Inflatable Structures

Overview

There have been a lot of attempts to achieve extremely large space structures such as antenna, telescope, and solar concentrator. The inflatable structure is one of the most desirable solutions to construct large structure with light weight and small packing volume. The inflatable structure means a thin film structure packed compactly and expanded to a three-dimensional shape by the internal gas pressure. The low cost and on-orbit deployability are also the advantages of the inflatable structure as well as light weight and low volume. Inflatable membrane structures are faced with many challenges, particularly the need to achieve and maintain precise shape. So, the reliable maintenance of the shape or surface precision during the mission life is one of the most important technologies for the development of inflatable structures. The methodology to correct local deviations in the shape of the inflatable membrane structures with smart materials is experimentally and numerically investigated.