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Space is hard – Celebrate the wins!

It has been a very interesting first quarter of 2024, with several international attempts to reach the surface of the Moon, and whilst it's known within the Space Industry, the rest of the world is fast learning that space is hard!

Intuitive Machines mission

In February, Intuitive Machines announced mission success on IM-1 Mission after the successful transmission of data to and from the Nova-C class lunar lander, at the south pole region of the Moon.

The lunar lander is carrying both NASA and commercial payloads on board and is the **first commercial-sector company to successfully land and transmit from the moon.**

However, it was not all smooth sailing; when the lander first touched down it was not entirely clear what happened. Whether the robot caught a foot on the Moon's surface and fell, or broke a leg as it landed, or just needed a nap after a long journey - whatever the case, due to lateral motion at the moment of impact, the lander fell on its side. Fortunately for all involved, all radio antennas onboard were still pointing at Earth and the solar cells used to power the system were not damaged. In fact the only part that was pointing down to the Moon's surface is a static art project, meaning mission operations could continue (relatively) un-compromised.

Despite not being in the position they would have liked, Intuitive Machines mission can still claim success as the lander is transmitting data to and from the Moon. While success factors are different to what was originally anticipated, a lot can be learned from the spacecrafts position and the data it is transmitting.

JAXA mission

Similarly, in January, JAXA mission - the Smart Lander for Investigating Moon (SLIM) landed on the Moons surface, near an equatorial crater. **The mission was successful** in that it landed with 'pinpoint' accuracy, landing within 100m of its target - which is quite impressive compared to other landing sites that measure up to 10kms. Not everything went to plan with the landing, as the lander impersonated Mr Squiggle and landed upside down.

Whilst it did not land the 'right way up', the mission objective of SLIM was to make a precision landing, send two small rovers onto the Moons surface for their own operations, and collect scientific data in the surrounding area. SLIM met that original intent, proving it is possible to land where you want not just where you can.

SLIM is entirely reliant on its batteries, which given its landing position couldn't easily recharge. It was hoped that as light angles changed on the Moon, it could be possible for the spacecraft to come back to life, the alternative being it would simply go quiet.

Following a near month long hibernation, which included the Moon's two week 'night', in February SLIM responded to a command from Earth. The communication is exciting to see, as it means the lander survived the cold night conditions and maintained the ability to communicate. Whilst not able to complete its mission as originally envisaged, the lander being able to gather scientific data and communicate, means there is still a lot to be taken from the exercise.



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In both the JAXA and Intuitive Machines missions, whilst the outcome may not have been exactly what the myriad of professionals involved in the program envisaged, the fact that the landers made it to the Moon's surface and are able to communicate is success in and of itself.

Peregrine mission

The same fate is not shared by all. In January, the Peregrine moon lander suffered an anomaly shortly after separating from the Vulcan rocket. A critical propellant leak developed that prevented the lander from completing its mission and ruled out a landing on the Moon. Carrying payloads for the NASA Commercial Lunar Payload Services (CLPS) program, and initially expected to land on the moon on 23rd February, the lander instead performed a series of short burns and attitude adjustment, redirecting back into the Earth's atmosphere where it burned up on re-entry.

Why space missions are harder than other projects

If you are building a new car, you design and test and build and test (and test some more) and then you get to drive it around the test track and make modifications before rolling it out for use. The same principles are applied for spacecraft. They are designed and tested and built and tested and tested some more and then they are strapped to the side of a literal rocket, and blasted hundreds of kms into a very harsh environment that gets both incredibly cold and incredibly hot and contains cosmic radiation. Once the spacecraft is there, it is hoped that it turns on and performs as designed (and tested). If it doesn't, you can't just 'go over and fix it'.

Space is hard!

The fact that two missions this year successfully landed and communicated is absolutely wild and should be celebrated.



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