



Double Asteroid Redirection Test (DART) Mission: NASA

For Prelims: Double Asteroid Redirection Test, NASA, Asteroid Dimorphos, Kinetic Impactor Method of planetary defence.

For Mains: Double Asteroid Redirection Test Mission and its Significance.

Why in News?

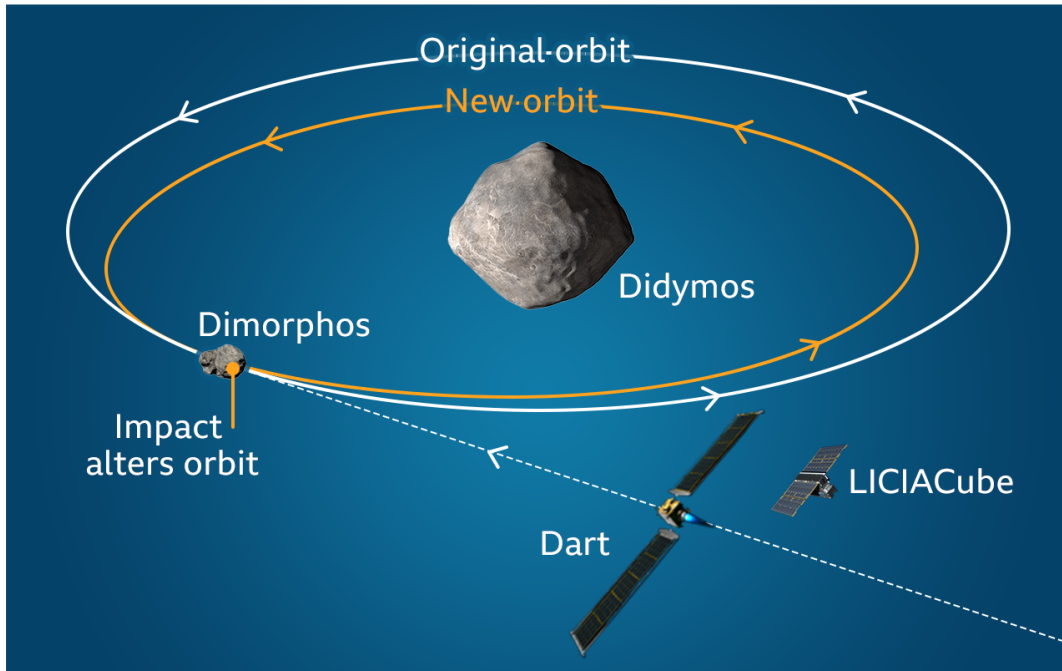
The [National Aeronautics and Space Administration \(NASA\)](#) is about to launch its Double Asteroid Redirection Test (DART) mission.

What is the Launch?

- It is the first **Kinetic Impactor Method** of planetary defence, where a DART spacecraft will be colliding with the **asteroid Dimorphos**.
 - The Kinetic Impactor Method involves sending one or more large, high-speed spacecraft into the path of an approaching near-earth object. This could deflect the asteroid into a different trajectory, steering it away from the Earth's orbital path.
- Data obtained from DART's crash will be **compared to the data from various computer simulations** run by scientists to **ascertain whether this kinetic impactor method will remain a viable option** in case of an actual threatening asteroid.
- Scientists don't yet know the exact mass of Dimorphos but it is estimated to be around five billion kilograms. The **DART spacecraft weighs around 600 kilograms**.

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Nasa spacecraft will crash into asteroid's moon



What is a DART mission?

▪ About:

- DART is a **low-cost spacecraft**.
- 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-C gridded ion thruster system provides **a combination of performance and spacecraft integration capabilities** that make it uniquely suited for deep space robotic 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** (the target asteroid).
- DART will also carry a **small satellite or CubeSat named LICIACube** (Light Italian CubeSat for Imaging of Asteroids).
 - LICIACube is expected to capture images of the impact and the impact crater formed as a result of the collision.

▪ Objectives:

- The mission is to test **the new technology to be prepared in case an [asteroid](#)** heads towards Earth in the future.
- The aim is to test the newly developed technology that would allow a spacecraft to crash into an asteroid and change its course.
- The target of the spacecraft is a small moonlet called Dimorphos (Greek for "two forms").
 - Dimorphos orbits a larger asteroid named Didymos (Greek for "twin").
- It is a suicide mission and the **spacecraft will be completely destroyed**.

What is the Reason for Choosing Dimorphos?

- The goal of the mission is to determine how much DART's impact alters the moonlet's velocity in space by measuring the change in its orbit around Didymos.
- Scientists think the collision will change the speed of Dimorphos by a fraction of one percent.
- It should alter the moonlet's orbital period around the larger asteroid by several minutes - enough to be observed and measured by telescopes on Earth.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. What is 'Greased Lightning-10 (GL-10)', recently in the news? (2016)

- (a) Electric plane tested by NASA
- (b) Solar-powered two-seater aircraft designed by Japan
- (c) Space observatory launched by China
- (d) Reusable rocket designed by ISRO

Ans: (a)

Exp:

- Greased Lightning-10 (GL-10) is NASA developed battery-powered plane with 10 engines that can take off and land like a helicopter and fly efficiently like an aircraft.
- It is a remotely piloted plane having a 3.05 meter wingspan, eight electric motors on the wings, and two electric motors on the tail and weighs a maximum of 28.1 kilograms at take-off.
- Therefore, option (a) is the correct answer.

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