



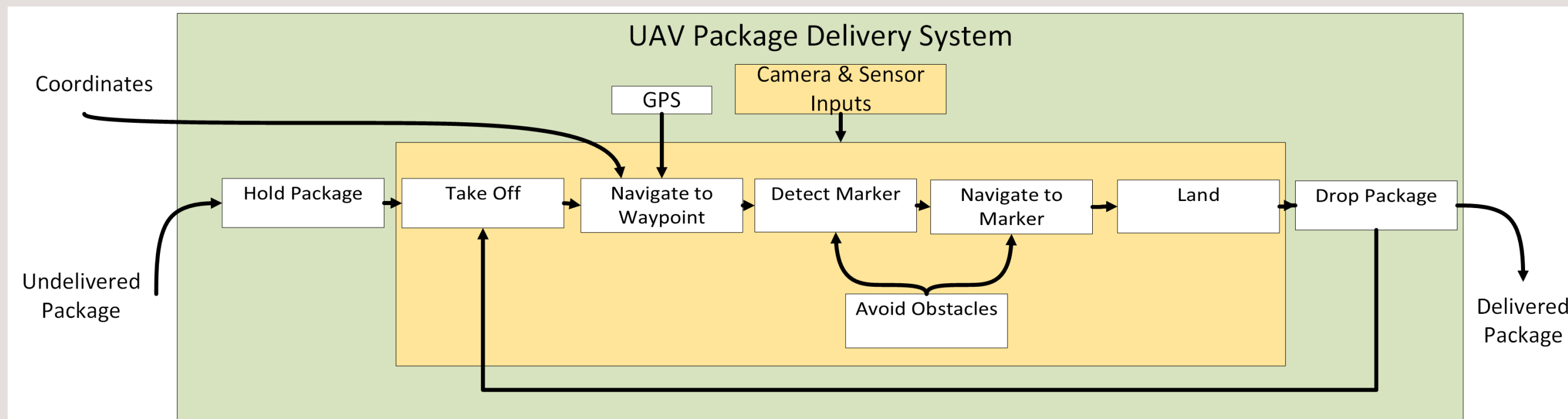
Project Pegasus

UAV Based Package Delivery System

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MRSD PROJECT 2015-2016: TEAM A

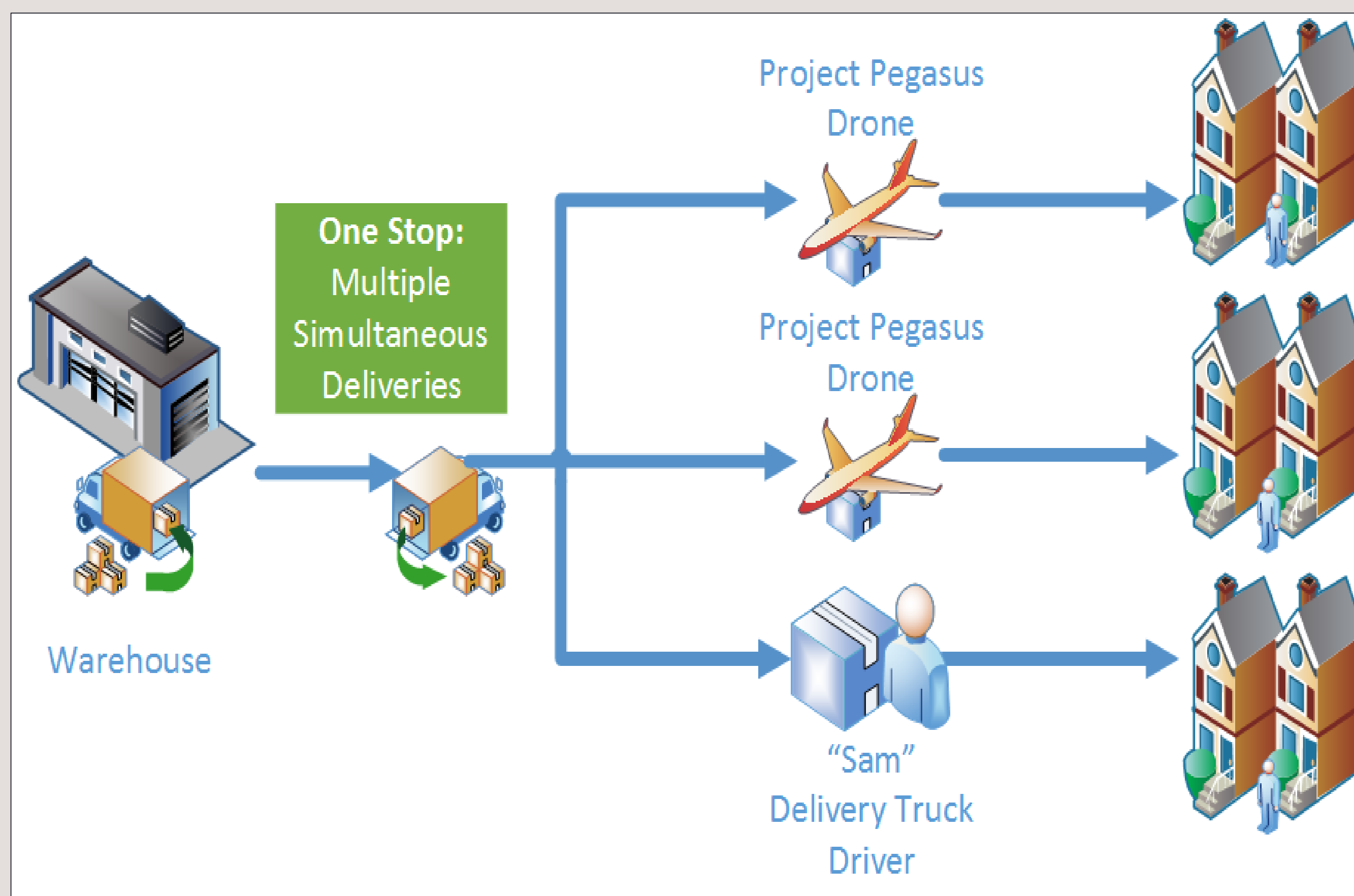


PROJECT DESCRIPTION



- Drone delivers package to house
 - Moves within area of house
 - Executes search pattern for delivery marker
 - Detects marker, lands on it, and releases package
- Drone returns to delivery truck

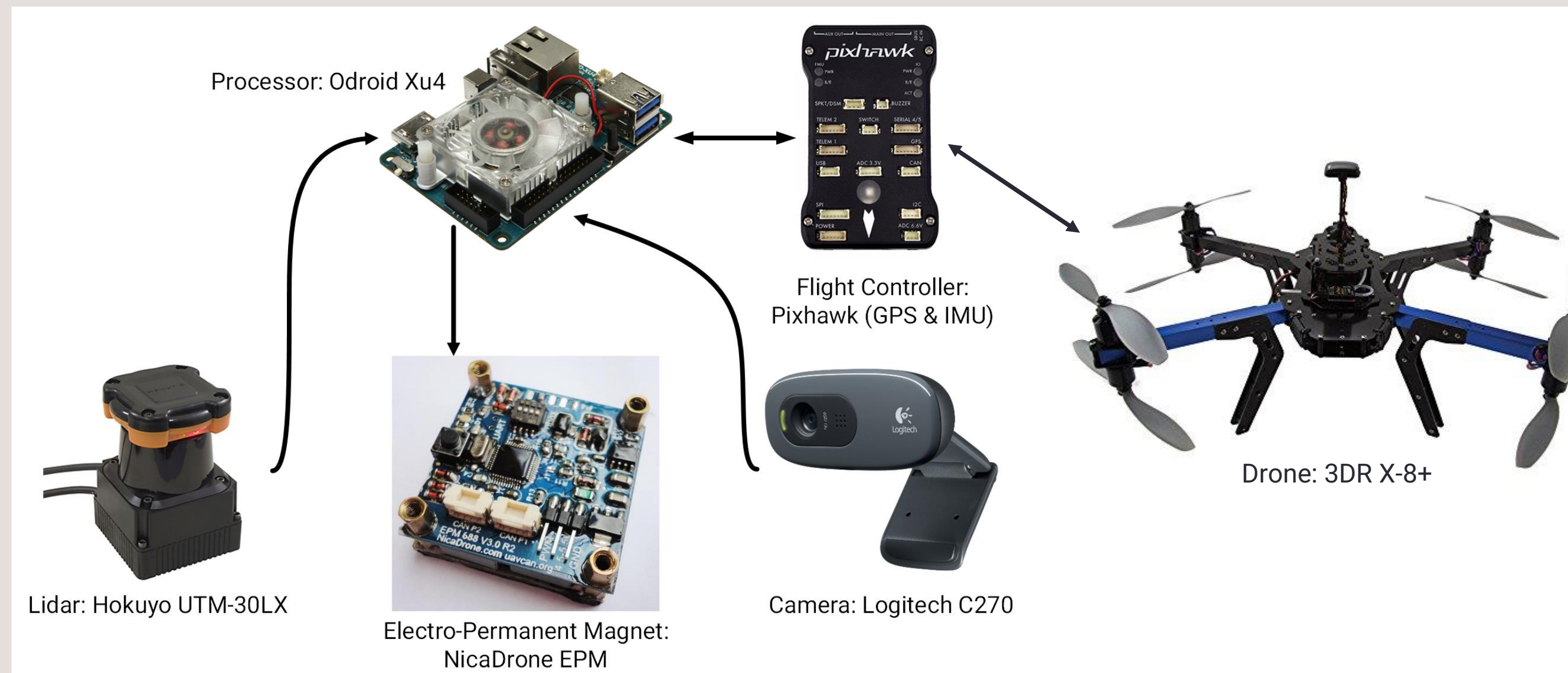
USE CASE



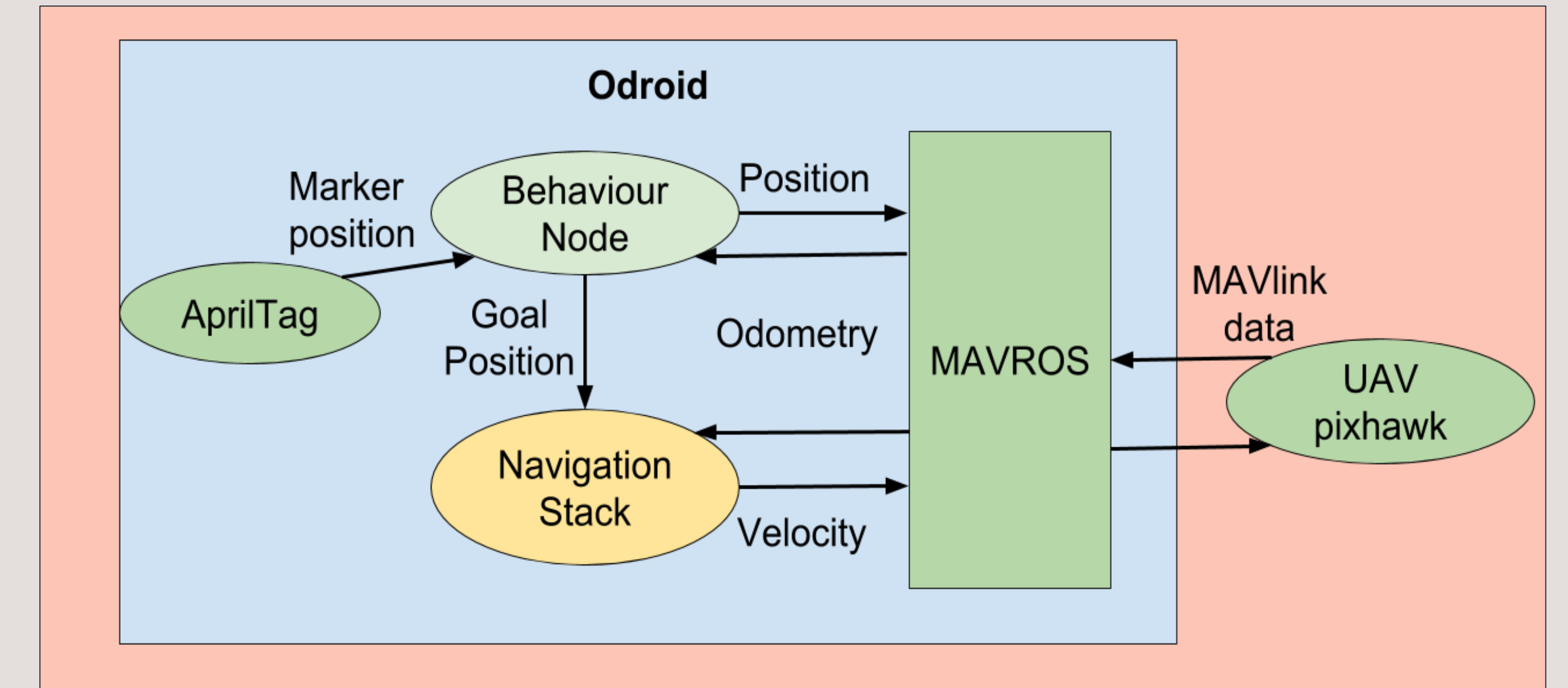
REQUIREMENTS

- Autonomously take off
- Navigate to a known position close to the house
- Detect and navigate to the drop point at the house.
- Avoids static obstacles with a minimum cross-sectional dimensions of 1.5m x 0.5m
- Land and Drop package within 2m of the drop point
- Take off, fly back to and land at another visually marked platform.
- Package should weigh at most 100g and fit in a cuboid of dimensions 9.5" x 6.5" x 2.2".

SYSTEM ARCHITECTURE

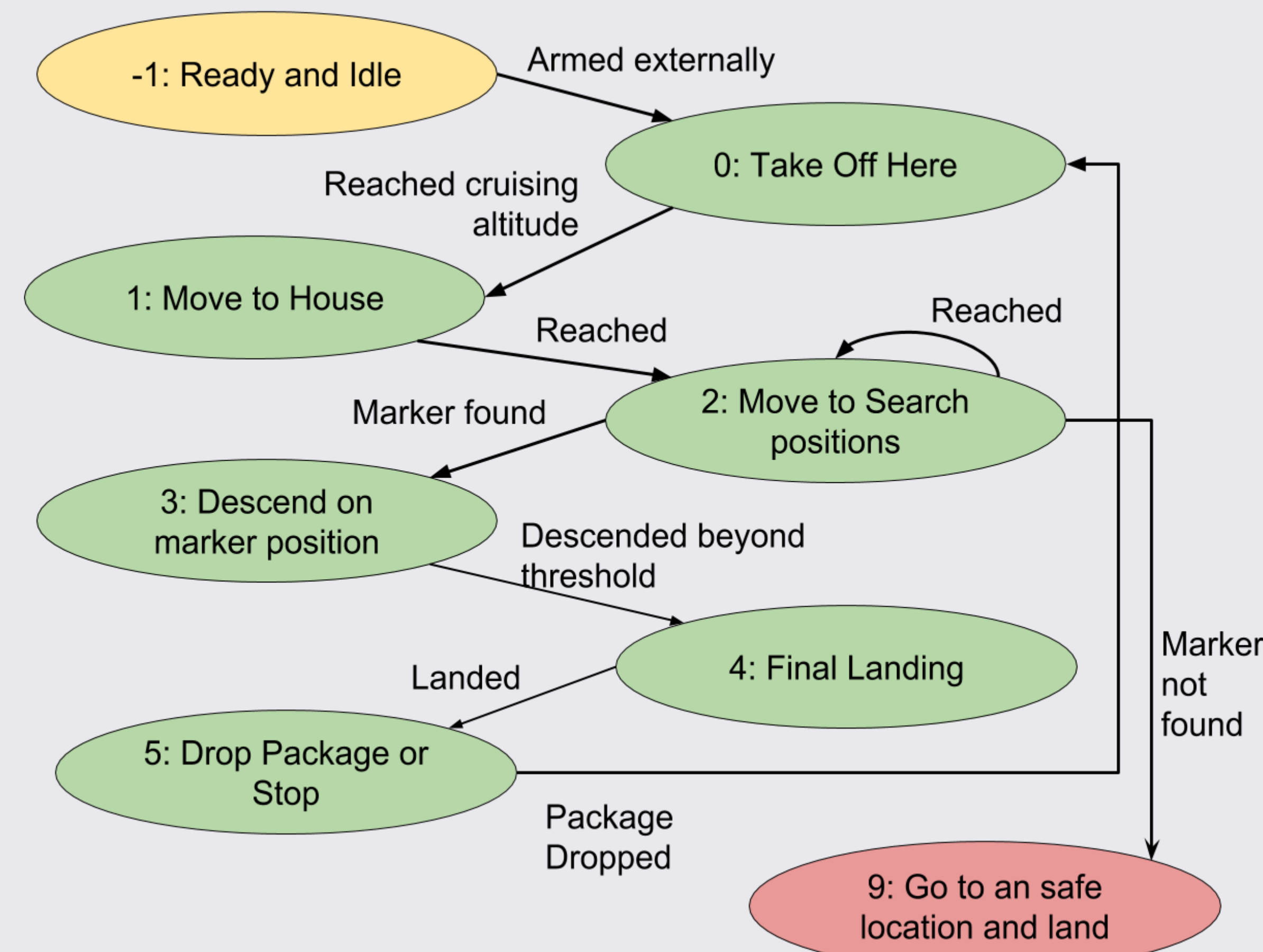


CONTROL ARCHITECTURE

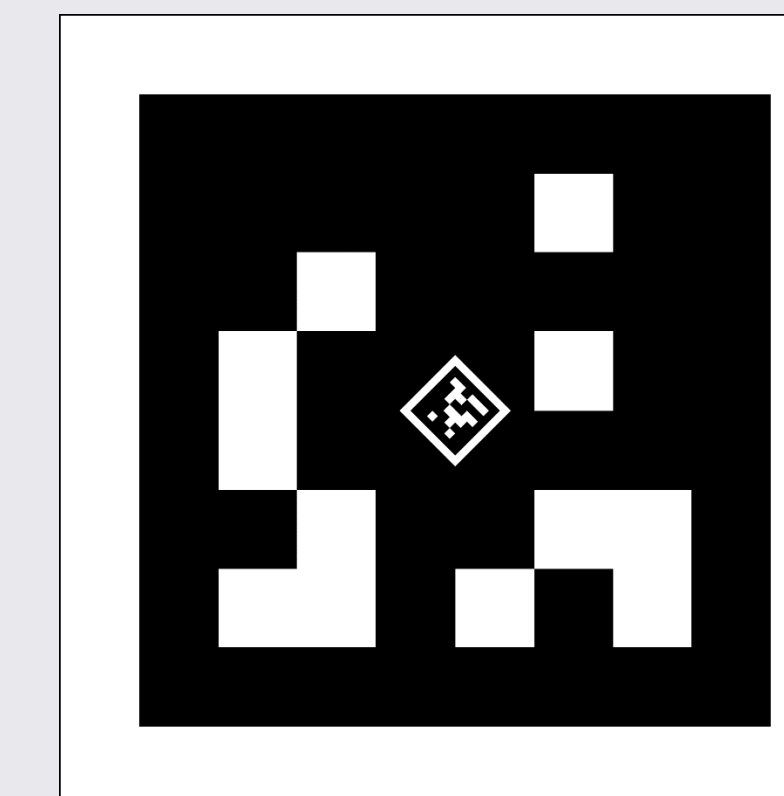


SUBSYSTEMS

BEHAVIOUR

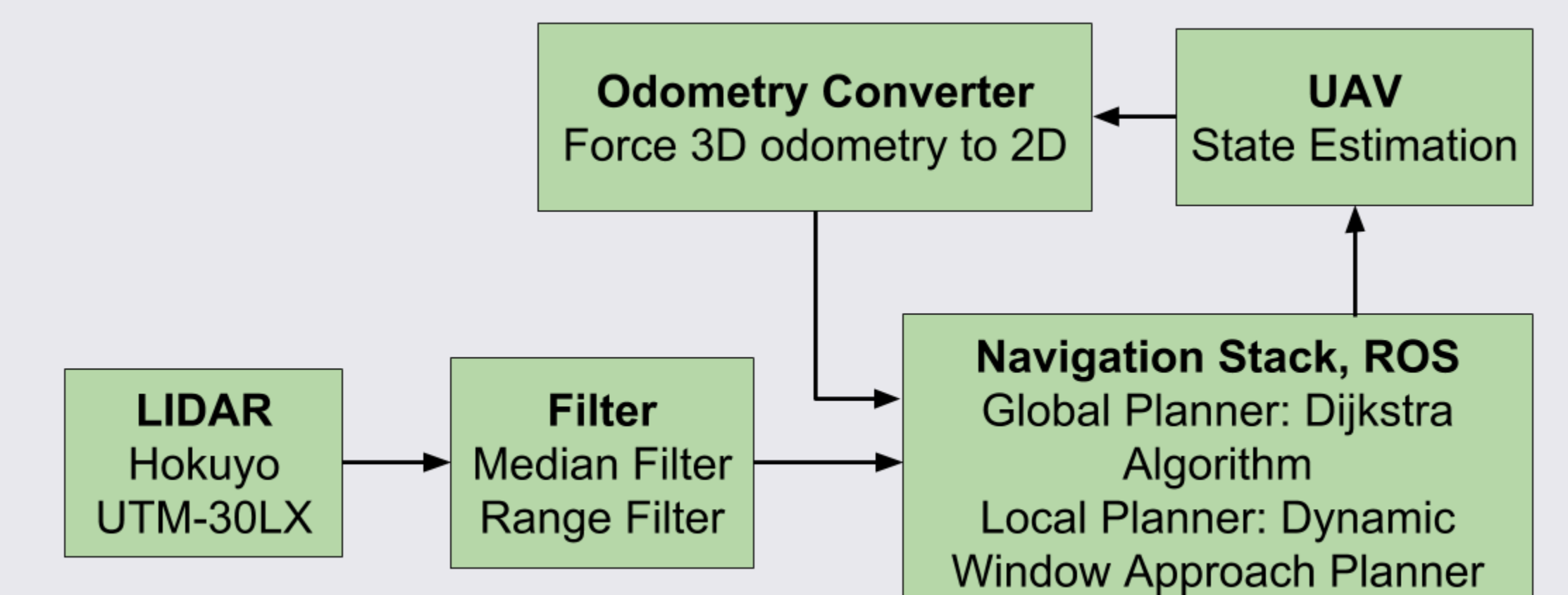


VISION



- April Tags
Nested Tags - **Range**
- Outer: 1.6m to 30m
 - Inner: 20cm to 2m
- LK Tracking - **Speed on Odroid**
- 8 fps detection
 - 29 fps tracking

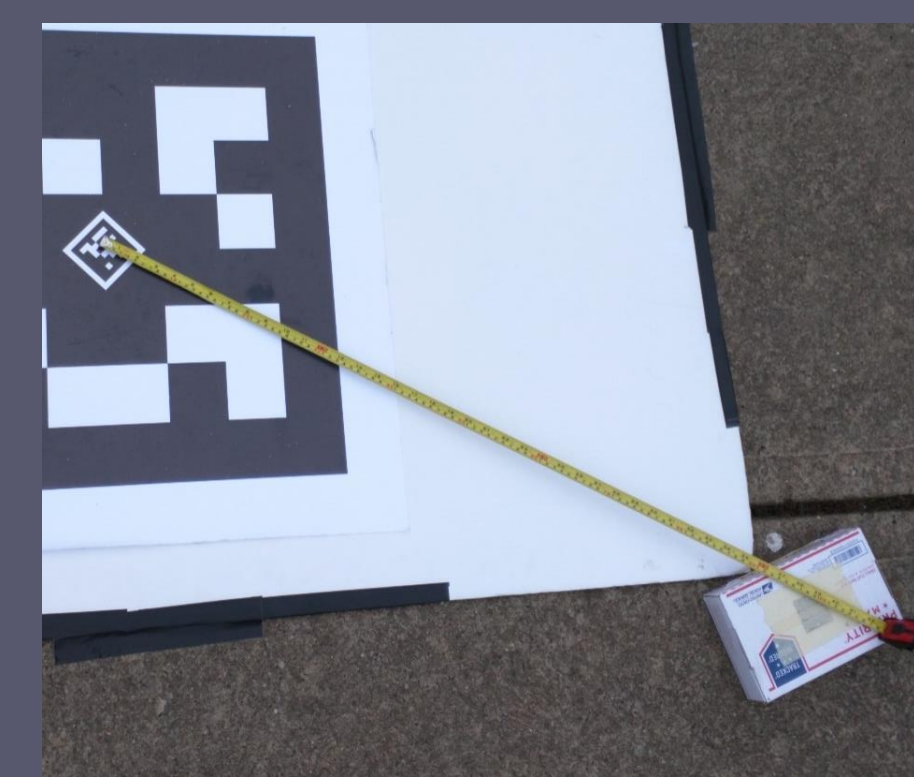
OBSTACLE AVOIDANCE



RESULTS

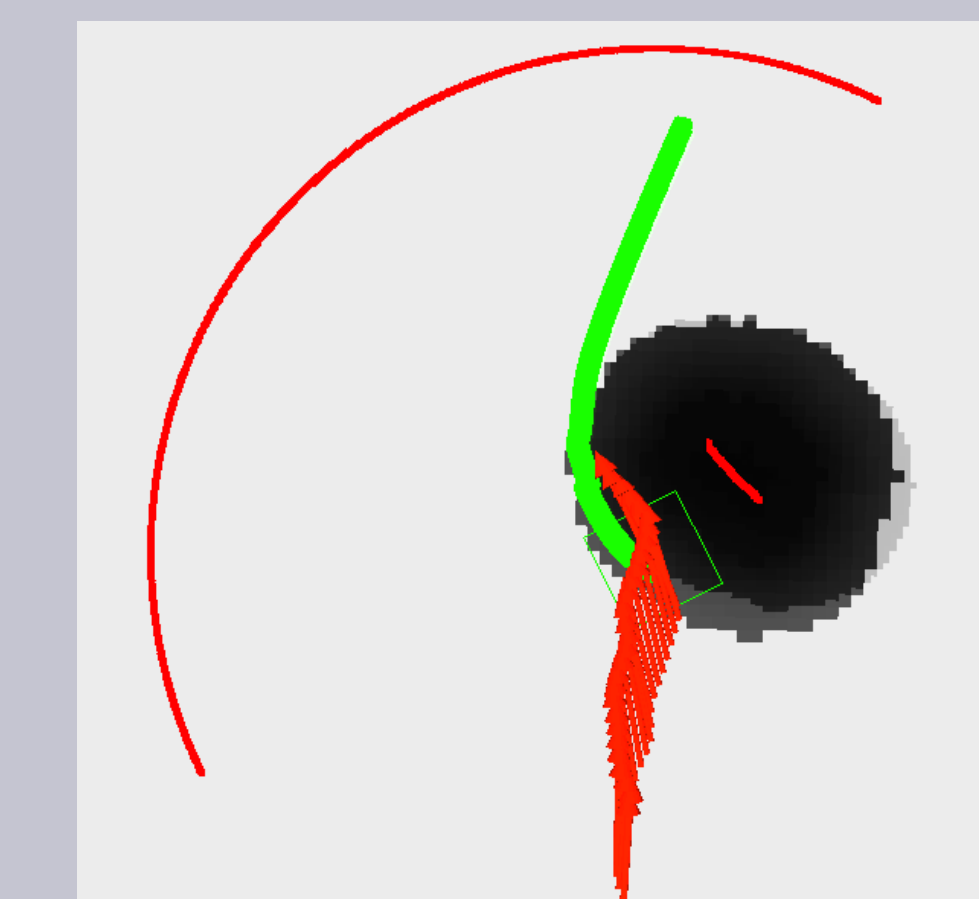
PACKAGE DROP ACCURACY

Average distance from AprilTag: 58cm



OBSTACLE AVOIDANCE

Minimum distance to obstacle: 1m



SYSTEM ROBUSTNESS

Package Delivery

- Success Rate: 90%
- Failure Reasons: Exposure and reflections from marker

Package Delivery with Obstacle Avoidance

- Success Rate: 60%
- Failure Reasons: Obstacle not in view of marker