

## Comparative Modeling of Full-Scale and Subscale Spacecraft Parachutes

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After the success of the HAYABUSA project, Japan is also now interested in manned spacecraft, and that will require large parachutes. The full-scale spacecraft parachutes are usually too large for wind tunnel tests. Therefore one can possibly test in wind tunnel a sub-scale version. However, it is almost impossible to have the same scaling in fluid and structure. For example, scale effects in geometric porosity can be different. The added mass effects are different. These differences might lead to completely different parachute responses.

The Team for Advanced Flow Simulation and Modeling (T\*AFSM) has successfully addressed the computational challenges related to the parachute dynamics and geometric complexities at full scales (see [1–7]). This is being accomplished with the Stabilized Space–Time Fluid–Structure Interaction technique [1], which was developed and improved over the years by the T\*AFSM, and special techniques [1–6]. In this presentation we will qualitatively and quantitatively compare the parachute responses for the full-scale and subscale versions.

**Keywords:** Manned Spacecraft, Parachute, FSI, Space–Time Formulation

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