My Notes....

NATIONAL

HERITAGE STATUS TO KOLKATA'S DURGA PUJA

The **UNESCO** on 15 December 2021 **accorded heritage status** to **Kolkata's Durga Puja festival**. **Durga Puja in Kolkata** has just been **inscribed on the intangible heritage list**. The **16th Committee of UNESCO** for safeguarding of the **Intangible Cultural Heritage (ICH)** in its meeting held on 15th December 2021 in Paris has inscribed **Durga Puja in Kolkata** on the representative list of **Intangible Cultural Heritage (ICH) of Humanity**."

What is Durga Puja?

1. **Durga Puja**, also known as **Durgotsava** or **Sharodotsava**, is an annual Hindu festival of West Bengal where people pay homage to **Hindu goddess Durga**.
2. It is the **biggest religious festival** in Bengal and is celebrated to mark Durga's victory over Mahishasur (buffalo demon).
3. The city of **Kolkata is the centre of this festival** where more than 3,000 community Durga pujas are held during the 10-day festival, excluding the large number of pujas performed in Bengali households.
4. The puja is also celebrated by Bengali communities residing in other states, notably in **Tripura**, **Bihar**, **Jharkhand**, **Odisha**, **Assam**, **Maharashtra**, Delhi, Uttar Pradesh and neighbouring country Bangladesh.
5. In 2019, the central government nominated **Kolkata's Durga Puja** for the 2020 UNESCO Representative list of the **Intangible Cultural Heritage of Humanity**.

What is 'Intangible Cultural Heritage'?

1. **Cultural heritage** does not end at **monuments** and **collections of objects**.
2. It also includes **traditions or living expressions** inherited from our ancestors and **passed on to our descendants**, such as **oral traditions**, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and **skills to produce traditional crafts**.

Other elements from India that feature in the list:

1. **Koodiyattam:** A **Sanskrit theatre of Kerala**;
2. **Mudiyett**: a **ritual theatre** and dance drama of Kerala
3. **Vedic chantings: recitation of sacred Hindu**
4. **Ramlila**: the **traditional performance of the Ramayana**
5. **Ramman:** a religious festival and ritual theatre of **Garhwal, Uttarakhand**
6. **Kalbelia**: **folk songs and dances of Rajasthan**
7. **Chhau dance**: a **classical dance form of Odisha** and West Bengal
8. **Ladakh Buddhist chantings**: recitation of **sacred Buddhist texts in Ladakh**
9. **Manipuri Sankirtana**: a **ritual singing**, drumming and dancing of Manipur
10. **Traditional brass and copper craft** of utensil making among the Thatheras of Jandiala Guru, Punjab
11. **Yoga**: **ancient Indian physical**, **mental and spiritual practices** originating in ancient India
12. **Kumbh Mela**: mass **Hindu pilgrimage** held at Haridwar of Uttarakhand, Nashik of Maharashtra, Prayagraj of Uttar Pradesh and Ujjain of Madhya Pradesh.

3. The Representative List of the **Intangible Cultural Heritage of Humanity** has **492 elements** currently.

4. With the inclusion of **Durga Puja** in total **13 Intangible Cultural Heritage elements from India** have now been inscribed on UNESCO's Representative List.

NATIONAL BLOCKCHAIN STRATEGY

The **Ministry of Electronics and Information Technology** on 3 December 2021 released a "**National strategy on blockchain**", which identifies **44 potential areas** of using the technology and lays out the broad contours of how it can be leveraged across different sectors.

What the strategy said

1. The sectors, where **blockchain models** have applications, have been identified as **education**, **governance**, **finance & banking**, healthcare, logistics, cyber security, media, legal, power sector, etc.
2. The Strategy will work with **various Government organizations** and other stakeholders in implementing this strategy and realizing the various **advantages of the Blockchain technology** in terms of enhanced security, trust and its ability to ensure tamper-evident transactions.
3. The ministry identified **five areas of weakness** in the **technology- scalability**, **security**, **interoperability**, **data localisation** and **disposal of records**.
4. Key challenges to such widespread adoption are- **adoption of the technology**, **regulatory compliance**, **identification of suitable use cases**, **finding the right data format**, and **awareness and skill set**.

What is a blockchain?

1. A **blockchain** is simply a **shared ledger, or database**, that can be **accessed**, **filtered**, and **manipulated quickly** and easily by any number of users at once.
2. It **stores information in groups called blocks**, which have a **certain storage capacity.** When full, they are linked, or "**chained**", to the **previous block.**
3. Any subsequent information is put into a **freshly created block** and the **immutable chain** continues to grow.
4. In a **blockchain**, each participant computer, or "**node"** has a full record of the data that **has been stored on it since inception.**

5. The **National Strategy** to evolve a trusted digital platform for providing **e-Governance services** using Blockchain lays out overall vision and the development and implementation strategies for a **National Blockchain Platform** covering the technology stack, legal and regulatory framework, standards development, collaboration, human resource development and potential use cases.

UNGA GRANTS OBSERVER STATUS TO ISA

The **United Nations General Assembly** has granted **Observer Status** to the **International Solar Alliance (ISA)**, according to India's Permanent Ambassador to the UN, T S Tirumurti. The ISA was conceived as a **joint effort** by **India and France** to mobilise efforts against climate change through the **deployment of solar energy solutions.**

What

1. The granting of **Observer Status** to ISA in the General Assembly would help provide for **regular** and **well-defined cooperation** between **the Alliance** and the **United Nations** that would benefit global energy growth and development.

2. ISA was presented by the leaders of the two countries at the **21st Conference of Parties (COP21)** to the **United Nations Framework Convention on Climate Change (UNFCCC)** held in Paris in 2015.

3. In a short span of **six years**, the ISA has become an example of how positive global climate action can be taken forward through partnerships.

4. **ISA** provides a dedicated platform for **cooperation among governments**, **multilateral organisations**, **industry**, and **other stakeholders** to help achieve a common goal.

5. Increasing the use and **quality of solar energy** to meet energy needs in a **safe**, **convenient**, **affordable**, **equitable and sustainable manner** enhances energy security and sustainable development, and improves **access to energy** in developing member countries.

6. A total of **80 countries have signed** and **ratified the ISA Framework Agreement** and **101 countries have only signed the agreement**.

ART BILL GETS PARLIAMENTARY NOD

The Parliament on 8 December 2021 passed a bill **to regulate** and supervise **assisted reproductive technology clinics** with the Rajya Sabha giving its nod to the **Assisted Reproductive Technology (Regulation) Bill, 2021**. The Upper House also passed the **Surrogacy (Regulation) Bill, 2020** with amendments, aimed at providing a legal framework to curb **unethical practices in reproductive services** as well as safeguard interest of women.

Difference between Surrogacy and ART Bill

1. **The Surrogacy (Regulation) Bill** relates to **surrogacy**, an **infertility treatment**, where a **third person**, a woman, is the surrogate mother.

2. **In ART**, treatments can be availed by the **commissioning couple themselves** and it is not always necessary that a **third person** is involved.

3. **Surrogacy** is allowed for **only Indian married couples**. **ART** procedures are open to **married couples**, **live-in partners**, single women, and **also foreigners**.

4. A **2015 notification** prohibits **commissioning of surrogacy** in India **by foreigners** or **OCI or PIO cardholders**, but NRIs holding Indian citizenship can avail surrogacy.

5. Foreigners can visit India under **medical tourism** to avail **ART services.**

Why the ART Bill?

1. The **growth of ART clinics** in India is among the highest in the world, and these are a key part of **medical tourism**.

2. These offer **gamete donation**, **intrauterine insemination**, **in-vitro-fertilisation**, **intracytoplasmic sperm injection**, and pre-implantation **genetic diagnostic.**

3. India does not have standard protocols of **ART clinics** yet. Amid questions raised on their **ethical**, **medical**, and **legal aspects**, Lok Sabha passed the **Bill** that provides for regulation and supervision of **ART clinics** and **ART banks**.

6. Under the **Surrogacy Bill**, there will be a **National Surrogacy Board** that will be involved in policymaking, and act as a **supervisory body**, and **State Boards** that will act as executive bodies.

7. The **ART Bill** provides for a National Board, with the powers vested in a civil court under the **Code of Civil Procedure.**

INDIA VOTES AGAINST UNSC'S CLIMATE DRAFT

India on 13 December 2021 **voted against a UNSC draft resolution** that attempted to "**securitize**" **climate action** and undermine the hard-won **consensual agreements** in Glasgow, the government said. While **China abstained**, the resolution — which sought to **link climate change with threats to international security** and found support from US, UK and France — was **vetoed by Russia**.

About the Resolution

1. The **first-of-its-kind resolution** was supported by **113 of the UN's 193 member countries**. This included **12 of the Council's15 members**.
2. The **draft resolution**, co-sponsored by **Ireland and Niger**, said the adverse effects of climate change can exacerbate vulnerable situations or **contribute to future violence**, **conflicts and instability**, presenting "a key risk" to international peace and security.
3. The document sought to request the UN Secretary-General **to integrate climate security risk** "**as a central component**" into the United Nations' conflict-prevention strategies aiming to reduce the risk of conflict relapse due to harmful effects of climate change.
4. The **resolution was vetoed by Russia**, which is a permanent member of the UN Security Council.

KEN-BETWA RIVER INTERLINKING PROJECT APPROVED

The Union Cabinet chaired by Prime Minister has approved the funding and implementation of the **Ken-Betwa river inter-linking project**. It will be completed in eight years and will generate **103 MW hydropower** and **27 MW solar powers**.

What

1. The project will pave the way for more **interlinking of river projects in India** and "also showcase to the world our **ingenuity and vision**".
2. This project involves the transfer of water **from Ken to the Betwa river** through the construction of **Daudhan Dam** and a canal linking the two rivers, the **Lower Orr Project**, **Kotha Barrage** and **Bina Complex Multipurpose Project**.
3. The project will be of immense benefit to the **water-starved Bundelkhand region**, spread across the states of **Madhya Pradesh** and **Uttar Pradesh**.
4. This project also comprehensively provides for **environment management** and safeguards.

Flashback

1. An agreement was signed on 22 March this year between the Union Minister of Jal Shakti and the chief ministers of Madhya Pradesh and Uttar Pradesh to implement the **first major centrally-driven river interlinking project** in the country.
2. This agreement heralds the beginning of **inter- state cooperation** to implement the vision of former Prime Minister Atal Bihari Vajpayee to carry water from areas that have surpluses to drought-prone and water deficit areas, through the **interlinking of rivers**

5. For this purpose, a **comprehensive landscape management plan** is under finalization by the **Wildlife Institute of India**.

PARLIAMENTARY PANEL REPORT ON EV ADOPTION

A **Parliamentary committee** has recommended to the government to **increase the subsidy** on buying of private **electric 3- and 4-wheelers** as has been done for promoting the adoption of electric two wheelers under **FAME-II**. It has also sought an increase in import duty on "**child parts**" — smaller parts that are assembled together to create vital parts — in a phased manner till these **components are manufactured locally**, while taking note that some of these items are still imported from countries including China.

What

1. The panel has also suggested the **lowering of GST rates** on **hybrid electric vehicles (HEVs)**. It took note of how **currently EV cars** are taxed at 5% and big HEVs are charged 43% (28% GST plus 15% cess).
2. **EVs reduce energy consumption by 75%** over **internal combustion engine (ICE)**, while HEVs reduce energy consumption by 30-45% over ICE without any external charger.
3. Hence, **HEVs are also entitled for discount on GST rate** as in the case of EVs. GST support of HEV would help the whole ecosystem and provide impetus to EVs.
4. The committee has said that despite great progress in **localising major components**, vehicle manufacturers are still importing some child parts from other countries such as China.

Type of EVs

1. **BEVs (Battery operate Electric Vehicle)** have **no internal combustion engine** or fuel tank, and run on a **fully electric drive train** powered by rechargeable batteries.
2. **Conventional hybrid electric vehicles or HEVs** combine a conventional internal combustion engine system with an **electric propulsion system**, resulting in a hybrid vehicle drive train that substantially reduces fuel use. The **onboard battery** in a **conventional hybrid** is charged when the IC engine is powering the drive train.
3. **Plug-in hybrid vehicles or PHEVs** too have a **hybrid drive train** that uses both an internal combustion engine and electric power for motive power, backed by rechargeable batteries that can be plugged into a power source.
4. **FCEVs (Fuel Cell Electric Vehicle)** are widely considered to be the **next frontier in EV technology**.

INTERNATIONAL

INDIA JOINS G20 TROIKA

India on 1 December 2021 joined the **G20 Troika** comprising the current, previous and incoming presidencies of the grouping, the Ministry of External Affairs said. The **G20 Troika** consists of **Indonesia**, **Italy**, and **India**. **G20 countries** have come together to better prepare for the future.

What

1. The **G20 is the premier forum for international economic cooperation**, which reflects recognition that **global prosperity** is interdependent and the economic opportunities and challenges are interlinked.
2. As a **founding member of the G20**, India has used the platform to raise issues of vital importance and those that impact on the most vulnerable around the world.
3. Taking over from **Italy**, **Indonesia assumed the G20 Presidency** on 1 December 2021 and will convene **various G20 meetings** throughout the year culminating with the **G20 Leaders' Summit** on 30-31 October 2022 under the overall theme of "**Recover Together Recover Stronger**".
4. As a Troika-member, India will work closely with Indonesia and Italy to ensure **consistency and continuity of the G20's agenda**.
5. **India will assume the G20 Presidency on 1 December 2022** from Indonesia, and will convene the G20 Leaders' Summit for the **first time in India in 2023**.

Flashback

1. The **Group of 20**, also called the **G-20**, is a group of finance ministers and central bank governors from 19 of the world's largest economies, including those of many developing nations, along with the European Union.
2. **Formed in 1999**, the G-20 promotes **global economic growth**, **international trade**, and **regulation of financial markets**.
3. Because the **G-20 is a forum**, not a legislative body, its agreements and decisions have **no legal impact**, but they do influence countries' policies and global cooperation.

INDIA RE-ELECTED TO IMO COUNCIL

India has been **re-elected** to the **International Maritime Organisation (IMO) Council** after elections were held at its Assembly in London for the **2022-23 biennium**. India's election falls under the **Category of 10 states** with "the largest interest in **international seaborne trade**", alongside Australia, Brazil, Canada, France, Germany, the Netherlands, Spain, Sweden and the United Arab Emirates (UAE).

What

1. The **newly elected Council** will meet formally at the conclusion of the **32nd Assembly** for the **IMO's 126th session** on 15 December 2021, when it will elect its Chair and Vice-Chair for the next biennium.
2. India's delegation to **IMO** extends heartfelt thanks to all fellow member states, looks forward to working with all for the achievement of our common goals.
3. The **Council is the executive organ of IMO** and is responsible, under the Assembly, for **supervising the work of the organisation**.
4. Between sessions of the Assembly, the **Council performs the functions of the Assembly**, except that of making recommendations to governments on **maritime safety and pollution prevention**.
5. China, Greece, Italy, Japan, Norway, Panama, the Republic of Korea, the Russian Federation, the UK and the US were elected to the Council under the **Category of 10 States** with the "**largest interest in providing international shipping services**".

6. Meanwhile, **another 20 states not elected under the two categories** were elected to the Council to ensure the representation of all major geographic areas of the world as having "special interests in **maritime transport or navigation**".

7. The 20 countries in the list are Bahamas, Belgium, Chile, Cyprus, Denmark, Egypt, Indonesia, Jamaica, Kenya, Malaysia, Malta, Mexico, Morocco, the Philippines, Qatar, Saudi Arabia, Singapore, Thailand, Turkey and Vanuatu.

Flashback

1. The **32nd Assembly of IMO** is currently meeting at the IMO headquarters in London between 6 - 15 December 2021.
2. All **175 member states** and **three associate members** are entitled to attend the Assembly, which is the IMO's highest governing body. The Assembly **normally meets once every two years** in regular session.
3. It is responsible for approving the work programme, voting the budget and determining the financial arrangements of the Organisation.
4. It also elects the **Organisation's 40-member council** at these meetings for the next two-year period.

CABINET APPROVES SEMICONDUCTORS ECOSYSTEM

The Cabinet on 15 December 2021 has approved the **comprehensive programme** for the development of a **sustainable semiconductor** and **display ecosystem** to position India as the global hub for **electronics manufacturing** with semiconductors as the foundational building block.

What

1. The programme aims **to provide attractive incentive support** to companies/consortia engaged in **Silicon Semiconductor Fabs**, Display Fabs, Compound Semiconductors/Silicon Photonics/Sensors Fabs, Semiconductor Packaging and Semiconductor Design.
2. The scheme envisages investment of **around ₹76,000 crore** in **semiconductor production** over the next five-six years, the government said, adding that the government has announced **incentives for every part of the supply chain**, including **electronic components** and **sub-assemblies**, and finished goods.
3. The scheme for setting up **semiconductor fabs** and **display fabs in India** will extend fiscal support of up to 50 per cent of project cost on a **pari-passu basis** to applicants who are found eligible and have the technology as well as capacity to execute such highly capital intensive and resource incentive projects.

What Is a Semiconductor?

1. A **semiconductor** is a material product usually **comprised of silicon**, which conducts **electricity more than an insulator**, such as glass, but **less than a pure conductor**, such as copper or aluminum.
2. Their conductivity and other properties can be altered with the **introduction of impurities**, called **doping**, to meet the specific needs of the electronic component in which it resides.
3. Also known as **semis**, or chips, semiconductors can be found in thousands of products such as **computers**, **smartphones**, **appliances**, **gaming hardware**, and **medical equipment**.

ECONOMY

PPBL RECEIVES SCHEDULED BANK STATUS

Paytm Payments Bank Limited (PPBL), an associate entity of Paytm, has received **Scheduled Bank status** from **Reserve Bank of India (RBI)** and has been included in the **Second Schedule** to the Reserve Bank of India Act, 1934. However the "**Payment bank**" has to be used by the bank in their name in order to differentiate from other banks.

What

1. Being a **Scheduled Payments Bank**, Paytm Payments Bank can now **explore new business opportunities**.
2. The bank can participate in government and other large corporations issued **Request for Proposals (RFP)**, **primary auctions**, fixed-rate and variable rate repos, and reverse repos, along with **participation in Marginal Standing Facility**.
3. Paytm Payments Bank would now also be eligible to partner in **government-run financial inclusion schemes**.
4. As per **RBI Act 1934**, banks satisfying the central bank that its affairs are not being conducted in a manner detrimental to the interests of its depositors are included in the **second schedule**.
5. **Paytm Payments Bank** has emerged as one of the largest enablers of digital payments in the country with its payment instruments such as **Paytm Wallet**, **Paytm FASTag**, **net banking** and **Paytm UPI**.

Flashback

1. **Payment bank** is like any other bank, but operating on a **smaller scale** without involving any Credit risk.
2. In India currently, **6 Payment bank** namely, Airtel Payment Bank, India Post Payment Bank, Fino, Paytm Payment Bank, NSDL Payment Bank and Jio Payment Bank.

INDIA TO COMPLY WITH TRADE RULES ON SUGAR: WTO

A **World Trade Organization panel** ruled **in favour of Brazil, Australia and Guatemala** on 14 December 2021 in **their trade disputes with India over sugar subsidies** and asked New Delhi to **conform with global rules**. In the cases brought before the WTO in 2019, the rival producers alleged that **India had broken WTO rules** by providing **excessive domestic support** and **export subsidies for suga**r and **sugarcane**.

What the Panel said

1. The Panel recommends that **India bring its WTO-inconsistent measures** into conformity with its obligations under the **Agreement on Agriculture** and the **SCM (Subsidies and Countervailing Measures) Agreement**.
2. **India**, the **world's biggest sugar producer** after Brazil, **encouraged overseas sales for three years** in a row, helping New Delhi emerge as a significant, **stable exporter of the commodity**.

Flashback

1. **India**, the **world's second-largest sugar producer**, after Brazil, said later on 14 December 2021 that it would appeal the findings of the **panel's 115-page report**.
2. The appeal will go into a **legal void**, however, since the WTO's top chamber, the **Appellate Body**, does not have enough judges to function.

3. After protests from **Brazil**, **Australia**, and **Guatemala**, the WTO in 2019 decided to set up panels to rule on complaints against **India's export subsidies for sugar**.

4. It also said **India failed to notify a WTO committee** of its sugar export subsidies, violating a separate agreement.

5. The panel **did not uphold one of Australia's allegations** that **India had maintained buffer sugar stocks** that it should have reported to the WTO in the 1990s.

CONTINUATION OF SIP APPROVED

The government has approved the continuation of the **Scheme for Investment Promotion (SIP)** for **five years (2021-26)** with a financial outlay of Rs 970 crore, according to a notification of the commerce and industry ministry. The scheme comprises a **number of components and activities** for the promotion of investment into the country; **enhancing international co-operation for promoting FDI** and **capacity building**.

What

1. To **increase the investment inflow**, the Department for Promotion of Industry and Internal Trade (DPIIT) has been undertaking various initiatives and reforms such as the launching of **Make in India**, **setting up of project development cells**, creating a **GIS-based Industrial Information System** and **National Investment Clearance Cell**.

2. These activities are being supported under the **Scheme for Investment Promotion**, which was launched on 11 November 2008. The last implementation period of the scheme was from 2017-18 to 2019-20.

3. It said that to sustain and take the **momentum forward**, it is important to continue with the activities under this scheme in a more focused and **targeted manner**.

4. Given this, continuation of the **Scheme for Investment Promotion** from 2021-22 to 2025-26 has been approved" with certain components including **investor targeting and facilitation**; **project management activities**; and **foreign travel**.

5. Activities proposed under investor facilitation include **organising CEO Forums**; **financial investors initiatives for attracting institutional investors**; support to Indian missions abroad for market entry support programmes; **Investment Clearance Cell** (National Single Window System); and monitoring of FDI activities.

INDIAN GEOSPATIAL MARKET REPORT

India's geospatial economy is currently valued at **Rs 38,972 crore** and has potential to grow to Rs 63,100 crore at **12.8 per cent by 2025** end, according to **India Geospatial Artha Report**, released on 7 December 2021. The report was launched at the **GeoSmart India 2021.**

What

1. **ISRO** says that if the Centre implements the **three geospatial policies** by 2022, which are currently in the draft stage, the **country's Geospatial economy** has the potential to double in a year.

2. The Centre is currently in the process of finalizing the **draft National Geospatial Policy (NGP)** and the **Indian Satellite Navigation Policy (SATNAV Policy)**.

3. It has already implemented **Guidelines for Geospatial Data** (Guidelines for acquiring and producing **geospatial data** and **geospatial data services**, including maps) in 2021.

4. **Geospatial sector** has brought about **transformational changes** whereby even an inch of a land in India can be mapped, thus providing solid backups for land reforms.

5. **Vaccinations in India** is a remarkable example was technology and logistics were perfectly supported through the use of **geospatial technology**.

6. The industry-defining report titled '**Geospatial Artha report**: **Indian Geospatial Market, Economy, and Industrial Development Strategy**', has been prepared under the aegis of the National Think Tank on **Geospatial Strategy** for New India.

SCIENCE AND TECHNOLOGY

VLSRSTA MISSILE SUCCESSFULLY TESTED

India on 7 December 2021 successfully flight tested the indigenously developed new **Vertical Launch Short Range Surface-to-Air Missile** from Odisha coast. The **DRDO**-developed quick reaction **surface-to-air-missile** was test-launched from the Integrated Test Range at Chandipur. To monitor the missile's trajectories number of tracking instruments were used.

About the Missile

1. The **missile** has an operational range of **50 to km distance** and features **mid-course inertial guidance** through **fiber optic gyroscope** and active radar homing in the terminal phase.

2. The missile was tested against an **electronic target** at a low altitude. The weapon is planned for integration onboard **naval ships**.

3. The **test of VLSRSTA** will enhance the defence capability of Indian naval ships against the **aerial threat**.

4. The launch was conducted from a **vertical launcher** against an electronic target at a very low altitude.

5. The flight path of the vehicle along with health parameters was monitored using a number of tracking instruments deployed by the **Integrated Test Range**, Chandipur.

6. Ahead of the test firing of the tactical missile on 7 December 2021, Balasore district administration as a **safety measure** temporarily shifted more than 4,500 people residing within a 2.5 km radius of launch pad number 3 of the ITR form where the weapon with a dummy payload was positioned and launched.

AIR VERSION OF BRAHMOS SUCCESSFULLY TESTED

India on 8 December 2021 successfully test-fired the **air version of the BrahMos supersonic cruise missile** from the integrated test ranges of Chandipur, off the coast of Odisha. The **air version of the missile** was test-fired from supersonic fighter aircraft **Sukhoi 30 MK-I**.

What

1. The "**copy book flight**" followed the **pre-planned trajectory** and met all objectives.

2. The launch has cleared the way for serial production of **air-version BrahMos missiles**.

3. Various laboratories at the DRDO, academic institutions, public sector undertakings and **Indian Air Force (IAF)** participated in the testing, production and induction of this complex missile system.

4. **BrahMos missiles** are designed developed and produced by **BrahMos Aerospace**, a joint venture company set up by the DRDO and Mashinostroyenia of Russia.

5. The **BrahMos supersonic cruise missile** can cover a range of **290 km** reaching the **Mach 2.8 to 3 Mach speed**.

6. Meanwhile, the **BrahMos- II Hypersonic cruise missile** can be deployed to hit the target within a range of **450 – 600 km** in a Mach 7 velocity.

7. The missile is currently under joint development by the **DRDO** and **Russia's NPO Mashinostroyenia**.

NASA'S NEW COMMUNICATIONS SYSTEM LCRD

NASA launched its new **Laser Communications Relay Demonstration (LCRD)** — the agencies **first-ever laser communications system** — from Cape Canaveral Space Force Station in Florida on 7 December 2021. The LCRD will help the agency test **optical communication** in space. Currently, **most NASA spacecraft** use **radio frequency communications** to send data. **Optical communications** will help increase the **bandwidth 10 to 100 times** more than radio frequency systems.

What

1. **LCRD** will demonstrate all of the advantages of using **laser systems** and allow us to learn how to use those best operationally.

2. **LCRD** has **two optical terminals** – one to **receive data from a user spacecraft**, and the **other to transmit data to ground stations**.

3. The modems will translate the **digital data into laser signals**. This will then be transmitted via encoded beams of light.

4. These capabilities make **LCRD NASA's first two-way**, **end-to-end optical relay**.

5. **Optical communications systems** are smaller in **size**, **weight**, and require less power compared with radio instruments. A **smaller size** means more room for science instruments.

6. **Less weight** means a less expensive launch. Less power means less drain on the spacecraft's batteries.

7. **With optical communications** supplementing radio, missions will have unparalleled communications capabilities.

Laser VS radio

1. **Laser communications** and **radio waves** use different wavelengths of light.

2. **Laser uses infrared light** and has a **shorter wavelength** than radio waves. This will help the **transmission of more data in a short time**.

3. It would take roughly **nine weeks to transmit** a completed **map of Mars back to Earth** with c**urrent radio frequency systems**. With lasers, we can accelerate that to about **nine days**.

4. Using infrared lasers, **LCRD will send data to Earth at 1.2 gigabits-per-second (Gbps)**. At this speed, it will take less than a minute to download a movie.

IXPE MISSION LAUNCHED

On 9 December 2021, NASA launched a **new mission** named **Imaging X-ray Polarimetry Explorer** or **IXPE**. Onboard SpaceX's Falcon 9 rocket, it was sent to its orbit from NASA's Kennedy Space Center in Florida. **IXPE observatory** is a joint effort of **NASA** and the **Italian Space Agency**.

What

1. The mission will study "**the most extreme and mysterious objects** in the **universe** – **supernova remnants**, **supermassive black holes**, and dozens of other **high-energy objects**."
2. The mission's primary length is **two years** and the observatory will be at **600 kilometers altitude**, orbiting around Earth's equator. IXPE is expected to study about **40 celestial objects** in its first year in space.
3. IXPE carries **three state-of-the-art space telescopes**. Each of the three identical telescopes hosts one **light-weight X-ray mirror** and one detector unit.

Why is it important?

IXPE's polarization measurements will help scientists answer questions such as:

1. **How do black holes spin?**
2. Was the **black hole at the center of the Milky Way** actively feeding on surrounding material in the past?
3. How do **pulsars shine so brightly in X-rays?**
4. What powers the **jets of energetic particles** that are ejected from the region around the **supermassive black holes** at the centers of galaxies?

4. These will help observe **polarized X-rays from neutron stars** and **supermassive black holes**.
5. By measuring the **polarization of these X-rays**, we can study where the light came from and understand the geometry and inner workings of the light source.
6. This new mission will complement other **X-ray telescopes** such as the **Chandra X-ray Observatory** and the **European Space Agency's X-ray observatory**, **XMM-Newton**.

INDIA SUCCESSFULLY TESTS PINAKA-ER

India successfully tested **multi barrel rocket launcher system** with extended range at Pokharan range, on 11 December 2021. Defence Research and Development Organisation (DRDO) said that successful tests of **Pinaka Extended Range (Pinaka-ER)**, **Area Denial Munitions (ADM)** and **indigenously developed fuzes** have been carried out at various test ranges.

About Pinaka-ER

1. The system is jointly designed by laboratories of DRDO - **Armament Research & Development Establishment (ARDE)**, Pune and High Energy Materials Research Laboratory (HEMRL), Pune.
2. The DRDO, after establishing the performance efficacy of the **enhanced range Pinaka**, transferred the technology of the system to the industry.
3. The Industry Partner has manufactured enhanced **Pinaka Mk-1 rockets** with DRDO's hand holding during the production and Quality Assurance.

4. The **Pinaka-ER is the upgraded version of earlier Pinaka version** which has been in service with the **Indian Army** for the last decade.

5. The system has been designed in the light of emerging requirements with **advanced technologies** enhancing the range.

About ADM

1. The **Area Denial Munition (ADM)** variants of munition designed by the ARDE, Pune for Pinaka and manufactured by the industry partners under technology transfer were successfully carried out at Pokhran Field Firing Ranges.

2. These trials are part of performance evaluation under technology absorption.

Fuzes for Pinaka rockets

1. The indigenously-developed **proximity fuzes for Pinaka rockets** have also been tested.

2. The ARDE, Pune has developed **different fuzes for Pinaka rocket** for different types of applications.

3. The **ARDE has also designed miniaturised fuzes for ADMs**. Performance of dual-purpose Direct-Action Self Destruction (DASD) and **Anti-Tank Munition (ATM) fuzes** were evaluated during the current flight trials and the results were satisfactory.

NASA SPACECRAFT 'TOUCHES' SUN FOR 1ST TIME

A spacecraft launched by NASA has done what was once thought impossible. On 28 April, the **Parker Solar Probe** successfully **entered the corona of the Sun** -- an extreme environment that's **roughly 2 million degrees Fahrenheit**. A scientific paper describing the milestone was published in the Physical Review Letters on 14 December 2021.

What

1. A key instrument on board the probe: **the Solar Probe Cup** collects particles from the **Sun's atmosphere** that helped scientists verify that the spacecraft had indeed crossed into the corona. The goal of this entire mission is **to learn how the Sun works**.

2. The **corona is the outermost layer of the Sun's atmosphere** where **strong magnetic fields bind plasma** and prevent **turbulent solar winds** from escaping.

3. The **Alfven point** is when solar winds exceed a critical speed and can break free of the corona and the **Sun's magnetic fields**. Prior to 28 April, the spacecraft had been flying just beyond this point.

4. According to data collected by the cup, the **spacecraft entered the corona three times** on 28 April, at one point for up to five hours.

5. The **amount of light hitting the Parker Solar Probe** determines **how hot the spacecraft will get**.

6. To avoid degradation, the device is constructed of materials that have high melting points, like **tungsten**, **niobium**, **molybdenum** and **sapphire**.

7. **Launched in 2018**, Parker was **8 million miles (13 million kilometers)** from the center of the sun when it first crossed the jagged, uneven boundary between the solar atmosphere and **outgoing solar wind**.

Flashback

1. There are **many mysteries about Earth's closest star** that scientists are hoping the probe can help solve.
2. For example, "We don't actually know **why the outer atmosphere of the Sun** is **so much hotter than the Sun itself**.
3. The **Sun is 10,000 degrees Fahrenheit** [5,500 degrees Celsius], but its **atmosphere is about 3.6 million degrees Fahrenheit** [2 million degrees Celsius].
4. We know that the energy comes from the **churning magnetic fields** bubbling up through the **surface of the sun**, but we do not know how the **Sun's atmosphere absorbs this energy**.
5. In addition, **outbursts from the Sun**, like **solar flares** and **high-speed solar winds**, can have a direct impact on Earth, disrupting power grids and radio communication.
6. The **Parker Solar Probe** can help **better understand all these phenomena** as it continues to orbit the Sun and take measurements and data for scientists to analyze here on Earth.
7. The **plasma around the Sun** can act as a laboratory that teaches us about processes taking place in almost every astronomical object across the entire universe.

INDIA FLIGHT-TESTS SANT MISSILE

India on 11 December 2021 successfully **flight-tested** indigenously developed helicopter-launched **stand-off anti-tank (SANT) missile** in Rajasthan's Pokhran firing ranges. The flight-testing, carried out by the **Defence Research and Development Organisation (DRDO)** and the **Indian Air Force**, was "successful" in meeting all the mission objectives of the missile.

What

1. The weapon, **developed for the IAF**, can **neutralise targets in a range up to 10 km**.
2. The flight test was successful in meeting all its mission objectives. The release mechanism, **advanced guidance and tracking algorithms**, all avionics with integrated software, performed satisfactorily and tracking systems monitored all mission events.
3. The missile is equipped with a **state-of-the-art MMW seeker** which provides high precision strike capability from a safe distance.
4. The **SANT missile** has been designed and developed by **Research Centre Imarat (RCI)**, Hyderabad. in coordination with **other DRDO labs** and participation from industries.
5. The missile will be deployed on **board various frontline ships** of the Indian Navy.

BLUE ORIGIN BLASTS CREW INTO SPACE

Jeff Bezos' rocket company, **Blue Origin** on 11 December 2021 blasted its **third private crew** into space. This flight marked the third of what Blue Origin hopes will be many **space tourism launches**, carrying wealthy customers to the **edge of space**. This is the first time

that **Blue Origin** filled all six seats on its **New Shepard rocket** and capsule, which is named for **Alan Shepard**.

What

1. On the company's two previous flights -- including the **July flight** that sent Bezos himself to space -- only four of the seats were taken up.
2. The group blasted off aboard **Blue Origin's suborbital space tourism rocket** from the company's launch facilities near the rural town of Van Horn, Texas and took a supersonic, 10-minute flight that reached more than 60 miles above the Earth's surface before parachuting to a landing.
3. **Space tourism is a segment of space travel** that seeks to give lay people the opportunity to go to space for **recreational**, **leisure** or **business purposes.**
4. The idea is **to make space more accessible** to those individuals who are **not astronauts** and want to go to space for **non-scientific purposes**
5. **As of now**, companies including **Virgin Galactic (VSS Unity)**, **SpaceX (Starship)**, **XCOR Aerospace**, **Jeff Bezos's Blue Origin** and **Armadillo Aerospace** are working on providing space tourism services to people.

SMART SYSTEM SUCCESSFULLY TESTED

India on 13 December 2021 successfully tested a long-range **Supersonic Missile Assisted Torpedo (SMART)** system developed by **Defence Research and Development Organization (DRDO)**. The missile aimed at enhancing the **country's anti-submarine warfare capability** was launched from Balasore in Odisha.

What

1. The weapon system is being **developed by DRDO** for the **Indian Navy**.
2. The system is a **next-generation missile-based standoff torpedo delivery system**. The full range capability of the missile was successfully demonstrated.
3. The system has been designed to enhance **anti-submarine warfare capability** far beyond the **conventional range of the torpedo**.
4. This was a **textbook launch**, where the entire trajectory was monitored by the **electro-optic telemetry system**, various range radars including the downrange instrumentation and downrange ships.
5. The **missile carried a torpedo**, parachute delivery system and release mechanisms. This **canister-based missile system** consists of advanced technologies like **two-stage solid propulsion**, electro-mechanical actuators and precision **inertial navigation**.

Flashback

1. The test comes just days after the **DRDO and the Indian Air Force (IAF)** successfully flight-tested the indigenously designed and developed helicopter launched **Stand-off Anti-Tank (SANT)** missile from Pokhran range.
2. This was the **third in the series of indigenous stand-off weapons** to be tested in recent times, after the **Long-Range Bomb** and **Smart Anti-Airfield Weapon (SAAW)**, further strengthening the arsenal of the Indian Air Force.
3. The missile is equipped with a state-of-the-art **millimetre wave (MMW)** seeker which provides high precision strike capability from a safe distance.

6. A number of **DRDO laboratories** developed various technologies for this **advanced missile system**.

MISCELLANEOUS

WORLD SOIL DAY (WSD)

World Soil Day (WSD), observed on **5 December annually**, raises awareness about the **importance of healthy soil**. It is also observed to raise awareness about the need to manage soil resources in a sustainable manner. WSD aims to encourage people to **make efforts to improve soil health**.

Flashback

1. **World Soil Day (WSD)** is held annually on 5 December as a means to focus attention on the importance of healthy soil and to advocate for the **sustainable management of soil resources**.
2. **An international day** to celebrate soil was recommended by the **International Union of Soil Sciences (IUSS)** in 2002.
3. Under the leadership of the **Kingdom of Thailand** and within the framework of the **Global Soil Partnership**, **FAO** has supported the formal establishment of WSD as a global awareness raising platform.
4. The **FAO Conference** unanimously endorsed **World Soil Day in June 2013** and requested its official adoption at the **68th UN General Assembly**.
5. In December 2013, the UN General Assembly responded by designating **5 December 2014** as the **first official World Soil Day**.
6. The theme for this year will be **Halt soil salinization, boost soil productivity**, which is aimed at decreasing the salinity of the soil.

H2S GAS CAN HELP IN FIGHT AGAINST HIV

Researchers at the **Indian Institute of Science (IISc)** and their collaborators have identified a key role played by **hydrogen sulphide (H2S) gas** in suppressing the **Human Immunodeficiency Virus (HIV)**. **Increased H2S** was found to have a direct effect on reducing the rate at which the **virus multiplies in HIV-infected human immune cells**. The finding paves the way for developing a more comprehensive **antiretroviral therapy** against HIV.

What

1. The discovery has been made by a team that includes researchers from the **Department of Microbiology and Cell Biology (MCB)** and the **Centre for Infectious Disease Research (CIDR)** at IISc, along with collaborators from the **Bangalore Medical College and Research Institute**. The results have been published in the journal eLife.
2. Current state-of-the-art **combined antiretroviral therapy (cART)** is not a cure for HIV. It can only suppress the virus - cause it to become latent.
3. In some cases, **cART is known to fail** even when patients fully follow their drug regimen.
4. Certain negative effects are also associated with cART, such as the **build-up of toxic molecules** leading to '**oxidative stress**' and loss of function in the mitochondria.

5. These effects can contribute to inflammation and organ damage. **Stopping cART** is also not an option because the virus can reactivate - emerge from its latent state - in the absence of therapy.

6. Scientists have recently begun exploring the beneficial effects of the **presence of H2S in HIV-infected cells** on both oxidative stress and **mitochondrial dysfunction.**

HUMAN RIGHTS DAY, 2021

Human Rights Day is observed every year on **10 December** to honour the day **in 1948** when the **United Nations General Assembly (UNGA)** adopted the **Universal Declaration of Human Rights (UDHR)**. The **UDHR** is available in **more than 500 languages** and is the **most translated document** across the globe. It continues to be the foundation of all **international human rights laws**.

What

1. The **UDHR** is a document which "**proclaims the inalienable rights** that everyone is entitled to as a human being"- irrespective of their **gender**, **language**, **religion**, **race**, **colour**, **national or social origin**, political or other opinions among other statuses.
2. **Human rights** are the rights that **people simply have** and **are not granted** by any state.
3. These rights are **inherent to all** irrespective of any of the above statuses.
4. **Human rights** range from **right to life**, **right to food**, **right to education**, **right to health** etc.
5. This year's **theme for Human Rights Day** is **Equality** - Reducing inequalities, advancing human rights.
6. The theme is related to **Article 1 of the UDHR** which states that "**all human beings are born free and equal in dignity and rights**.

Flashback

1. The **Human Rights Council** comprises **47 elected United Nations Member States**, which are empowered to prevent **inequality**, **abuses and discrimination**, protect the most vulnerable, and punish the perpetrators of human rights violations.
2. The **National Human Rights Commission of India** defines **human rights** as provided under the Protection of **Human Rights Act (PHRA), 1993**, as "Rights Relating To Life, liberty, equality and dignity of the individual guaranteed by the constitution or embodied in the international covenants and enforceable by courts in India".

RAMANUJAN PRIZE 2021

Mathematician **Neena Gupta** from Kolkata's **Indian Statistical Institute** has been awarded the "**2021 DST-ICTP-IMU Ramanujan Prize for Young Mathematicians** from developing countries, for her contribution in **affine algebraic geometry** and **commutative algebra**.

What

1. **Gupta** became the **third woman** to receive the award ever since it was introduced in 2005.
2. **In 2014**, she was awarded the Young Scientists Award of the **Indian National Science Academy** for her solution in solving the **Zariski cancellation problem**, with the

Academy deeming her solution as 'one of the best works in algebraic geometry in recent years.'

3. The **Ramanujan Prize** is given to an eminent Mathematician **less than the age of 45** on 31 December, every year.

4. The mathematician to have conducted **credible research in developing countries** by the International Centre for Theoretical Physics, Trieste, under the sponsorship of the **Department of Science and Technology**, Government of India.

NATIONAL ENERGY CONSERVATION DAY

India marks **14 December as National Energy Conservation Day** in a bid to raise awareness about the **importance of energy conservation**. The **Bureau of Energy Efficiency (BEE)**, under the Ministry of Power, marks the day by organising several events to stress on the need for **efficient use of energy** and how it can benefit both **present and future generations**.

What

1. **Energy conservation** is the decision and practice of **using less energy**. In simple ways, **energy conservation** means **reducing the consumption of energy** by producing or using less of it.

2. This could be in the **form of using fewer energy services** or using devices that require less energy.

3. Most of the energy sources we use in our daily lives are '**non-renewable**' and they cannot be **reused and renewed.** It is said that our energy resources may last only for another **40 years or so.**

4. **National Energy Conservation Day** focuses on making people aware of **global warming** and **climate change** and promotes efforts towards saving energy resources.

Flashback

1. The **Energy Conservation Act** was implemented by the **Energy Efficiency Bureau (BEE)** in 2001.

2. **BEE is a constitutional body** that works under the Government of India and helps in the **development of policies and strategies** to reduce the use of energy.