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1. India’s lunar mission Chandrayaan-3 achieves another milestone (Feb. 20, 2023)

Indian Space Research Organisation (ISRO) on 19 February said that the '**Chandrayaan-3**' lander has "**successfully**" underwent the **Electro-Magnetic Interference/Electro-Magnetic Compatibility (EMI/EMC) test** at the **U R Rao Satellite Centre.**

An overview of the news

- The EMI-EMC test is conducted for satellite missions to ensure functionality of the satellite subsystems in space and their compatibility with the expected electromagnetic levels.
- The purpose of this test is to ensure that the satellite's systems work properly in conjunction with the expected electromagnetic levels in space.
- This is an important step in preparing the test satellites.
- The test was conducted between January 31 and February 2 at the UR RAW Satellite Center in Bengaluru.
- During this test several points related to the post-landing phase of Chandrayaan's mission were checked.
- These include a number of tests including launch capability, polarisation of antenna for radio frequency systems and compatibility of lander and rover.
- All the systems performed satisfactorily during the test.
- The complexity of this operation relates to the establishment of radio frequency communication links between these modules.

2. Saudi Arabia to send its 1st female astronaut to space this year (Feb. 14, 2023)

Saudi Arabia's first female astronaut

Saudi Arabia's first female astronaut is set to go into space this year, in what is seen as a move to reform Saudi Arabia's **ultra-conservative image.**

An overview of the news

- Saudi female astronaut **Rayna Barnawi** will join **Saudi Ali Al-Qarni** on a 10-day mission to the **International Space Station (ISS)** this year.
- **Barnawi and al-Karni** will fly to the ISS aboard a **SpaceX Dragon spacecraft** as part of a mission by American privately funded space infrastructure developer private space company **Axiom Space .**
- The **Ax-2** will be launched by a **SpaceX Falcon 9 rocket** from Launch Complex 39A at **NASA's Kennedy Space Center in Florida,** America.

- Another fellow **Emirati, Sultan Al-Neyadi** will also visit the space station at the end of February 2023.
- Axiom Space launched its **first private astronaut mission** to the ISS in April 2022, with four private astronauts spending 17 days in space orbit.
- In 2019, Saudi Arabia's neighbouring **United Arab Emirates became the first Arab country** to send a citizen into space. Astronaut Hazza al-Mansoori spent eight days on the ISS.
- **In 1985**, Saudi royal prince **Sultan bin Salman bin Abdulaziz** participated in a US-organised space mission, becoming the first Arab Muslim to travel in space.

Saudi Arabia

- King - **Salman**
- Capital - **Riyadh**
- Currency - **Saudi Arabian riyal**
- Official Language - **Arabic**
- Official Religion - **Islam**

3. Lithium reserves found for the first time in Jammu and Kashmir (Feb. 10, 2023)

For the first time in the country, reserves of **59 lakh tonnes** of lithium have been **found in the Reasi district of Jammu division.**

An overview of the news:

- The **Geological Survey of India** has discovered lithium deposits in the **Salal-Haimana area of Reasi district in Jammu and Kashmir.**
- Currently India is dependent on imports for Lithium, Nickel and Cobalt. This discovery will reduce India's dependence on lithium from other countries.
- **A report on 51 mineral blocks including Lithium and Gold was submitted** to the State Governments **during the 62nd Central Geological Programming Board (CGPB) meeting.**
- Out of these 51 mineral blocks, 5 blocks are related to gold and other blocks are related to potash, molybdenum, base metals.
- These minerals have been found in different districts of 11 states which include Jammu and Kashmir (UT), Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Tamil Nadu and Telangana.

Lithium:

- It is a chemical element with the **symbol (Li).**
- It is a soft and silvery white metal.
- It is the lightest metal and the lightest solid element at standard conditions.
- It is alkaline and a rare metal.
- Lithium has an **atomic number of 3 and an atomic mass of 6.941u.**
- Lithium is one of the key components of rechargeable batteries for mobile phones, laptops, digital cameras and electric vehicles.
- It is also used in some non-rechargeable batteries for things like heart pacemakers, toys, and watches.
- Countries with the largest reserves: Chile > Australia > Argentina

4. ISRO launches its smallest rocket SSLV - D2 (Feb. 10, 2023)

I**ndian Space Research Organization** has **launched its smallest rocket SSLV-D2 into space from Satish Dhawan Space Center (Sriharikota).**

An overview of the news:

- ISRO's SSLV-D2 flew into space **carrying three satellites with it.**
- These include **ISRO's satellite EOS-07,** Chennai-based space startup **Spacekidz's satellite Azad SAT-2** and **American company Antaris's satellite JANUS -1.**
- All these **three satellites will be placed in circular orbit 450 km apart.**
- ISRO's smallest new rocket SSLV-D2 works on the technology of launch on demand.
- It has the capability to cater to the launch of 500 kg satellites into low earth orbits.
- SSLV-D2 is 34 metres in length while 2 metres in width. It can fly with a load of about 120 tonnes.

Indian Space Research Organization (ISRO):

- It was established on 15 August 1969.
- It is the national space agency of India. It launches its space rocket from Satish Dhawan Space Center in Sriharikota, Andhra Pradesh.
- Headquarters: Bengaluru
- Chairman: S Somnath

5. 'NISAR' satellite made by ISRO-NASA to be launched from India in September (Feb. 8, 2023)

An **Earth-observation satellite** jointly developed by **National Aeronautics and Space Administration (NASA) and ISRO** will be sent to **India** in late February 2023 for a possible launch in **September.**

An overview of the news

- Indian Space Research Organization (ISRO) Chairman **S Somnath** recently visited **NASA's Jet Propulsion Laboratory (JPL)** in California to oversee the final power test of the NASA-ISRO **Synthetic Aperture Radar (NISAR) satellite** before it is sent to India.
- The mission will help study **Earth's land and ice surfaces** in greater detail than ever before.
- This SUV-sized payload will be carried in a special cargo container for the **14,000 km flight** to the **UR Rao Satellite Center in Bengaluru.**

About 'NISAR' satellite

- ISRO and NASA had tied up in **2014** to build a satellite weighing **2,800 kg.**
- In **March 2021**, ISRO sent its **S-band SAR payload** developed in India to NASA for integration with the **L-band payload** manufactured by JPL.
- This is an important step in better understanding the **Earth and the changing climate.**
- It will provide important information on the **Earth's crust, ice sheets and ecosystems.**
- The NISAR spacecraft will be integrated into the satellite bus at the UR Rao Satellite Center for launch.

6. Google introduces AI chatbot 'Bard' (Feb. 8, 2023)

Recently, **Google has launched an Artificial Intelligence (AI) powered chatbot named "Google Bard"** to compete with ChatGPT.

An overview of the news:

- Bard is **built on Google's existing language model LaMDA**, the language model for the firm's Dialog Application System.
- According to Google, it will be used by a group of testers first, after which Bard will be introduced to the general public.

- Bard has been developed to compete with the currently fastest growing user application, ChatGPT, which has overtaken platforms such as Tik Tok and Instagram.
- Through Bard, users can access complex information in simple language as before, not only that, but also get fresh, high-quality and accurate information from Google's chatbot.

What is Chatbot?

- A chatbot is a software application used to conduct on-line chat conversations via text or text-to-speech in lieu of providing direct interaction with a live human agent.
- Chatbot in simple language means talking robot.

There are 2 types of chatbots -

- rule-based chatbot
- AI-based chatbot

AI-based chatbot

- AI-based chatbots do not have any pre-saved questions and answers in their database, rather they answer with their intelligence. You can ask any question from them and get your answer.
- It learns according to user behaviour and questions asked by them and keeps on evolving itself very fast.

7. Reliance introduces India's first Hydrogen Internal Combustion Engine (H2-ICE) truck (Feb. 8, 2023)

Reliance introduces India's first Hydrogen Internal Combustion Engine (H2-ICE) truck

India's first Hydrogen Internal Combustion Engine (H2-ICE) truck was unveiled by Prime Minister Narendra Modi during the 'India Energy Week' in Bengaluru.

An overview of the news:

- The **ICE** in the H2-ICE **stands for Internal Combustion Engine.**
- It is d**eveloped by Reliance Industries (RIL**) in **association with Ashok Leyland.**
- The H2-ICE truck is the first of its kind in India to be powered by hydrogen.
- The truck uses hydrogen instead of conventional diesel fuel or liquefied natural gas (LNG), reducing carbon emissions to almost zero.
- Hydrogen is considered the cleanest fuel. This emits only water and oxygen.
- It is quieter compared to conventional diesel trucks while delivering the same performance. Its operating cost is also less.

The combustion principle in H2-ICE is as follows:

- **2H2 + O2 → 2H2O**
- Two hydrogen atoms combine with one oxygen atom to form water. The heat energy released during this reaction is used to ignite the spark plug.
- The first H2-ICE was developed by Francois Isaac de Rivaz in the year 1806. It ran on a mixture of hydrogen and oxygen.

8. Naval Light Combat Aircraft, MIG29 K Fighter Aircraft successfully take-off on INS Vikrant (Feb. 7, 2023)

Light Combat Aircraft (Navy) and **MIG29 K Fighter Aircraft** on 6 February successfully performed a **maiden landing and take off** from **India's first Indigenous Aircraft Carrier INS Vikrant.**

An overview of the news

- This shows India's prowess in designing, developing, producing and operating aircraft carriers with indigenous fighter aircraft.
- India's first Made in India aircraft carrier **INS Vikrant** was commissioned into the Navy by **Narendra Modi on 2 September 2022** at the **Kochi Shipyard.**
- With this, India has joined the list of countries with the capability to build more than **40,000 ton class aircraft carriers.**
- INS Vikrant is built by **Cochin Shipyard Limited**. It has been designed by the **Warship Design Bureau**, formerly known as the Directorate of Naval Design. It is the in-house design organization of the Indian Navy.

MIG29 K Fighter Aircraft

- Navy's MiG-29K aircraft has been upgraded by **Hindustan Aeronautics Limited (HAL)** with air-to-air and air-to-surface weapons.
- The MiG-29K, which is procured by the Navy directly from **Russia**, is equipped with **weapons of Russian origin.**
- HAL has also initiated integration of **indigenous weapons such as Astra** on the MiG-29K.

9. Union Health Minister unveils world’s first intranasal COVID19 vaccine, iNNCOVACC (Jan. 26, 2023)

Union Health Minister unveils world’s first intranasal COVID19 vaccine, iNNCOVACC

Union Health Minister **Dr. Mansukh Mandaviya** on 26 January **unveiled world's first** intranasal COVID-19 vaccine, **iNNCOVACC** in New Delhi.

An overview of the news

- The vaccine was launched in the presence of **Dr. Jitendra Singh**, Union Minister of State for Science and Technology (Independent Charge).
- It is developed by **Bharat Biotech International Limited (BBIL)** in collaboration with **Biotechnology Industry Research Assistance (BIRAC).**
- An initial manufacturing capacity of several million doses per year of the vaccine has been established, to be scaled up to one billion doses as needed.
- iNCOVACC has been priced at **Rs 325 per dose.**
- On September 9, 2022, **Bharat Biotech's** iNCOVACC, the world's first nasal COVID-19 vaccine, was approved for emergency use in adults.
- On November 28, 2022, Bharat Biotech announced that the vaccine has been **approved for restricted emergency use in adults.**

About iNCOVACC Vaccine

- Bharat Biotech's intranasal COVID-19 vaccine is a **recombinant replicating adenovirus vectored vaccine.**
- A recombinant vaccine means that it has been manufactured using **bacterial cells or yeast cells or parts of a virus** to introduce viral proteins into the host.
- It removes critical parts of the **genome of SARS-CoV-2,** so that the viral vector can no longer replicate.
- Phase I, II and III clinical trials of the vaccine have yielded successful results.
- The vaccine will be given intranasally **through drops** in the nose, a system that has been designed and developed to be cost-effective in low- and middle-income countries.
- The maximum temperature range for storage and distribution of iNCOVACC is **two to eight degrees Celsius.**

Working of iNCOVACC

- An intranasal vaccine stimulates a broad immune response by producing a wide range of antibodies including **neutralising Immunoglobulin G (IgG) and mucosal Immunoglobulin A (IgA).**
- The vaccine also initiates **T cell** responses.
- When the iNCOVACC vaccine is given to an individual, the immune cells in the body express the **immobilized spike protein.**
- As a result, the body starts producing antibodies against the spike protein of SARS-CoV-2.

- After a person is exposed to SARS-CoV-2, the immune system will **block Covid-19 infection** in both the upper and lower respiratory tract due to the presence of antibodies.
- Therefore, iNCOVACC has the potential to **block SARS-CoV-2 and prevent the transmission of Covid-19.**

10. IIT incubated firm develops indigenous Mobile Operating System (Jan. 21, 2023)

An **IIT Madras incubated firm** has developed an indigenous mobile operating system '**Bharos**' that can benefit India's 100 crore mobile phone users.

About Mobile Operating System 'Bharos'

- The software, named 'Bharos', can be installed on commercial off-the-shelf handsets.
- It was developed by **JandK Operations Pvt Ltd (JandKops)**, a company set up by the IIT Madras Innovative Technologies Foundation.
- It provides a secure environment for the users and is a significant contribution towards '**Atmanirbhar Bharat'.**
- It provides access to trusted apps from organisation-specific **Private App Store Services (PASS).**
- A PASS provides access to a curated list of apps that have been thoroughly tested and have met certain security and privacy standards of organisations.
- Its users can be rest assured that the apps they are installing are safe to use.
- It comes under **No Default Apps (NDA)**. That means users can't be forced to use apps they don't know about or can't trust.
- Bharos provides **'Native Over The Air**' (NOTA) updates that can help keep devices secure.
- NOTA updates are automatically downloaded and installed on the device without the user needing to manually initiate the process.