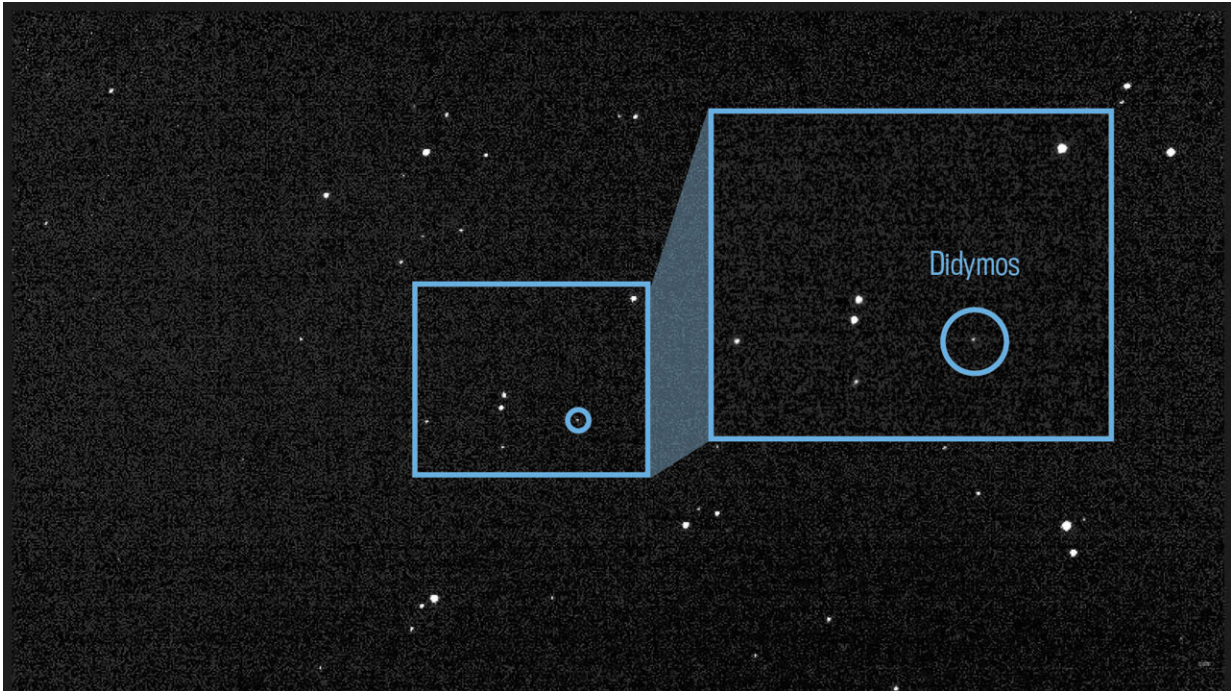


# DART sets sights on asteroid target

September 9 2022

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This image of the light from asteroid Didymos and its orbiting moonlet Dimorphos is a composite of 243 images taken by the Didymos Reconnaissance and Asteroid Camera for Optical navigation (DRACO) on July 27, 2022. Credit: NASA JPL DART Navigation Team

NASA's Double Asteroid Redirection Test (DART) spacecraft recently got its first look at Didymos, the double-asteroid system that includes its target, Dimorphos. On Sept. 26, DART will intentionally crash into Dimorphos, the asteroid moonlet of Didymos. While the asteroid poses

no threat to Earth, this is the world's first test of the kinetic impact technique, using a spacecraft to deflect an asteroid for planetary defense.

This image of the light from asteroid Didymos and its orbiting moonlet Dimorphos is a composite of 243 [images](#) taken by the Didymos Reconnaissance and Asteroid Camera for Optical [navigation](#) (DRACO) on July 27, 2022.

From this distance—about 20 million miles away from DART—the Didymos system is still very faint, and navigation camera experts were uncertain whether DRACO would be able to spot the asteroid yet. But once the 243 images DRACO took during this observation sequence were combined, the team was able to enhance it to reveal Didymos and pinpoint its location.

"This first set of images is being used as a test to prove our [imaging techniques](#)," said Elena Adams, the DART mission systems engineer at the Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Maryland. "The quality of the image is similar to what we could obtain from [ground-based telescopes](#), but it is important to show that DRACO is working properly and can see its target to make any adjustments needed before we begin using the images to guide the spacecraft into the asteroid autonomously."

Although the team has already conducted a number of navigation simulations using non-DRACO images of Didymos, DART will ultimately depend on its ability to see and process images of Didymos and Dimorphos, once it too can be seen, to guide the spacecraft toward the asteroid, especially in the final four hours before impact. At that point, DART will need to self-navigate to impact successfully with Dimorphos without any [human intervention](#).

"Seeing the DRACO images of Didymos for the first time, we can iron

out the best settings for DRACO and fine-tune the software," said Julie Bellerose, the DART navigation lead at NASA's Jet Propulsion Laboratory in Pasadena, California. "In September, we'll refine where DART is aiming by getting a more precise determination of Didymos' location."

Using observations taken every five hours, the DART team will execute three trajectory correction maneuvers over the next three weeks, each of which will further reduce the margin of error for the spacecraft's required trajectory to impact. After the final maneuver on Sept. 25, approximately 24 hours before impact, the navigation team will know the position of the target Dimorphos within 2 kilometers. From there, DART will be on its own to autonomously guide itself to its collision with the asteroid moonlet.

DRACO has subsequently observed Didymos during planned observations on Aug. 12, Aug. 13 and Aug. 22.

Provided by NASA

Citation: DART sets sights on asteroid target (2022, September 9) retrieved 6 May 2024 from <https://phys.org/news/2022-09-dart-sights-asteroid.html>

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