



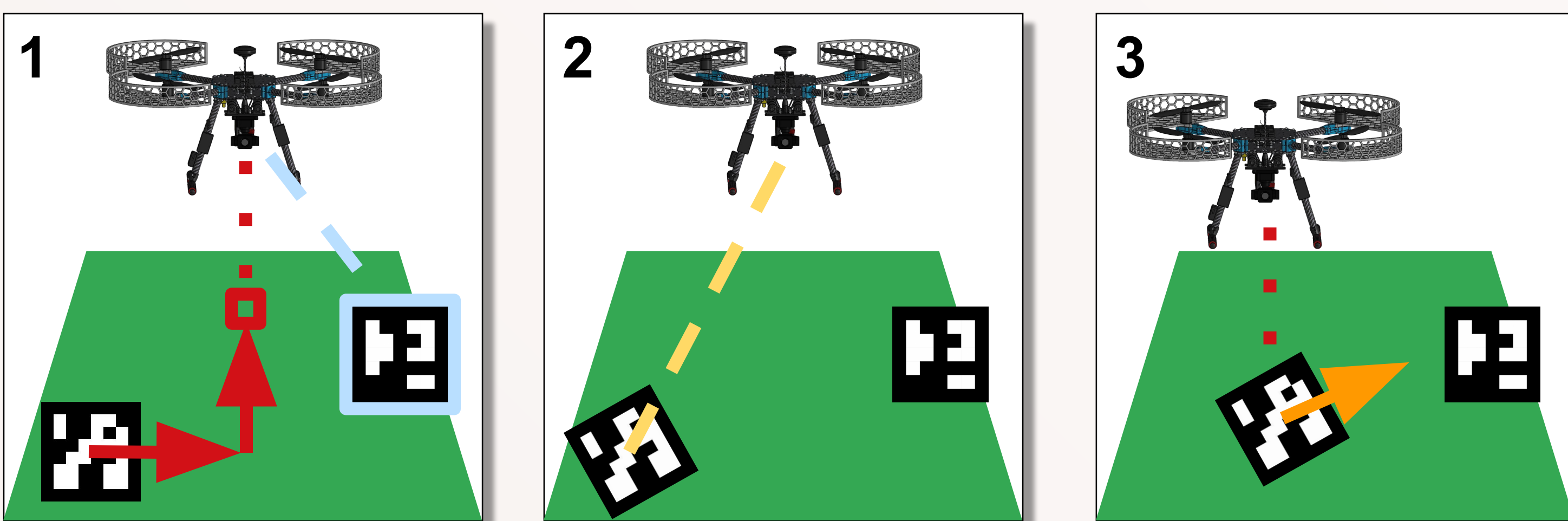
A. T. L. A. S.

Carry the skies

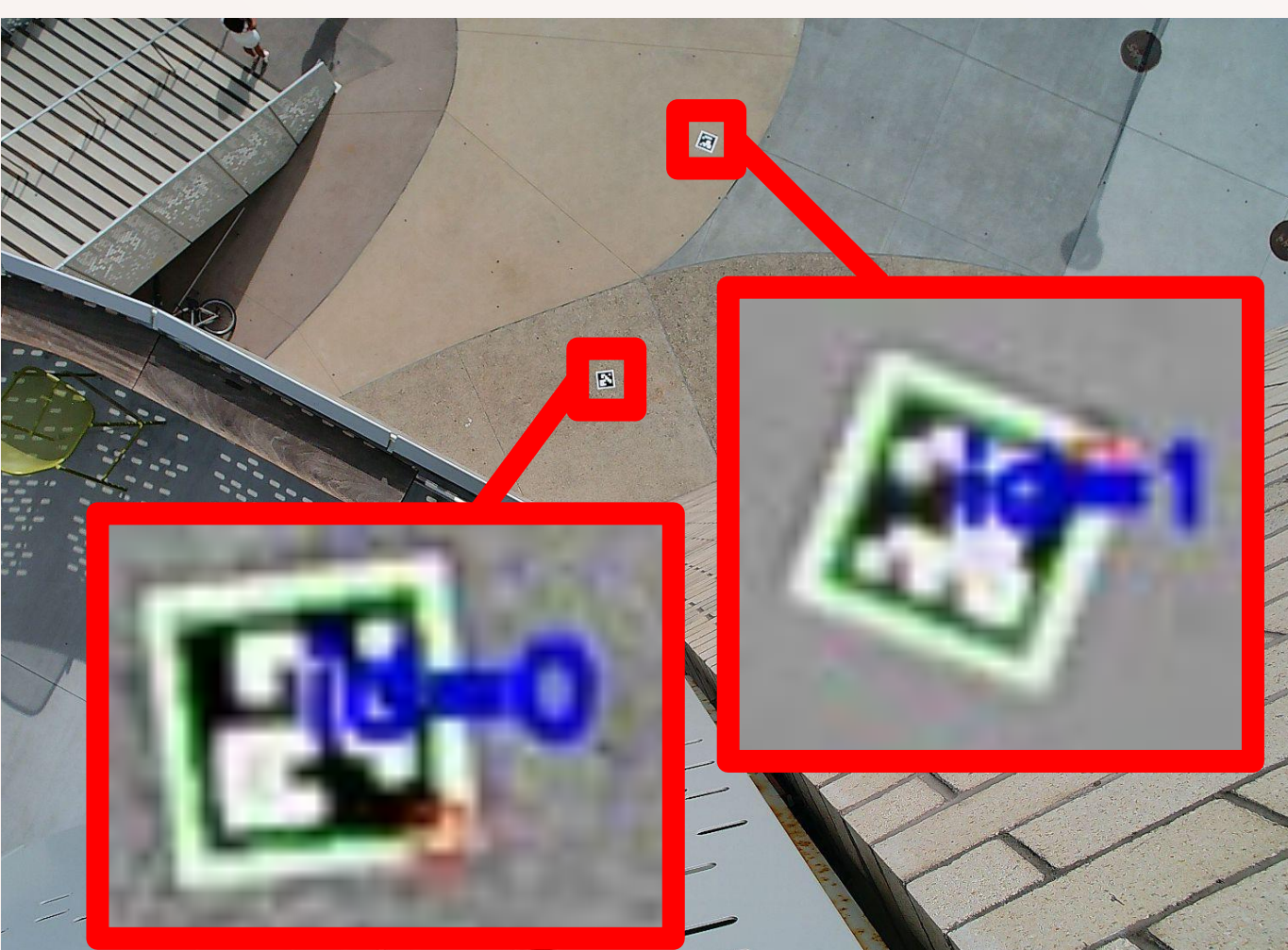
System Implementation

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Tag Search Algorithm

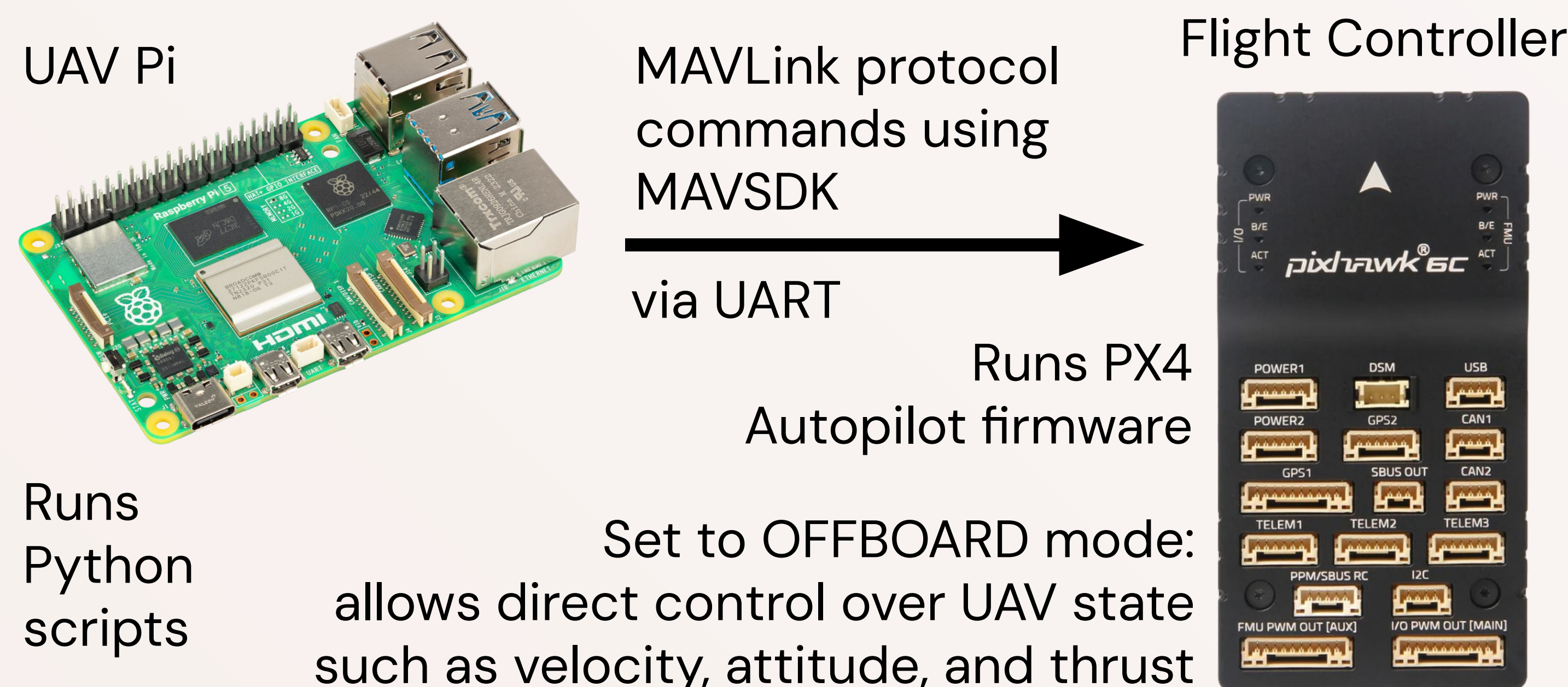


1. UAV takes off from the UGV to an altitude of 15m at 6m in x-y towards center field.
2. When both tags are detected, a heading is relayed to the UGV.
3. The UAV returns to track the UGV from above.

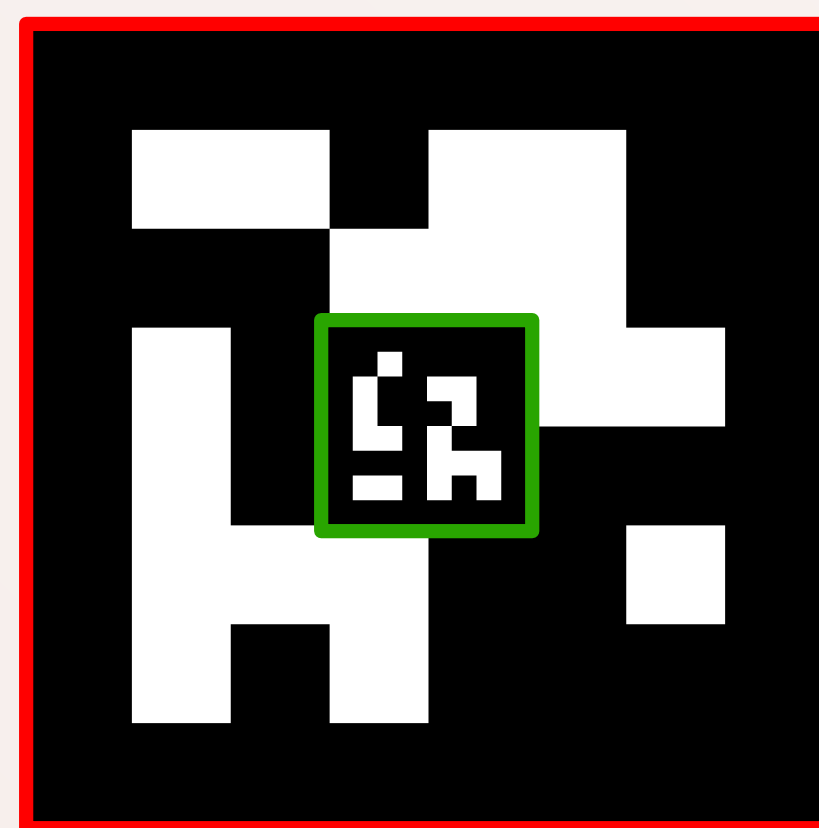


Static image taken at 15m

Software & Flight Stack



Landing the UAV



2'x2' outer tag
6''x6'' inner tag

- x-y velocity PID controller
- Tag-in-tag design
 - provides constant visual reference as z-height changes
- UAV autolands at 6cm
- UGV stops after 10s

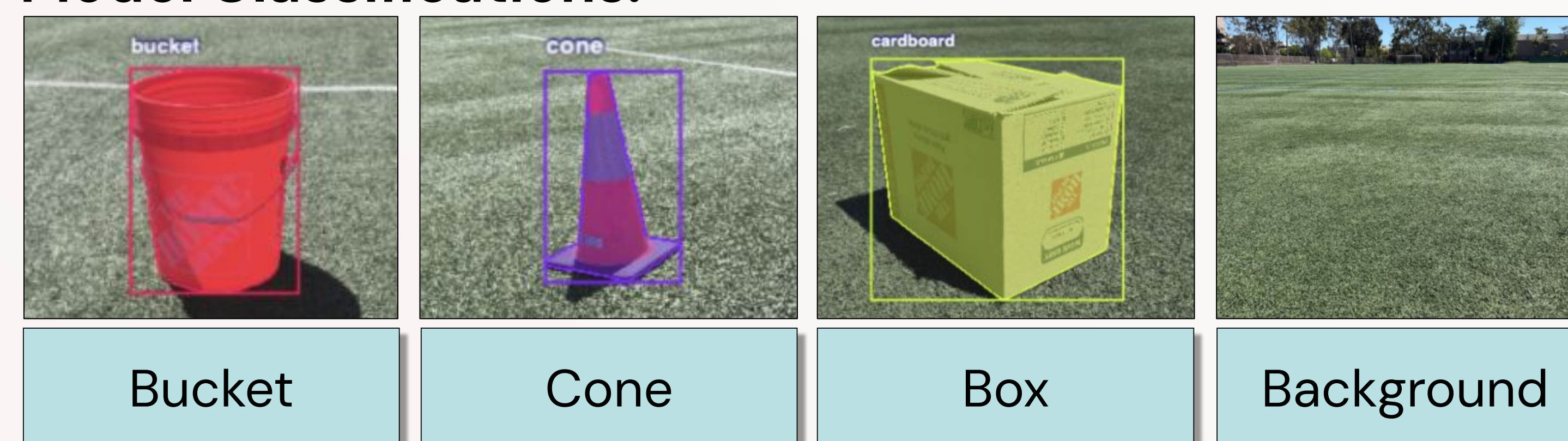
detectable flight height
— >5cm & <5m — >3m & <16m

Power Draw

	UGV	UAV
Specification	Run for 10 minutes	Fly for 10 minutes
Battery Life	15000 mAh / 166.5 kWh	7200 mAh / 106.56Wh
Largest Power Draw (W)	Motors - 668	Motors - 1109.16
Run Time at Max Power Draw (min)	~14:18	~5:30

Object Detection Model

Model Classifications:



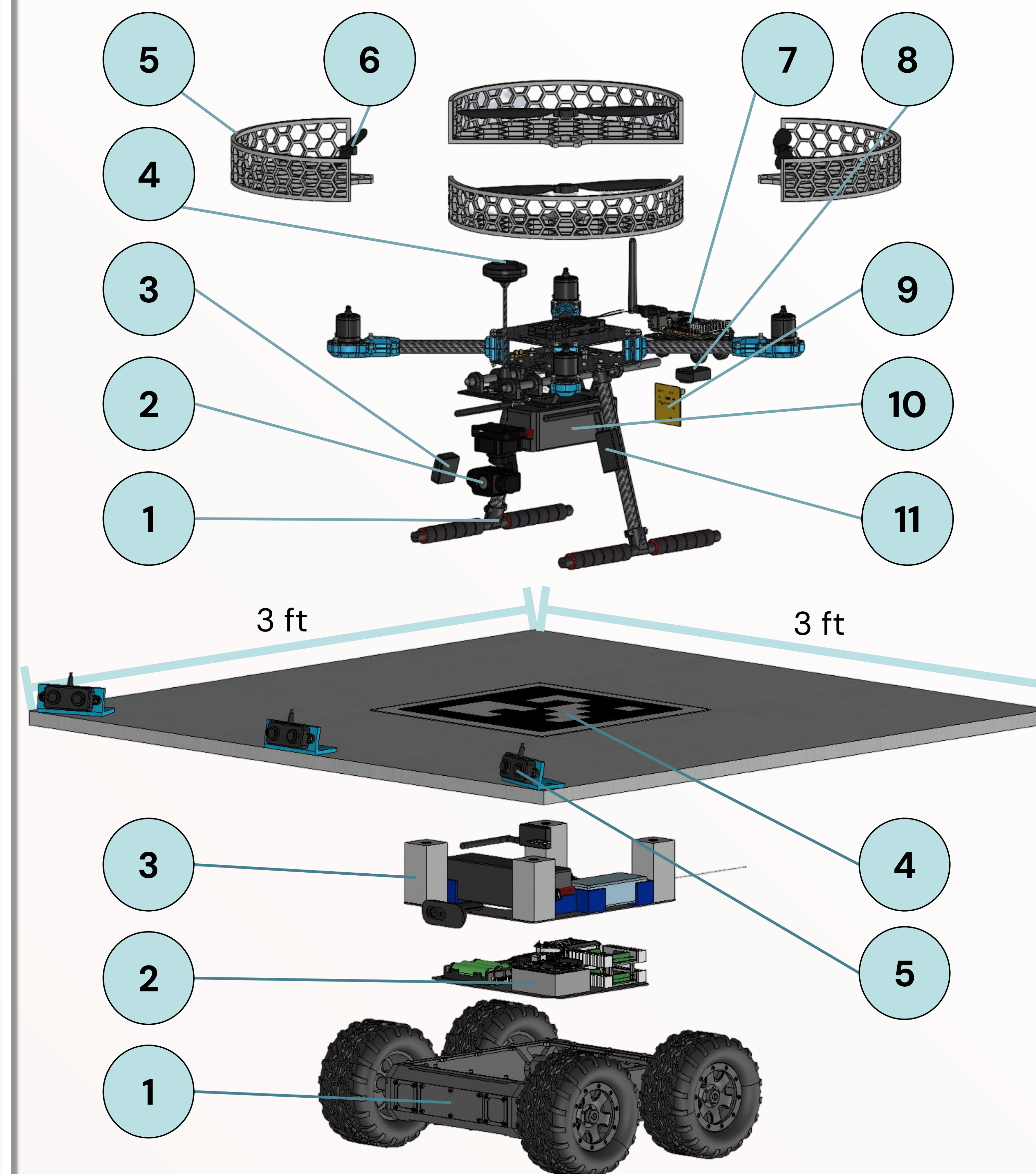
24 Training Runs
 93.4% model accuracy

- Trained based on:
- competition environment
 - object classes and color
 - variety in shadows, angles, and size in frame



Objects detected live with Akida-required resized images 224x224

UAV & UGV CAD



UAV Key Components

1. X500 V2 Quadcopter
2. SIYI A8 Mini Camera
3. Ruko R111S Remote ID
4. Holybro M10 GPS
5. Propeller Guard
6. 1045 Propeller
7. Raspberry Pi 5
8. Holybro H-Flow Sensor
9. D24V50F5 Regulator
10. 4S 14.8V 7200mAh LiPo
11. SiK Telemetry Radio

UGV Key Components

1. Lynxmotion A4WD3
2. Electronics Plate
 - Raspberry Pi 5 (Primary)
 - Sabertooth Motor Driver
 - BrainChip Akida
3. Top Plate
 - Raspberry Pi 5 (Secondary)
 - 9-axis IMU
 - Logitech C270 Webcam
 - SiK Telemetry Radio
4. ArUco Tag
5. AO2YYUW Ultrasonic Sensor

Acknowledgements

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