November 2018 to November 2019

Project title

Conceptual system design of a deployable inflatable structure

Institutions：Shimizu Corporation, Taiyo Kogyo Corpolation, Setsunan University

Project outline

Objective

In order to realize an overnight shelter in which a rover running on the lunar surface can be carried over the night, a method of deploying and storing a structure which can stand on its own even under a gravitational environment by using inflatable material of a cylinder as a frame structure is established.

Contents

1. Automatic deployment and storage of structures
   - Demonstrate the feasibility of automatic construction of large-scale structures
   - Experimental study of automatic deployment by partial prototyping
2. Develop specifications for overnight shelter
   - Determine specifications based on the size of lunar rover overnight shelter, the shape of rover entrance, the method of opening and closing the shelter, thermal conditions, interface with the lunar regolith, membrane material, additional power generation and communication, and relationship with the lander
3. Examination of measuring inflated structures
   - Propose a measurement method that can monitor the deployment of inflatable structures
   - Obtain measurement data by experimentally inflated prototype model
4. Examination of methods for joining and expanding structures Investigate a mechanism for joining inflatable structures after deployment or storage to expand space