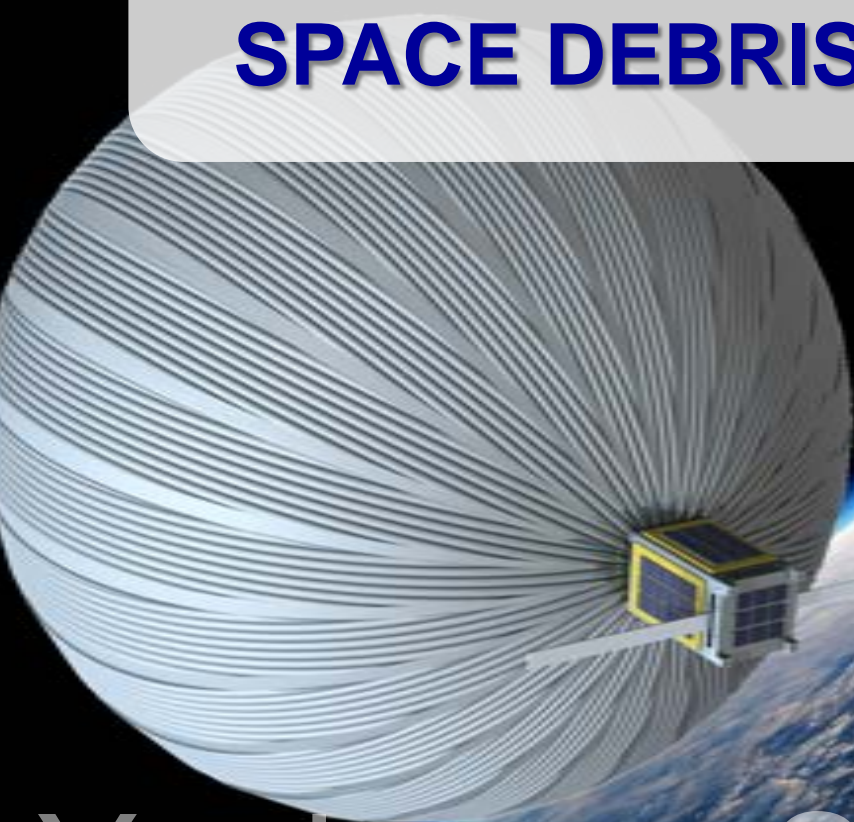


# INFLATABLE PASSIVE AERODYNAMIC SPACE DEBRIS DE-ORBIT SYSTEM



Yuzhnoye SDO proprietary  
*design office*  
**YUZHNOYE**



## DESCRIPTION

**Inflatable Passive Aerodynamic Space Debris De-orbit System (IDS)** is intended for de-orbiting space objects with expired operating lifetime from Low Earth Orbits (LEO) by enlarging their cross-section. This ensures higher aerodynamic drag and faster decay from orbit into dense atmosphere respectively.

Man-made space objects launched into Earth orbits remain there for a long time creating a constant hazard for the currently operating spacecraft.

LEO is the mostly congested orbit with non-operating objects requiring special services to dispose it of such objects. The market for disposal services is being developed at the present time.

The key point of the strategy of de-orbiting the non-operating space objects from LEO is a rational choice of efficient and cost effective means to perform such operations. These means include, first of all, passive deceleration devices using different environmental properties for reducing kinetic energy of the object.

De-orbiting the objects using aerodynamic deceleration systems is considered to be a promising method for de-orbiting spacecraft and launch vehicle upper stages.

The device (IDS) in its initial stowed configuration is mounted on the casing of an object to be de-orbited. After the expiry of object operating lifetime, the IDS is inflated. By means of artificial increase of the object ballistic coefficient the force of its deceleration by atmosphere grows accordingly This allows decreasing the orbit of the object within required time period before its re-entry with follow-on destruction.

The IDS may be placed on the object to be de-orbited in advance, before its launch, and may be activated after the in-flight mission is completed. Also the IDS may be directly placed on the object in orbit by means of active spacecraft.

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After issuing activation command the IDS deploys in its operational condition. The IDS system consists of a shell made of light-weight high-strength thin materials, of pressurization system, pressurization control system and system for attachment to the object to be de-orbited. To improve the IDS survivability, forming of the shell is performed by application of inflatable framed or segmented structures. This enables the system to maintain its deceleration capability during collision with space debris fragments.

**Due dates:** Depend on the scope of works and has to be determined after coordination of Requirement Specification for development.

**Cost, USD:** Depend on the scope of works and has to be determined after coordination of Requirement Specification for development.

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## Attachments:

1. Framed Inflatable De-orbit System;
2. Segmental Inflatable De-orbit System;
3. Segmental Inflatable De-orbit System De-orbiting Spacecraft from the LEO.

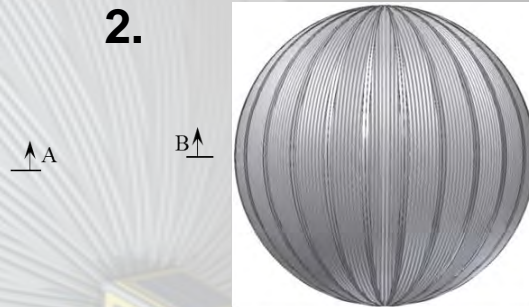
1.



A-A



2.



B-B



3.

