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1. ISRO will launch Chandrayaan 3 in August 2022 (Feb. 4, 2022)

Union Minister of State in the Department of Atomic Energy of India Dr. Jitendra Singh on 3rd February 2022 informed the Lok Sabha that the Indian Space Research Organisation's (ISRO's) Chandrayaan-3 is scheduled for launch in August 2022.

- The Chandrayaan-1 mission was launched on 22nd October 2008 using the PSLV-C11. The major discovery of the Chandrayaan-1 mission is the detection of water (H2O) and hydroxyl (OH) on the lunar surface.
- The Chandrayaan-2 mission was launched on 22nd July 2019. It comprised an Orbiter, Lander (Vikram) and Rover (Pragyan) sent aboard the country's most powerful geosynchronous launch vehicle the GSLV-Mk3 However, lander Vikram which to land on the moon's South Pole, instead of a controlled landing, ended up crash-landing on September 7, 2019. It still has a fully operational orbiter.
- Chandrayaan-3 will be the follow-up mission of Chandrayaan-2. It will only include Lander and Rover.
- Other major projects of ISRO such as first manned mission **Gaganyaan** and mission to Sun, **Aditya Solar Mission** are also in the pipeline for this year.
- The number of missions planned by the ISRO from January 2022 to December 2022 are 19.

Some of the important mission are::

- **RISAT-1A PSLV C5-2 Satellite** (scheduled for launch in mid-February 2022).
- **OCEANSAT-3** and **INS 2B ANAND** on **PSLV C-53** (scheduled for launch in March 2022).
- **SSLV-D1 Micro SAT** (scheduled for launch in April 2022).
- **GSAT-24 through the Ariane 5 rocket** owned by Arianespace (scheduled for launch in the first quarter of 2022).

Note

RISAT:- Radar Imaging Satellite

PSLV:- Polar Satellite Launch Vehicle

SSLV:- Small Satellite Launch Vehicle

2. Atal Innovation Mission declares results for Space Challenge 2021 (Jan. 13, 2022)

The Atal Innovation Mission (AIM), NITI Ayog on 12th January 2022 announced the results of the "ATL Space Challenge 2021" which was launched in collaboration with Indian Space Research Organisation (ISRO) and Central Board of Secondary Education (CBSE) on September 6th, 2021.

Atal Innovation Mission declares results for Space Challenge 2021

- Mission Director, AIM, Dr. Chintan Vaishnav unveils the winners through a virtual event.

- The ATL Space Challenge witnessed over 2500 submissions from both ATL and Non-ATL students across the country from which **75 top innovators were selected and announced.** ATL Space Challenge 2021 witnessed over 6500 students participating in the challenge from 32 States/ UTs. This Challenge also had a heartening participation of over 35% from girl students.

The ATL Space Challenge 2021 was launched with an objective to enable innovation among young school students to create something in space sector that will not only help them learn about the space but create something that the space programme can use itself. The Challenge is also aligned with the World Space Week 2021, which is observed from 4 to 10 October each year at the global level in order to celebrate the contributions of space science and technology.

3. Pig's heart in human (Jan. 12, 2022)

Surgeons in the United States have **transplanted a pig's heart in a human patient** that represents a remarkable first in the world of medical science, one whose success could potentially end the years-long backlog of people waiting to get a healthy organ and open up a new world of opportunities.

Pig's heart in human

- The highly experimental surgery was performed on a **57 year old** Maryland resident, **David Bennett** at the University of Maryland Medicine (UMM) on January 7, 2022.
- Surgeon **Dr. Bartley P Griffith** conducted the first-in-the-world surgery.

Gene editing by the United States biotech firm Revivicor:

- The transplanted heart was harvested from the pig that had undergone genetic editing.
- The scientists removed the three genes of the pig "that would have led to rejection of an animal's heart by the human body" along with the one that would have led to the excessive growth of pig's heart tissues.
- Further six human genes that would have facilitated the organ's acceptance by the human body were inserted into the pig genome, meaning that a total of 10 unique edits were carried out in the pig.

Xenotransplantation:

The process of transplanting or grafting of animal organs is known as Xenotransplantation.

Points to Know:

- The world's first human-to-human heart transplant was performed by **Dr. Christiaan Barnard** at Groote Schuur Hospital in Cape Town, South Africa on 3 December 1967.
- In India the first heart transplant was done by **Dr. Prafulla Sen** on 16 February 1968 in Bombay now Mumbai, however the patient died on the same day
- The first successful heart transplant in India was done by a team of Doctors led by **Dr. P. Venugopal** at AIIMS, New Delhi on 3 August 1994.

4. India successfully tests advanced "Sea to Sea" variant of BrahMos Missile (Jan. 11, 2022)

India on 11th January 2022 successfully tested an advanced sea variant of **BrahMos Supersonic Cruise Missile** from newly commissioned **INS Visakhapatnam.**

India successfully tests advanced "Sea to Sea" variant of BrahMos Missile

- Defence Research and Development Organisation, DRDO said the missile hit the designated target precisely.
- Raksha Mantri Rajnath Singh congratulated the team work of DRDO and Indian Navy.
- The Indian Navy tweeted, "Successful test-firing of the extended-range BrahMos Supersonic Cruise missile from INS Visakhapatnam, Indian Navy's newest indigenously-built guided missile destroyer, represents a twin achievement: Certifies the accuracy of the ship's combat system and armament complex. Validates a new capability the missile provides the Navy and the Nation."

Additional Information:

- The Indian Navy began deploying BrahMos, which has the capability to hit sea-based targets beyond radar horizon, on its frontline warships from 2005.
- The BrahMos from ship can be launched as a single unit or in a salvo up to eight in numbers separated by 2.5 second intervals. These salvos can hit and destroy a group of targets having modern missile defence systems. BrahMos as a 'prime-strike weapon' for the ships significantly increases their capability of engaging naval-surface targets at long ranges.

A combination of the names of **Brahmaputra and Moskva rivers,** BrahMos missiles are designed, developed and produced by BrahMos Aerospace, a **joint venture** company set up **by** the **DRDO and the Mashinostroyenia of Russia.**

5. Orang National Park may see return of Gharial (Jan. 9, 2022)

Orang National Park may see return of Gharial

The Assam government had on January 3 issued a preliminary notification for adding 200.32 sq. km to the 78.82 sq. km Orang National Park, the State's oldest game reserve about 110 km northeast of Guwahati.

- The gharial, wiped out from the Brahmaputra River system in the 1950s, could be the prime beneficiary of a process to expand an Assam tiger reserve.

Orang National Park

- **Orang National park is the oldest game reserve on the Northern bank of river Brahmaputra in the Darrang and Sonitpur districts of Assam** with an area of 78.80 sq. kms and it is an important breeding ground for varieties of Fishes.
- It was established as a sanctuary in 1985 and declared a National Park on 13 April 1999. It is also known as the mini Kaziranga National Park.

The park has a rich flora and fauna, including Great Indian One-Horned Rhinoceros, pygmy hog, elephants, wild buffalo and tigers. It is the only stronghold of rhinoceros on the north bank of the Brahmaputra river

6. A star with a heartbeat & without a magnetic field discovered (Jan. 8, 2022)

A group of Indian and international scientists have spotted a peculiar binary star that shows heartbeat but no pulsations contrary to the norm of binary stars. **This star is called HD73619 in Praesepe (M44), located in the Cancer constellation, one of the closest open star clusters to the Earth.**

- A total of about 180 heartbeat stars are known to date. The name 'Heartbeat' stems from the resemblance of the path of the star to an electrocardiogram of the human heart.
- These are the binary star systems where each star travels in a highly elliptical orbit around the common centre of mass, and the distance between the two stars varies drastically as they orbit each other.
- This is carried out by a team of scientists from Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital an autonomous institution under the Department of Science & Technology (DST), Govt of India.
- The discovery is of vital importance for the study of inhomogeneities due to spots in non-magnetic stars and to investigate the origin of the pulsational variability.

This joint work is supported by the Department of Science & Technology (DST), Govt. of India, and the Belgian Federal Science Policy Office (BELSPO), Govt. of Belgium under the Belgo-Indian Network for Astronomy and Astrophysics (BINA), project.

7. New Variant of Corona virus identified in France (Jan. 6, 2022)

The World Health Organization said that **'IHU',** a coronavirus variant found in France, hasn't become much of a threat since it was first identified in November.

- The variant was identified in 12 people in the southern Alps around the same time that omicron was discovered in South Africa last year.

8. ISRO gearing up for multiple missions in the year 2022 (Jan. 4, 2022)

One of the most anticipated launches of ISRO in 2022 is that of its first unmanned mission of Gaganyaan to Lower Earth Orbit(LEO). GSLV Mk III will be used for this mission. Glavkosmos, which is a subsidiary of the Russian space corporation Roscosmos is supporting ISRO in this mission.

Other notable launches include-

- **Earth Observation Satellites EOS4 and EOS6** onboard the **Polar Satellite Launch Vehicle (PSLV).**
- **Earth Observation Satellite EOS02** on board the maiden flight of the **Small Satellite Launch Vehicle (SSLV)**

- **Chandrayaan 03** - It will be India's third planned **lunar exploration mission**. It will be a mission repeat of Chandrayaan-2 but will **only include a lander and rover similar to that of Chandrayaan-2 but will not have an orbiter. GSLV Mk III will be used for this mission.**

Aditya LI - First Indian mission to study the Sun. It is a planned coronagraphy spacecraft to study the solar atmosphere. Aditya-L1 will be placed in a 'libration orbit', which is about 1.5 million km from Earth. It is about 1% of the distance between the Sun and the Earth, where the gravity of the two celestial objects equalizes. Placing it in such an orbit allows the spacecraft to circle along with the earth, thereby constantly facing the Sun.

- **XpoSat** - **The X-ray Polarimeter Satellite (XPoSat) is a planned space observatory to study the polarization of cosmic X-rays. It will be launched on a Small Satellite Launch Vehicle (SSLV). It will be a five-year mission**, carrying a polarimeter instrument made by Raman Research Institute to measure cosmic radiation. The spacecraft will be placed in a circular 500-700km orbit
- **IRNSS** - Indian regional navigation satellite system

Other notable future missions of ISRO are-

- **Venus mission**,
- **DISHA** (Disturbed and quiet-type System at High Altitude) –twin **aeronomy (uppermost layer of Earth's atmosphere)** satellite mission at an altitude of 450km.
- **TRISHNA** (Thermal infraRed Imaging Satellite for High-resolution Natural resource Assessment), an **ISRO-CNES [Centre national d'études spatiales France] mission in 2024 for accurate mapping of land surface temperatures across the globe.** It will be launched in sun-synchronous orbit at an altitude of 750km with a mission life of 5 years

Indian Space Research Organisation (ISRO)

Headquarters - Bengaluru, Karnataka

Chairman - Kailasavadivoo Sivan

Nodal authority - Department of Space under Prime Minister of India

Main launchpad - Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh

9. Iran launches a new rocket into space (Dec. 31, 2021)

- The launch was carried out by the **Iranian Space Agency**.
- The rocket was launched from **Imam Khomeini Space Launch Terminal located at Semnan space center, 300 km east of Tehran**.
- The rocket or the Satellite launch vehicle used for this mission was **Simorgh. It is also known as Phoenix or Safir-2 (Safir was Iran's first space launch vehicle).**
- **Tehran successfully put its first military satellite into orbit in April 2020.**
- Iran always insists that its **space program is for civilian and defense purposes only,** and does not breach the nuclear deal or any other international agreement.

- Western governments worry that satellite launch systems incorporate technologies interchangeable with those used in ballistic missiles capable of delivering a nuclear warhead.
- **Iranian Space Agency**
  - Established in 2004
  - Iran is one of the 24 founding members of the **United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), which was set up on 13 December 1958.**
  - **Iran became an orbital-launch-capable nation in 2009.**
  - **Some of Iran's satellite launch vehicles are Safir, Simorgh, Zuljanah, Qoqnoos, and Soroush.**
  - Iran's main launch center is Imam Khomeini Space Launch Terminal located at Semnan.
  - **Omid is Iran's first indigenously-launched satellite.**

10. Two Covid vaccines and drugs got approval in India (Dec. 29, 2021)

- **Central Drugs Standard Control Organisation(CDSCO)** has approved two more COVID-19 vaccines, **Corbevax and Covovax**, and an **anti-COVID pill Molnupiravir** for restricted emergency use in India.
- CORBEVAX vaccine, made by Hyderabad-based firm Biological-E is India's first indigenously developed **RBD (receptor-binding domain) protein subunit vaccine** against COVID-19.
- The **nanoparticle-based vaccine Covovex** has been **developed by Serum Institute of India**, a pharma firm based in Pune.
- Molaupiravir is the first oral medicine approved by the UK Medicines and Healthcare products Regulatory Agency.
- After this approval, the number of vaccines that can be used in emergency situations in the country has now increased to 8.

Other approved Covid Vaccines in India are:

- Covishield
- Covaxin
- ZyCoV-D
- Sputnik V
- Moderna
- Johnson and Johnson