

REPLACE

*Fast Delivery in Urban
Environments using Drone Relays:
Planning, Control, and Estimation*

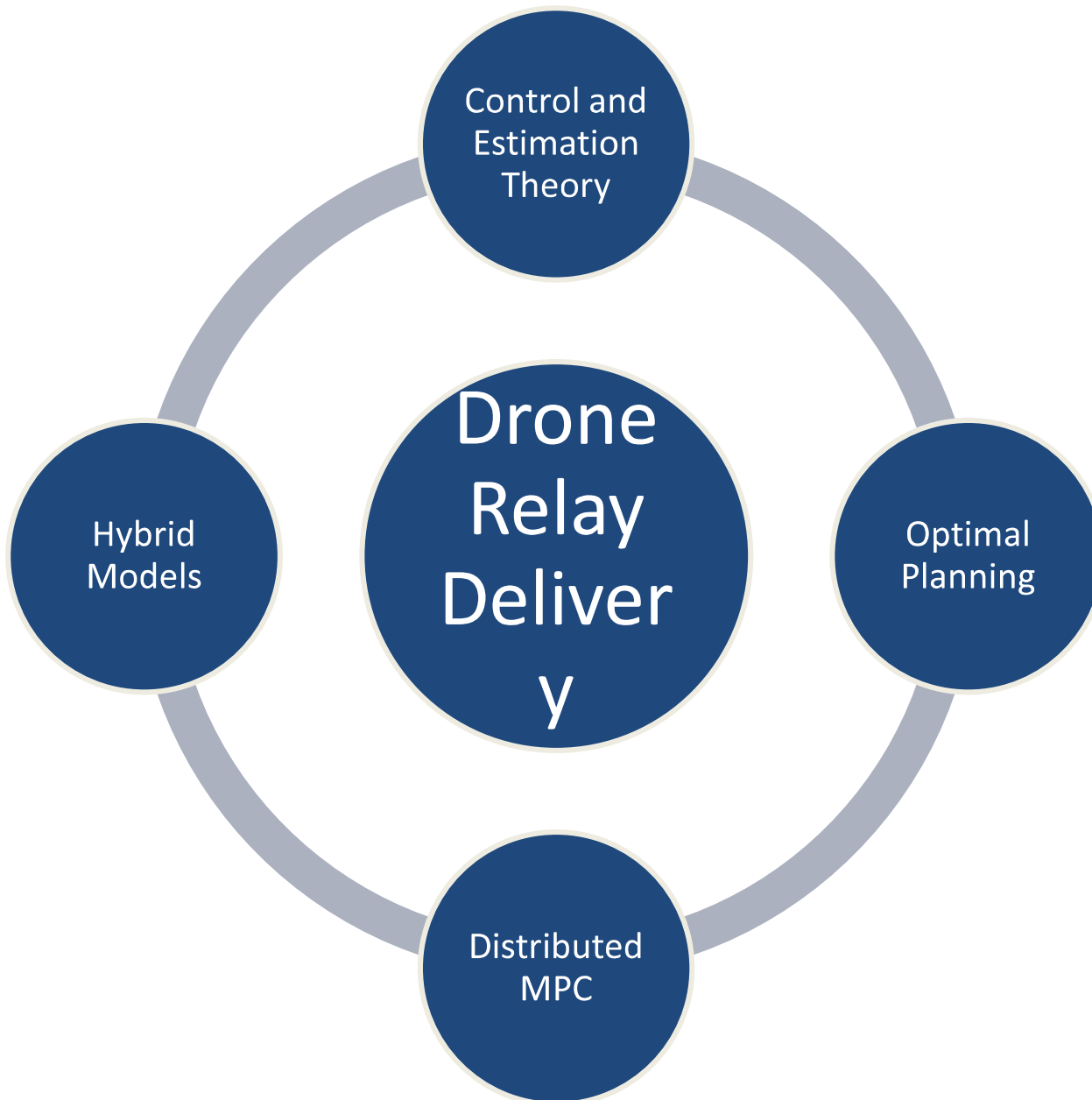
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High Impact Fundamental Science



Parcel transportation using drones is currently a potentially disruptive technology.

In-flight parcel manipulation is a novel and potential high-impact research topic

The proponent team has the required **experience** and **means** in the area of aerial vehicles

Leverage into **significant contributions**

Why use multiple aerial vehicles?

- *Quadrotor and VTOL Airplane Platforms*

- *Versatile*
- *VTOL and hover*
- *3-D trajectories*
- *Appropriate Payload*
- *Challenging*



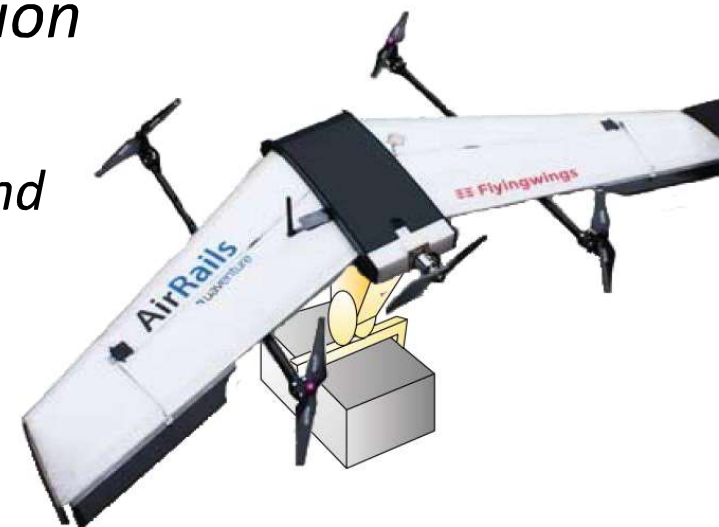
- *Multiple vehicles*

- *Increased payload*
- *Greater endurance*
- *Redundancy*
- *Robustness*

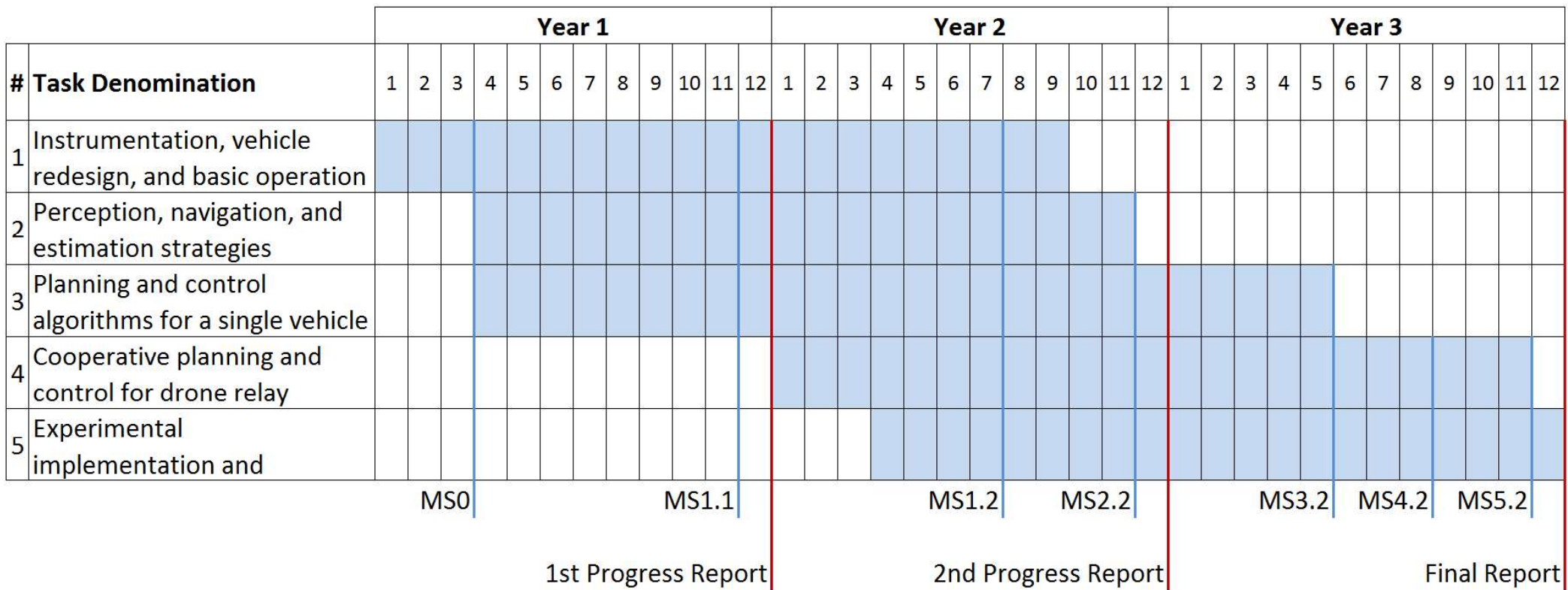


Main Objectives

- *Fundamental science in robotics and control*
- *Develop novel strategies for parcel transportation in urban environments*
 - *Using a single UAV*
 - *Multiple UAVs with in-flight relay maneuvers*
- *Design new planning, control, and estimation methods that are*
 - *Reliable and independent of external sensors and processing units*
 - *Use hybrid systems and analysis for improved robustness*



Project Chronogram



Applications Scenarios

- *Single vehicle in Urban Dynamic Environments*
- *Multiple vehicles with simple relay maneuvers (left)*
- *Multiple vehicles with 3-D relay maneuvers (right)*

