Maratha Vidya Prasarak Samaj's
Karmaveer Adv. Baburao Ganapatrao Thakare College Of Engineering
Nashik-13.
(NAAC ACCREDITED INSTITUTE WITH 'A++' GRADE)

DEPARTMENT OF ELECTRONICS &TELECOMMUNICATION ENGG.

Departmental TeChronicle

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Department Vision:-

To be recognized as an excellent department offering competent technical education to create competent electronics & telecommunication engineers for the benefit of the common masses.

Department Mission:-

Committed to serve the needs of society through innovative teaching learning processes, promoting industry-institute interaction to provide competent and cultured electronics and telecommunication engineers.

Program Educational Objectives:-

1. *To impart state of art technical education in the Electronics & Telecommunication Engineering.*
2. *To promote society beneficial projects and activities.*
3. *To develop soft skill, team work, professional ethics and multidisciplinary approach for the carrier enhancement.*
4. *To bridge the gap between Industry-Institute through collaboration with Industries, Institutions and Universities.*
5. *To provide suitable infrastructure and facilities in tuned with advancing technological evaluation.*

Greeting,

Department of Electronics and Telecommunication Engineering is celebrating "MVP Samaj Din" by unveiling technical newsletter "TeChronicle" VOL5, ISSUE-2 on 19th August 2023. The day is commemorated in honor of Karmaveer Raosaheb Thorath's birthday and all M.V.P. Samaj Karmaveer.

CHANDRAYAN

[Ms. Darshana Narkhede (TE E&TC) & Ms. Bhoomi Ahire (TE E&TC)]

The idea of exploring lunar surface was come to existence when an American scientist Neil Armstrong successfully completed the first mission named Apollo 11 on moon in 1969. Finally the journey of lunar probe missions started by ISRO in 2008 when first mission was launched Chandrayaan 1**.** Chandrayaan-1 was the first Indian Lunar probe under Chandrayaan programme. It was launched by the Indian Space Research organization in October 2008 and operated until August 2009 from Satish Dhawan space centre, Sriharikota.

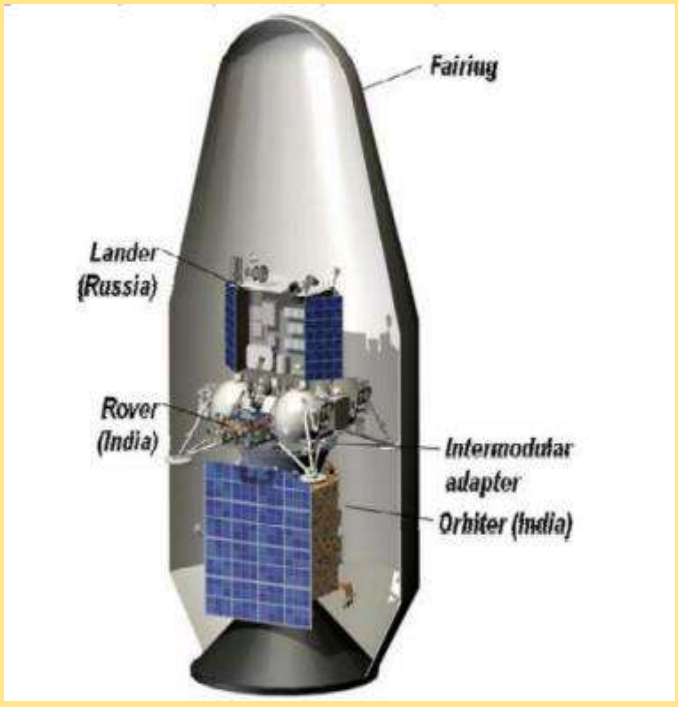
FAILURE OF CHANDRAYAAN 2

CHANDRAYAAN 2 (India's second mission to the Moon), had failed to make a soft-landing on the lunar surface. The lander and rover malfunctioned in the final moments and crash-landed, getting destroyed in the process.

Chandrayaan II experienced a deviation from its intended path, resulting in an unsuccessful soft-landing attempt on the Moon. To accomplish the original mission objectives of Chandrayaan II, the Indian Space Research Organisation (ISRO) devised the Chandrayaan 3 mission, which was successfully launched on July 14, 2023.

Chandrayaan 3 follows a distinct design approach compared to its predecessor. Like Chandrayaan II, it includes a lander and rover, but it diverges by excluding an orbiter. This decision was influenced by the accomplishment of placing a functional orbiter into lunar orbit during the Chandrayaan II mission.

Noteworthy enhancements have been implemented in Chandrayaan 3's lander, featuring reinforced landing legs designed to withstand higher-velocity impacts upon lunar touchdown. These improvements address the challenges encountered during the landing phase of Chandrayaan II.



The launch of Chandrayaan 3 is facilitated by the GSLV Mk III rocket, the same heavy-lift launch vehicle that was utilized for Chandrayaan 2 in 2019. The GSLV Mk III comprises a core liquid booster (L110), flanked by two solid rocket boosters (S200), and a cryogenic upper stage (C25) powered by India's largest cryogenic engine, CE-20. The core stage is propelled by two Vikas engines, consuming 110 tons of fuel.

The realization of Chandrayaan 3 encompasses a series of intricate processes, encompassing the finalization of the mission's configuration, subsystem manufacturing, integration, meticulous spacecraft-level testing, and a battery of specialized tests to assess system performance under Earth's conditions. This comprehensive approach ensures the robustness and efficacy of the mission's components before their deployment in the lunar environment.

REFRENCES:-

- Narendra Bhandari, “Scientific challenges of CHANDRAYAAN-1: The Indian lunar polar orbiter mission”.
- Pooja Mishra, U Rajashekhar and Dharmendra Singh, “STUDY AND CHARACTERIZATION OF LUNAR CRATERS USING MINI-SAR DATA OF CHANDRAYAAN-l, 978-1-4799-21744/13/ $31.00 © 2013 IEEE. https://en.wikipedia.org/wiki/Chandrayaan-3

Space shuttle "DISCOVERY"

[Ms. Disha More (TE E&TC)]

DISCOVERY (OV-103) is a retired American space craft. Discovery is one of the orbiters from NASA's space shuttle program. It is fully operational space shuttle which gave over 27 years of integrated service. It was NASA's third space shuttle orbiter to join the fleet, arriving for the first time at Kennedy space center in Florida in November 1983.

After its checkout as well as processing, it was launched on 30th August 1984 for its first mission, 41-D to deploy three communication satellites. And from the pace goes on, Discovery completed over 30 successfully accomplished missions surpassing the number of flights made by any other orbiters in NASA's fleet.

TECHNICAL SPECIFICATIONS:

1. The space shuttle dimensions were as follows:
   Overall:
   24.314m x 17.768m x 38.03m, 73176.5kg (78 ft. x 57 ft. x 122 ft., 161325lb.)

2. Material used:
   Airframe: aluminum alloys, titanium
   Surface: silica tiles, reinforced carbon carbon RCC nose cap and wing leading edges
   Interior: many materials (aluminum, fabric, beta cloth, velcro, etc.)

3. Alternate Name:
   Space Shuttle *Discovery*

4. Inventory Number
   A20120325000

5. Credit Line:
   Transferred from National Aeronautics and Space Administration

6. Data Source
   National Air and Space Museum

7. Dry mass
   78,000 kg

REFRENCES:-

- https://www.nasa.gov/centers/kennedy/shuttleoperations/orbiters/discovery-info.html
- https://en.wikipedia.org/wiki/Space_Shuttle_Discovery

Mission MOM

[Ms. Sakshi Karad (TE E&TC)]

In 2008, the Indian Space Research Organisation (ISRO) was primarily focused on launching artificial satellites and developing rocket technology. However, a significant turning point occurred on October 22, 2008, when ISRO achieved a momentous feat - the successful launch of 'CHANDRAYAN 1'. This achievement propelled India onto the global stage of space exploration, garnering widespread recognition. During this period, Mars emerged as a focal point for scientific exploration, prompting NASA and the European Space Agency to initiate missions to the Red Planet. Despite budgetary constraints that set ISRO apart from the financial resources of NASA and ESA, and lacking prior experience in Mars missions like

the Mars Orbiter Mission (MOM), ISRO remained undeterred.

On November 23, 2008, ISRO's then-chairman, Mr. G. Madhavan Nair, announced ISRO's ambitious goal of launching a spacecraft to Mars. Despite global skepticism and laughter, ISRO's scientists remained determined, supported by the Indian populace. Over a year, ISRO meticulously prepared a budget of 450 crore Indian rupees, with 153 crores allocated for orbital needs and the rest for ground stations and technical essentials. The Indian government approved the budget under ISRO Chairman K. Radhakrishnan's leadership on August 3, 2012, after a two-year wait, aligning with the Mars launch window between 2013 and 2016 – the prime timeframe for the shortest Earth-Mars travel.

On August 5, 2013, the PSLV-C25 was set for launch, followed by ISRO's collaboration with NASA for communication via the Deep Space Network (DSN). The Mars Orbiter Mission utilized the I1 satellite platform, powered by three solar panels generating 840 watts. It employed a liquid fuel engine, a MARS31750 processor, mid and low-gain antennas, star and sun sensors, reaction wheels, and a propulsion system. The spacecraft weighed 1337.2 kg, including 852 kg of fuel.

The mission pursued scientific goals with five instruments. The Mars Exospheric Neutral Composition Analyser (MENSA) detected atomic compositions, while the Lyman Alpha Photometer identified Deuterium and Hydrogen, crucial for water assessment. The Methane Sensor encountered damage in Mars' orbit. The Thermal Infrared Imaging Spectrometer analysed soil and minerals, and the Mars Colour Camera captured detailed images, including moons Phobos and Deimos. Orbital monitoring and communication employed Telemetry Tracking and Network methods, involving collaboration with NASA and SANSA.

Originally slated for October 28, 2013, adverse weather conditions delayed the launch by a week. Finally, on November 5, 2013, at 3:20 pm (Indian time), Mangalyaan took off from Srihari Kota's Satish Dhawan Space Centre. After 25 days and a journey of 78 crore kilometres, it entered Mars' orbit on September 24, 2014. This ground-breaking achievement established India as the first nation to succeed in MOM on its maiden effort. Notably, all equipment was homegrown. Operating at distances of 421 km and 76993 km from Mars, Mangalyaan meticulously captured images, fulfilling its Mars Orbiter Mission (MOM) objective and marking a pivotal milestone in India's space exploration journey.

REFRENCES:-

- https://youtu.be/CYgbMFVNui8
- https://youtu.be/mjbOj-scsOo
- https://en.m.wikipedia.org

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