

Project NETRA

❖ Context

- With **space junk posing an increasing threat** to Indian assets in space, **ISRO is building up** its orbital debris tracking capability by deploying new radars and optical telescopes under the **Network for Space Objects Tracking and Analysis (NETRA)** project.

❖ Key Highlights

- Last year, the space agency monitored 4,382 events in LEO and 3,148 events in the geostationary orbit where **space objects closely approached Indian assets**.
- Fragments from the **Fengyun-1C satellite** (part of the anti-satellite test (ASAT) by China in 2007) and the **Cosmos 2251-Iridium satellite** collision in 2009 accounted for the **maximum number of these threats**.
- The observations also **covered 84 “close approaches of less than one km”** between Starlink satellites and Indian assets.

❖ Space Junk

- Space junk or debris consist of **spent rocket stages, dead satellites, fragments of space objects and debris resulting from ASAT**.
- Hurling at an **average speed of 27,000 kmph** in LEO, these objects pose a very real threat as collisions involving **even centimeter-sized fragments can be lethal to satellites**.
- The **volume of debris is likely to go up** in the coming years with the increase in space missions globally.
- Globally, **2021 saw the highest space object-to-launch ratio**. In other words, more space objects are placed in orbit per launch.

❖ Project NETRA

- **About:**
 - It is an **early warning system in space to detect debris and other hazards to Indian satellites**.
 - It will first be for **low-earth orbits or LEO** which have remote-sensing spacecraft.
- **Under NETRA**, ISRO plans to put up many **observational facilities** such as:
 - **Space debris tracking radar.**
 - It will be capable of detecting and tracking objects 10 cm and above in size.
 - It will have a range of 1,500 km.
 - **Optical telescopes:**
 - These will be inducted as part of establishing an effective surveillance and tracking network.
 - **Data processing units.**
 - **Space Situational Awareness Control Center.**
- They can, among others, spot, track and catalogue objects as small as **10 cm, up to a range of 3,400 km and equal to a space orbit of around 2,000 km**.
- **Significance:**
 - It will give **India its own capability in space situational awareness (SSA)** like the other space powers - which is used to ‘predict’ threats from debris to Indian satellites.
 - It also goes so far as to serve as an unstated **warning against missile or space attack** for the country.

Genome Editing Technology

❖ Context

- Recently, the central government paved the way for **easy introduction of genome edited crops**.
- The government has **clearly distinguished such crops from genetically modified (GM) crops** and has **prescribed relatively easier norms for their introduction**.

❖ Genome Editing

- This technique **allows scientists to ‘cut’ DNA strands and edit genes**.
- For agriculture scientists this process allowed them to **bring about desired changes in the genome** by using site directed nuclease (SDN) or sequence specific nuclease (SSN).
- **Nuclease is an enzyme** which cleaves through nucleic acid — the **building block of genetic material**.
- **CRISPR -associated proteins based systems.**
 - This system allows for **targeted intervention at the genome sequence**.
 - Using this tool, agricultural scientists can now **edit the genome to insert specific traits** in the gene sequence.

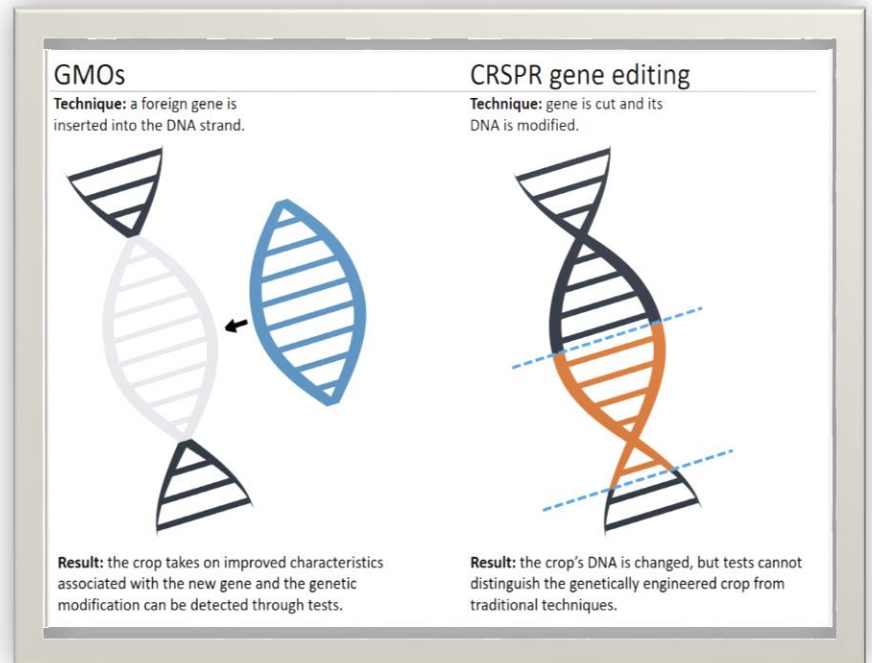
❖ Gene Editing Vs Genetically Modified Organisms (GMO)

- The **genome editing does not involve the introduction of foreign genetic material but the GMO does**.
- GMO involves modification of the genetic material of the host by **introduction of a foreign genetic material**.
- In the case of agriculture, soil bacteria is the best mining source for such genes which are then inserted into the host genome using genetic engineering.
- In the case of agriculture, **both the techniques aim to generate variants which are better yielding and more resistant to biotic and abiotic stress**.
- Globally, European Union countries have bracketed genome edited crops with GM crops.
- Countries like Argentina, Israel, US, Canada, etc have liberal regulations for genome edited crops.

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- Depending on the nature of the edit that is carried out, **the process is divided into three categories - SDN 1, SDN 2 and SDN 3.**
- **SDN1:**
 - It introduces changes in the host genome's DNA through **small insertions/deletions without introduction of foreign genetic material.**
- **SDN 2:**
 - The edit involves using a **small DNA template to generate specific changes.**
- **SDN3:**
 - This process involves **larger DNA elements or full length genes of foreign origin** which makes it similar to Genetically modified organisms (GMO) development.



Light Combat Helicopter

❖ Context

- The Cabinet Committee on Security (CCS) recently approved the procurement of 15 indigenously developed Light Combat Helicopters (LCH) at a cost of Rs 3,887 cr along with infrastructure sanctions worth Rs 377 cr.

❖ Key Highlights

❖ Genesis of the Project

- The genesis of the LCH lies in the **Kargil conflict of 1999** when the absence of an attack helicopter which could operate in ultra-high altitude areas was felt acutely by the Indian Army and the Indian Air Force (IAF).
- The intruding Pakistan Army troops had occupied various heights on the Indian side of the Line of Control but the existing Russian-made attack helicopters could not be deployed.
- The IAF was forced to use the MI-17 helicopters in a modified role against those heights and suffered the loss of a helicopter when it was fired upon by the enemy.
- In **2006 the Hindustan Aeronautics Limited (HAL) announced its intention** to develop a LCH which could operate in the harsh desert conditions as well as the high altitude areas of Ladakh including the Siachen Glacier.



❖ Major Features

- Pilot and co-pilot sitting in tandem position (one behind the other).
- Stealth features.
- Armour protection.
- Night attack capability.
- Crash worthy landing gear to give it better survivability.
- Powered by two Shakti engines and has a maximum take off weight of 5,800 kg.
- Maximum speed of 268 km per hour it has a range of 550 km and an operational ceiling of 6.5 kms.
- Armed with air-to-air and air-to-ground missiles, a 20 mm gun and 70 mm rockets.
- Full glass cockpit, the LCH has an Electronic Warfare suite and helmet mounted display for the flying crew.

❖ Roles

- **Anti-tank role** wherein it can fly low and fast to attack enemy armour columns and destroy them.
- **Scout role** wherein it can fly ahead of advancing columns of the Army and detect enemy presence.
- **Air defence roles** and destruction of enemy air defence assets.
- **Urban warfare missions** and combat search and rescue operations.

News in Between the Lines

IMEX-22

❖ Context

- Recently, the maiden edition of **Indian Ocean Naval Symposium (IONS) Maritime Exercise 2022 (IMEX-22)** was conducted at Goa and in Arabian Sea from 26 – 30 March 2022.

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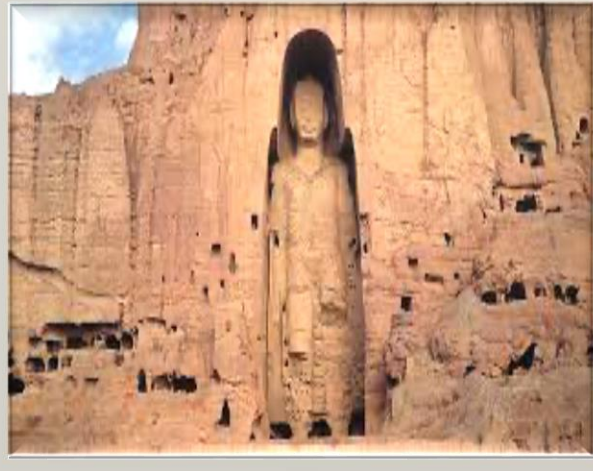




❖ About IMEX

- **Aim:**
 - To **enhance interoperability in Humanitarian Assistance and Disaster Relief (HADR) operations** among member navies.
- **Participants:**
 - The exercise witnessed participation of **16 out of the 25 member nations of IONS.**
 - The participation included warships, Maritime Reconnaissance aircraft and helicopters from the Navies of Bangladesh, France, India and Iran.
 - 22 Observers from 15 IONS member navies, namely Australia, Bangladesh, France, India, Indonesia, Maldives, Mauritius, Mozambique, Oman, Qatar, Singapore, Sri Lanka, Thailand, UAE and UK also participated in the exercise.
- **Significance:**
 - The exercise is seen as a significant stepping stone for regional navies to **collaborate and respond collectively to natural disasters in the region** and paves way for further strengthening regional cooperation.
- **About IONS:**
 - **Established in 2007.**
 - It is a premier **forum for cooperation and collaboration** among navies of **littoral states of the Indian Ocean Region.**
 - The forum has enabled discussions on regional maritime issues, promoted friendly relationships, and significantly improved maritime security cooperation in the Indian Ocean Region.

Bamiyan Buddhas



❖ Context

- Recently, the **Taliban regime** in Afghanistan said it would **protect the ancient Buddha statues in Mes Aynak.**

❖ About Ancient Bamiyan Buddhas

- The Bamiyan valley was a key node of the early Silk Routes, emerging as a hub of both commercial and cultural exchange.
 - It is situated in the Hindu Kush mountains and along the river Bamiyan.
- According to UNESCO, the “rise of Bamiyan was closely connected with the spread of Buddhism across Central Asia.
- The **Bamiyan Buddha statues, hewn from sandstone cliffs**, are said to have dated back to the **5th century AD**, and were once the **tallest standing Buddhas in the world.**
- In their Roman draperies and with two different mudras, the statues were **great examples of a confluence of Gupta, Sassanian and Hellenistic artistic styles.**
- Called **Salsal and Shamama by the locals**, they rose to heights of 55 and 38 metres respectively.
 - Salsal means “light shines through the universe”, while Shamama is “Queen Mother”.
- In **2003, UNESCO included** the remains of the Bamiyan Buddhas in **its list of world heritage sites.**
- **Mes Aynak Site:**
 - It contains **Afghanistan's largest copper deposit**, as well as the remains of an ancient settlement with over **400 Buddha statues, stupas and a 40 ha (100 acres) monastery complex.**

Fuel Cell Electric Vehicle (FCEV)

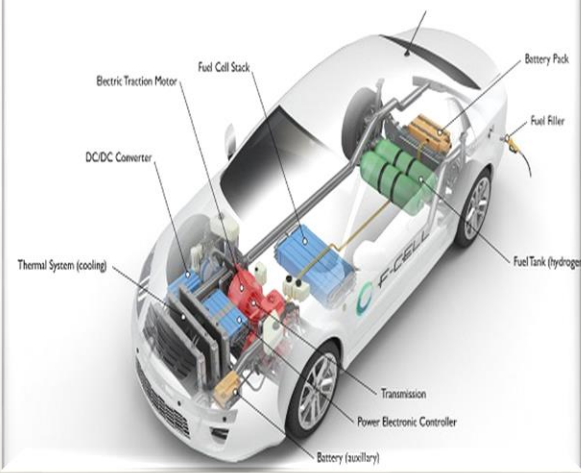
❖ Context

- Recently, **Union Transport Minister Nitin Gadkari travelled to Parliament in a hydrogen-based Fuel Cell Electric Vehicle (FCEV).**

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Hydrogen Fuel Cell Electric Vehicle



❖ Key Highlights

- He emphasized the need to spread awareness about **Hydrogen, FCEV technology** and its benefits to support hydrogen-based society for India.
- Typically, there are **four broad categorisations of electric vehicles**—conventional hybrid electric vehicles (HEVs), plug-in hybrid vehicles (PHEVs), BEVs and FCEVs.

❖ About Fuel Cell Electric Vehicle (FCEV)

- At the heart of the fuel cell electric vehicles (FCEV) is a device that **uses a source of fuel, such as hydrogen, and an oxidant to create electricity by an electrochemical process.**
- The fuel cell **combines hydrogen and oxygen to generate electric current, water being the only byproduct.**
- Like conventional batteries under the bonnets of automobiles, **hydrogen fuel cells too convert chemical energy into electrical energy.**
- From a long-term viability perspective, **FCEVs are billed as vehicles of the future**, given that **hydrogen is the most abundant resource** in the universe.
- Since they're powered entirely by electricity, FCEVs are considered EVs, but unlike BEVs, **their range and refueling processes are comparable to conventional cars and trucks.**
- The major difference between a BEV and a hydrogen FCEV is that the latter enables a refuelling time of just five minutes, compared to 30-45 minutes charging for a BEV.
- Also, consumers get about **five times better energy storage per unit volume and weight**, which frees up a lot of space for other things, while allowing the rider to go further.

India's First Steel Slag Road



❖ Context

- **Surat** has become the **first city in the country to get a processed steel slag (industrial waste) road.**

❖ Key Highlights

- The road is built as part of a joint-venture project by the Council of Scientific and Industrial Research (CSIR), Central Road Research Institute (CRRI), Union Ministry of Steel, government think-tank NITI Ayog, and Arcelormittal-Nippon Steel (AM/NS), at Hazira.
- The six-lane, a kilometre-long public road is being used by heavy-duty vehicles of multinationals located in the industrial estate on the outskirts of Surat.
- The **slag is generated from a steel furnace** burning at around 1,500-1,600 degree centigrade in the form of **molten flux material** as an **impurity**. The molten material is poured into the slag pits for cooling as per the customised procedure and further processed to develop stable steel slag aggregates.
- The CRRI will now prepare guidelines and specifications for the utilisation of steel slag in road construction.

❖ In comparison to normal aggregates

- Production cost 30 % cheaper.
- Thickness of the road 30 % lesser than normal ones.
- Longer durability, more durable during monsoon.
- Lower carbon footprint & sustainable use of waste.
- Upper surface temperature 1-2 degree higher in mid-afternoon.
- Negligible effect on tyres.

FASTER

❖ Context

- A **digital platform** formally launched by Chief Justice of India (CJI) for delivery of SC orders.

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❖ Key Highlights

- 'FASTER', an abbreviation of 'Fast and Secured Transmission of Electronic Records.'
- The platform would be used by the court officials to **instantly send e-copies of the orders** through a secured electronic communication channel to **intended parties**.
- The idea stemmed from a case about several prisoners in the Agra Jail forced to remain behind bars for three days after the court granted them bail because the hard copies of the order had not reached the prison officials.

One Station One Product



❖ Context

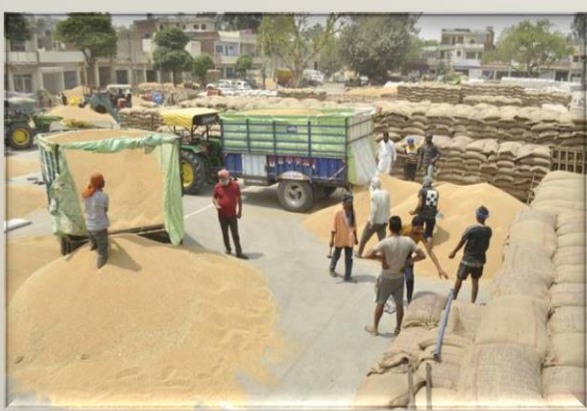
- Minister of Railways informed Parliament about the government initiative.

❖ Key Highlights

- Presently a **pilot project**, under implementation on each zonal railway, the concept aims to **encourage indigenous and specialised products and crafts of India** through providing display and sale outlets on railway stations across the country.
- The products would be specific to that place.
- Indian Railways intends to provide stall/ kiosk/ sale outlets at identified railway stations for **sale and promotion of items sourced from local manufacturers to improve their skills and livelihood**.

Station	Item	Station	Item
Patna Jn	Madhubani Painting	Bengaluru	Channapatna wooden toys
Visakhapatnam	Etikoppaka (wooden toys)	Chennai Central	Kanchipuram sarees
Howrah	Tant handloom sarees & textiles	Tirupati	Kalamkari sarees and textiles
Guwahati	Assamese Gamocho	Balasore	Coconut mat products
Jaleswar	Silver and stone jewellery	Nagpur	Bamboo handicrafts
Rajkot	Terracotta/Ceramic products	Kota	Kota Doria Sarees
Bilaspur	Dokra Bell metal handicraft products	Gorakhpur	Terracotta handicrafts
Banaras	Azamgarh black pottery	Varanasi Cantt	Wooden toys
Panipat	Handloom and pickles	Jaipur	Sangareni print items and Jaipur Razai
Agra Cantt	Marble handicrafts		

Digitised J Form



❖ Context

- Punjab is set to become the first state in the country to provide digitised form J in real time.

❖ Key Highlights

- The Punjab Mandi Board has decided to send a 'digital form J' **on the WhatsApp number of farmers** from this Rabi procurement season.
- The move, aimed at bringing transparency as well as empowering farmers, is expected to benefit around 9 lakh registered farmers.
- 'J form' is the **sale receipt of a farmer's agricultural produce in mandis** (grain market) **issued manually by arthiyas** (commission agents).
- Also, this form is an **income proof** for a farmer who sells his crop. Several **arthiyas had the habit of keeping these forms with themselves**, instead of providing it to the farmers, which was their right. Hence, many farmers ended up having no record of their income after selling their crops.
- The 'J form' can be **used for raising finance** from financial institutions, **IT waivers, subsidy claims, farmer's insurance**, and getting **admission** for their wards in educational institutes abroad.

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