

## LOFTID Mission [UPSC Notes]

NASA completed the technology demonstration of its Low Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID) Mission. The inflatable aerodynamic decelerator or aeroshell technology could one day help land humans on Mars. In this article, you can read all about the LOFTID Mission for the [UPSC Exam](#).

### LOFTID Mission

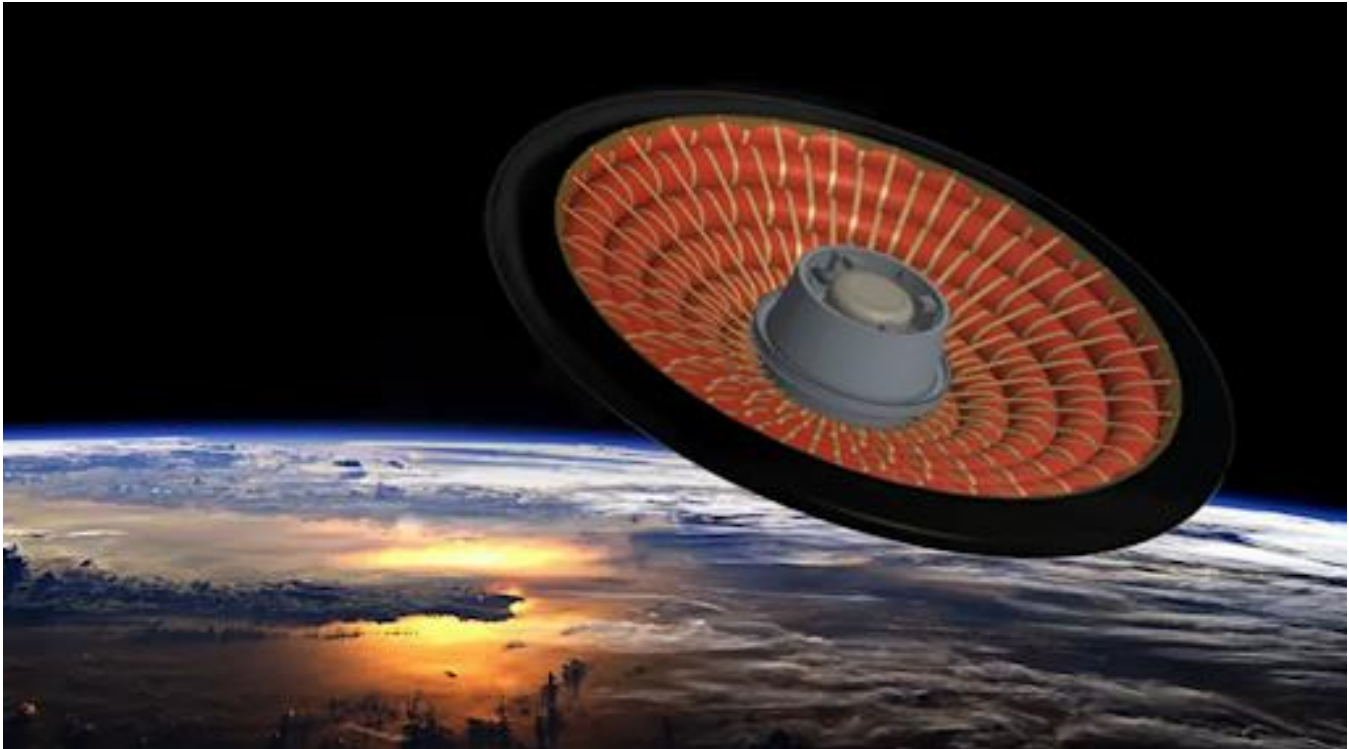


Image source: NASA

An Atlas-V rocket launched JPSS-2 NOAA's newest environmental satellite into orbit. Hitching a ride on the rocket was NASA's Low Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID), as a secondary payload. This mission demonstrated a cross-cutting aeroshell - an innovative inflatable heat shield for atmospheric re-entry. It lifted off from Space Launch Complex - 3 at Vandenberg Space Force Base in California. After JPSS-2 reached orbit, LOFTID was put on a re-entry trajectory from low earth orbit to demonstrate the inflatable aeroshell or heat shield's ability to slow down and survive re-entry.

- The National Oceanic & Atmospheric Administrations (NOAA) Joint Polar Satellite System - 2 (JPSS-2) will support essential forecasts for extreme weather events, feed daily weather models and monitor climate change.
- When a spacecraft enters a planet's atmosphere, aerodynamic drag converts kinetic energy into heat which helps it slow down as it descends towards the atmosphere.

- The atmosphere of Mars is too thin to decelerate the spacecraft as quickly as it would in earth's atmosphere.
- LOFTID's large deployable aeroshell acts as a giant brake as it moves the Martian atmosphere. The large aeroshell creates more drag than a traditional, smaller rigid one.

### Structure of LOFTID

LOFTID's aeroshell is essentially a large circular, six meters diameter (20 feet) inflatable structure protected by a flexible heat shield.

- LOFTID aeroshell is constructed with a stack of pressurized concentric rings that render the rigid blunt cone-shaped structure.
- The rings are made of braided synthetic fibres that are 15 times stronger than steel and can withstand temperatures exceeding 1,600-degree celsius.
- The inflatable structure maintains the shape against drag forces while the flexible thermal protection system acts as a shield from the heat during re-entry.

### LOFTID - Early results show it to be a success

About an hour after launch on a United Launch Alliance (ULA) Atlas V rocket, LOFTID inflated and deployed in space. The aeroshell began its journey, after being released, through the earth's atmosphere. LOFTID created enough drag to slow to less than 80 miles per hour by the end of its demonstration. The aeroshell landed close to the recovery ship in the Pacific Ocean near Hawaii.

### UPSC Questions related to LOFTID Mission

#### **Q. What does LOFTID stand for?**

Ans. Low Earth Orbit Flight Test of an Inflatable Decelerator.

#### **Q. What is the LOFTID Mission?**

Q. The LOFTID mission is the demonstration of a cross-cutting aeroshell - an innovative inflatable heat shield for atmospheric re-entry. NASA launched LOFTID, its latest heat shield technology, onboard the United Launch Alliance (ULA) Atlas V rocket. It took off alongside the JPSS-2 - weather satellite.

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