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Chandrayaan-3 Mission Gets Boost from Private Sector Collaboration

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The Indian Space Research Organisation's (ISRO) Chandrayaan-3 spacecraft safely landed near the south pole of the Moon on Wednesday evening, marking a historic step towards space exploration.

This historic accomplishment is the result of teamwork **between several** high-profile private companies, each of which brought specific expertise to bear on some facet of the project. The following is a rundown of the firms and the contributions they made:

Tata Consulting Engineers Limited (TCE): TCE was instrumental in developing homegrown versions of mission-critical systems and sub-systems. Its achievements include the development of the solid propellant plant, the facility in which vehicles are assembled, and the mobile launch pedestal.

L&T, or Larsen & Toubro, provided crucial parts for the Chandrayaan-3 spacecraft. They made the "middle segment and nozzle bucket Sange" at their Powai plant and the ground and Sight umbilical plates at their Coimbatore aerospace plant.

The Krst-stage booster and the “Sex nozzle control tanks,” which are 80 feet tall and over 12 feet in diameter, were both produced by Walchandnagar Industries, an important supplier for the lunar mission vehicle.

With their work on the L110 engine for the core stage and the CE20 engine thrust chamber for the upper stage of LVM3 (Launch Vehicle Mark III), Godrej & Boyce contributed signiKcantly to the success of the mission.

Over 200 essential components and subsystems for the LVM3 were supplied by Centum Electronics.

By realising avionics packages such onboard computers, navigation systems, control electronics, telemetry, and power systems, Ananth Technologies (ATL) made a substantial contribution to the LVM3 launch vehicle.

The Pragyaa rover’s image processing software was developed by Omnipresent Robotic Technologies Ltd.

Key components, such as the Vikram Processor (1601 PE01) for LVM3 navigation and the CMOS Camera ConKgurator (SC1216-0) used in the Vikram lander imager camera, were built at the Semiconductor Laboratory (SCL).

Hindustan Aeronautics Limited (HAL): HAL provided a variety of components for the Chandrayaan-3 rover and lander, including metallic and composite structures, propellant tanks, and bus structures.

Bharat Heavy Electricals Limited (BHEL): BHEL made a substantial contribution by creating the lander’s and propulsion module’s lithium-ion batteries and titanium alloy propellant tank.

MTAR Technologies: MTAR Technologies supplied a number of engine components for the Launch Vehicle Mark-III (LVM3). These included Vikas engines, turbo pumps, booster pumps, gas generators and injector heads.

Launch vehicle components rely on crucial materials supplied by Mishra Dhatu Nigam (MIDHANI), which includes cobalt base alloys, nickel base alloys, titanium alloys, and speciKc steels.

For the Chandrayaan-3 mission, KELTRON provided 41 electronic modules and a large number of power modules.

The titanium sponge alloys used in crucial parts were supplied by Kerala Minerals and Metals (KMML).

Kortas Industries Pvt Ltd: Kortas Industries donated **many** booster stage subassemblies, including as the S200 and C25 cryogenic stages, and components for the LVM3 launch vehicle’s CE20 cryo engine.

Vajra Rubber Products contributed by providing the LVM3 rocket’s S 200 Thrust vector control Sex seal.

India’s space programme has been catapulted to new heights thanks to the joint efforts of these commercial companies, establishing India as a major player in the international **space** exploration scene. This success demonstrates the importance of private industry in driving forward **space** exploration and technology.

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