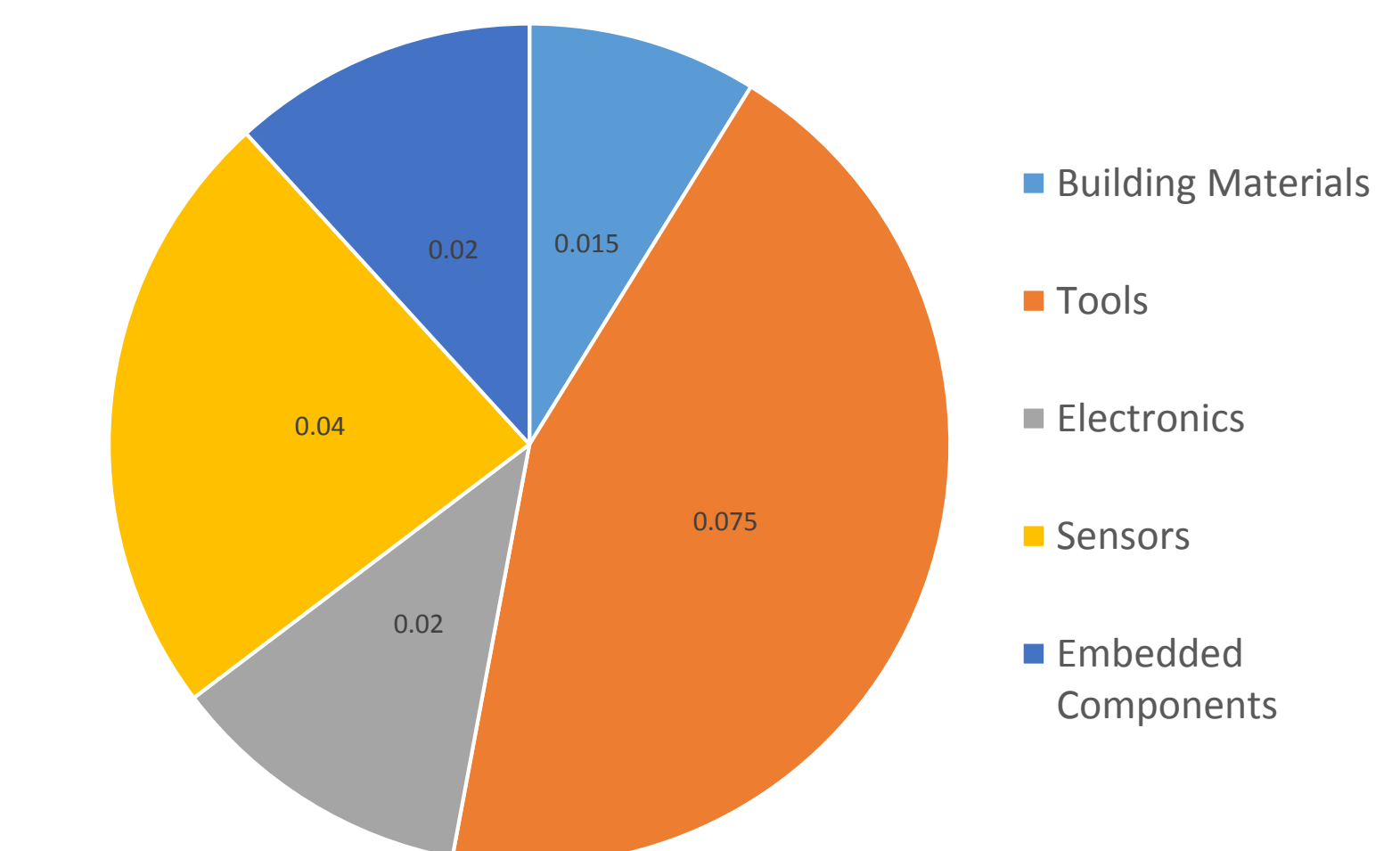
Structure



Timeline

Time Frame	Milestone
December 2015	<ul style="list-style-type: none"> • Tiltrotor design completion • Ground Station / UAV link establishment • Sledgehammer v2 fabrication
January 2016	<ul style="list-style-type: none"> • AHRS implementation • Mesh network continuation
February 2016	<ul style="list-style-type: none"> • Initial autonomous flight test
March 2016	<ul style="list-style-type: none"> • Tiltrotor fabrication completion

Expenditures



CONTACT INFORMATION

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