UAV Forge: Innovation for Personal Autonomous Systems

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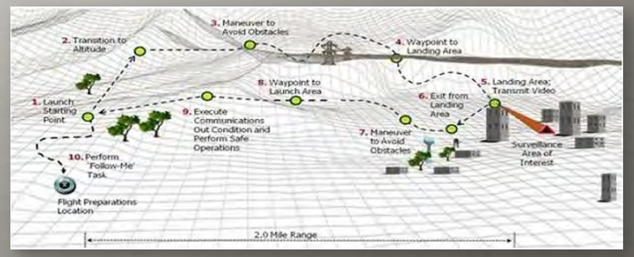
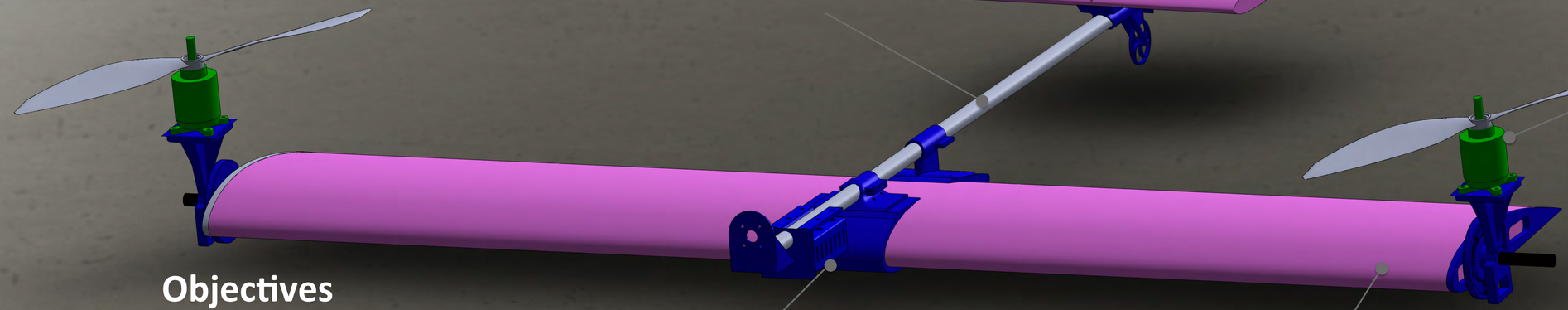
Background and Goal

To create personal autonomous systems starting with DARPA's UAV Forge goal. Unmanned Arial Vehicles (UAVs) are created to perform autonomous mission behavior like obstacle avoidance, mission task determination, etc. with the goal of a general purpose system for autonomy in the future.



Innovation

We are focusing on creating new technology in the fields of autonomy, networking, sensing, and aircraft design. With a focus on vertical takeoff and landing (VTOL) capabilities, obstacle avoidance, and autonomous integration with people, our system explores research fields that are challenging and still unsolved.



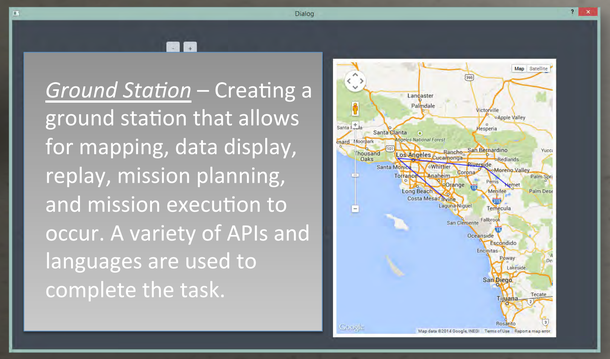
Networking – Creating routing Integrated Circuits (IC's) that will instantiate a mesh network of components on the UAV.

Aero/Fab/R&D – Creating a tilt-rotor UAV that is structurally and dynamically optimized for performance.

Embedded Systems– Takes the software created by other teams and embeds it into the hardware available on the UAV.

Controls – Identifying useful shared characteristics between fixed wing and rotor flight, creating controls for a tilt-rotor UAV. Testing with simulation of platforms in MatLab.

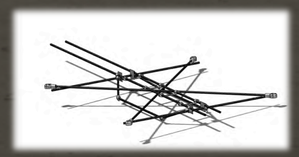
CV/AI - Data collection is collected using both LiDAR and Stereo Vision techniques, filling in an Octree and performing pathfinding through that data structure.



Ground Station – Creating a ground station that allows for mapping, data display, replay, mission planning, and mission execution to occur. A variety of APIs and languages are used to complete the task.

Objectives

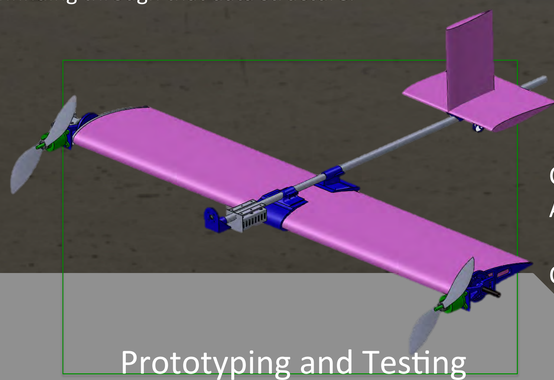
- ✓ Obstacle avoidance and other behaviors necessary for ANY autonomous system
- ✓ Software, Hardware, and other systems are created by us for applied use of the project
- ✓ Create a base system that can be used on multiple autonomous systems in future
- ✓ Demo a platform in Spring that meets DARPA competition goals



Concept

Simplification

Fabrication



Prototyping and Testing

Team Leads:
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