

SO CLOSE, YET SO FAR**Chandrayaan 2 might have failed in an objective, but the mission itself is not a failure**

The Indian Space Research Organisation (ISRO) came tantalisingly close to creating history in the early hours of September 7 when the robotic lander Vikram followed the predetermined descent trajectory and came just within 2 km of the lunar surface before contact was lost. While it is unfortunate that the lander failed to safely touchdown, it is apt to remember that ISRO was attempting powered landing for the first time. To put it in perspective, there have been 38 attempts so far by other countries to land a rover on the moon and have succeeded only a little more than half the time. This April, Israel's Beresheet lunar lander crashed to the lunar surface. But early January this year, China's Chang'e-4 touched down on the lunar far side and deployed the Yutu-2 rover to explore the South Pole-Aitken basin. In Vikram, the velocity was successfully reduced from about 6,000 km per hour at the start of the descent at 35 km altitude to a few metres per second before communication snapped. That strongly indicates that powered landing went as per plan till about 2 km altitude from the lunar surface.

While the powered landing of Vikram and exploration of the moon's surface for 14 earth days by the Pragyan rover were one of the main objectives of Chandrayaan 2, it is wrong to think that the mission itself has failed. On the contrary, 90-95% of the mission objectives have already been "accomplished". The orbiter is safe in the intended orbit around the moon. And with the "precise launch and mission management", its life span will extend to almost seven years. Carrying eight of the 13 payloads, the orbiter will spend the next nearly seven years making high-resolution maps of the lunar surface, mapping the minerals, understanding the moon's evolution, and most importantly looking for water molecules in the polar regions. Some of the impact craters in the South Pole are permanently shadowed from sunlight and could be ideal candidate sites to harbour water. Water on the moon would, in principle, be used for life support and manufacturing rocket fuel. With the U.S. wanting to send astronauts to the South Pole by 2024, the National Aeronautics and Space Administration (NASA), in particular, will be keen on data from the Chandrayaan 2 orbiter. The ISRO's Moon Impact Probe and NASA's Moon Mineralogy Mapper on board Chandrayaan 1 had already provided evidence of the presence of water in the thin atmosphere of the moon, on the surface and below. A NASA study last year found regions, within 20° of each pole in general and within 10° in particular, showed signs of water. The Chandrayaan 2 orbiter will now possibly reconfirm the presence of water on the moon.

Words**Kind****Meaning**

Tantalise

Verb

Tease, torment, torture, bait, entice, lure

Robotic

Adj.

Resembling / characteristic of a robot

| | | |
|----------------|------|--|
| Pre-determined | Adj. | Pre-planned, calculated, premeditated |
| Descent | Noun | Ancestry, line age, parentage |
| Trajectory | Adj. | Course, path, route, orbit, ambit |
| Touchdown | Verb | Land, alight, come into land |
| Perspective | Noun | Outlook, view, stance, attitude, approach |
| Succeed | Verb | Triumph, prosper, flourish, make good |
| Deploy | Verb | Position, place, instal, station, locate |
| Explore | Verb | Travel over, traverse, reconnoitre |
| Velocity | Noun | Speed, pace, tempo, momentum, impetus |
| Altitude | Noun | Height, elevation, distance above the sea |
| Communication | Noun | Transmission, imparting, conveying, conveyance |
| Snap | Verb | Break, fracture, splinter, crack |
| Accomplished | Adj. | Skilled, expert, adept, adroit |
| Precise | Adj. | Exact, accurate, detailed, explicit |
| Spend | Verb | Payout, lay out, expend, disburse |
| Resolution | Noun | Intention, resolve, decision, plan |
| Evolution | Noun | Development, progress, extension |
| Craters | Noun | Hollow, cavit |
| Shadow | Verb | Overshadow, dwarf, shade, block off |
| Site | Verb | Place, put, position, situate, locate |
| Harbour | Noun | Port, dock, marina, haven, mooring |
| Astronaut | Noun | Spaceman, space woman, cosmonaut, cadet |
| Keen | Adj. | Eager, anxious, impatient, yearning |
| Show | Verb | Manifest, exhibit, reveal, array |
| Confirm | Verb | Confirm, corroborate, substantiate |

ITALY AFLOAT

The rise of the far right has been halted, but the respite might be temporary

Rome's unlikely ruling coalition of the anti-establishment Five Star Movement (M5S) and the centre-left Democratic Party (PD) seems free of the many unwieldy elements of the previous government. To begin with, Prime Minister Giuseppe Conte would now command greater functional independence. Earlier, he was hamstrung by two deputies from the M5S and its former ally, the far-right League, whose antagonism weighed on the 14-month long coalition. As Interior Minister, the League's leader, the hard-line anti-immigrant Matteo Salvini, adopted a hostile stance on the rescue of

refugees stranded at sea, in the Mediterranean. Under the stewardship of a known immigration expert, Italy can hope to return to a course consistent with (EU) policy it had helped shape during the onset of the refugee crisis earlier this decade. Similarly, there will be relief in Brussels over the appointment of an influential PD member of the European Parliament to the economy portfolio. Under his predecessor, the bloc was faced with the risk of a deliberate breach of its already shaky fiscal rules. Worse, given the size of its economy, Rome's threat to quit the Euro single currency was far more potent than Greece's in 2015, sending financial markets into a tizzy. A key plank of the new coalition is to expand education, research and to stimulate growth.

As Foreign Minister, the M5S leader Luigi Di Maio would be obliged to temper his populist anti-EU rhetoric, which at times bordered on suggestions to the effect that Italy, one of the EU's founder-members, would withdraw from the bloc. The coalition has been granted additional legitimacy following its online ratification by the M5S's vast membership. But the unusual coming together of the two traditional adversaries was brought about by the intervention of veterans Beppe Grillo and former Prime Minister Matteo Renzi, respectively. They overruled their parties from going for a general election, given that the M5S is the largest in Parliament and much of its term still remains. That move spectacularly wrong-footed Mr. Salvini, who in mid-August pulled the plug on the coalition with M5S, following the League's emergence as the largest party in May's European elections. He has already attacked the new government as one engineered by Paris and Berlin. With his incendiary campaign, Mr. Salvini continues to receive high poll ratings and strong populist backing. Frictions in the new coalition would be apt for him to force an election. Governance by consensus would therefore have to form the operative principle. Mr. Conte has been reported to have emerged from his relative political inexperience during the recent crisis, confronting Mr. Salvini's sectarian agenda and enabling the coalition to close ranks. The good former professor would know that the far-right's current halt in Italy is but temporary. More needs to be done to keep Italy afloat.

| <u>Words</u> | <u>Kind</u> | <u>Meaning</u> |
|---------------------|--------------------|---|
| Halt | Verb | Hinder, constrain, curb, staunch, inter fear with |
| Respite | Verb | Rest, breathing, interlude, lull, pause |
| Coalition | Noun | Alliance, affiliation, bloc, caucus |
| Command | Noun | Order, diktat, behest, injunction |
| Independence | Noun | Self govt., self determination, non alignment |
| Hamstring | Verb | Cripple, lame, hock, disable, injure |
| Antagonism | Noun | Hostility, friction, antipathy, animus |
| Weigh | Verb | Consider, Contemplate, muse on |
| Negotiate | Verb | Arrange, broker, work out, thrash out, agree on |

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|-------------|------|--|
| Reprive | Verb | Cancel, postpone, put off, defer |
| Announce | Verb | Pronounce, aver, avow, herald, proclaim |
| Apprehend | Verb | Arrest, catch, capture, seize, appropriate |
| Espionage | Noun | Spying, under cover, work, surveillance |
| Consular | Adj. | Commission, consulate, legation, delegation |
| Bitter | Adj. | Sharp, acid, acidic, pungent, resentful, embittered, frantic, splenetic, disgruntled |
| Signatory | Adj. | Certifier, endorser, scrivener, registrar |
| Mandate | Noun | Instruction, directive, direction, decree |
| Repudiate | Verb | Reject, rebuff, jettison, turn down |
| Tete-a-tete | Noun | Conversation, discussion, parley, consultation |
| Sham | Noun | Pretence, fake, counterfeit, simulation |
| Compliance | Noun | Agreement, acquiescence, acceptance, accession |
| Rhetoric | Adj. | Oratory, eloquence, diction, expression |