

WHAT DO WE KNOW ABOUT THE NEWEST CRATER ON THE MOON?

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A 2011 image made available by NASA shows the lunar far side.

The story so far: A leftover piece of a spacecraft flying through space reportedly hit the surface of the moon last Friday, creating a new crater that may be around 65 feet wide. The piece of space junk was earlier believed to be a SpaceX rocket, but was later said to be the third-stage booster of Chang'e 5-T1 – a lunar mission launched by the China National Space Administration in 2014. China, however, denied responsibility, saying that the booster in question had "safely entered the earth's atmosphere and was completely incinerated", news agency AFP reported. According to orbital calculations, the collision took place on March 4 at 5.55 p.m. IST on the far side of the moon. The object reportedly weighs around four tonnes and was racing towards the moon at a speed of 9,300 km an hour. The speed, trajectory, and time of impact were calculated using earth-based telescope observations.

American astronomer Bill Gray was the first to predict the collision. In January 2022, Gray had said that a booster from a SpaceX Falcon 9 rocket was likely to hit the moon after seven years of floating in space. Gray later corrected his prediction, saying that the space junk was part of a Chinese lunar mission and not from SpaceX.

Gray runs Project Pluto, a blog that tracks near-earth objects. Project Pluto also supplies astronomical software to amateur and professional astronomers. Gray is the creator of popular astronomy software called Guide.

The astronomer explained the process of ascertaining the date and time of the collision in a [blog post](#) on Project Pluto. He informed that the object was first spotted during an asteroid survey in 2015 and was believed to be a part of the Deep Space Climate Observatory (DSCOVR) satellite that was launched by SpaceX on Falcon 9 rocket on February 11, 2015.

Gray continued to track the object, and after analysing data that came in from nine different observatories in January 2022, he was able to improve the accuracy of the object's trajectory and give a confident prediction of the date and time of the object's collision with the surface of the moon.

The astronomer has also said that this is the first recorded unintentional case of space junk hitting the moon.

According to Gray, an email from Jon Giorgini of NASA's Jet Propulsion Laboratory in California made him retrace the trajectory of DSCOVR, and it was seen that the SpaceX spacecraft did not go close to the moon. "It would be a little strange if the second stage went right past the moon, while DSCOVR was in another part of the sky. There's always some separation, but this was suspiciously large," Gray wrote on his blog.

The astronomer then studied the trajectory of the object backwards, and discovered a lunar flyby on October 28, 2014. The [Chang'e 5-T1 mission](#) was launched on October 23, 2014, providing evidence that the object was indeed a leftover from the same mission.

A team at the [University of Arizona](#) also studied the object and confirmed that it resembles the

Chinese rocket and not that of SpaceX.

NASA's Lunar Reconnaissance Orbiter and ISRO's Chandrayaan-2 orbiter are two active lunar missions that are capable of observing the crater and picturing it. The location of the impact – on the far side of the moon – has made it difficult for the crater to be pictured and studied immediately.

Both the earth and the moon have been hit by multiple objects like asteroids throughout their existence, but craters on the moon are of a more permanent nature than those on earth. This is because of processes like erosion, tectonics, and volcanism. According to NASA, these three processes keep the surface of the earth crater-free and remove traces of collisions that have happened in the past. Currently, the earth has less than 200 known craters while the moon has thousands.

An absence of atmosphere means there is no wind system and no weather on the moon, and hence no cause for erosion of existing craters. Absence of tectonics prevents the moon's surface from forming new rocks, or causing a shift in the existing surface patterns, unlike that on earth. Lastly, absence of volcanism makes it impossible for craters to be covered.

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