LOFTID mission

November 16, 2022

In news- NASA completed the technology demonstration of its **Low-Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID) mission.**

What is LOFTID mission?

- It is a NASA mission to test inflatable reentry systems**.It is the first such test of an inflatable decelerator from Earth-orbital speed.**
- LOFTID was launched on an Atlas V 401 in November 2022 as a secondary payload, along with the JPSS-2 weather satellite.
- NASA's LOFTID**, is demonstrating a cross-cutting aeroshell a type of heat shield for atmospheric re-entry.**
- For destinations with an atmosphere, one of the challenges NASA faces is how to deliver heavy payloads (experiments, equipment, and people) because current rigid aeroshells are constrained by a rocket's shroud size.
- One answer is an inflatable aeroshell that can be deployed to a scale much larger than the shroud.
- This technology enables a variety of proposed NASA missions to destinations such as Mars, Venus, Titan as well as return to Earth.
- The "inflatable aerodynamic decelerator," or "aeroshell" technology could one day help land humans on Mars.

Using HIAD technology for reentry-

- When a spacecraft or anything else enters a planet's atmosphere, drag acts upon the body and slows it down, converting kinetic energy into heat.
- The **large size of the HIAD device means that it creates more drag and starts the deceleration process** higher in the atmosphere than traditional aeroshells.
- Not only will this **allow payloads that are much heavier, but it can also allow landings starting at higher altitudes**.
- Further, **it could also be used to bring back massive objects back from Earth's orbit,** like items from the International Space Station.
- NASA says the technology could also potentially be used for bringing back rocket assets after they are launched.
- **A HIAD device will have an inflatable structure that is capable of holding its shape against drag forces**.
- It will also have a **protective flexible thermal protection system** that will **protect it from the heat generated during re-entry.**
- Its structure is made with a stack of pressurised concentric rings that are strapped to form a cone-shaped structure.
- According to NASA, these **rings are made from braided synthetic fibres that are 15 times stronger than steel.** This entire system is foldable, packable, and

deployable, meaning that it will take up less room on rockets. This also allows its design to be scalable.