

Problem Statement

Unmanned multirotor drones are becoming increasingly more prevalent in **reconnaissance** and **surveillance operations**. However, smaller drones are often **limited** by shorter flight times compared to their larger counterparts.

Design Criteria

The UAV Docking Station **extends flight time** and **reduces downtime** by performing battery swaps at a remote base closer to its target mission location.

Design Goals

- Production Cost not to exceed **\$1200**
- Battery Swap Time of less than **60 sec**
- **Consistent** and **Reliable**

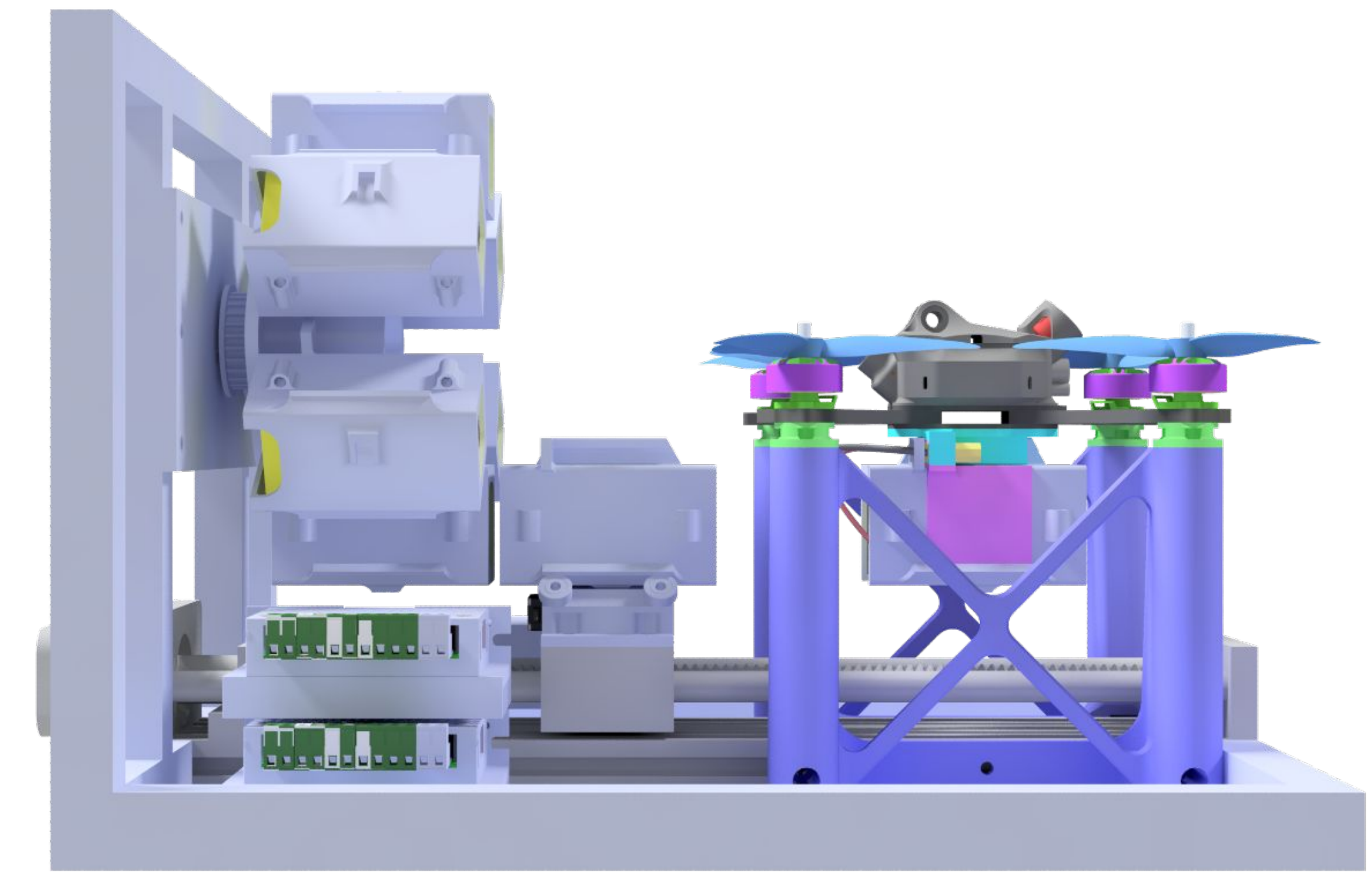
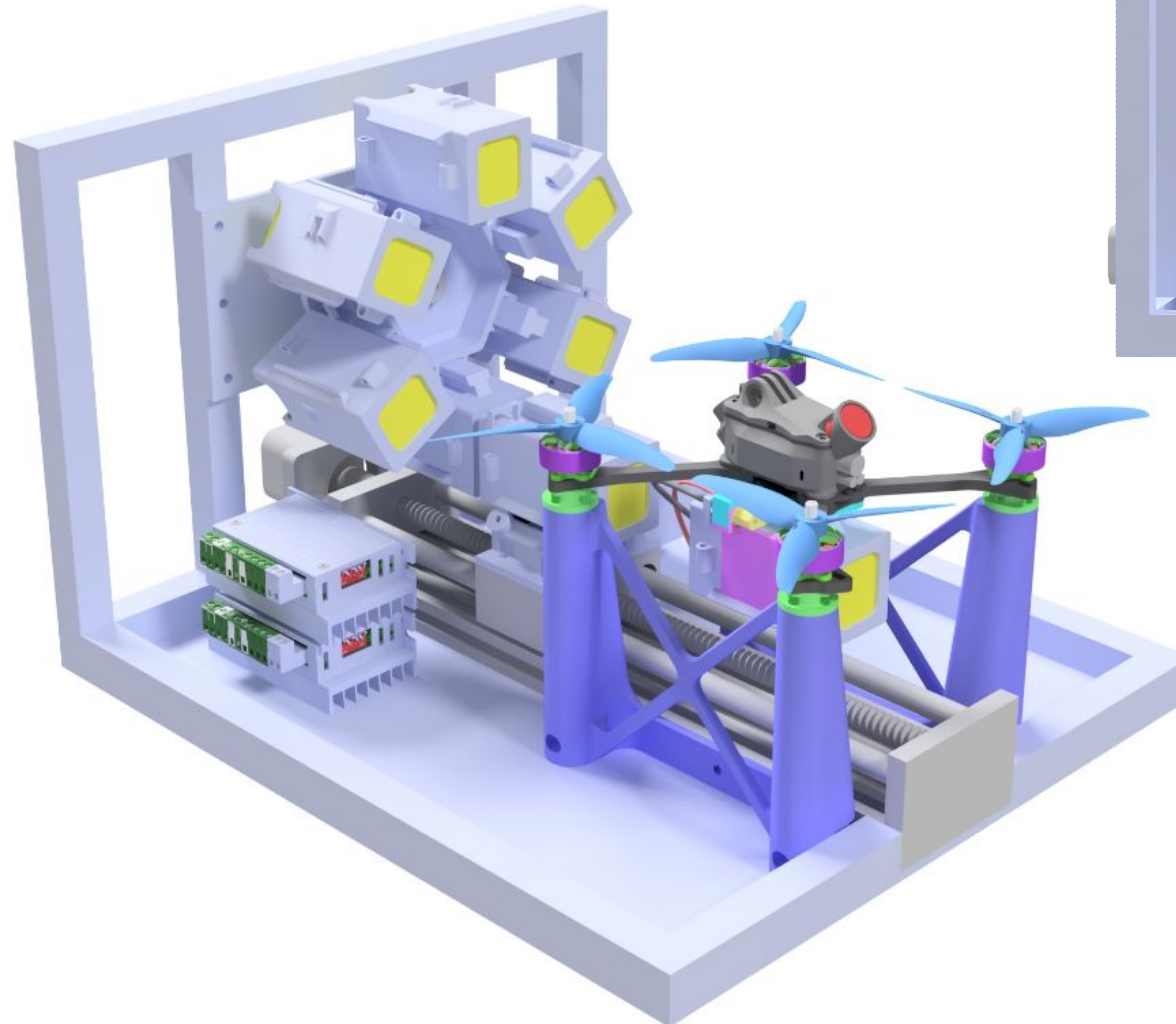
STORE, SWAP, LAUNCH

Applications

Performing a battery swap away from the operator can **extend operational flight time** of smaller drones to allow them to **outperform** larger drones in certain roles:

- **Maneuverability** in confined spaces
- **Accessibility** to organizations such as first responders, utility companies, construction companies with **lower costs** and greater **ease** of use and maintenance

Final Design



Test Results

Average Battery Swap Time: **50.3 seconds**
Design Goal: **Maximize** drone flight time

Trial	Time (Sec)
Trial 1	52
Trial 2	48
Trial 3	51

Future Considerations

With a wider commercial launch, the **UAV Docking Station** would have attachments made so that it is **compatible** with commercially available drones and ground vehicles.

To **minimize environmental impact**, the drone hub will feature modular subsystems meant to facilitate **upgradability** and **repairability**. The result will be a full assembly with improved **longevity** and higher **sustainability** ratings.

Design Metrics

- 5x** Time spent in mission
- 6x** Cheaper than the nearest competitor at a mass production cost of **\$847.03**
- 7x** Smaller footprint than the average competitor at a footprint of **1500 cm²**
- 50** Second average swap time