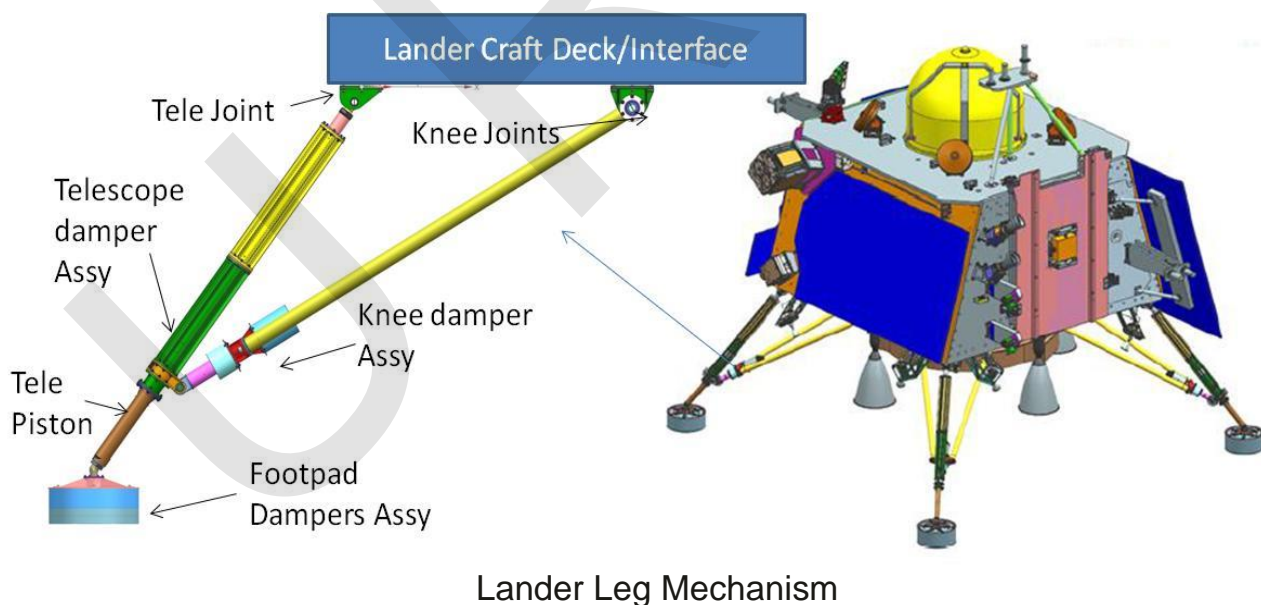


## Lunar Lander Leg Mechanism (LLLM)

U R Rao Satellite Centre (URSC) of Indian Space Research Organisation (ISRO) has developed Lander Leg Mechanism which is flown in Chandrayaan-2 and Chandrayaan-3. Lander Leg Mechanism consists of four Lander Leg Mechanism assemblies mounted on bottom deck of Landercraft. The main objective of the lander leg mechanism is to ensure soft landing on the lunar terrain on touchdown and ensure stability of Landercraft. It is designed to absorb the impact energy and attenuate loads when the lander module impacts the lunar terrain at touchdown for soft landing with vertical velocity of 2 m/sec and horizontal velocity of 0.5 m/sec for Landercraft. The Lander Leg Mechanism employs crushable honeycomb dampers of appropriate capacity, modular sub-assemblies and common interfaces and assemblies so that leg design is common at all locations. The present CHN-3 configuration has capacity to soft land on lunar terrain with Landercraft mass of 800kg and with maximum slope of 12 deg. The test article is tested for margin above mission goal of vertical velocity of 2 m/sec and horizontal velocity of 0.5 m/sec for stable and soft landing.



## Salient Features

Following are the salient features of the Lander Leg Mechanism.

- ❖ Consists of three cushioning/damper assembly system to provide adequate energy absorption to the test limit.
- ❖ Energy Absorption limits the forces transfer to Landercraft thus ensure soft landing and functioning of equipment onboard after touchdown.
- ❖ Leg design is modular and Leg assembly with same design can be used at all locations. Subassemblies can be tested separately.
- ❖ Common Interface at Deck Level.
- ❖ Provision for sensing elements for crushing indication.

## Major Specifications

Sl. No.	Parameter	Chandrayaan-3 Design Specification
1	Landercraft Mass Roll C.G. (from outside of bottom deck)	800 kg (Maximum) ~440 mm
2	Touchdown Specification of Lander Vertical Velocity Horizontal Velocity Slope	$\leq 2$ m/sec $\leq 0.5$ m/sec $< 12^\circ$
3	Total Energy absorption Nominal Case Limiting Case	1700 J 4000 J
4	Number of landing legs	4
6	Lander Leg Mass	~10 kg/ Leg Assembly
6	Launch loads	25 g in all axis (QSL)
7	Temperature limits	$\pm 100^\circ\text{C}$

## Technology Transfer

URSC-ISRO offers to transfer this technology for the configuration of Lander Leg Mechanism which is used in successful landing of Chandrayaan-3 to industries in India with adequate experience and hand holding. Industries interested in obtaining know how may write giving details of their present activities, infrastructure and facilities.

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