SPACE POWER SYMPOSIUM (C3)
Space Power Experiments Applications and Benefits (4)

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THE SUAINEADH PROJECT: A STEPPING STONE TOWARDS THE DEPLOYMENT OF LARGE FLEXIBLE STRUCTURES IN SPACE

Abstract

A number of future space applications envisage the deployment of large flexible structures in space. From large aperture telescopes to new generation antennas for telecommunication, from solar sails to solar power satellites, all require putting a light weight flexible structure into space

The Suaineadh project aims at testing the controlled deployment and stabilisation of space web. A space web is the archetype of all flexible structures and can be used as a support to assemble more complex structures.

The deployment system is based on a simple yet ingenious control of the centrifugal force that will pull each of the four daughters sections apart. The four daughters are attached onto the four corners of a square web, and will be released from their initial stowed configuration attached to a central hub (or mother section).

Enclosed in the central hub is a specifically designed spinning reaction wheel that controls the rotational speed with a closed loop controlled fed by the measurements from an inertial measurement unit (IMU). Five other IMU's located within the web and central hub provide information on the surface curvature of the web, and progression of the deployment. Suaineadh is currently at an advanced stage of development: all the components are manufactured with the subsystems integrated and are presently awaiting full integration and testing.

This paper will present the current status of the Suaineadh project and the results of the most recent set of tests. In particular, the paper will cover the overall mechanical design of the system, the electrical and sensor assemblies, the communication and power systems and the spinning wheel with its control system.