Hayabusa2 drops target marker at asteroid Ryugu

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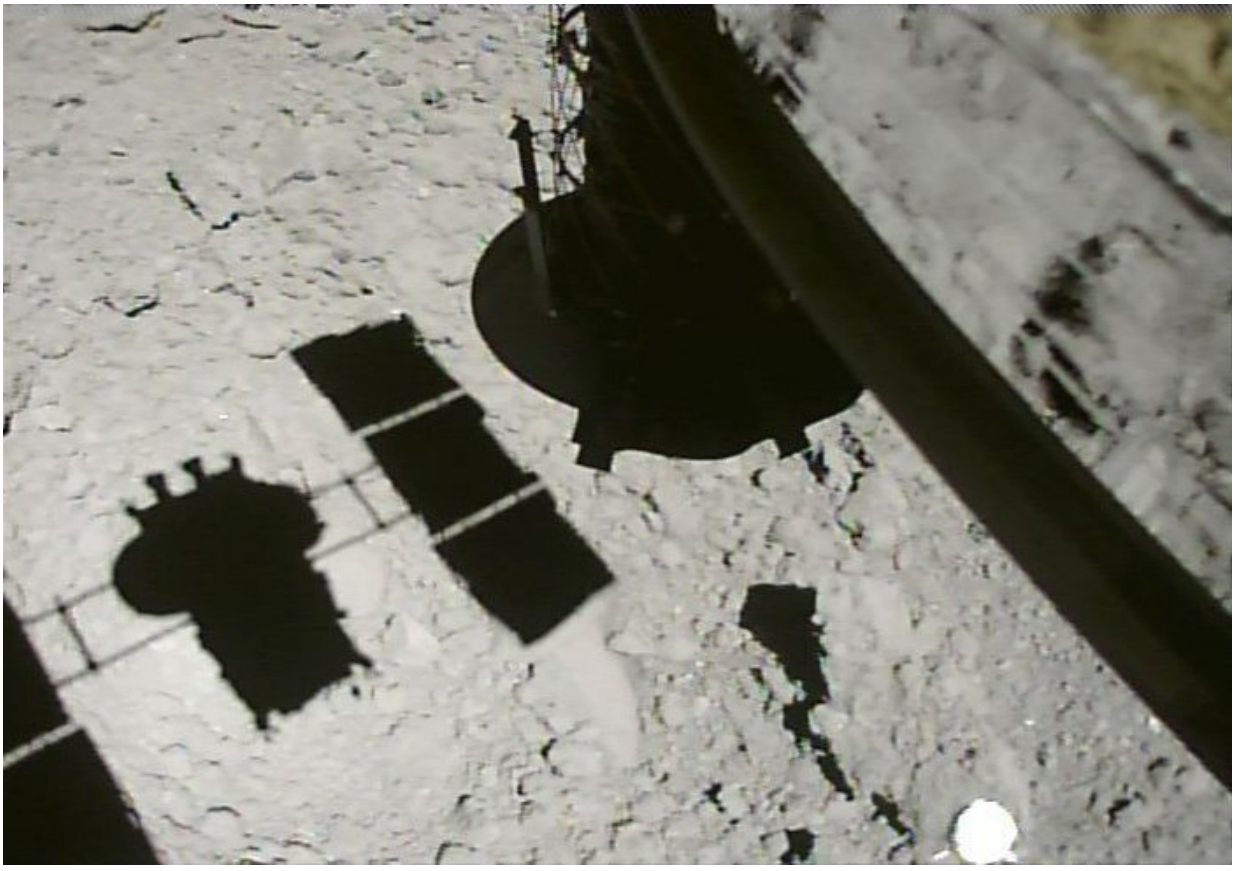

Credit: JAXA

The Japanese Aerospace Exploration Agency (JAXA) has made some impressive feats in recent years. Roughly one year ago, and following in the footsteps of its predecessor, the Hayabusa2 spacecraft successfully

rendezvoused with a near-Earth asteroid (NEA) called 162173 Ryugu. Since then, it has been collecting samples from the surface in the hopes of learning more about the formation and evolution of the solar system.

Just a few months after the spacecraft created an artificial crater with an anti-tank warhead, the spacecraft has once again descended close to the asteroid to drop another target marker. This marker, a reflective sphere that contains the names of people who've supported the mission, will provide a visual guide as the spacecraft attempts to collect its second sample of material from the asteroid's surface.

The target marker was deployed on Thursday, May 30th, at 07:18 pm PDT when the spacecraft was between 10 and 40 meters (33 to 130 feet) from the surface of the asteroid. The agency tweeted an animation of the separation and descent from the spacecraft shortly thereafter, followed by a last-minute image of the separation almost a week later—on Wednesday, June 5th.

> The target marker separation on May 30 during PPTD-TM1A was caught at the last moment by the small monitor camera, CAM-H! The image time was May 30, 11:18 JST (on-board time) at an altitude of about 9m. CAM-H was built with donations from all of you & is a big success! Thank you! pic.twitter.com/pHSwqPaywh
>
> — HAYABUSA2@JAXA (@haya2e_jaxa) June 5, 2019

The latest image was taken when Hayabusa2 was just nine meters (29.5 ft) from Ryugu and shows the spacecraft's shadow on the surface, as well as that of the target marker. This successful deployment comes on the heels of a delay in mid-May, when the spacecraft was forced to abort descent operations due to an error with the spacecraft's LIDAR data.

According to a report briefing filed by JAXA, the issue was the result of the spacecraft's LIDAR instrument returning false data. When the instrument reported that the spacecraft was 50 meters too high, the science team aborted the descent and returned the spacecraft to its home position—50 km from the asteroid.

According to the report, this error was caused by "noise data" that was factored into the adjustments, causing the LIDAR to lose calibration. Once the science team noted the discrepancy in altitude, the spacecraft was pulled away from the surface to avoid an accident. While it is not clear what "noise data" refers to, this is not the first time that the spacecraft has had to abort a descent due to a glitch with the LIDAR.

Simply put, LIDAR relies on lasers to determine the range of an object. However, Ryugu has a very dark surface, which can make detecting reflected laser light rather difficult at times. In any case, a JAXA statement said, "After this event occurred, we found [an] adjustment method that could reliably prevent noise mixing. This will be adopted from now on."

With this new method, the spacecraft managed to successfully descend to within 50 m (31 ft) of the asteroid on May 30 and deploy its second marker. All that remains now is for mission controllers to decide if they will be collecting samples from this site (designated SO1), which is located close to the artificial crater they created.

Previously, mission controllers were not sure if SO1 was a safe enough place to land the spacecraft. The crater was created for the express purpose of kicking up material from the interior that would be unaffected by billions of years of exposure to the vacuum of space or solar radiation. Mission controllers were not certain if the terrain was clear enough for a safe touchdown.

However, during the previous descent and aborted touchdown, close-up images from around the crater were obtained that revealed that it could, in fact, be safe to land there. The decision to attempt a touchdown and sample collection is expected to be announced by mid-June, with the touchdown itself taking place in late June or early July.

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