REPLACE

Fast Delivery in Urban Environments using Drone **Re**lays: **Pla**nning, **C**ontrol, and **E**stimation









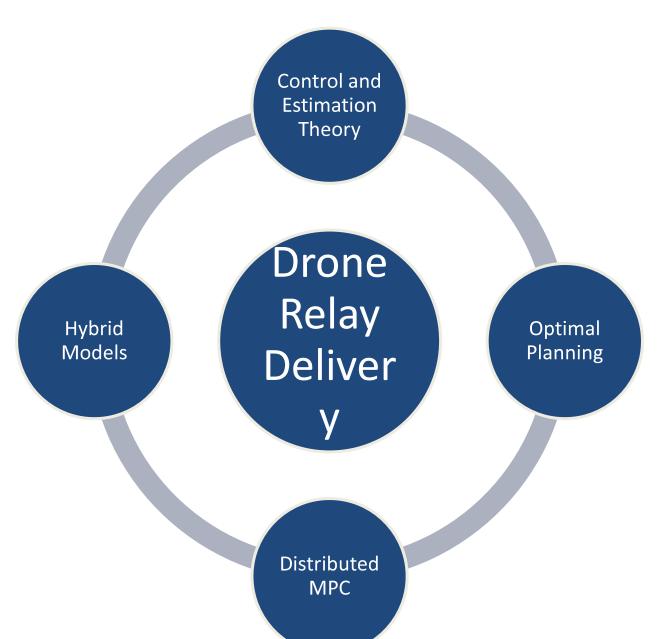


Bruno Guerreiro (IR - Investigador Responsável)

Proponent Institution: IST-ID (NIF 509830072)

Reference: LISBOA-01-0145-FEDER-032107

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**

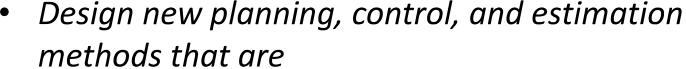
Why use multiple aerial vehicles?

- Quadrotor and VTOL Airplane Platforms
 - Versatile
 - VTOL and hover
 - 3-D trajectories
 - Appropriate Payload
 - Challenging
- Multiple vehicles
 - Increased payload
 - Greater endurance
 - Redundancy
 - Robustness



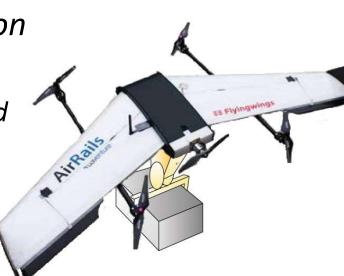
Main Objectives

- 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



- Reliable and independent of external sensors and processing units
- Use hybrid systems and analysis for improved robustness





Project Chronogram

25		Year 1													Year 2										Year 3												
	Task Denomination	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
	Instrumentation, vehicle									*													8 8				8			3	3			3			
	redesign, and basic operation													-																3				2		2.	
	Perception, navigation, and																																				
	estimation strategies																																				
	Planning and control																																	3			
	algorithms for a single vehicle			2			, ,																											(6			
	Cooperative planning and																																				
	control for drone relay					263				42																											
5	Experimental																																				
	implementation and																																				
\$25			N	150			MS1.1										MS1.2 MS2.2							MS3.2						MS4.2 MS5.2							
							1s	t Pr	og	res	s R	epo	ort			2nd Progress Report										Final Report											

Applications Scenarios

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

