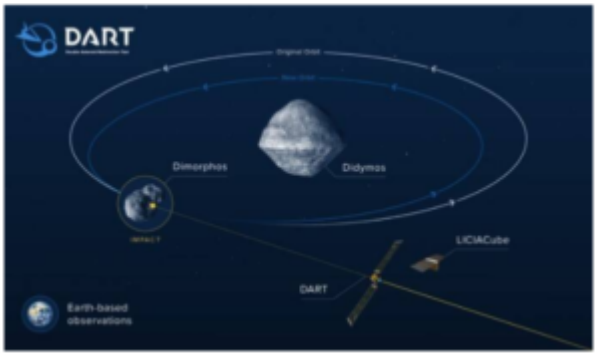
DART mission

November 13, 2021

In news– NASA will launch its first planetary defense test mission named the Double Asteroid Redirection Test (DART) on November 24, 2021.

About Double Asteroid Redirection Test (DART) mission

- DART is a **planetary defense-driven test of technologies for preventing an impact of Earth by a hazardous asteroid.**
- It will be the **first demonstration of the kinetic impactor technique to change the motion of an asteroid in space.**
- This mission is **directed by NASA to the Johns Hopkins Applied Physics Laboratory (APL)** with support from several NASA centers.
- The **target of the spacecraft is a small moonlet called Dimorphos (**Greek for "two forms").
- It is about **160-metre in diameter** and the spacecraft is expected to collide when it is 11 million kilometres away from Earth.
- **Dimorphos orbits a larger asteroid named Didymos** (Greek for "twin") which has a diameter of 780 metres.
- The **mission is to test the new technology to be prepared in case an asteroid heads towards Earth in the future.**
- The **spacecraft will navigate to the moonlet and intentionally collide with it** at a speed of about 6.6 kilometres per second or 24,000 kilometres per hour.
- The **collision is expected to take place between September 26 and October 1, 2022.**



- It is believed that **Didymos is a perfect system for the test mission because it is an eclipsing binary** which means **it has a moonlet that regularly orbits the asteroid** and we can see it when it passes in front of the main asteroid.
- The timing for the DART impact is when the Didymos system is closest to the Earth.

***About the spacecraft*–**

- **It is a low-cost spacecraft,** weighing around 610 kg at launch and 550 kg during impact.
- The main structure is a box (1.2 × 1.3 × 1.3 metres).
- **It has two solar arrays and uses hydrazine propellant for maneuvering the spacecraft.**
- It also **carries about 10 kg of xenon** which will be used to demonstrate the agency's new thrusters called NASA Evolutionary Xenon Thruster–Commercial (NEXT-C) in space.
- NEXT has very high fuel efficiency and flexible operations making it ideal for many classes of science missions.
- The spacecraft carries **a high-resolution imager called Didymos Reconnaissance and Asteroid Camera** for Optical Navigation (DRACO).
- Images from DRACO will be sent to Earth in real-time and will help study the impact site and surface of Dimorphos.
- **DART will also carry a small satellite or CubeSat named**

LICIACube (Light Italian CubeSat for Imaging of Asteroids).

- It will be deployed ten days before the impact on Dimorphos.
- **LICIACube is expected to capture images of the impact and the impact crater formed as a result of the collision.**
- Once launched, DART will deploy Roll Out Solar Arrays (ROSA) to provide the solar power needed for DART’s electric propulsion system.