Electrostatic Sail –
Tether Deployment Testbed

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Electrostatic Tether

- Generates electromagnetic field to utilize Lorentz force from solar wind
- Conductive AmberStrand only 10s of microns thick
- Held at 6kV bias
- 12U CubeSat TDM will use Barbell configuration

<table>
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<tr>
<th>Tether Length</th>
<th>Steering Capability</th>
<th>Configurations</th>
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<tbody>
<tr>
<td>4 km</td>
<td>Different tether voltages</td>
<td>Hub and Spoke</td>
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<tr>
<td>8 km</td>
<td>Different tether voltages</td>
<td>Hybrid</td>
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<tr>
<td>16 km</td>
<td>Insulation/switch at center</td>
<td>Barbell</td>
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Testing Objectives

- Use the 3 Degrees of Freedom granted by the Flat-Floor to simulate tether deployment
- Record position and tether tension throughout deployment to aid simulations
- Develop a testbed for testing any future CubeSats

Testbed Features

- Launch on SLS NET 2024
- Deploy 16km tether outside of Earth’s gravitational influence
- Spin up to maintain tension and vary voltage for steering
- Deploy LISA-T solar arrays
- Demonstrate 0.6 mm/s² acceleration
- Dual-chamber air bearing
- Cold gas thruster movement control system
- 360° LiDAR position DAQ
- Arduino based processing
- Manual & Autonomous radio control from ground station
- Battery powered air-compressors for floating

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