Important Topic Wise Current Affairs – February 2023- Important Science & Technology News

NASA hands over payload of NISAR satellite to ISRO

- The **National Aeronautics Space Administration (NASA)** handed over the payload for the **NISAR (NASA-Isro Synthetic Aperture Radar) satellite** to **Indian Space Research Organisation (ISRO).**

About NISAR satellite :

- NISAR, is an **earth science satellite** & jointly built **Synthetic aperture radar (SAR)** by NASA and the ISRO.
- It has been built by space agencies of the United States (US) and India under a partnership agreement signed in **2014**.
- It is expected to be launched from **Satish Dhawan Space Centre** in Andhra Pradesh (AP) in **2024**.
- NISAR will be the **first radar of its kind** in space to systematically map Earth, using 2 different radar frequencies.
- NISAR's **2 radar systems**

1. The **L-band Synthetic aperture radar (SAR)** provided by JPL.
2. The **S-band** SAR built by ISRO.

- NASA-ISRO SAR refers to a technique for producing **fine-resolution images** from a resolution-limited radar system.
- It will use a signal-processing technique called **interferometric synthetic aperture radar (InSAR)**, to observe changes in Earth's land and ice surfaces down to fractions of an inch.
- NISAR provides **information** on **earth's crust, ice sheets,** and ecosystems, biomass, natural hazards, sea level rise, and groundwater.
- It **monitors** resources such as **water, forests** and **agriculture** and measures changes in earth surface less than a centimetre across
- The satellite will help researchers **detect slow-moving variations** of a land surface that can precede earthquakes, landslides, and volcanic eruptions.

About NASA :

- Established : July 29, 1958

- Headquarters : Washington, D.C, United States of America (USA)
- Administrator : Bill Nelson

About ISRO :

- Established : 15 August 1969
- Headquarters : Bengaluru, Karnataka, India
- Chairman : Sreedhara Somanath

IIT Madras to receive grant worth Rs 242 crore for research on Lab Grown Diamonds

- The **Union Government** has chosen the **Indian Institute of Technology-Madras (IIT-M)** for undertaking **research on Lab Grown Diamonds (GDs)** and will provide a grant of **Rs. 242 crore** over a period of 5 years.
- This research will be focused on driving indigenisation of the LGD manufacturing process.
- The **India Centre for Lab Grown Diamonds (InCent-LGD)** at IIT-Madras was identified for this prestigious project based on our nearly two decades of work experience in diamond research wherein we have developed many technologies for industry, space and defence sectors.

What is Lab Grown Diamonds (LGD)?

- Lab-grown diamonds are diamonds that are produced using **specific technology** which **mimics** the **geological processes** that grow natural diamonds.
- LGDs are mostly manufactured through two processes – **high pressure, high temperature (HPHT) method or Chemical Vapour Deposition (CVD) method.**

Google unveils AI chatbot 'Bard' - its answer to ChatGPT

- **Google** confirmed it will soon start public testing for a new **artificial intelligence (AI) chatbot** of its own called **Bard**, based on the company's **Language Model for Dialogue Application (LaMDA)** to answer the challenge and threat posed by Microsoft-backed OpenAI and its AI chatbot.

What is ChatGPT?

- Technically, **ChatGPT (Chat Generative Pre-trained Transformer)** can be categorized as a type of **generative AI** - a broad label that's used to describe any type of artificial intelligence (AI) that can

be used to create new text, images, video, audio, code or synthetic data.

- It is a complex machine learning model that can carry out **natural language generation (NLG)** tasks with a very high level of accuracy.
- It is a version of the GPT model trained from the internet with an enormous text dataset.
- It is developed by a San Francisco-based AI and research company, **OpenAI,** and the final version was launched on **November 30, 2022.**
- It comes as **Microsoft** has invested **$10 billion** this year in OpenAI and is preparing to -Announce an integration of ChatGPT into its Bing Search engine & Offer ChatGPT to its enterprise customers as part of the Azure Cloud services.
- Running these models requires significant computing power (ChatGPT is powered by **Microsoft's Azure Cloud services).**

What is Bard?

- Bard is **Google's own conversational AI chatbot.**
- Bard is powered by LaMDA which was developed and released by Google in **2021**.
- It draws on information from the web to provide **fresh, high-quality responses.**
- It will give in-depth, conversational, and essay-style answers just like ChatGPT does right now.

Key Highlights :

- Bard is built on **Transformer technology** - which is also the backbone of ChatGPT and other AI

bots.

- Transformer technology, pioneered by Google and made open-source in **2017**, is a neural network architecture, which is capable of making predictions based on inputs.
- Chinese search giant Baidu has also announced that it plans to debut a ChatGPT-style application in March called "**Ernie**."

About Google :

- Founded: September 4, 1998
- Headquarters: California, U.S
- CEO: Sundar Pichai

Jupiter becomes a planet with most moons with 12 newly discovered

- With the discovery of **12 new moons, Jupiter** becomes the **planet** with the **highest number of moons.**
- With this, the count of Jupiter's moons increased to **92** from 80 moons.
- **Saturn** is in the **second position with 83 moons.**

About Jupiter :

- Jupiter is the biggest planet in our Solar System.
- It is mainly made up of **hydrogen** and **helium**.

Key Highlights :

- 9 of the 12 discovered moons are among the 71 outermost Jovian moons, whose orbits are **more than 550 days.**
- The discovery was made during observations by astronomer **Scott Sheppard** of the Carnegie Institution for Science and his team.
- These moons have been discovered by using telescopes in **Hawaii** and **Chile** in **2021** and **2022**.
- These newest discovered moons range in size from **0.6 miles to 2 miles (1 kilometer to 3 kilometers.**
- The **National Aeronautics and Space Administration (NASA)** will launch the **Europa Clipper mission** to explore Jupiter's moon Europa.

- Uranus has **27** confirmed moons, Neptune has **14**, Mars has **2** and Earth has **1** moon. Venus and Mercury don't have any moons.
- The **JUICE mission** of the European Space Agency is to be launched in **2024**.

ISRO & Indian Navy conducts key trials for Gaganyaan mission

- The **Indian Space Research Organisation (ISRO)**, along with the **Indian Navy,** has conducted an important trial for the **Gaganyaan, human space flight mission.**
- The trials were performed in the **Indian Navy's Water Survival Test Facility (WSTF)** located in **Kochi, Kerala**
- The **first trial** (uncrewed flight) for Gaganyaan is planned by the **end of 2023** or early 2024, followed by sending **Vyom Mitra,**a humanoid and then with the crew onboard.

Key Highlights :

- The Gaganyaan project envisages demonstration of human spaceflight capability of India.
- Gaganyaan will be launching a crew of 3 members for a 3 day mission.
- The members will be launched to an orbit of **400 km** and bring them back safely to earth, by landing in Indian sea waters.
- **Vikas engine and Launch Vehicle Mark-3 (LVM-3)** will be used in this mission.
- A **Crew Module Recovery Model (CMRM)** was used for the trials.
- The CMRM simulates the mass, centre of gravity, outer dimensions, and externals of the actual Crew Module at touchdown.
- The **safe recovery** of the crew is the **final step** for a successful human spaceflight.
- It has to be carried out with the minimum lapse of time.

Skye Air launches India's first traffic management system for drones - Skye UTM

- **Skye Air,** a Gurugram (Haryana) based **drone solutions provider**, launched **India's first traffic management system** for drones called **Skye UTM** in India.
- It was launched in the presence of Minister of Road Transport and Highways of India Shri **Nitin Gadkari**.
- The software will allow drone operators to plan routes, make flight plans and assess risks before

running drone-based operations in India.

Key Highlights :

- Unmanned traffic management systems will play a key role in how airspace will be managed, allowing multiple **beyond visual line-of-sight (BVLOS)** drone operations to be run by different firms at the same time.
- Globally, several companies, such as **US-based AirMap** and **Netherlands-based Airbus,** offer such solutions.
- The software imports data from the government's **Digital Sky platform,** which has been created to help drone operators plan flights in Indian airspace.
- The platform was first launched in **2018**.
- It offers operators essential information for running drone missions in the country.
- It is run by the **Directorate General of Civil Aviation (DGCA).**
- Skye UTM will allow operators a "**better understanding"** of where they can fly.
- **India's Drone Rules 2021** set restrictions on where private entities can fly zones by designating red, green and yellow zones.
- The Skye UTM will also offer latitude and longitude data, which is unavailable on Digital Sky.
- To **track drones,** Skye Air is also offering **remote ID services**, which is a piece of hardware that needs to be installed on drones to communicate real-time information on its location.

About BVLOS :

- BVLOS refers to drone flights where the pilot **cannot see the drone.**
- They allow firms to run drone missions over greater distances, required for logistics, medicine delivery and more.

About Skye Air :

- CEO : Ankit Kumar

ISRO launches SSLV-D2 rocket with 3 satellites from Sriharikota, AP

- The **Indian Space Research Organisation (ISRO)** launched the **second developmental flight** of the **Small Satellite Launch Vehicle (SSLV-D2)** from the First Launch Pad, **Satish Dhawan Space**

Centre, Sriharikota, Andhra Pradesh (AP).

- The SSLV rocket carrying **3 satellites**

1. **EOS-07** (Earth Observation Satellite-07)
2. **Janus-1** (co-passenger Satellite)
3. **AzaadiSat-2** (co-passenger Satellite)

- The **objectives** of the SSLV-D2 mission are the demonstration of a designed payload capacity of SSLV in low-Earth orbit, and the injection of an Earth Observation Satellite and 2 passenger satellites into a **450.7-kilometre circular orbit**
- The maiden mission of SSLV, which was launched on **August 7, 2022,** had **failed** to place its payloads into the intended orbit.

About EOS-07 :

- It weighs **156.3 kilograms.**
- It was developed at **U R Rao Satellite Centre (URSC), ISRO.**
- EOS-07, which has a mission life of **1 year**, was designed so that its "payload instruments are compatible with microsatellite buses and new technologies that are required for future operational satellites".

About Janus-1 :

- It is a **technology demonstrator satellite** built by **United States-based Antaris** and its Indian partners XDLinks and Ananth Technologies.
- It weighs **only 10.2 kg** and is a **6-unit cube satellite** with 5 payloads on board- 2 from Singapore, and 1 each from Kenya, Australia, and Indonesia.

About Azadisat-2 :

- The 8.7 kg satellite Azadisat-2 is a joint effort of about 750 girl students from across India guided by Space K/ids India, Chennai.

Key features of SSLV :

- Low cost
- Flexibility in accommodating multiple satellites
- Launch on demand' feasibility

- Low turnaround time (the time taken to complete a process)
- Minimal launch infrastructure requirements
- Increased production rate from industries.
- It is a **34-metre tall, 2m diameter** vehicle having lift off mass of **120-tonne.**

About ISRO :

- Founded : 15 August 1969
- Headquarters : Bengaluru, Karnataka, India
- Chairman : Sreedhara Somanath
- ISRO is the national space agency of India, operating under the **Department of Space (DOS).**

Qualcomm launched world's first satellite-based two-way messaging solution - Snapdragon Satellite

- **Qualcomm Technologies, Inc.** has introduced the **world's first satellite-based two-way capable messaging solution** for premium smartphones, called **Snapdragon Satellite,** at the **Consumer Electronics Show (CES) 2023**.
- Qualcomm and global satellite communications company, **Iridium**, have entered into an agreement to bring the **satellite-based connectivity** to next-generation premium Android smartphones.

Key Highlights :

- The Snapdragon Satellite will offer **global connectivity** using mobile messaging from around the world.
- Devices based on the flagship **Snapdragon 8 Gen 2 mobile platform** will be the first to get this technology.
- It will be supported by an operational Iridium satellite constellation and powered by Snapdragon 5G Modem-RF Systems.
- In terms of connectivity, the Satellite can be expanded to other devices such as **tablets, vehicles, laptops** and **IoT (Internet of Things)**
- Notably, the Satellite system was developed to support **5G Non-Terrestrial Networks (NTN)**, as NTN satellite infrastructure and constellations can be easily available.

About Qualcomm :

- Founded : July 1985
- Headquarters : San Diego, California, United States
- CEO : Cristiano Amon

About Iridium Communications Inc :

- Founded : 2001
- Headquarters : McLean, Virginia, U.S
- CEO : Matthew J. Desch

India first hybrid sounding rocket launched in Chengalpattu

- **India's first hybrid sounding rocket** made by the **school students** from various states launched as part of **Dr APJ Abdul Kalam Satellite Launch Vehicle Mission 2023** from **Pattipulam Village** in **Chengalpattu, Tamil Nadu (TN).**
- It was launched in the presence of Tamilisai Soundararajan, Governor of Telangana and Lieutenant Governor of Puducherry.

World's highest weather station rebuilt on Mount Everest

- The **World's highest altitude weather station** has been **rebuilt on Mount Everest**.
- World's highest weather station was **destroyed** due to **hurricane- winds on Mount Everest.**
- A team of scientists and Sherpa have again placed its new version & the group has been led by a 31-year-old electrician and mountain guide **Tenzing Gyalzen Sherpa.**

About Mount Everest :

- The world's highest peak, Mt. Everest is located between **Nepal** and **Tibet.**
- Its total height is **8,849 metres.**
- It is known as **Sagarmatha (Goddess of the Sky)** in **Nepal** & **Chomolungmai(Goddess of Mother of the World)** in **Tibetan.**

ISRO announces opportunities to analyze AstroSat

- The **Indian Space Research Organisation (ISRO)** has made an **Announcement of Opportunity (AO)** to allow scientists and researchers to analyze data from the **first dedicated Indian astronomy mission, AstroSat.**

About ISRO :

- Founded: 15 August 1969
- Headquarters: Bangalore, Karnataka, India
- Chairman: Sreedhara Somanath

NASA to launch Israel's 1st space telescope mission in 2026

- The **United States (US) National Aeronautics and Space Administration (NASA)** and **Israel's Ministry of Innovation, Science and Technology** signed a partnership that will send **Israel's first space telescope mission**, the **Ultraviolet Transient Astronomy Satellite (ULTRASAT)** in early **2026.**
- The Israel Space Agency and the Weizmann Institute of Science are behind the premier project.

About NASA :

- Founded: July 29, 1958
- Headquarters: Washington, D.C, United States of America
- Administrator: Bill Nelson

About Israel :

- President : Isaac Herzog
- Prime Minister: Benjamin Netanyahu
- Capital: Jerusalem
- Currency : New shekel

World-first 'super' magnets for fusion plant testing

- **Tokamak Energy** has built a **world-first set of high-temperature superconducting (HTS) magnets,** to be assembled and tested in fusion power plants–relevant scenarios.
- Creating sustainable fusion energy requires strong magnetic fields to confine and control the **extremely hot, positively charged hydrogen fuel**, which becomes a plasma several times hotter than the sun.

About Tokamak Energy :

- Founded: 2009
- Headquarters: Oxford, United Kingdom

- Chairman: Dr. Christopher Martin
- Tokamak Energy is a **fusion power research company.**

AIIMS Delhi named as Centre of Excellence for artificial intelligence in healthcare

- The Centre has designated **All India Institute of Medical Sciences, New Delhi,** also known as **AIIMS Delhi** as the **centre of excellence (CoE)** for **Artificial Intelligence (AI)** in **healthcare.**
- It was announced by the Union health minister **Mansukh Mandaviya** to the Lok Sabha.

Key Highlights :

- AI tools can **support monitoring** of **physical** and **financial** aspects of programmes including fraud detection, effective disease management, identifying early warning signals as part of surveillance, development of clinical decision support system (CDSS) supporting practitioners in providing quality care, etc
- To detect suspicious transactions/potential frauds in **Ayushman Bharat Pradhan Mantri – Jan Arogya Yojna (ABPM – JAY)** the National Health Authority, has been using AI technologies.
- One of the challenges faced in the healthcare sector in the country is shortage of doctors, especially in rural areas.
- There is one doctor per 1,511 population against the WHO norm of **1:1,000.**

World's First Cloud-Built Demonstration Satellite - JANUS-1 Launched By ISRO's mini-Rocket SSLV-D2

- **JANUS-1 satellite** that rode on Indian Space Research Organisation's (ISRO's) new mini-rocket **SSLV-D2** and reached its **orbit successfully.**
- JANUS-1 satellite is the **world's first satellite** fully conceived, designed and manufactured using an Indian company's end-to-end cloud platform.
- Integration and test for JANUS-1 has been conducted in Bengaluru by **Ananth Technologies Ltd (ATL).**

Key Highlights :

- JANUS-1 is a software defined **6U technology demonstration satellite** designed and built using the **Antaris cloud software platform** and **SatOSsoftware**, as well as XDLinx's modular spacecraft

bus.

- ATL has also contributed various avionics subsystems for ISRO's earth observation satellite EOS-7 that was the main payload of SSLV-D2.
- From concept to launch readiness, JANUS-1 was designed and built in just 10 months at a cost saving of **75%** over comparable satellite missions.
- JANUS-1 carries **5 payloads**, including IOT (internet of things) and communication systems.

About ATL :

- Founded : 17 August 1992
- Headquarters : Hyderabad, Telangana, India
- CEO : Adithya Anand
- Chairman & MD : Subba Rao Pavuluri
- ATL is an **Indian aerospace manufacturer** that provides hardware and software services.

Tech Mahindra to open its first data & AI and cloud centre of excellence in Saudi Arabia

- **Tech Mahindra** has signed a **Memorandum of Understanding (MoU)** with the **Ministry of Communication and Information Technology (MCIT), Saudi Arabia** to establish a **Data & Artificial Intelligence (AI)** and **Cloud Center of Excellence (CoE)** in **Riyadh.**
- The announcement supports **'Vision 2030'**, a strategic long-term digital-led development of Saudi Arabia which aims to diversify from the oil market to technology and economic development with private players.
- The MoU was signed between **Ibrahem N Al-Nasser**, deputy minister for technology of MCIT, and **Ram Ramachandran,** head -Middle East & Africa, Tech Mahindra.
- The CoE will combine academic and socio-economic goals to build national Hi-tech talent capacity, create high-quality jobs, promote digital innovation and upscale **small & medium enterprises (SMEs).**

About Tech Mahindra :

- Founded : 24 October 1986
- Headquarters : Pune, Maharashtra, India

- Chairman : Anand Mahindra
- MD & CEO : c. p. Gurnani
- Tech Mahindra is an Indian multinational information technology services and consulting company.

About Saudi Arabia :

- Capital : Riyadh
- Currency : Saudi riyal

SpaceX ignites giant Starship rocket into orbit in crucial pad test

- **SpaceX** is a big step closer to sending its giant **Starship spacecraft** into **orbit**, completing an engine-firing test at the launch pad.
- 31 of the 33 first-stage booster engines ignited simultaneously for about **10 seconds** in **south Texas.**

About Starship :

- Starship is a **super-heavy-lift rocket** and spacecraft built to carry immense cargo and numerous astronauts into deep space.
- It is the collective name for a two-component system consisting of the **Starship spacecraft** (which carries the crew and cargo) and the **Super Heavy rocket.**
- The Starship launch system is powered by the **Raptor engine,** a reusable methalox staged-combustion engine.
- It is built by **SpaceX**, which is an American spacecraft manufacturer.
- It will be the world's most powerful launch vehicle ever developed, with the ability to carry up to **150 metric tonnes** to Earth orbit reusable and up to 250 metric tonnes expendable.
- The rocket is made of stainless steel and runs on liquid methane.
- It is **164 feet (50 meters)** tall and has a diameter of 9 meters.
- Starship is intended to evolve into a **fully reusable launch** and landing system.

Velocity launches India's 1st ChatGPT-integrated AI chatbot - Lexi

- Homegrown financial technology firm **Velocity launched India's first Artificial Intelligence (AI)**

chatbot integrated with **OpenAI's ChatGPT**, called "**Lexi**".

- Velocity has integrated this latest advancement in AI with its existing analytics tool, Velocity Insights.

Key Highlights :

- Indian eCommerce brands that utilise Velocity Insights receive a daily business report on Whatsapp, which led the company to also integrate ChatGPT in the same Whatsapp interface.
- The integration of ChatGPT with Velocity Insights **empowers eCommerce founders** by providing them with AI-powered business insights in a conversational manner, freeing up time for critical business functions.

About Velocity :

- Co-founder and chief executive officer (CEO) Abhiroop Medhekar
- ChatGPT has reached 100 million users within two months and has clocked over 590 million visits.

NASA developed heartbeat-detecting tech to help with Turkey's earthquake relief effort

- The **National Aeronautics and Space Administration (NASA)** has developed a **technology** that can **remotely detect** the **tiniest motions** of the body that will be used by **disaster relief teams** in earthquake-stricken **Turkey**.
- The devices, called **FINDERs(Finding Individuals for Disaster Emergency Response),**

About FINDERs :

- The FINDER technology was developed by a team from **NASA's Jet Propulsion Laboratory** in California following the devastating 2010 earthquake in **Haiti** and was later commercialized by **Florida-based SpecOps Group.**
- It uses **microwave radar sensors** to find survivors underneath rubble or in avalanches by remotely detecting their heartbeat and respiration.
- It was designed to detect a human heartbeat buried beneath **30 feet of rubble.**
- The radar illuminates the rubble pile and receives reflections back from a disaster site, including the victim.

- FINDER looks for changes in the reflection that indicate movement and then checks to see if those movements can be attributed to human heartbeats and respirations.
- It can distinguish human respiration from **animals or mechanical movements.**

About NASA :

- Founded: July 29, 1958
- Headquarters: Washington, D.C, United States of America
- Administrator: Bill Nelson

AIIMS Rishikesh conducts a trial of delivering TB medicines to patients using drones

- The **All India Institute of Medical Sciences (AIIMS), Rishikesh** conducted the **first successful trial** for **transporting anti-tuberculosis (TB) drugs** with the help of unmanned aerial vehicles (UAV) to the district hospital in Tehri Garhwal in **Uttarakhand**.
- TB is one of the most ancient and highly contagious diseases caused by **Mycobacterium tuberculosis.**

Key Highlights :

- TechEagle's Vertiplane X3 drone made its first delivery in Uttarakhand, transporting **3kg** of TB medicines from AIIMS Rishikesh to New Tehri PHC, covering a distance of **36 non-stop** and an elevation gain of 2 km in 29 minutes.
- It is **6 times faster** than by road as it can take up to 3 hours to cover the 72 km.
- This initiative is part of the **Pradhan Mantri TB Mukt Bharat Abhiyaan**, launched by the government in 2022.
- TechEagle's end-to-end drone technology stack has the potential to improve healthcare access in remote and under-served communities in Uttarakhand.
- It can transport up to 5kg over a distance of 100km, making it the fastest and longest-range hybrid drone in the country.
- In addition, it can also land in small areas of just 5m x 5m, making it ideal for delivering essential supplies to remote or hard-to-reach areas.
- In **Jammu and Kashmir (J&K),** the Indian Army used **drones** to supply booster doses of **Covid**

vaccine to forward troops in snow-bound areas.

- Drones were used in **Maharashtra** as well to **deliver vaccines** to **remote villages.**

About AIIMS Rishikesh :

- Founded: 2012
- Location: Rishikesh, Uttarakhand, India
- President : Samiran Nundy
- Director: Meenu Singh
- The institute operates autonomously under the **Ministry of Health and Family Welfare.**

India's first mission to study the sun Aditya-L1 is to be launched by June-July 2023

- For the **first time in the history of India,** the **Indian Space Research Organisation (ISRO)** is set to launch a **scientific mission** to **study** the **sun - Aditya-L1 mission in June or July, 2023.**
- Aditya L1 is **India's first space-based mission** to observe the Sun and the solar corona.
- To **study** the **sun from a halo orbit** around the **Sun-Earth system's Lagrangian point 1 (L 1).**
- Scientists at the **Indian Institute of Astrophysics (IIA), Bengaluru** have **spent** over **15 years building** and **assembling** nearly **40 different optical elements** in a **payload.**

About EOS-02 :

- It is an **ima-ging microsatel-lite** designed to **address agri-cul-ture** as well as dis□aster man□age□ment object□ives, while the cube□sat car□ried 75 microsatel□lites to con□duct exper□i□ments.

About SSLV :

- SSLV is a **small-lift launch vehicle** developed by ISRO with payload capacity to deliver 500 kg (1,100 lb) to low Earth orbit (500 km (310 mi)).
- Height: 34 metres
- Diameter: 2 metres
- Mass: 120 tonnes
- It is a **three-stage vehicle** with all solid propulsion stages and liquid propulsion-based **Velocity Trimming Module (VTM).**

About ISRO :

- Established : 15 August 1969
- Headquarters : bangalore, Karnataka
- Chairman : Sreedhara Somanath

DRDO develops unfurlable antenna for space radar

- **Electronics and Radar Development Establishment (LRDE),** a Bengaluru, Karnataka lab of the Defence Research and Development Organisation (DRDO), has developed an UnFurlable Reflector Antenna (UFRA), major subsystem for a space radar,
- The UFRA holds significant potential in the **Indian Space Research Organisation (ISRO)**, & also in the military.

About UFRA :

- LRDE has developed the UFRA system which consists of a **rim truss-based deployable mechanism**, primary arm, reflector mesh, tension ties, nets, and motor.
- A cable is routed through the diagonal members of the rim truss elements," adding that one end of the cable is fixed and the other end is pulled by a motor.
- LRDE, has been involved in the development of space-borne imaging radar mainly consisting of **electronic radar subsystems** and **antenna deployment mechanisms** for installation on satellites

About LRDE :

- Headquarters : Bengaluru, Karnataka, India
- Director : Bengaluru, Karnataka, IndiaShri. P Radhakrishna
- Founder : S. P. Chakravarti (father of Electronics and Telecommunication engineering in India)
- LRDE is a **DRDO lab** with a mission to design and develop state-of-the-art radar systems meeting current and futuristic requirements of the tri-services, paramilitary forces, intelligence and strategic missions.
- To distinguish between "**Electrical" and "Electronic"**, the latter is abbreviated with the first letter of its Latin root (lektra).

IIT Patna Partners with Drone Destination to open Bihar's 1st govt-approved UAV training center

- One of India's leading unmanned aerial vehicle (UAV) training and manufacturing groups, **Delhi-**based **Drone Destination (DD) Private Limited**, has signed a **memorandum of Understanding (MoU)** with the **Indian Institute of Technology (IIT) Patna** to open **Bihar's first government-approved drone training hub.**
- DD is the state-run **Indira Gandhi Rashtriya Udan Academy (IGRUA)'s** partner for drone training and has several centers across India.
- IIT Patna has been at the forefront of being a technology-first institution and plans to develop a large Drone Centre of Excellence to propel the UAV ecosystem.

About Drone Destination :

- Headquarters: New Delhi, Delhi
- CEO: Chirag Sharma.
- Seedhara Somanath

Roscosmos launches Soyuz spacecraft to bring back 3 astronauts stranded on ISS

- Russian space agency **Roscosmos** has successfully launched the **Soyuz MS-23 spacecraft** to **bring back 3 astronauts** stranded on the **International Space Station (ISS)** following a leak in the cooling system in their Soyuz capsule.
- The unmanned Soyuz MS-23 lifted off from Baikonur space centre in **Kazakhstan** and had been placed in orbit.
- Russian cosmonauts **Sergey Prokopyev** and **Dmitry Petelin** and U.S. astronaut **Francisco Rubio** had been due to end their mission in March.
- According to the Russian space agency Roscosmos, all 3 Soyuz will return to Earth on the MS-23 vehicle in **September, 2023**.
- The 3 astronauts reached the ISS in **Sep, 2022** and their mission was supposed to last for 6 months but it was prolonged because their return vehicle started leaking coolant in December, 2022.

About Roscosmos :

- Established : 25 February 1992
- Headquarters : Moscow, Russia
- Director General : Yury Borisov
- It is a state corporation of the Russian Federation responsible for space flights, cosmonautics programs, and aerospace research.

About ISS :

- The ISS is the **largest modular space station** in **low Earth orbit.**
- The project involves **5 space agencies**: the United States' NASA, Russia's Roscosmos, Japan's

JAXA, Europe's ESA, and Canada's CSA.

IIM Kashipur's entrepreneurship event Uttishtha 2023 facilitates ₹ 5 crore funding for agri start-ups

- The **Indian Institute of Management (IIM) Kashipur Foundation for Innovation and Entrepreneurship Development (FIED)** helped facilitate **Rs 5 crore funding** for **15 agri start-ups** at its annual entrepreneurship summit, **7th edition of Uttishtha 2023.**
- The initiative was supported by the **Ministry of Agriculture and Farmers Welfare, Government of India (GoI).**

SpaceX Falcon 9 Rocket Launches 40 OneWeb Internet Satellites To Orbit

- A **SpaceX Falcon 9 rocket** successfully launched **40 broadband satellites** of United Kingdom(UK)-based company **OneWeb** from **Florida's Cape Canaveral Space Force Station** in **Florida, United States of America (USA).**
- With this, **OneWeb 17,** the total number of satellites in this network to **582**.
- It was the **13th launch** and landing for this particular booster
- It was carried out to facilitate OneWeb's goal of constructing a constellation of over **600 satellites** in **low earth orbit (LEO)**.

About SpaceX :

- Founded : March 14, 2002;
- Headquarters : Hawthorne, California, United States
- CEO & Chairman : Elon Musk
- SpaceX is an American spacecraft manufacturer, launcher, and satellite communications corporation.

DRDO Conducts Successful Flight-test Of Indigenous PTO Shaft And Two VSHORADS Missile Test

- The **Defence Research and Development Organisation (DRDO)** conducted **two consecutive successful flight tests** of the **Very Short Range Air Defence System (VSHORADS) missile** at the integrated test range (ITR) Chandipur off the coast of **Odisha**
- The flight tests were carried out from a ground-based man-portable launcher against high-speed unmanned aerial targets.
- VSHORADS is a **man-portable air defence system (MANPAD)** meant for neutralising low-altitude aerial threats at short ranges.

About DRDO :

- Established : 1958
- Headquarters : New Delhi, Delhi, India
- Chairman : Dr Sameer V Kamath
- The DRDO is the premier agency under the Department of Defence Research and Development in the **Ministry of Defence** of the Government of India.

Svaya Robotics develops India's first indigenous quadruped robot, exoskeleton for defence sector Missile Test

- Hyderabad-based **Svaya Robotics** has **developed India's first indigenous quadruped (four-legged) robot** and **exoskeleton** for the **defense sector** as part of the Atmanirbhar Bharat initiative.
- The indigenous robots and wearable exoskeletons were developed by Svaya Robotics in collaboration with the **Defence Research and Development Organisation (DRDO) Labs, Research and Development Establishment (R&DE), Pune,** and the **Defence Bioengineering**

and Electromedical Laboratory (DEBEL), Bengaluru, as technology demonstrators with their design inputs.

- **Founder and MD of Svaya Robotics** : Vijay R Seelam

UK Space Agency funds Rolls- Royce's plan to build nuclear reactor on moon

- The **UK Space Agency (UKSA)** would back research by **Rolls-Royce** looking at the use of **nuclear power** on the **moon**.
- The researchers from Rolls-Royce had been working on a **Micro-Reactor program** "to develop technology that will provide power needed for humans to live and work on the Moon.

About UK Space Agency :

- Founded : 1 April 2010
- Headquarters : Swindon, Wiltshire
- Chief Executive : Paul Bate

Launch of world's 1st 3D-printed rocket cancelled at last second

- The launch of the **world's first 3D-printed rocket, Terran 1**, was recently **cancelled** at the last second.
- 3D printing or additive manufacturing is a process of making **three-dimensional solid objects** from a digital file.

IIT Madras Researchers develops pocket-friendly device to detect milk adulteration in 30 seconds

- **Indian Institute of Technology Madras (IIT Madras)** Researchers have developed a **three-dimensional (3D)** paper-based **portable device** that can **detect adulteration** in **milk within 30 seconds**.
- The test could be even performed at home.
- The research was led by **Pallab Sinha Mahapatra**, associate professor, department of Mechanical Engineering, IIT Madras, along with research scholars Subhashis Patari and Priyankan Datta.
- The research paper has been published in the prestigious peer-review journal Nature.

Key Highlights :

- The device can **detect multiple substances** commonly used as **adulterating agents** including Urea, detergents, soap, starch, hydrogen peroxide, sodium-hydrogen-carbonate and salt, among others
- The conventional laboratory-based methods to test the purity of milk are both **expensive** and **time-consuming.**
- This new technology is **affordable** and could also test other liquids such as water, fresh juices, and milkshakes for traces of adulteration.
- **Only one millilitre sample** of any liquid is sufficient to test for adulteration.
- The adulteration of milk is a growing menace, especially in developing countries like **India, Pakistan, China,** and **Brazil.**
- Consumption of adulterated milk could cause medical complications such as kidney problems, infant death, gastrointestinal complications, Diarrhoea, and even cancer

Chinese tech giant Baidu unveils ChatGPT rival Ernie Bot

- **Chinese tech company Baidu** has launched its **own Artificial Intelligence (AI)-powered chatbot, Ernie Bot**, based on its deep learning model Ernie (short for "**enhanced representation through knowledge integration**").
- The first version of Ernie Bot was developed in **2019**.
- Ernie Bot can perform various tasks, such as mathematical calculations, speaking in Chinese dialects, and generating videos and images with text prompts.

About ChatGPT :

- ChatGPT is made by the Microsoft-backed **OpenAI**, while Google and a host of ambitious startups are also developing their own so-called large language models.

About Baidu :

- Founded : January 18, 2000
- Headquarters : Beijing, China
- CEO : Robin Li
- Baidu, Inc. is a Chinese multinational technology company specialising in Internet-related services, products, and artificial intelligence.

Tamil Nadu's novel initiative results in reduced TB deaths

- **Tamil Nadu (TN)** has pioneered an initiative called **TN-KET (Tamil Nadu Kasanoi Erappila Thittam** - meaning TB death-free project) across the State to **reduce** the **mortality rate** among people with tuberculosis.
- The initiative TN-KET **began** in **April 2022** in 2,500-odd public healthcare facilities that diagnosed TB in 30 districts.

- It has achieved significant reduction in the number of early TB deaths (Deaths within 2 months of TB diagnosis).
- Early TB deaths have reduced from more than **600** in **April 2022** to less than **350** in **December 2022.**

Key Highlights :

- The heart of the initiative is the **'Differentiated TB Care'** aimed at assessing whether people with TB need ambulatory care or admission in a health facility to manage severe illness at the time of diagnosis.
- The guidelines, released by the **Central TB Division** in **January 2021**, requires comprehensive assessment of **16 clinical, laboratory and radiological parameters.**
- **Chennai-based National Institute of Epidemiology (ICMR-NIE),** which is spearheading TN-KET along with the State TB Cell, found that preliminary assessment (triaging) of patients based on just **three conditions-very severe undernutrition, respiratory insufficiency,** and **inability to stand without support** was feasible for quick identification at diagnosis.

RailTel bags order worth Rs 287.57 crore from C-DAC

- State-owned **RailTel Corporation of India Ltd** has received the **work order** from **Centre for Development of Advanced Computing (C-DAC)** for supply, installation, integration, testing and commissioning of IT infrastructure in green field data centre at **New Delhi** and **Bengaluru** along with training and support amounting to **Rs 287.57 crores (including taxes).**"
- The data centres will facilitate C-DAC in building up its capacity for **secure, big data enterprise applications.**
- The C-DAC is the premier R&D organisation of the **Ministry of Electronics and Information Technology (MeitY).**

- The delivery period of the project is **300 days.**
- The C-DAC is undertaking creation of this greenfield, turnkey project to build a suite of Big Data enterprise Applications.
- The complete solution is to be spread over two geographical locations, one hosting both the data centre and the **Business Continuity Plan (BCP)**, and the other hosting the **Disaster Recovery (DR) site.**

About RailTel :

- Founded : September 2000
- Headquarters : New Delhi, Delhi, India
- Chairman and Managing Director : Sanjai Kumar
- RailTel, a "**Mini Ratna (Category-I)**" Central Public Sector Enterprise is an **information and communications technology (ICT)** provider and one of the largest neutral telecom infrastructure providers in the country owning a pan-India optic fibre network on exclusive **Right of Way (ROW)** along Railway track.

North Korea tests nuclear underwater attack drone Haeil generate 'radioactive tsunami'

- **North Korea** has tested a **nuclear-capable underwater attack drone** called **'Haeil'** (meaning "tsunami" in Korean) the first weapon of its kind capable of generating a **radioactive tsunami** that can destroy naval strike groups and major ports.

Key Highlights :

- The drone cruised underwater at a depth of **80 to 150 metres (260-500 ft)** for over **59 hours** during the test.

- The drone can be towed by a surface ship for operation, and can be deployed at any coast or port.
- The United States (US) and South Korea completed an **11-day exercise** that included their biggest field training in years, and are preparing another round of joint naval drills that will reportedly involve a U.S. aircraft carrier.

About North Korea :

- Capital : Pyongyang
- Currency : Korean People's won

ISRO successfully launches LVM3-M3/OneWeb with 36 satellites from Andhra Pradesh

- The **Indian Space Research Organisation (ISRO)** successfully launched the **LVM3(Launch Vehicle Mark III)-M3/OneWeb India-2 mission** with all **36 satellites** deployed into intended orbits.
- The mission launch took place from the second launch pad at the iconic **Satish Dhawan Space Centre at Sriharikota (SDSC-SHAR) spaceport off the Andhra Pradesh coast.**
- OneWeb is backed by **Bharti Enterprises.**

About LVM3-M3 Mission :

- This was the second mission operated by the ISRO for the OneWeb subsidiary Network Access Associates Ltd, United Kingdom under a commercial agreement with the **NewSpace India Ltd (NSIL)** to launch **72 satellites** into **Low Earth Orbits (LEO).**
- The first set of **36 satellites** of OneWeb Group company was launched on **October 23, 2022** by ISRO.
- In the OneWeb Gen-1 constellation, the satellites are equally divided among **12 planes.**
- The constellation operates at an altitude of about **1,200 kilometres** above Earth's surface.

- Each plane is separated by an altitude of **4 kilometres** to prevent inter-plane collision.
- The satellites totalling about **5,805 kilos** were placed in a **450 km circular orbit** with an inclination of **87.4 degrees.**
- The **height** of the launch vehicle is **43.5 metres,** and its lift-off mass was **643 tonnes.**
- This was the **6th** launch of **India's heaviest rocket LVM-3.**
- The mission completes OneWeb's network of **618 LEO satellites** for providing global broadband connectivity against the initial target of 648 satellites.
- LVM3 was previously known as the **Geosynchronous Satellite Launch Vehicle (GSLV) Mark–III** with a cryogenic upper stage.

About NSIL :

- Established : 2019
- Headquarters : Bangalore, Karnataka, India
- Chairman & MD : Radhakrishnan Durairaj
- NSIL is **ISRO's commercial arm.**
- It is a Central Public Sector Enterprise.
- It is the **second commercial entity** of the **Department of Space (DoS)** after **Antrix Corporation Limited,** which was set up in 1992 to market the products and services of the ISRO.

About ISRO :

- Founded : 15 August 1969
- Headquarters : Bangalore, Karnataka

- Chairman : Sreedhara Somanath

World's First 3D Printed Rocket 'Terran 1' Launched in 3rd attempt

- The **world's first 3D-printed rocket Terran 1 launched** successfully on its **third attempt**, but failed to achieve orbit during second-stage separation.
- It was launched from **Complex 16 at Canaveral's US Space Force Station.**
- Despite sustained efforts, it failed to achieve orbit during second-stage separation & it **crashed** into the **Atlantic Ocean.**

About 'Terran 1' :

- Terran 1's engines are powered by liquid oxygen and liquid natural gas.
- It is built by California aerospace startup **Relativity Space**.
- **85%** of its mass is **3D printed** with metal alloys, including the engines.
- It is made with the **world's largest 3D metal printers**.
- The rocket is **110 feet (33.5 metres) tall** with a diameter of 7.5 feet (2.2 metres).
- It hasn't carried any payload in its first flight but it can carry a payload of **2,755 pounds (1,250 kilograms)** into low Earth orbit.
- 3D printing builds the shapes of objects with the layers of **aluminium powders or beads.**
- It also allows for the rapid iteration of designs and reduces the wastage of raw materials.

ISRO successfully conducts flight test of cryogenic engine for Chandrayaan-3 mission

The **Indian Space Research Organisation (ISRO)** has successfully conducted the f**light acceptance hot test** of the **CE-20 cryogenic engine**.

- The Engine will power the Cryogenic Upper Stage of the **LVM3 (Launch Vehicle Mark-3)** for the **Chandrayaan-3 mission** at the ISRO Propulsion Complex, Mahendragiri in Tamil Nadu (TN).
- It has been designed and developed by the **Liquid Propulsion Systems Centre (LPSC)** , a subsidiary of ISRO.
- It is the **first Indian cryogenic engine** to feature a gas-generator cycle.
- It is one of the most powerful upper-stage cryogenic engines in the world.
- This engine develops a nominal thrust of **186.36 kN in vacuum.**

About Chandrayaan-3 :

- Chandrayaan-3 is **India's third moon mission** and is a follow-on mission to Chandrayaan-2 to demonstrate end-to-end capability in safe landing and roving on the lunar surface.
- Chandrayaan-3 mission has 3 major modules - the **Propulsion module, Lander module,** and **Rover.**
- The mission is slated to be launched later **2023** by Launch Vehicle Mark 3 (LMV3) from the **Satish Dhawan Space Centre at Sriharikota.**

About ISRO :

- Established : 15 August 1969
- Headquarters : Bangalore, Karnataka, India
- Chairman : Sreedhara Somanath
- The ISRO is the national space agency of India & it operates under the **Department of Space (DOS).**

China Launches Communications Satellite Zhongxing-26 Into Orbit

- **China** Launched **Zhongxing-26 (ChinaSat-26),** a communications satellite into **geosynchronous transfer orbit (GTO)** by a **Long March 3B rocket** lifted off from Xichang Space Centre (XLSC), southwest China.
- To provide broadband connectivity for aviation and ship-related operations.
- The satellite was launched by the **China Academy of Space Technology.**
- Zhongxing-26 is based on the **DFH-4E satellite bus** and uses chemical and electric propulsion.
- It is **China's first satellite** providing **more than 100 gigabits per second (Gbps)** and was developed by **China Aerospace Science & Technology Corporation's (CASC) China Academy of Space Technology (CAST).**
- It is the **5th** Long March launch this calendar year, with CASC planning more than 60 launches in 2023.
- The satellite is equipped with **94 Ka-band user beams**.
- This is 3.5 times more than the 26-beam, 20 Gbps, Dongfanghong-3B-based Zhongxing-16 launched in **2017**.

About China :

- Capital : Beijing
- Currency : Renminbi

Centre for Railway Information System collaborated with ISRO for live tracking of trains under Real Time Train Information System project

- The **Indian Railways** is collaborating with **Indian Space Research Organization (ISRO)** under the **Real Time Train Information System (RTIS) project.**
- To enable **real-time tracking** of train movements with the assistance of **satellite imagery.**
- RTIS devices that use satellite imagery are being installed on the trains to automatically acquire its "movement timing at the stations, including that of arrival and departure or run-through".

- These timings get automatically plotted on the control chart of those trains in the **Control Office Application (COA) system.**
- RTIS gives mid-section updates with a periodicity of **30 seconds.**
- The Train Control can now **track** the **location** and speed of RTIS-enabled locomotives/trains more closely, without any manual intervention.
- It allows passengers to get the real-time location or train running status of a train on their smartphone.

About ISRO :

- Established : 15 August 1969
- Headquarters : Bangalore, Karnataka, India
- Chairman : Sreedhara Somanath

About CRIS :

- Established : July 1986
- Headquarters : New Delhi, India
- It is under the ownership of the Government of India and administrative control of the **Ministry of Railways.**

About Ministry of Railways :

- Union Minister : Ashwini Vaishnaw
- Minister of State : Raosaheb Danve, Darshana Jardosh
- Chairman & CEO of Railway Board : Anil Kumar Lahoti

NASA hands over NISAR satellite to ISRO

- The US Space Agency **National Aeronautics and Space Administration (NASA)** has handed over the **Earth observation satellite, NASA-ISRO SAR (NISAR)** to **Indian Space Research Organisation (ISRO)** at **Bengaluru, Karnataka.**
- SAR stands for **'Synthetic Aperture Radar'** technique, responsible for producing **high-resolution images** from a resolution-limited radar system that NASA has used to measure changes in Earth's surface.
- NISAR is an **earth observation satellite**.
- It is jointly **developed** by **NASA** and **ISRO**.
- It was envisioned by NASA and ISRO in **2014** for the powerful demonstration of the capability of radar as a science tool.

About NASA :

- Established : July 29, 1958
- Headquarters : Washington, D.C, United States
- Administrator : Bill Nelson

About ISRO :

- Established : 15 August 1969
- Headquarters : Bangalore, Karnataka, India
- Chairman : Sreedhara Somanath