Project Proposal: Mile-High-MyRio

High Altitude Ballistic Descent, Landing, and Recovery

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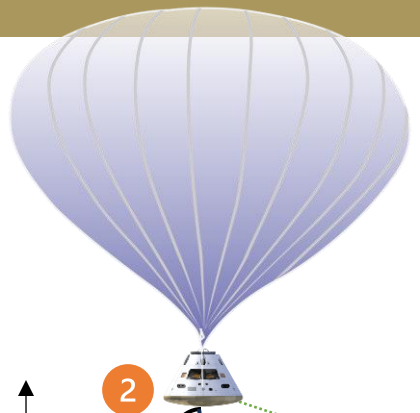


2. We rely on a High-Altitude Weather Balloon to bring our capsule to altitude – here we separate from the balloon

The position and velocity of the capsule is GPS tracked

3. During its descent, the capsule is currently set to record the following data:
- Video
- Pressure
- Temperature
- Position
- IMU

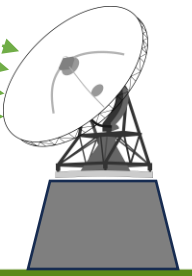
~120.000 [ft]

4-5. When altitude thresholds are met, an incendiary charge-released drogue and main chute the capsule reduces velocity near-landing

The capsule will actively downlink information through radio-communication

1. We launch balloon meeting weather and visibility targets. We notify ATC of launch and begin pursuit.

6. Payload recovered safely



Mission Goal

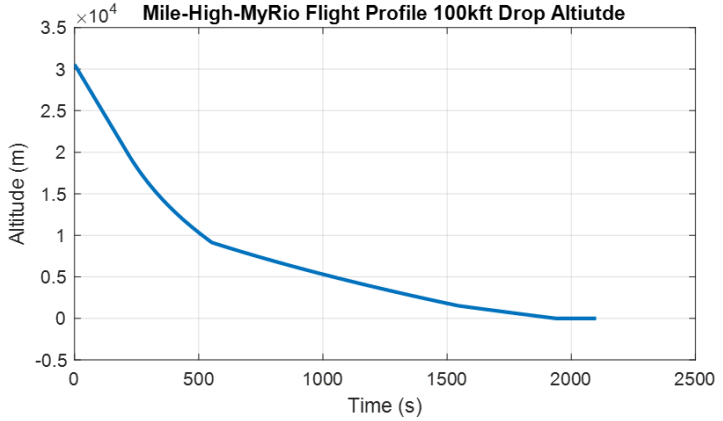
- **Send payload containing NI MyRio microcontroller to ~ 120,000ft and return it safely to surface of Earth.**
  - Ascent method: High altitude latex helium balloon w/ attached payload
  - Descent method: Ballistic descent
  - Landing Method: Drogue parachute deceleration and main parachute landing

- **Minimum Success Criteria:**
  - Payload detaches from balloon
  - Payload lands with electronics in functioning condition
  - Payload is recovered

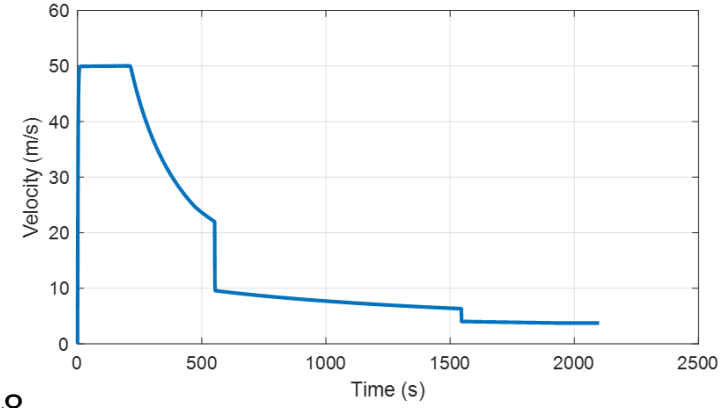
- **Icing on the Cake:**
  - Capture clear video footage of entire flight
  - Record data from various sensors for entire mission duration
  - Successfully demonstrate capsule return capabilities
  - Demonstrate MyRio operational ability in novel environment

Preliminary Capsule Design

- **Capsule Properties:** The capsule is currently designed approximately with a diameter of 13 [inch] and a size of 1100 [g]
  - We aim to maintain the mass of the capsule below 4 [lbs], if we exceed this threshold, we must adhere to stricter FAA regulations and paperwork
  - The MyRio shall operate the sensors and actuators within the capsule, with exception however the video hardware shall operate on a separate architecture



- **Capsule Design Concept**
  - Trilateral carbon fiber frame: carbon fiber rods and 3d printed joints
  - Safety Cell: weather sealed enclosure for electronics with impact protection
  - Dual Batteries: one battery for flight critical hardware and another for cameras and lights
  - Drogue Assist Main Deployment: drogue deployment will be used to pull main parachute out of capsule when commanded



- **Initial Simulation Validation**
  - Initial simulation results show a maximum speed <150 [mph] and a touch down speed of ~8 [mph] indicating project feasibility.