

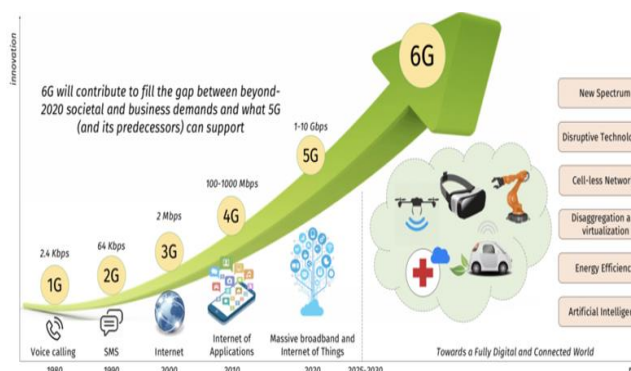
6G COMMUNICATIONS TECHNOLOGY: WHY IS INDIA TAKING 6G SERIOUSLY?

Why in News?

- Recently, Prime Minister Narendra Modi unveiled the **Bharat 6G Vision Document**, a starting point for policymakers and the industry to gear up for the next generation of telecommunications.

About 6G Technology:

- Technically, **not in existence today**, 6G has been conceived as a far superior technology than 5G.
- As opposed to 5G, which at its peak can offer internet speeds up to 10 gigabits per second (GBPS), 6G promises to offer **ultra-low latency with speeds up to 1 terabit per second** (100 times faster than 5G).
 - Latency** is the time taken for a data packet to move from one place to another.
 - On the other hand, **speed** is the number of such packets that can travel on a connection each second.
- Its application will include** remote-controlled factories, constantly communicating self-driven cars and smart wearables taking inputs directly from human senses.
- However, since the majority of 6G supporting communication devices will be battery-powered and can have a high carbon footprint, **it will also need to be balanced with sustainability.**



What is India's 6G Roadmap?

- The Government of India formally launched 5G services in **October 2022** and said that India should be ready to launch 6G services in the next 10 years.
- The Bharat 6G project will be implemented **in two phases** and the government has also appointed an **apex council to oversee the project and focus on issues** such as –
 - Standardisation,

- Identification of the spectrum for 6G usage,
- Create an ecosystem for devices and systems, and
- Figure out finances for research and development, etc.
- **In Phase One (from 2023 to 2025)**, support will be provided to explorative ideas, risky pathways and proof-of-concept tests.
- Ideas and concepts that show promise and potential for acceptance by the global peer community will be adequately supported to develop them to completion, leading to commercialisation as part of **Phase Two (from 2025 to 2030)**.
- **To fund research and innovation on 6G**, the document recommended the creation of a corpus of **Rs 10,000 crore** to facilitate various funding instruments such as grants, loans, VC fund, etc.
- **Some indicative goals are to –**
 - **Guarantee every citizen** a minimum bandwidth of **100Mbps**;
 - Ensure **every gram panchayat** has half a terabit per second of connectivity; and
 - Blanket the country with over 50 million internet hotspots, with thirteen per square km.

Why did the Government put out a 6G Vision Document?

- To accelerate India's wireless data consumption lead and **assume leadership** in setting the standards for 6G in the coming years.
 - This may involve everything from **encouraging local manufacturing** of telecom gear to supporting Indian companies and engineers in international discussions around **standardisation**.
 - **Standardisation is key**, as telecommunications standards are usually adopted globally.
- **Delay in previous generations** of telecommunications technology rolling out in India.
 - **For example**, 5G was rolled out years after countries like South Korea and the US had already covered their major urban areas with high-speed wireless connectivity.
 - **India does not want a repeat of that.**

[LITHIUM FIND IN J&K: CHILE, WITH MOST RESERVES, READY TO SHARE KNOW-HOW](#)

Why in News?

- Chile, country with the largest lithium reserves worldwide, is ready to partner with India on tapping into the lithium value chain.
- This includes potentially extending technical expertise in exploiting the newly established “inferred” lithium resources of 5.9 million tonnes in India.
- In February 2023, the Geological Survey of India (GSI), for the first time, had established availability of lithium-inferred resources of 5.9 million tonnes in Reasi district of Jammu and Kashmir.

About Lithium:

- Lithium is a chemical element with the symbol Li and atomic number 3.
- It is a **light and soft** (can be cut with a kitchen knife), **silvery-white** alkali metal.
- Lithium is a special metal in many ways. It is **so low in density** that it floats on water.

Applications of Lithium:

- The most important use of lithium is in **rechargeable batteries for mobile phones, laptops, digital cameras and electric vehicles (EVs)**.
- Lithium is often dubbed as “**white gold**” for electric vehicles.
- Lithium metal is made into alloys with aluminium and magnesium, improving their strength and making them lighter.
- Aluminium-lithium alloys are **used in aircraft, bicycle frames and high-speed trains**.
- Lithium has no known biological role. **It is toxic**, except in very small doses.

Where is Lithium Found Naturally?

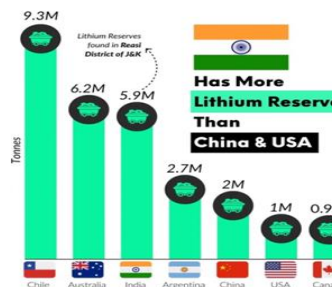
- Lithium makes up a mere **0007 per cent of the Earth's crust** and it's only found locked up in minerals and salts.
- With 9.3 million tonnes, **Chile has the world's largest known lithium reserves**.
- Chile is followed by **Australia (6.2 million tonnes), Argentina (2.7 million tonnes) and China (2 million tonnes)**.
- **NOTE** – This was before the discovery of 5.9 million tonnes of reserves in J&K.
- Global lithium production surpassed **100,000 tonnes** for the first time in 2021, quadrupling from 2010.

- Currently, **Australia alone produces 52% of the world's lithium.**

Future of Lithium Production:

- As the world produces more batteries and EVs, the **demand for lithium is projected to reach 1.5 million tonnes of lithium carbonate equivalent (LCE) by 2025 and over 3 million tonnes by 2030.**
- Based on the above demand projections, production needs to triple by 2025 and increase nearly six-fold by 2030.

Discovery of Lithium-reserves in India:



- The GSI, during preliminary exploration stage, found 5.9 million tonnes of Li in Salal-Haimana area of Reasi district, J&K.
- As part of efforts to augment local reserves of the critical mineral, the GSI has carried out **14 projects on lithium during last five years.**
- **India now has the third largest resource of lithium globally, but it will take time to convert it to reserves.**

Strategic Significance of this Discovery:

- This is the **first significant discovery of lithium in India**, as previously only a small reserve had been discovered in Karnataka.
- Lithium deposits are critical for India as the country puts its focus on electric mobility for both public and private transport.
- The country's imports of lithium and lithium-ion in FY21 stood at Rs 8,900 crore in FY21 and increased to Rs 13,800 crore in FY22.
- This will also **help reduce India's dependence on China** — "a major concern for many in the current political climate".
- The ongoing **Russia-Ukraine has disrupted the supply chain**, resulting in high cost of the minerals.
- The discovery of lithium in J&K is expected to give a **major fillip to the country's self-sufficiency in EV Batteries.**

- Experts say the discovery could lead to not only a reduction in India's dependence on foreign countries but also bring down the cost of such batteries in the future.
- The cost of a battery is around 45-50 per cent in an EV.
- **It will also help India to boost its climate action plan.**
- In order to decarbonise the transport sector, India aims to grow EV sales to capture the markets of **30 per cent of private passenger cars, 70 per cent of commercial vehicles, and 80 per cent of two and three-wheelers by 2030.**
- This will put India on track to reaching its **goal of net zero emissions by 2070.**

ISRO'S REUSABLE LAUNCH VEHICLE AUTONOMOUS LANDING MISSION – RLV LEX



Why in News?

- The Indian Space Research Organisation (ISRO) successfully conducted the Reusable Launch Vehicle Autonomous Landing Mission (RLV LEX).
- The test was conducted at the Aeronautical Test Range (ATR), **Chitradurga, Karnataka.**

What is a Reusable Launch Vehicle (RLV)?



- Reusable launch vehicle (RLV) means a **launch vehicle that is designed to return to Earth substantially intact and therefore may be launched more than one time.**
- An RLV may also contains stages that may be recovered by a launch operator for future use in the operation of a substantially similar launch vehicle.

About Reusable Launch Vehicle Autonomous Landing Mission (RLV LEX):

- A Reusable Launch Vehicle (RLV) was flown by a **Chinook Helicopter** of the Indian Air Force as an underslung load to a **height of 4.5 km** from the mean seal level.

- The RLV was then released mid-air.
- The RLV then performed approach and landing maneuvers using the Integrated Navigation, Guidance & control system and successfully completed an autonomous landing back on the ATR in Chitradurga, Karnataka.
- The **autonomous landing was carried out under the exact conditions of a Space Re-entry vehicle's landing** —high speed, unmanned, precise landing from the same return path— as if the vehicle arrives from space.

Significance of the RLV LEX Test:

- This is the **first time in the world that a launch vehicle has been carried to an altitude of 4.5 km by a helicopter** and released for carrying out an autonomous landing on a runway.
- With the successful landing of RLV LEX, the **dream of an Indian Reusable Launch Vehicle arrives one step closer to reality.**

History of ISRO's RLV Missions:

- The cost of access to space is the major deterrent in space exploration and space utilization.
- A reusable launch vehicle is the unanimous solution to achieve low cost, reliable and on-demand space access.
- In line with this aim, ISRO, in 2016, launched the **Reusable Launch Vehicle-Technology Demonstration (RLV-TD)**
- RLV-TD is India's first uncrewed flying testbed. It is a scaled down prototype of an eventual two-stage-to-orbit (TSTO) reusable launch vehicle.
- The RLV-TD successfully completed its first atmospheric test flight on 23rd May 2016, which lasted for 770 seconds and reached a maximum altitude of 65 kilometers.
- It was designed to evaluate various technologies, and **development of the final version is expected to take 10 to 15 years.**
- After the successful execution of RLV LEX, the ISRO is now working on **Orbital re-entry Experiment (ORE)**.
 - In ORE, a wing body called Orbital Re-entry vehicle (ORV) will be taken to an orbit by an ascent vehicle derived from the existing GSLV and PSLV stages and stay in orbit for a stipulated period, re-enter and land in a runway autonomously with a landing gear.

- More experiments are in the pipeline to ensure that the RLV succeeds in payload delivery to low earth orbit, as ISRO plans to **reduce the cost of the process by 80%**.
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CENTRAL ADMINISTRATIVE TRIBUNAL (CAT)

A Parliamentary committee recently asked the Central Administrative Tribunal (CAT) to decide on a priority basis the cases pending disposal for more than 10 years.



About Central Administrative Tribunal (CAT):

- The Central Administrative Tribunal (CAT) had been **established under Article 323-A** of the Constitution.
 - **Mandate:** To **adjudicate disputes and complaints with respect to recruitment and conditions of service** of persons appointed to public services and posts **in connection with the affairs of the Union** or other authorities **under the control of the Government**.
 - In addition to the Ministries and Departments of Central Government, the **Government has notified about 214 organizations** under section 14 (2) of the Administrative Tribunals Act, 1985, to **bring them within the jurisdiction of the CAT** from time to time.
 - There are **17 Benches and 21 Circuit Benches** in the CAT all over India.
 - **Composition:** A bench consists of **one Judicial Member** and **one Administrative Member**.
 - The **conditions of service of the Chairman and Members** of CAT are the **same as** applicable to a **Judge of High Court**.
 - **Salaries, Allowances and Conditions of Service of the officers** and other employees of the Tribunal are **specified by the Central Government**.
 - **Powers:**
 - It exercises **jurisdiction only in relation to the service matters** of the parties covered by the Administrative Tribunals Act 1985.
 - The Tribunal is **guided by the principles of natural justice** in deciding cases and is not bound by the procedure prescribed by the Civil Procedure Code.
 - CAT is **empowered to frame its own rules of procedure and practice**.
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- It has been conferred with the power to exercise the same jurisdiction and authority in respect of contempt of itself as a High Court.
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ASOLA BHATTI WILDLIFE SANCTUARY

Officials recently said the forest and wildlife department will develop a second native seeds nursery at the Asola Bhatti Wildlife Sanctuary.



About Asola Bhatti Wildlife Sanctuary:

- **Location:**

- The sanctuary covering a 32.71 sqkm area on the **Southern Delhi Ridge of the Aravalli hill range** on the Delhi-Haryana border lies in **Southern Delhi** and **northern parts of Faridabad** and **Gurugram districts of Haryana state**.
- It is also **part of the Sariska-Delhi Wildlife Corridor**, which runs from the Sariska Tiger Reserve in Rajasthan to Delhi Ridge.
- **Vegetation: Dry deciduous,**
- **Flora:** Consists of **Prosopis juliflora** as the **dominant exotic species** and **Diospyros montana** as the **dominant native species** in the sanctuary.
- **Fauna:** **Golden Jackals, Striped-Hyenas, Indian crested-Porcupines, Civets, Jungle Cats, Snakes, Monitor Lizards, Mongoose** etc.

Key Facts about Aravalli Hills:

- It is one of the **oldest fold mountains of the world** which runs in a **southwest direction, starting near Delhi**, passing through southern **Haryana and Rajasthan**, and ending in **Gujarat**.
 - The **highest peak is Guru Shikhar** at 1,722 metres (5,650 ft).
 - **Three major rivers** originate from the Aravali hills, namely **Banas, Sahibi** and **Luni River** (which flows into the Rann of Kutch).
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AMOGHA-III MISSILE

Recently, the Bharat Dynamics (BDL) has successfully conducted a field firing test of its latest 3rd generation man-portable Anti-Tank Guided Missile (ATGM), Amogha-III.



About Amogha-III Missile:

- Amogha-III is an indigenous missile which has been developed under **Integrated Guided Missile Development Programme (IGMDP)**.
- It has a **fire-and-forget capability** and does not require external intervention after the launch.
- The missile also features **dual-mode Imaging Infra-Red (IIR) Seeker** systems with a **range of 200 to 2500 meters**.
- It showcases a tandem warhead, consisting of **two separate explosive charges** that are detonated in sequence.
 - The first charge, known as the **precursor charge**, penetrates the target's armour, creating a hole for the second charge, the main charge, to **detonate inside**, maximizing damage inflicted on the target.
- One of the unique features of the missile is it has **both top and direct attack modes**

REMEMBERING THE VAIKOM SATYAGRAHA

Why in News?

- Kerala Chief Minister Pinarayi Vijayan and Tamil Nadu Chief Minister MK Stalin jointly inaugurated the **centenary celebrations** of the Vaikom Satyagraha.
- On March 30th 1924, in the temple town of Vaikom in the princely state of Travancore (Kerala), a non-violent agitation started, marking the beginning of “**temple entry movements**” across the country.

About Vaikom Satyagraha:

- The Vaikom Satyagraha is the **first anti-caste movement**, as the pupil of the depressed class and untouchables were restricted from entering the temple.
- The movement in the vicinity of Mahadev temple in Kottayam district of Kerala took place during **1924-1925**.

Background:

- In AICC (All India Congress Committee) meeting in Kakinada 1923, **K Madhavan** along with **Sardar Panikkar** and **KP Kesava Menon** submitted a petition to the Travancore legislative council.
- The petition sought to grant the right to temple entry and worship of gods for all sections of the society irrespective of caste, creed, and community.

Beginning of the Movement:

- The Vaikom Satyagraha was launched on **30th March 1924**.
- The first chosen place for the initiation of the Satyagraha was the four public roads proceeding to the Shiva Shrine in Vaikom where marginalized, depressed caste and untouchables were not allowed to enter.
- The leading Satyagrahis namely **Kunjappy, Venniyil Govinda Panicker**, and **Bahuleyan** lead the procession walking hand in hand towards the Shiva shrine.
- Outside the shrine, a message was displayed that **Ezhavas** and other lower caste including the marginalized sections of the society are restricted to make use of the pavement (road) for any of its utilities.
- The policemen guarding the road arrested the three men and more Satyagrahis joined the movement, **marking the commencement of the Vaikom Satyagraha**.
- On 7th April 1924, **TK Madhavan** and **KP Kesava Menon** were also arrested which ignited more volunteers to come from Tamil areas and join the movement.

Prominent Social Workers Who Joined the Movement:

- One of the prominent figures was **Periyar E.V Ramaswamy**. He also joined the struggle and is popularly known as the only Satyagrahi who was arrested twice, thus earning him the title of **Vaikom Virar** (the fearless hero of Vaikom).
- **Sree Narayana Guru** also extended his support and co-operation to the Vaikom Satyagraha. He was against the caste system and orthodox discrimination prevalent in the society.
- The Vaikom Satyagraha **witnessed women's empowerment** as a large number of women seem to be actively participating in the movement for the first time.