



Centro Italiano Ricerche Aerospaziali

Summary:

The invention is relevant to a system for enclosing and then releasing a deployable space apparatus to be released into space from a launcher. The space apparatus might be a probe or a satellite or in general any deployable space system that, after being ejected from the carrier is required to deploy in space.

Benefits:

The proposed Stowing System gives a possibility to the Capsules or Probes based on deployable mechanisms, i.e. deployable thermal protection system to properly enclose them for the launch and also provide a suitable interface with the launcher, mainly for suborbital re-entry missions.

AEROSPACE DEVICE

Problem addressed:

Deployable Space Systems like Thermal Protection Systems for atmospheric re-entry suffer the need of a suitable stowing system for enclosing the deployable element at the time of the launch and before the release out of the atmosphere. The stowing system is also required to be the physical (mechanical, electrical) interface with the ejection system of the rocket.

Proposed use:

The proposed Stowing System of a deployable TPS is suitable for the enclosing and launch of small capsule, i.e. for suborbital mission and for a launch with rockets of the family of VSB30. Light modification of the design makes this system also usable in a wider typology of space mission based on rocket launch.

Technology overview:

The stowing system is mainly based on the three metal panels that close the deployable apparatus, a closing ring located in the bottom that interfaces the main body of the capsule. The other essential elements of the containment system are a locking washer held in position by a pin that will break up which when will be necessary to release the deployable system. And also a shape-memory cylinder that at the time of the releasing it expands in the axial direction until it breaks the pin. Finally, the enclosing system is preloaded by means of three suitable preload screws.

Reference Project:

Mini-Irene FLIGHT EXPERIMENT, ESA Contract
4000117718/16/NL/KMIL/fg

Intellectual property information:

Italian Patent n. 102023000017163 granted on 10.09.2025.

(Patent application is owned by CIRA SCPA, ALI SPA, LEAD TECH S.R.L. e UNIVERSITA' DEGLI STUDI DI NAPOLI FEDERICO II).

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