



Tactical Fire Remote Sensing Advisory Committee

November 29th/30th 2022

Multi-aircraft Remote Emergency Response Assessment

Field Operations Package Delivery Mission Concept
sUAS Logistics Flight Demonstration
NASA Langley Research Center



NASA Academy



Mission Concept

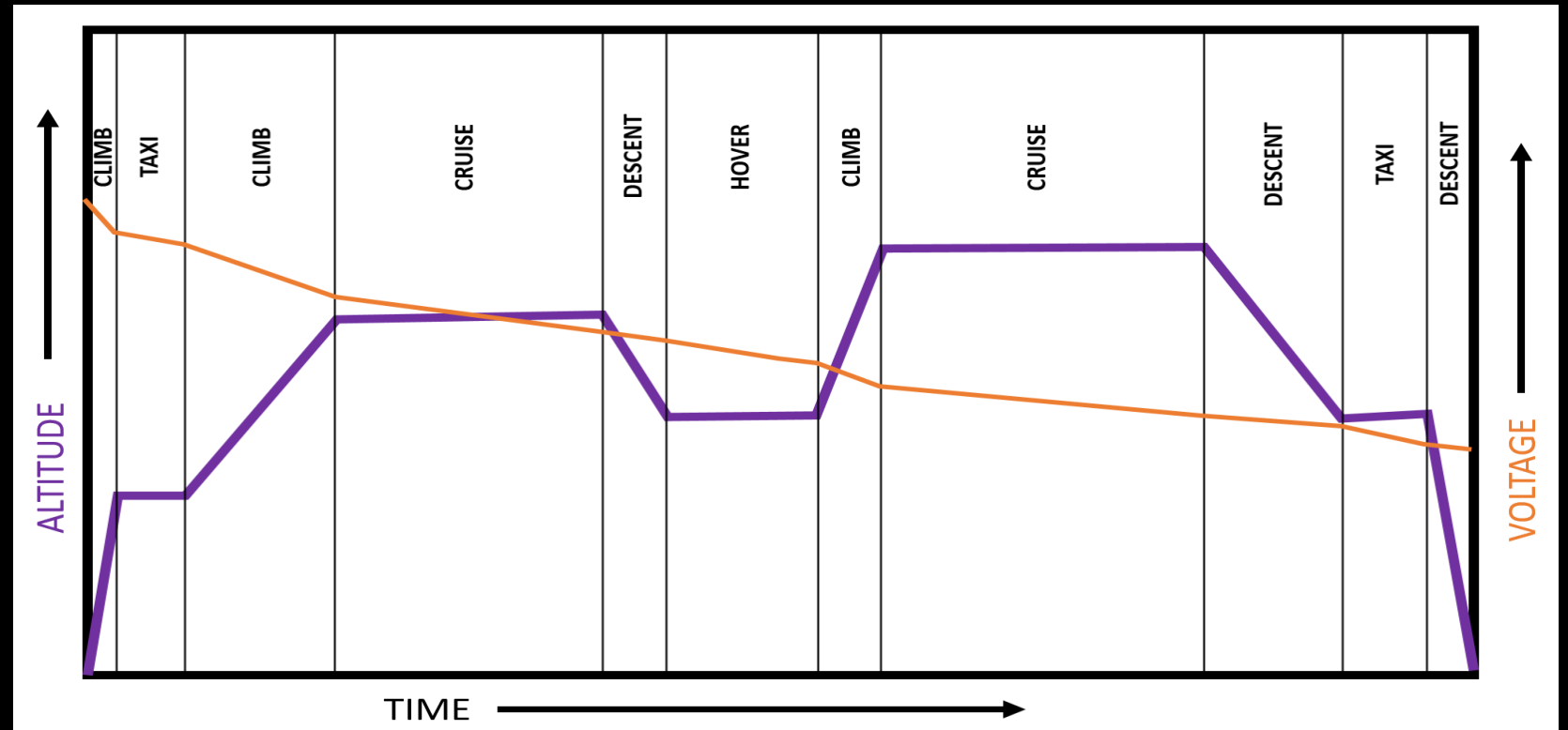


Flight Performance

- Hover
- Climb/Descent
- Cruise/Taxi
- Wind Effects
- Altitude
- Min/Max Deliveries/Hour

Payload

- 2.5 Gallon Cubinator



Operational Concept

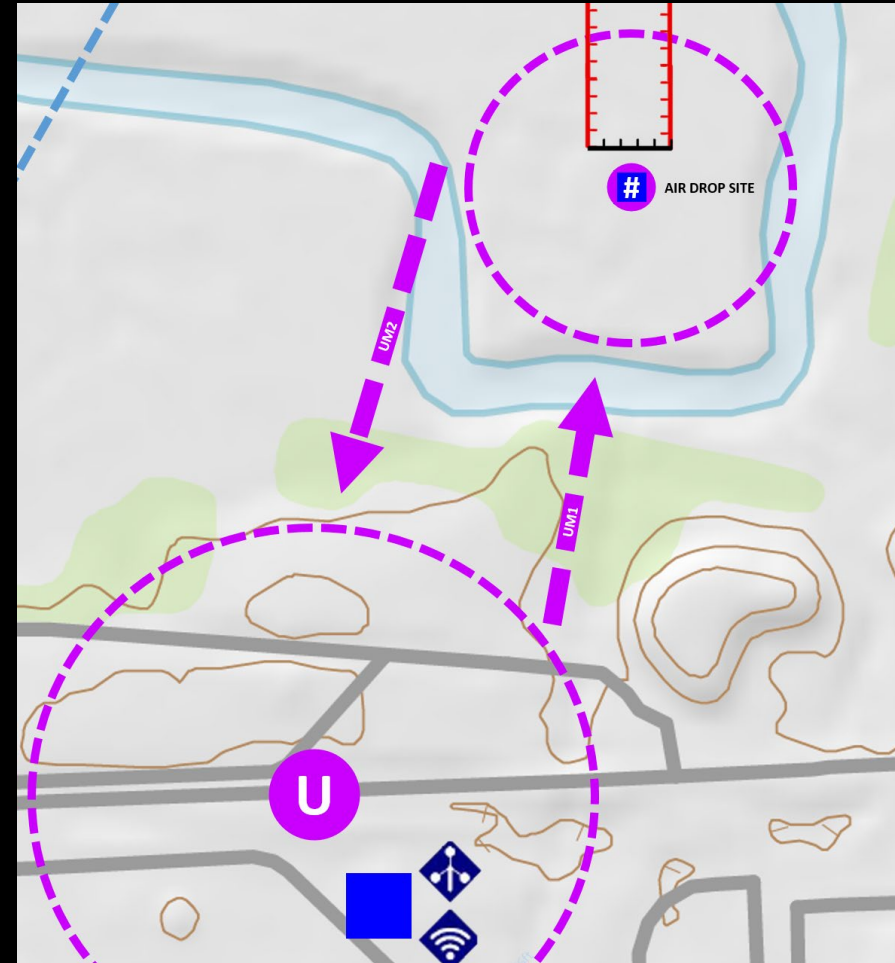


Flight Planning

- Take Off and Landing Procedures
- UAS Drop Site Procedures
- Enroute Procedures

Navigation Modes

- VLOS
- EVLOS
- BVLOS
- m:N



Concept Scenario



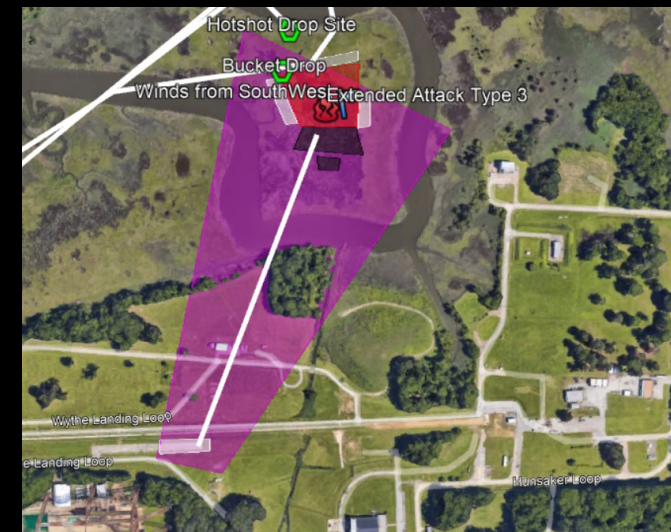
T0



T1



T2



T3

T0: Time Zero – Ignition Source

T1: Time 0-12 Hours – VLOS UAS Operations

T2: Time 12-24 Hours – BVLOS UAS Operations

T3: Time 24-36 Hours – VLOS UAS Operations and VFR Air Operations

Automated Flight Capabilities



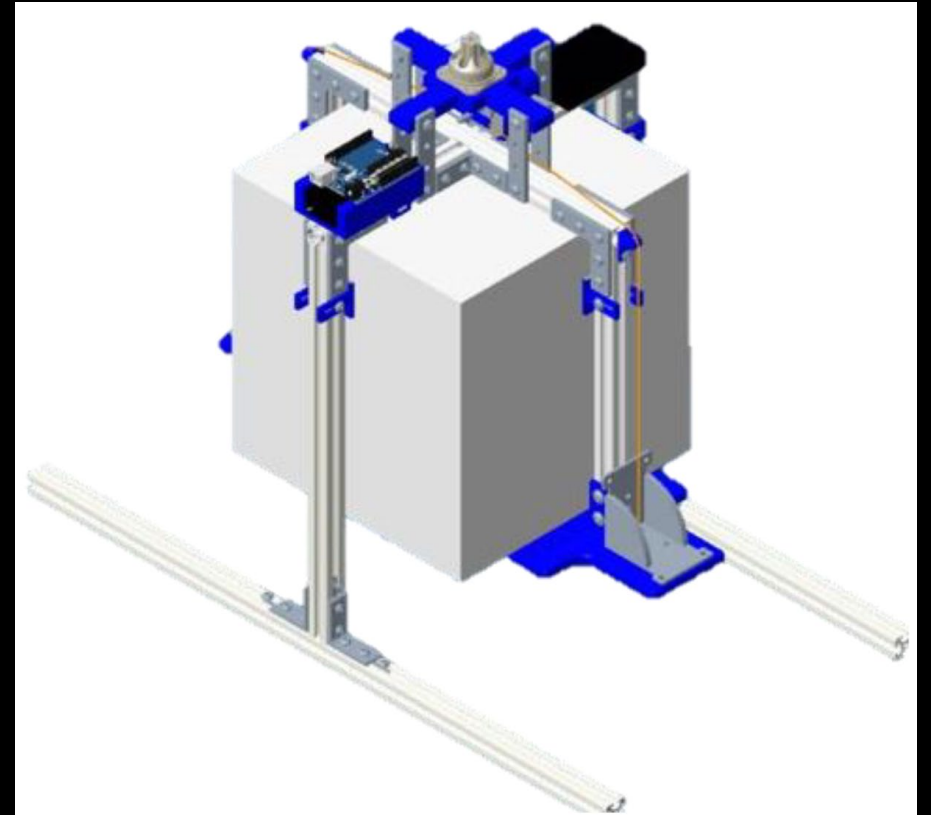
Crawl, Walk, Run

Level 1 – Payload Delivery (Focus of this presentation)

Level 2 – Waypoint Navigation Control

Level 3 – Collision Avoidance

Level 4 – Emergency Landing

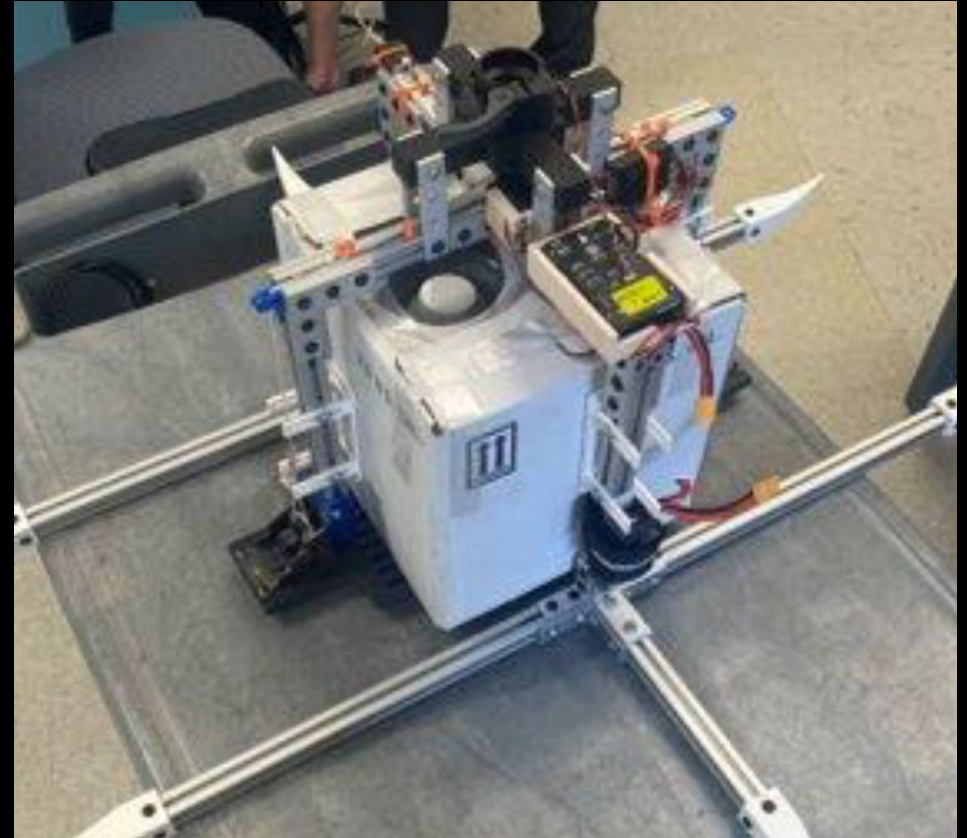


Level 2-4 POC: robert.g.mcswain@nasa.gov

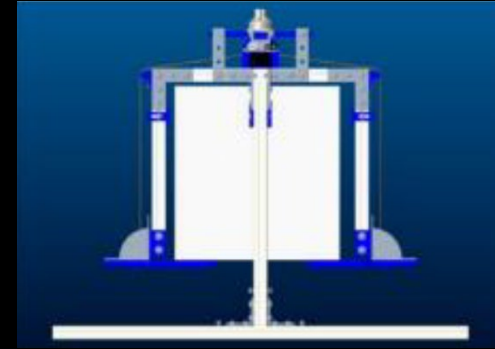
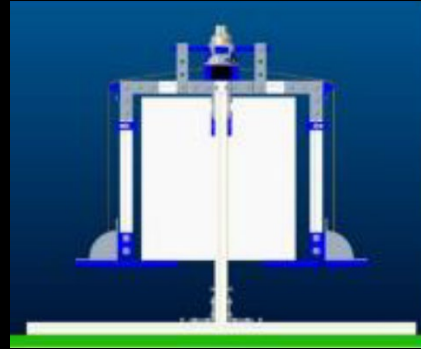
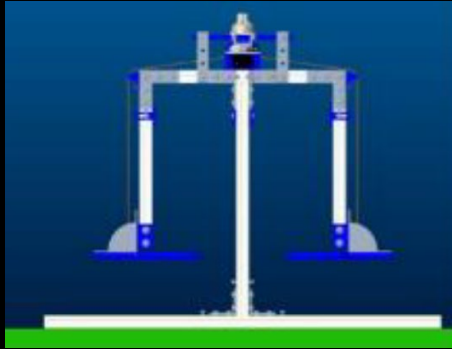
Payload Delivery Prototype



- No Special Tools To Load
- Simple Use Case
- Remote Unload
- 6 weeks to Design, Build and Fly



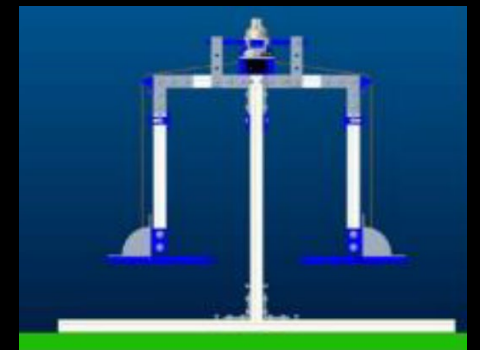
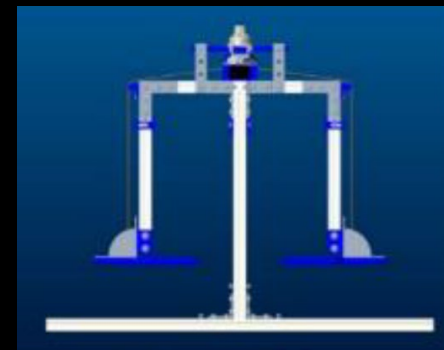
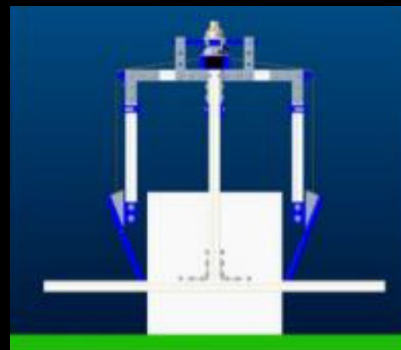
Prototype Deployment Process



Load Cubinator

Take Off

Land At Delivery Site



Release And Take Off

Land at Take Off Location



Flight Test Data Mission Performance

Gross Take Off Weight (lbs)	Flight Time (Hours)	Battery Capacity Recharged (A*Hours)	Average Amperage (A)	Maximum Flight Time No Reserve (Minutes)	Maximum Flight Time, 20% Reserve (Minutes)	Mission Speed (Kts)	Mission Distance (ft)
47.5	.126	5.51	43.730	43.86	35.09	10	5415
47.5	.127	5.69	44.803	42.85	34.28	10	5410
47.5	.094	4.39	46.702	41.11	32.89	20	5429
57.5	.127	7.15	56.299	34.10	27.28	10	5423
57.5	.094	5.15	54.787	35.04	28.04	20	5437
67.5	.127	9.16	72.126	26.62	21.30	10	5477
67.5	.094	7.05	75.000	25.6	20.48	20	5459
75.7	.127	11.51	90.630	21.19	16.95	10	5429
75.7	.127	11.35	89.370	21.48	17.19	10	5439

Mission Altitude was 375ft MSL

Flight Demonstration



#Dronesforgood

