

Origami-Inspired Deployable LiDAR Telescope

ID: 2022-030

Executive Statement:

An innovative LiDAR telescope design utilizing origami-inspired principles for efficient space deployment.

Technology Overview:

This technology outlines a LiDAR telescope with a deployable hexagonal twist design inspired by origami patterns, allowing for compact storage and expansive deployment. It incorporates a unique split-vertex thickness accommodation technique to ensure the structural and functional integrity of the telescope during deployment, making it ideal for space missions requiring compact launch configurations and large operational apertures.

Key Advantages:

- Compact stowing capability for efficient launch payload management.
- Large aperture upon deployment suitable for advanced space-borne observations.
- Self-deployment mechanism facilitated by torsional spring hinges for reduced mechanical complexity.
- Enhanced stability and flatness through the use of rigid and compliant joints.
- Protection of the optical membrane via split and sandwich panel design.

Problems Solved:

- Space and weight limitations of launch payloads.
- Risk of damage to optical components during deployment.
- Need for large-aperture telescopes in space for enhanced data collection.
- Mechanical complexity and reliability of deployable space structures.

Market Applications:

- Space-borne LiDAR observation systems.
- Deployable reflectarray antennas for satellite communications.
- Earth observation and remote sensing platforms.
- Scalable structures for both space and terrestrial applications.