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# A CASE STUDY ON THE DEPLOYMENT PROCESS FOR INFLATABLE SUPPORT BOOMS

**Abstract**

In the modern age, scientists are looking for innovative methods to achieve space mission success and quality under increasing financial constraints. This is where inflatable structures offer remarkable prospects for future space missions, their large lightweight packaging efficiency alongside their low development cost make them a perfect candidate. Inflatable space structures are needed in a number of space fields from solar sails and potential inflatable rovers to the next generation of habitat modules for extra-terrestrial exploration. For these structures to be efficient and effective, the support booms have to be strong and rigid to support any and all external loads of the structure while reaching a stable deployment state to meet mission requirements. In this paper, we will discuss the deployment of the support boom from an initial simple origami folded state to a final stable inflated rigidised state. In regards to numerical calculation, one has to take into account the non-linearities in the material, large deformation non-linearities, the inflating pressure and in particular the self-contact of the material. Numerical calculations are compared with simulated results obtained from Abaqus FEA to validate the ability of the numerical approach to accurately predict the deployment process.