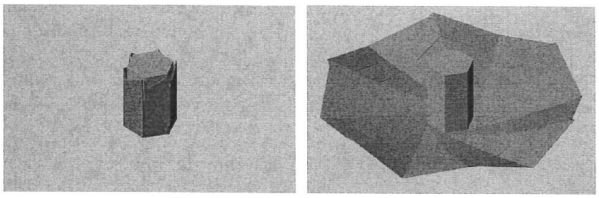
Self-Deployable Self-Stiffening and Retractable Space Structure (SDSR) Mechanism

BYU #2018-031

DESCRIPTION

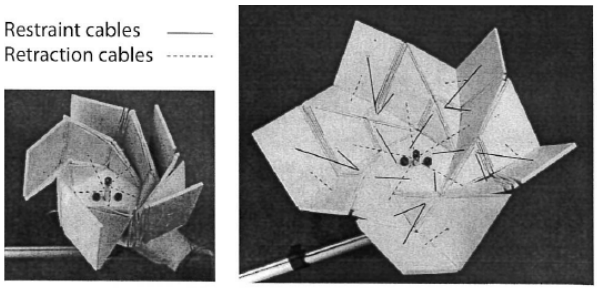
The SDSR is origami-based, fabricated using planar materials, folds up to stow into small volumes, self-deploys via release of stored strain energy, maintains stiffness via preload in a desired large-area 3D shape, and is retractable via reeling cables.



(a) Stowed. (b) Deployed.

PROBLEM SOLVED

Origami-based design allows for the fabrication of large-area planar materials such as solar cells, antenna array elements, mirrors, etc. to be folded into the small volumes required to transport space structures. Several technologies exist that allow large deployable space structures to be packaged on the ground and deployed after launch in space. The SDSR addresses the challenges that current technologies have as it does not require external deployment, support, stiffening, or retracting mechanisms.



SDSR prototype using a flasher pattern.

KEY ADVANTAGES

- *Self-deployable via the release of strain energy in joints*
- *Self-stiffening via the preload of restraint cables*
- *Retractable via the spooling of retraction cables*
- *Allows for the folding of rigid panels*

APPLICATIONS

The SDSR was developed for aerospace applications, particularly for use as deployable space structures with functionality as solar arrays or antennas. Other earthly applications could include solar arrays and antennas – similar benefits would be realized for transportation, deployment, protection, etc. The invention could also be used for shelters, art instalments like kinetic sculptures, or any other deployable products.

Offer:
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IP Status:
Patent Pending

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