AEROSTATIC ASSEMBLY PROVIDED WITH AN IMPROVED DECELERATION DEVICE

Technological advantages

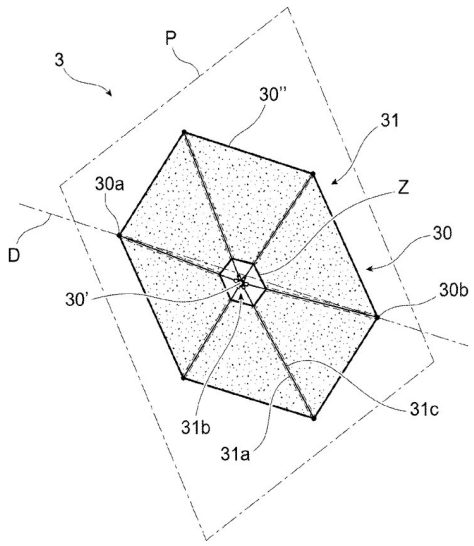
- No suspension lines: Eliminates tangling risks and deployment anomalies.
- Rigid structure: Constant and controlled aerodynamic shape of the wing, optimizing air resistance.
- Automatic wing orientation : Minimal resistance during ascent and maximum resistance during descent.
- Aerodynamic stability: Maintains alignment between the payload's center of mass and the wing's aerodynamic center of pressure.

Invention synthesis

This invention introduces an improved aerostatic system for transporting payloads to high altitudes and ensuring their safe recovery. Unlike conventional parachutes prone to deployment issues in thin atmospheres, this system utilizes a suspension-line-free decelerator device with a rigid wing. Its operation relies on intelligent tilting of the wing: during ascent, the wing orients itself to offer minimal aerodynamic resistance, optimizing the climb. Once the mission is complete, the buoyant element (e.g., the balloon) is released, causing the wing to tilt into a descent position where it offers maximum air resistance. This design enables a slowed and controlled descent of the payload, preventing damage from uncontrolled falls and making the equipment potentially reusable.

Potential applications

- Meteorological missions: Deployment and recovery of atmospheric probes.
- Scientific research: Transportation of instruments for stratospheric measurements (air quality, composition).
- Technological demonstrators: High-altitude testing of new equipment.
- Telecommunications relay equipment.



Aerostatic assembly schematic
(30) wing forming an aerodynamic surface
(30'') wing contour
(30a,30b) points defining the wing direction (D)
(31) rigid structure

Commercial benefits

- Cost reduction: Payload reusability lowers per-mission expenses.
- Increased reliability: Fewer deployment failure risks.
- Mission optimization: Improved ascent speed and controlled descent enhance operational efficiency.
- Enhanced safety: Reduced risk of uncontrolled falls of costly or hazardous equipment.

Patented invention - under license.

For more information :

valorisation@cnes.fr