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1. IAF develops indigenous data link communication: 'Vayulink' (Feb. 27, 2023)

In a major achievement, the Indian Air Force (IAF) has launched the **indigenously built jammer-proof communication platform 'Vayulink'.** This will help in maintaining contact with the base station even in bad weather.

An overview of the news:

- It is a highly secure communication system developed by the IAF.
- At Aero India 2023, IAF has given information about this and also organised a gallery for detailed information about this **'Vayulink platform**.

Platform 'Vayulink:

- Vayulink' is an ad-hoc data link communication system that, when installed on an aircraft, transmits encrypted traffic data over a secure channel as well as the position of other aircraft.
- The jammer-proof platform 'Vayulink' data link communication uses the **Indian Regional Navigation Satellite System (IRNSS),** also known as **NAVIC**.

Benefits of 'Vayulink:

- From this platform radio communication can be sent to the base station even in weak signal conditions.
- This system is very helpful for IAF. Because during a war situation when the aircraft are flying close to a friendly force, this system is helpful in telling the actual position of the aircraft.
- This helps the pilots to get accurate and precise information about the weather. In particular, it also helps in providing accurate communication to aircraft flying over hills.
- It helps prevent fratricide in case of war. Also it helps to know where our army is present.
- By this, mutual collision of fighter planes can also be prevented. Which provides an accurate teaming system service. It also helps in setting real time targets with the help of which multiple teams can attack the target simultaneously.
- The indigenous jammer-proof communication platform 'Vayulink' is helpful to all **the three services of the country.**

2. China launches Zhongxing-26 satellite (Feb. 27, 2023)

China has launched the **Zhongxing-26 satellite** in February 2023 at a cost of $333 million.

An overview of the news

- The Zhongxing-26 satellite was launched on a **Long March 3B rocket.** The main objective of this satellite is to provide broadband connectivity for aviation and shipping related operations.
- Zhongxing-26 was launched by the China Academy of Space Technology (CAST). CAST plans to launch 60 more in 2023.
- The rocket uses **liquid hydrogen and liquid oxygen fuel** in the third stage. Liquid rocket fuel requires controlled temperature to remain in its form.
- China is about to launch more than 200 spacecraft in its 60 missions in the coming time.
- China plans to launch **Tianzhou-6**, a cargo craft, by the end of 2023.
- Also, to strengthen its **Tiangong Space Station,** there are plans to launch crewed missions like **Shenzhou-16 and Shenzhou-17.**

3. Russian space agency launches Soyuz spacecraft to bring back 3 astronauts stranded on ISS (Feb. 25, 2023)

Recently the **Russian space agency, Roscosmos** has successfully launched the **Soyuz spacecraft** to **bring back three astronauts stranded on the International Space Station (ISS)** following a **leak in the cooling system in their Soyuz capsule.**

An overview of the news

- Two **Russian and one American astronauts** will board the **empty Soyuz spacecraft to return to Earth.**
- The **Soyuz MS-23** spacecraft was launched from the **Baikonur Space Center in Kazakhstan and placed in orbit.**
- US astronaut **Francisco Rubio**, along with Russian cosmonauts **Sergei Prokopyev and Dmitry Peteli**n, were due to return to Earth after their mission ended.
- But two months ago, it got stuck in space due to a leak in the cooling system of **Soyuz MS-22 capsule.**
- According to the Russian space agency Roscosmos, all three Soyuz will **return to Earth on the MS-23 vehicle in September.**
- The leak on the MS-22 spacecraft was **caused by a small piece of a micrometeoroid hitting the capsule.**

About International Space Station (ISS)

- It is a **multi-nation construction project** that is the largest single structure humans ever put into space.

- Its main construction was completed between **1998 and 2011.**
- It is not owned by a single nation and according to the **European Space Agency (ESA)** is a "**co-operative program" between Europe, the United States, Russia, Canada and Japan.**
- As of May 2022, **258 individuals from 20 countries** have visited the International Space Station.
- The top participating countries include the **United States (158 people) and Russia (54 people)**.

4. Indian Council of Agricultural Research developed new variety of wheat named HD-3385 (Feb. 23, 2023)

The **Indian Council of Agricultural Research (ICAR)** has developed a **new variety of wheat** which is **'HD-3385'.**

An overview of the news

- It is capable of meeting the challenges arising due to **climate change and rising heat.**
- This new variety is suitable for **early sowing.** It can survive the wrath of heat and its crop can be harvested **before the end of March**.
- The Central Government had recently announced setting up of a committee to monitor the situation arising out of rise in temperature and its impact on the current wheat crop.
- ICAR has registered the news variety HD-3385 with the **Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA).**
- ICAR has also granted a license to Bioseed owned by **DCM Shriram Limited** to conduct multi-location trials and seed multiplication.

About Indian Council of Agricultural Research

- It is an **autonomous body** formerly known as the **Imperial Council of Agricultural Research.**
- Headquarters - **New Delhi**
- Established - **1929**
- The Union Minister of Agriculture serves as its president. Presently its president is **Narendra Singh Tomar.**
- ICAR is the largest network of agricultural research and education institutes in the world.

5. India first hybrid rocket launched in Chengalpattu (Feb. 22, 2023)

India's first hybrid 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** on 19 February.

An overview of the news

- The reusable rocket has been made by the selected top **100 students.**
- The rocket can be used for research into **weather, atmospheric conditions and radiation.**
- Over **3,500 government school students** from classes VI to XII, including students from fishermen, tribal communities in Tamil Nadu and Puducherry, participated in the launch.
- Martin Foundation in association with Dr APJ Abdul Kalam International Foundation and Space Zone India successfully completed the Dr APJ Abdul Kalam Satellite Launch Vehicle Mission 2023.

What is a Hybrid rocket?

- It is a **bipropellant rocket engine** that uses propellants that are in two different states.
- These propellants are usually liquid and solid which react to form exhaust gases suitable for rocket propulsion.

India’s first privately developed rocket Vikram-S

- India's first private rocket **Vikram-S** (Suborbital) was launched on 18 November 2022 from the **Satish Dhawan Space Centre, Sriharikota.**
- It was designed by the **Space technology startup Skyroot Aerospace** as a tribute to the father of the country's space programme, **Vikram Sarabhai.**

6. Sea ice cover reaches lowest level in Antarctica (Feb. 20, 2023)

In the study conducted by scientists, it has been told that the area of the **Antarctic Ocean** covered with ice has **shrunk to a record low level.**

An overview of the news

- According to the **National Snow and Ice Data Center in the United States,** Antarctica's sea ice extent was recorded at **2.2 million square kilometres** last week, down from **2.27 million square kilometres** as of February 24, 2022, the previous record.
- This is the lowest since records **began in 1979.**

- According to scientists, this is the second consecutive year when snow has melted up to **20 lakh square km** in a day.
- The coldest region on Earth, **99 percent of Antarctica is covered with ice.**
- About two thick layers of ice are frozen here. But now this ice is melting fast.
- According to scientists, due to the hot winds, the snow is melting rapidly, this year the temperature of the hot winds has been **1.5 degrees** above the average.

About Antarctica

- It is the **southernmost** continent and the **fifth largest continent on Earth.**
- Antarctica is uninhabited except for about **40 permanent stations** set up by many countries including India for scientific research.
- India has two research centres on the Antarctic continent - '**Maitri' and 'Bharati'.**
- India has completed **40 scientific expeditions** here under the Antarctic program so far.

7. 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.

8. 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**

9. 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:

- Th**e 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

10. 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