

SPACE SYSTEMS SYMPOSIUM (D1)  
Innovative and Visionary Space Systems Concepts (1)

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CTIPS - (CISLUNAR TETHER DEPLOYMENT, PHYSICS AND SURVIVABILITY)

**Abstract**

Very long tethers in space ( thousands of kilometres) offer some interesting and useful applications. However, to date no tethers approaching this length have been attempted in space. There are numerous questions about how such tethers could be deployed and how they might behave during and after deployment.

Tether deployment near Earth is subject to high tidal forces, which become especially significant with longer tethers. Furthermore, unless the orbit is perfectly circular tidal forces will vary greatly, which will introduce non-deterministic disturbances into the system, which complicate the design and could result in unstable systems. Therefore, prior to attempting long tether deployments near Earth it could be beneficial to perform such tests at some distance away from Earth in a stable environment with low non-varying tidal forces.

One of the more convenient types of locations near to Earth which have low and nearly constant tidal forces are the Earth-Moon lagrange locations. (EMLs)

LiftPort Group proposes a mission concept called CTIPS - (CisLunar Tether Deployment, Physics and Survivability) experiment to investigate behavior of long tethers during and after deployment, at an EML location. This testing will be essential for developing technology to deploy planetary and lunar elevators, as well as long tethers for other applications.