

# DART to throw open new avenues



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In what looked like a lift from the climaxes of Hollywood sci-fi films 'Deep Impact' and 'Armageddon', the U.S. National Aeronautics and Space Administration (NASA) has slammed its DART (Double Asteroid Redirection Test) spacecraft weighing just 600 kg into Dimorphos, an asteroid weighing about 500 crore kg with a diameter of 160 metres. It is the first ever planetary defense test launched on Sept. 26, 2022.

Dimorphos, an asteroid moonlet in the double asteroid system of Didymos, orbits sun at a distance of 11 lakh km from the earth, having a mass of 5,000 crore kg and a diameter of 700 metres. It orbits Didymos once in 11 hours and 55 minutes. The 'double asteroid' orbits suns once in 770 days. The DART spacecraft smashed Dimorphos in a direct hit from about a 17-metre distance. As a result, the revolving pace of the minor planet has slowed down and its orbit path has shrunk. It has had an impact

on Didymos and there occurred deflection in the path where the double asteroid system orbits the sun.

The DART spacecraft, which travelled at the speed of 23,760 kmph, crashed into Dimorphos and reduced its revolving speed. If the revolving speed is reduced, the velocity will increase and the diameter will shrink. That is, the time Dimorphos takes to orbit the primary minor planet will get reduced considerably. How much will be the reduction depends on the quality of the minor planets concerned.

### **Impact of collision**

Scientists surmise that Dimorphos is a massive collection of varied stones, going by the images captured by the spacecraft during the crash. In the days to come, it will be estimated with the help of images captured by the CubeSat, a miniaturized satellite, how much velocity has happened following the crash.

### **Threatening minor planets**

About 660 lakh years ago, a minor planet with a diameter of 10 or 15 km crashed into the earth, triggering a great disaster. A third of the creatures including dinosaur became extinct totally.

About 20,000 asteroids are orbiting the earth. A few thousands of them are coming near the earth menacingly. Only if the asteroids cruising along the course likely to destroy the earth are identified and diverted, all creatures including humans on the earth can be saved. The DART mission is part of the technology meant to deflect such planets with destructive potential.

### **Space mining**

Experts say that the DART mission has the potential of paving the way for creating technologies that will usher in space commerce.

Chemical elements such as yttrium, iridium, palladium, niobium, rhodium, osmium, scandium etc. and digital gadgets, computers,

electric vehicles, digital storages, solar panels and windmills are necessary for the fourth industrial revolution. These precious materials are rarely available in the crust of the earth. The efforts to dig them out of earth will be detrimental to the ecosystem. But these rare things are abundant in the asteroids. Even a small measure of chemical elements dug out of the asteroids will fulfill long-term needs.

The 'kick' technology used to deflect the asteroids headed towards the earth can be used also to bring out the rare chemical elements from them. Space mining will flourish ultimately. This is the new avenue to be thrown open by the DART technology.

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