

## WAITING FOR DAYBREAK: ON CHANDRAYAAN-2

Relevant for: Science & Technology | Topic: Space Technology & related matters

India's second moon mission, [Chandrayaan-2, was pulled back from launch just 56 minutes before its scheduled liftoff on July 15](#). This was owing to a technical glitch in the GSLV Mark-III rocket launcher. No rescheduled date has been announced for launch. This has no doubt served as a damper on those who eagerly looked forward to India being only the fourth country to launch a mission that would land on the moon, and the very first to land on and explore its south pole region. Yet, it was best that the glitch was discovered before the launch. Rocket launches always have a nail-biting finish. Even the GSLV-D1, the slighter predecessor to the GSLV Mark-III, suffered such a setback when it was about to be launched for its first developmental test flight in 2001. It was called off exactly one second before launch, as it was discovered that one of the four liquid propellant strap-on stages had not developed the required thrust. This test flight was conducted just 21 days later, paving the way for several successful launches of the GSLV rocket subsequently.

### The women, and men, behind Chandrayaan 2

What seems to have touched the popular imagination is that the current launch window ends on July 16 and if this window is missed there could be an indefinite delay in rescheduling the launch. Coupled with news reports that checking and correcting the error could take up to 10 days, this has led to dire pronouncements of an indefinite postponement of the mission. The 'launch window' is determined by several factors. One of the most important considerations is that any spot on the moon receives sunlight for approximately 14 (earth) days before being plunged in night for another fourteen. The landing has to be timed so that it maximises the overlap with the sunlit days on that spot. This is because the lander and the rover need solar energy to power them and to keep the instruments warm. Therefore, given a landing spot that can be seen from the earth, the landing date has to coincide with the sixth phase of the moon (first quarter) as seen from the earth, on that spot. Secondly, once placed on the moon orbit, Chandrayaan-2 must have full visibility to the ground station, which will determine the time of operation of the landing. From the date of launch to the date of landing, the planned interval is about 54 days. Much of this time is needed for the Chandrayaan-2 mission to make various orbital manoeuvres and operations, but there is a leeway of a day or two to take some decisions. A window that takes all this into account, is available for about 10 minutes on each day now for about a week. Such a window can be found every month. Other tighter windows are available but are high-risk options. So even if Chandrayaan-2 misses its rendezvous with the moon this month, it will find a date, perhaps even next month, that will be suitable.

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