SECTOR:
AEROSPACE SYSTEMS

OFFERINGS:
BUILD TO SPECIFICATIONS

TECHNOLOGY:
STRUCTURES

DESIGN AND FABRICATION OF DEPLOYABLE BOOM

Our customer is the leading institute of the country, engaged in basic and applied research in Atmospheric and Space Physics. They were aiming to conduct high altitude balloon experiment for measurements of electric and magnetic field. The probes, in this case three pairs of 200 mm sphere, were to be deployed 4m away from the gondola of balloon after the initial take-off. Thus, the experiment required design and development of reliable light-weight booms with minimum tip deflection.

Zeus Numerix explored various concepts of boom opening mechanisms. A collapsible type opening was selected for detailed design and prototyping. The entire system was made with lighter weight material and with mechanical joints. Initially the arm remains in folded condition with solenoid holding it. On actuation of solenoid, the arms open with the help of spring force. All the design calculations for various components are verified using FEA analysis.

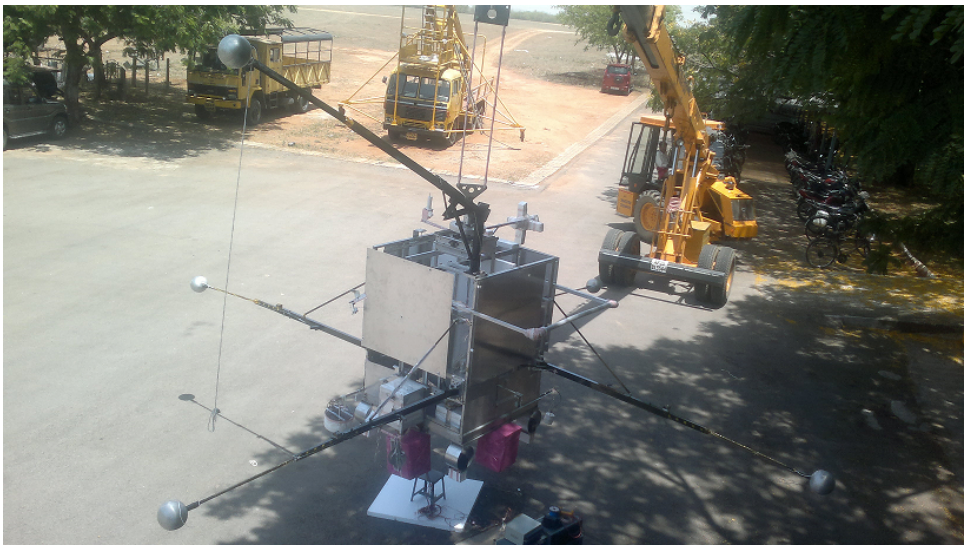

Figure 21: Prototype of deployable boom assembly

The customer was delivered with six sets of deployable booms that were readily integrated with gondola. These booms are being used by the customer for atmosphere experiments. The process of boom development did not encounter any need for costly concept revision since the design was derived from first principles of structural mechanics.

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