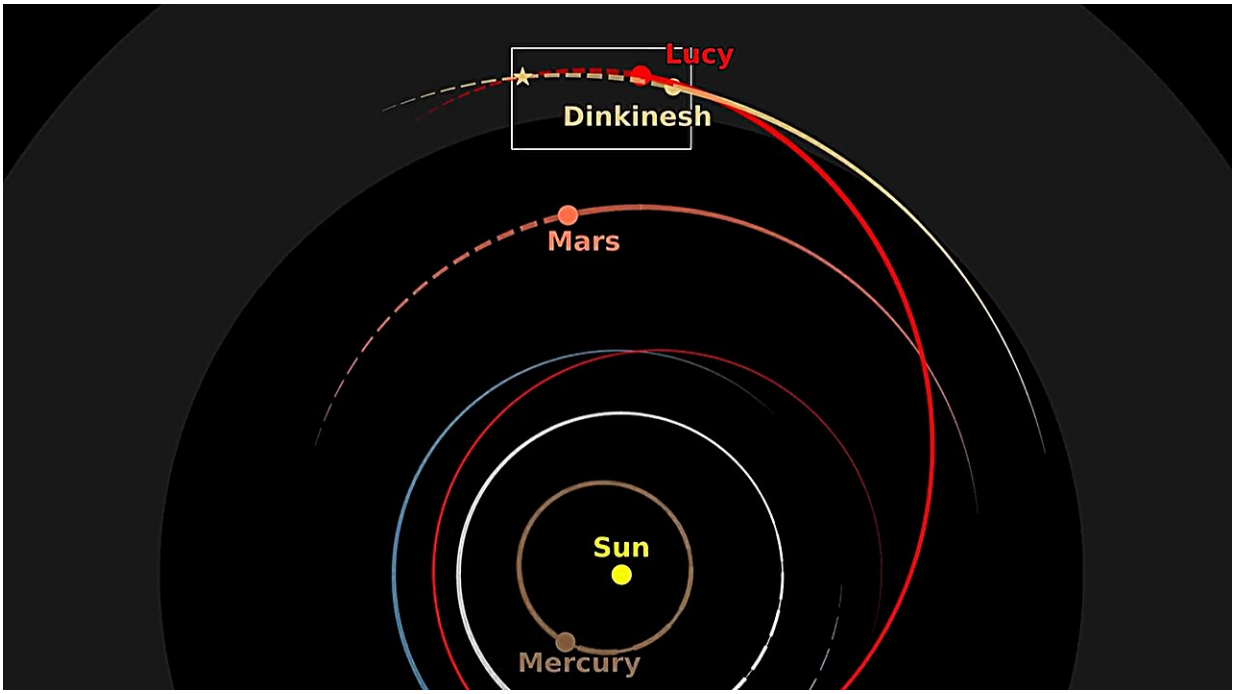
NASA's Lucy spacecraft ready for first asteroid encounter

October 31 2023, by Erin Morton



This data visualization overlays some of the images taken by the Lucy spacecraft's L'LORRI from Sept. 3, 2023, to Oct. 3, 2023, on the Lucy trajectory (red) and the orbit of the asteroid Dinkinesh (gold). These images were taken as part of the optical navigation program in advance of the encounter on Nov. 1. The stars indicate the locations at closest approach on Nov. 1, 2023. Credits: NASA/SwRI/APL

NASA's Lucy spacecraft is on track for its first asteroid encounter on

Nov. 1. Lucy's optical navigation team has confirmed that the latest trajectory correction maneuver on Sept 29 accurately set the spacecraft on course for its flyby of the small main belt asteroid Dinkinesh. The spacecraft is anticipated to pass approximately 265 miles (425 km) from the asteroid at 12:54 p.m. EDT.

On Oct. 28, the team sent the spacecraft what is known as the final knowledge update, a package of data with the most up to date information about the relative positions of the spacecraft and asteroid. This dataset is precise enough to guide the spacecraft for nearly all the half a million miles (800,000 km) that currently separate Lucy and Dinkinesh.

About an hour before the spacecraft's closest approach, when it's approximately 10,000 miles (16,000 km) from the asteroid, Lucy will begin actively monitoring the position of Dinkinesh with its terminal tracking system, although due to Dinkinesh's small size, the system is not expected to "lock-on" to the asteroid until just a few minutes before closest approach.

This system will autonomously reorient the spacecraft to keep the small asteroid within the field of view of the science instruments as the spacecraft zooms by at around 10,000 mph (4.5 m/s). This will be the first use of this terminal tracking system, and this flyby was designed to test the system in real spaceflight conditions.

As Lucy approaches Dinkinesh on the morning of Nov. 1, the spacecraft will rotate into a position that enables it to continually track the asteroid. This will move the high-gain antenna away from Earth, and the spacecraft will not be able to communicate again until it has completed the encounter sequence and reoriented itself so that the high-gain antenna is pointing back toward Earth. Imagery and other science and engineering data from the flyby will then be downlinked over the next

weeks.

Provided by NASA

Citation: NASA's Lucy spacecraft ready for first asteroid encounter (2023, October 31) retrieved 10 May 2024 from https://phys.org/news/2023-10-nasa-lucy-spacecraft-ready-asteroid.html