

# NASA finds likely cause of OSIRIS-REx parachute deployment sequence

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Credit: NASA

NASA's OSIRIS-REx sample return capsule landed under parachute in the Utah desert on Sept. 24, 2023, and safely delivered a canister of rocks and dust collected from near-Earth asteroid Bennu. Although the delivery was successful, the landing sequence did not go entirely according to plan, with a small parachute called a drogue not deploying as expected.

After a thorough review of the descent video and the [capsule](#)'s extensive documentation, NASA found that inconsistent wiring label definitions in the design plans likely caused engineers to wire the parachutes' release triggers such that signals meant to deploy the drogue chute fired out of order.

The drogue was expected to deploy at an altitude of about 100,000 feet. It was designed to slow and stabilize the capsule during a roughly five-minute descent prior to main [parachute](#) deployment at an altitude of about 10,000 feet. Instead, at 100,000 feet, the signal triggered the system to cut the drogue free while it was still packed in the capsule. When the capsule reached 9,000 feet, the drogue deployed.

With its retention cord already cut, the drogue was immediately released from the capsule. The main parachute deployed as expected, and its design was robust enough to stabilize and slow the capsule, resulting in a safe landing more than a minute earlier than expected. There was no negative impact to OSIRIS-REx's Bennu sample as a result of the unexpected drogue deployment.

In the design plans for the system, the word "main" was used inconsistently between the device that sends the electric signals, and the device that receives the signals. On the signal side, "main" meant the main parachute. In contrast, on the receiver side "main" was used as a reference to a pyrotechnic that fires to release the parachute canister cover and deploy the drogue. Engineers connected the two mains,

causing the parachute deployment actions to occur out of order.

To confirm the root cause, NASA will test the system responsible for releasing the parachutes. This hardware is currently inside one of the glove boxes with the Bennu sample at NASA's Johnson Space Center in Houston. Once the curation team there completes processing the sample material—the mission's top priority at present—NASA engineers will be able to access the parachute [hardware](#) and verify the cause.

Provided by NASA

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