Slide 1 (Title)

* Some of the current/past/recent members of the Autonomous Flight Systems Laboratory

Slide 2 (Autonomous Flight Systems Laboratory)

* Historically we have been involved with various research projects.
* The main unifying theme of our work is that we see to conduct research that advance technologies relevant to unmanned systems.
* In addition to aerial vehicles, we’ve worked with surface vehicles and human-in-the-loop simulators.

Slide 3 (Coordinated Search)

* This is work related to using teams of heterogeneous agents involved in a search mission
* Movie on the left shows 3 vehicles engaged in a search mission.
  + Vehicles are no in communication with each other
  + Environment is complex and systems carry imperfect sensors
* Movie on the right shows the algorithm applied to a persistent surveillance mission
  + ScanEagle is patrolling harbor
  + When it leaves the harbor, the submarine infiltrates the area
  + System retraces its steps to ensure no one has taken advantage of its absence and finds the target

Slide 4 (Risk Assessment of UAS Missions)

* This project involves developing a tool to help UAS operators assess the risk to human bystanders posed by a given UAS mission.
* System takes into account various factors such as mid-air collision, general failure probabilities, ground population density, etc. and tries to compute an estimate of expected number of fatalities per flight hour of a given mission.
* Can be used to help assess the liability (and in a more detached perspective, the insurance premium) associated with a mission.

Slide 5 (Dynamic Mission Management and Path Planning)

* This is the Evolutionary Cooperative Based Path/Task Planning Systems (ECoPS).
* System finds feasible paths and task assignments for a team of heterogeneous vehicles. If given more computation time, it can optimize these feasible solutions.
* System can handle dynamic environments (moving targets, pop-up threats) or loss/addition of team members.

Slide 6 (Implementation & Industry Partners)

* We spend a lot of time transitioning academic ideas out of a university environment and onto industry platforms.
* We’ve partnered with Insitu, Boeing, Aerovel, and other companies to implement systems such as the search and rescue algorithm onto deployed systems.