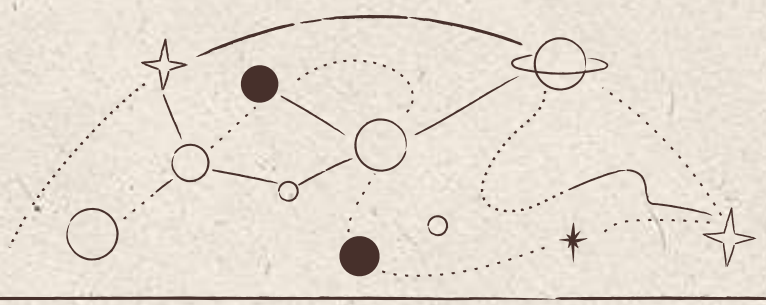
VOLUME 3 EDITION 3
DECEMBER 2023

SPECTRUM

THE ASSAM VALLEY SCHOOL SCIENCE JOURNAL

Contents!



Editor's Note

In this edition of Spectrum, we delve into the intricacies of India's ambitious journey into space, exploring the profound impact of our lunar endeavours. With a historic footprint on the southern pole of the moon, our nation has not just marked its presence but has illuminated the night sky with the brilliance of its technological achievements.

Through the lens of Spectrum, lets witness the unfolding saga of India's cosmic odyssey – a tale of curiosity, innovations, and the relentless pursuit of knowledge that transcends earthly boundaries. As a student when I reflect on these accomplishments, I feel amazed in the vastness of space, I am sure our journey has just begun.

-Anvita Dey

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India's solar mission- Aditya L-1

After India's successful lunar expedition, Chandrayaan 3, ISRO on September 2 launched the country's most ambitious Solar mission, Aditya-L1.

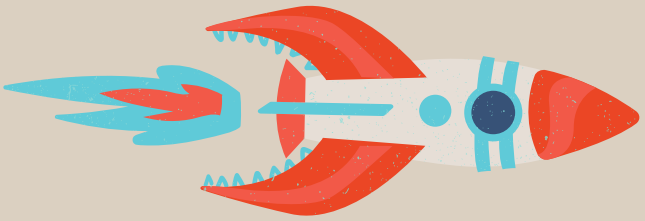
ISRO says that this is the first space-based observatory to study the Sun. It will send pictures of the Sun for scientific experiments.

To understand the various phenomena that instantaneously affect our local weather conditions, it's very important to study the solar surface and the long-term variability of solar radiation. Fundamental knowledge will be acquired through this unique mission, which is good news for the entirety of the world.

There are five Lagrangian points (parking areas) between the Earth and the Sun, which can be used by spacecraft to remain there with reduced fuel consumption. After travelling about 1.5 million km from the Earth over 125 days, the spacecraft is expected to be placed in a Halo orbit around the Lagrangian point L1 which is considered closest to the Sun. Aditya-L1 will stay in earth-bound orbits for 16 days, during which it will undergo five manoeuvres to gain the necessary velocity required for its journey.With the successful launch of India's first solar mission, the country can develop some prediction models and prepare a resilience plan to combat climate change.

This mission symbolizes the potential of 'New India' with the mission to serve the entire humanity. Along with the Moon, now the Sun will also witness the power of 'self-reliant India' and our unflinching courage and commitment. We are indebted and grateful to our scientists, space engineers, researchers and all our hard-working people at ISRO.

-Anushka Jitani XI



KIDS CORNER!

Cosmos Calling:

A journey into interplanetary marvels!

As India sails through the cosmic expanse,
It unfolds its potential, a celestial dance.
Abdul Kalam ignited the spark, a missile's ride,
On a cycle of dreams, the nation's pride.
First to touch the moon's southern shore,
Mars Orbital Mission as India explores.
The Sun awaits, a bold ambition declared,
In the vast cosmic sea, India's flag is shared.
Space's past was a male-dominated art,
Now the future belongs to the female heart.
As news blast, and opens a cosmic transition,
Headline declares a visionary mission.
"Women are the future"
The space's new explorers!

-Adrika Dey VIII

Cosmic Chronicles: Facts from the Universe!

01 chronicle

There are more stars in the universe than grains of sand on all the beaches on Earth. That's at least a billion trillion!

02 chronicle

A black hole is created when big stars explode. Its gravitational force is so strong that nothing can escape from it!

03 chronicle

When venturing into space, astronauts wear spacesuits which have to be warmed, cooled, pressurised and supplied with fresh air. This takes six hours for them to put on!

04 chronicle

The universe has no centre and is constantly expanding (getting bigger) every second – making it impossible to reach the edge.

05 chronicle

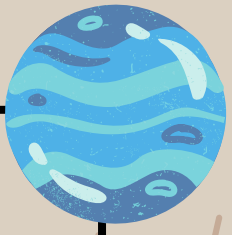
The moon is the reason why we have tides and waves on Earth. Along with the sun, it moves billions of tonnes of water each day.

-Benjamin McDonald, 8

Stepping stones: India's Journey into the space

Following are few important space missions of India:

- **Aryabhata ((April 19, 1975):** Application: India's first satellite for scientific and technological research.



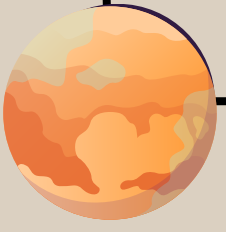
- **Chandrayaan-1 (October 22, 2008):** Application: Lunar probe; aimed at mapping the moon's surface and studying its mineral composition.

- **Mars Orbiter Mission- MOM (Mangalyaan) (November 5, 2013):** Application: India's first interplanetary mission; designed to study Mars' surface, morphology, and atmosphere.

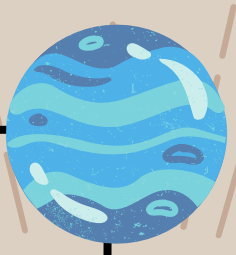
- **Astrosat (September 28, 2015):** Application: India's first dedicated multi-wavelength space observatory for astronomical observations.

- **NavIC (Navigation with Indian Constellation) (IRNSS-1g (April 28, 2016):** Application: Regional satellite navigation system, providing accurate position information service to users in India and the surrounding region.

- **GSAT-19 (June 5, 2017):** Application: High-throughput communication satellite, aimed at improving digital connectivity in India



- **Chandrayaan-2 (July 22, 2019):** Application: Lunar exploration mission, building on the success of Chandrayaan-1, with an emphasis on exploring the moon's south polar region.



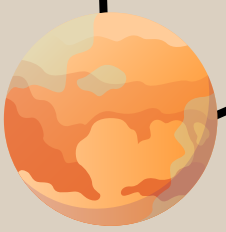
- **RISAT-2BR1 (December 11, 2019):** Application: Radar Imaging Satellite for all-weather, day-and-night Earth observation.

- **PSLV-C49 (November 7, 2020):** Application: Polar Satellite Launch Vehicle carrying RISAT-2BR2 and other satellites for earth observation.

- **PSLV-C51 (February 28, 2021):** Application: Polar Satellite Launch Vehicle carrying Brazil's Amazonia-1 and several smaller payloads.

- **Chandrayaan-3 (July 14 2023)** Application - To map the location and abundance of lunar water. It is without orbiter. Chandrayaan-2 orbiter helped Chandrayaan-3. The Chandrayaan-3 successfully landed on moon on 23/08/2023 at 18:05

- **Aditya L-1 (September 2 2023)** Application - To study solar atmosphere. Aditya-L1 is the first Indian observatory class mission to study the solar corona using a solar coronagraph and also chromosphere using near UV instrument. X-ray spectroscopic instrumentst



-Dhwani Deorah 12 .

Science Fiction

Some facts, some fiction, some Comedy!

" The Lunar Laughter: A Chandrayaan-3 rover "Luna-Lol."

In the not-so-distant future, the Indian Space Research Organisation (ISRO) was gearing up for its most ambitious mission yet – Chandrayaan-3. The mission aimed to explore the southern pole of the lunar surface with even greater precision, and it brought together a team of brilliant scientists, including S Somanath, ISRO Chairman, Ritu Karidhal Srivastava, Senior Scientist – ISRO, P Veeramuthuvel, Project Director, Chandrayaan-3, Kalpana K, Deputy Project Director, S Unnikrishnan Nair, Director, Vikram Sarabhai Space Centre (VSSC), M Sankaran, Director, U R Rao Satellite Centre (URSC).

The scientists were gathered in the control room for a crucial mission briefing. S Somanath,, the Chairman of ISRO, was known for his serious demeanour, but today he had a mischievous glint in his eye.

Listen up, everyone!" he declared, "We need something extra to make Chandrayaan-3 memorable.

" Let's inject a bit of humor into our mission."

P Veeramuthuvel, Project Director, raised an eyebrow, "Humor in a lunar mission, sir?"
"Yes! Picture this: A moon rover with a sense of humor!" ISRO Chairman S. Somanath grinned.

Kalpana K, Deputy Project Director, chimed in, "We could equip the rover with a joke database and make it crack lunar-themed jokes as it explores the surface."
And so, Chandrayaan-3's rover, affectionately named "Luna-Lol," was born.

As the spacecraft approached the moon, the scientists monitored Luna-Lol's progress. The rover landed smoothly, and soon it began its journey across the lunar landscape, transmitting data back to Earth.
The first message from Luna-Lol crackled through the speakers in the control room, "Why did the moon break up with the Earth? It needed space!"
The scientists burst into laughter, not expecting a punchline from a moon rover. Ritu Karidhal Srivastava, Senior Scientist – ISRO exclaimed, "This is the best idea we've ever had!"

As Luna-Lol continued its exploration, it shared more jokes:

"What do you call a group of musical rocks on the moon? The Rolling Stones!"

The jovial atmosphere in the control room continued, with the scientists eagerly awaiting Luna-Lol's next punchline.
What's an astronaut's favorite part of a computer?
The space bar.
However, as Luna-Lol ventured into a crater, a sudden spike in data caught their attention. S Unnikrishnan Nair, Director, Vikram Sarabhai Space Centre (VSSC), M Sankaran, Director, U R Rao Satellite Centre (URSC).squinted at the screen,

"What's this? An anomaly in the data stream."

Suddenly, Luna-Lol's message came through-

"Houston, we have a problem! I just found a bunch of alien moon rocks doing stand-up comedy. They're funnier than me!"

The scientists exchanged puzzled glances, unsure if LunaLol had stumbled upon an extra-terrestrial comedy club or if the moon was playing tricks on them.

In the end, Chandrayaan-3 became not only a scientific triumph but also a cosmic comedy show, leaving everyone on Earth and the moon in fits of laughter. The scientists, with tears of joy in their eyes, couldn't have asked for a more entertaining lunar mission.

And so, as Luna-Lol continued its lunar escapades, the laughter echoed across the cosmos, turning Chandrayaan-3 into a celestial comedy legend.

"Why did the astronaut break up with the space station? It needed more personal space!"

What do you call a tick on the moon?
A lunatick!

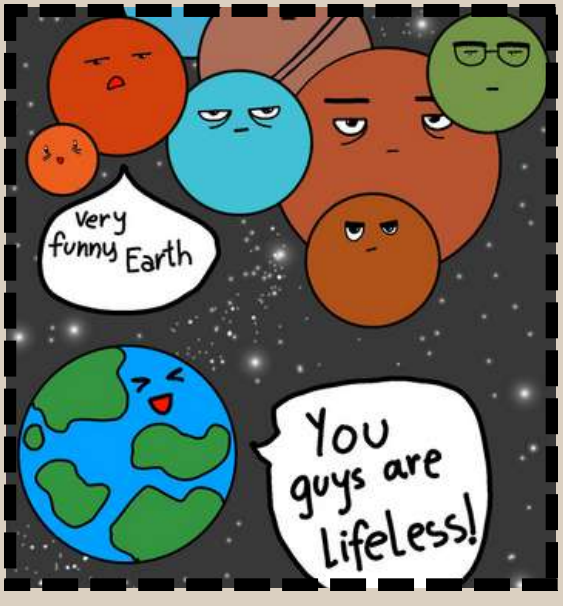
-Anvita Dey, 12SA

Why did the sun go to school?

To get a little brighter!

HUMOUR IN SPACE!

-Anvita Dey, 12



What does Earth say to tease the other planets? 🌎

"You guys have no life."

Why did the star get arrested?

Because it was a shooting star!

What did Mars say to Saturn?

Give me a ring sometime.

Why did the people not like the restaurant on the moon?

Because there was no atmosphere!

Bharat-Tarang: Riding the Waves of India's Cosmic Radiance

Some future projects

1

- The X-ray Polarimeter Satellite (XPoSat) – Space observatory

Expected Launch date – It is planned to be launched in 2023 on a Polar Satellite Launch Vehicle (PSLV-C58)

Applications-It is a ISRO planned space observatory to study polarization of cosmic X-rays. and to provide a service time of at least five years. XPoSat will study the 50 brightest known sources in the universe, including pulsars, black hole X-ray binaries, active galactic nuclei, and non-thermal supernova remnants.

2

- INSAT series ("INSAT-3DS") -communication satellite

Expected Launch date – It is planned to be launched in 2023

Applications – It's part of the Indian National Satellite System (INSAT) series, which serves various communication, broadcasting, disaster management, weather monitoring, cyclone detection and meteorological purposes across India and neighbouring regions.

3

- Gaganyaan-1 ("Orbital Vehicle") - an Indian crewed orbital spacecraft

Expected Launch date – It is planned to be launched in 2024

Applications- (jointly made by ISRO and HAL) intended to be the basis of the Indian Human Spaceflight Programme. The spacecraft is being designed to carry three people, and a planned upgraded version will be equipped with rendezvous and docking capability. This will be the first of two flight tests prior to the inaugural of crewed mission.

4

- NASA-ISRO Synthetic Aperture Radar (NISAR)

Expected Launch date – It is planned to be launched in January 2024

Applications- It is a joint project between NASA and ISRO to co-develop and launch a dual-frequency synthetic aperture radar satellite to be used for remote sensing

5

- Gaganyaan-2

Expected Launch date – It is planned to be launched in mid 2025

Applications- Second of two flight tests prior to the inaugural crewed mission..

6

- The Indian Venus orbiter mission (IVOM)

Expected Launch date - It is planned to be launched in December 2025

Applications-It is a planned orbiter to Venus by the Indian Space Research Organization (ISRO) to study the atmosphere of Venus.

7

- AstroSat-2

Expected Launch date - It is planned to be launched in 2025

Applications - India's second dedicated multi-wavelength space telescope, as the successor of the current Astrosat-1 observatory. For Astronomy and astrophysics study.

8

- Mars Orbiter Mission 2 (MOM 2) also called Mangalyaan 2

Expected Launch date - It is planned to be launched in 2026

Application- India's second interplanetary mission planned for launch to Mars by the Indian Space Research Organization (ISRO) It will consist of an orbiter.

9

- Gaganyaan-3

Expected Launch date - It is planned to be launched in 2026

Applications- First crewed mission. If successful, India would become the fourth country in the world (after the US, Soviet Union and China) to independently send humans in space.

10

- The Bharatiya Antariksha Station (Indian Space Station)

Expected Launch date - It is planned to be launched in 2035

Applications- A planned space station to be constructed by India and operated by the (ISRO). The space station would weigh 20 tonnes and maintain an orbit of approximately 400 kilometres above the Earth, where astronauts could stay for 15-20 days.

-Ssara Jha, 12

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