

My Notes....

NATIONAL

SVAMITVA SCHEME LAUNCHED

Prime Minister on 11 October 2020 launched the ‘**Survey of Villages and Mapping with Improvised Technology in Village Areas**’ (SVAMITVA) scheme and hailed it as a “historic move” that **will transform villages in rural India**.

About the SVAMITVA

1. The **scheme will also help villagers in taking loans**. If they have proper documents of their land and properties, no bank can deny those loans.
2. The beneficiaries of the new scheme **would include 1 lakh property holders** who would get “**property cards**” by their **respective state governments**.
3. These beneficiaries are **from 763 villages across six states**, including **346 from Uttar Pradesh, 221 from Haryana, 100 from Maharashtra, 44 from Madhya Pradesh, 50 from Uttarakhand and two from Karnataka**.
4. The **six states** had **signed a MoU with Survey of India for drone survey of rural areas** and implementation of the scheme. The physical distribution of the property cards will also be undertaken by the respective state governments.
5. PM interacted with many beneficiaries of the **Survey of Villages and Mapping with Improved Technology in Village Areas (SVAMITVA) scheme**.
6. This launch will enable nearly **one lakh property holders to download their property cards through SMS on their mobile phones** and pave the way for villagers to use property as a financial asset for taking loans and other financial benefits.
7. Emphasising on the changes brought in **rural India infrastructure under his tenure**, PM said that “today, **nearly two crore poor families in the villages have got pucca houses**.”
8. At the virtual event, PM paid tributes to **socialist icon Jayaprakash**

Flashback of SVAMITVA

1. The **SVAMITVA scheme** was launched by PM Modi in April this year with the **aim to update rural land records**, providing record of rights to village households and issue property cards.
2. **SVAMITVA is a central scheme of the Ministry of Panchayati Raj and Rural Development** and will be implemented across the country in a phased manner over the next four years, covering around 6.62 lakh villages.
3. The **scheme focuses on mapping rural-inhabited lands** using drones as land records are inaccurate or do not exist for vast areas across India.
4. **Only 19 per cent of potential property tax was being collected by Gram Panchayats**, according to the 2018 Economic Survey.

Narayan and RSS stalwart Nanaji Deshmukh on their birth anniversaries that coincided with the scheme's launch.

INDIA ELECTED SOLAR ALLIANCE CHIEF AGAIN

India and France were re-elected as president and co-president of the International Solar Alliance (ISA) for a term of two years at its third assembly on 14 October 2020. The **Third Assembly of the ISA was attended by 34 members' ministers**. As many as **53 member countries and five signatory** and prospective member countries participated in the assembly, the ministry of new and renewable energy said. **Four new vice-presidents** were also chosen to represent the **four regions of the ISA**.

What

1. The **representatives of Fiji and Nauru for Asia Pacific Region; Mauritius and Niger for Africa Region; UK and the Netherlands for Europe and Others Region; and Cuba and Guyana for Latin America and Caribbean Region** assumed the vice presidency.
2. The assembly also approved the initiatives of the ISA Secretariat in **institutionalising ISA's engagement with the private and public corporate sector** through the **Coalition for Sustainable Climate Action (CSCA)**.
3. Ten public sector organisations in India presented a cheque for \$1 million each at the assembly.
4. Speaking in the plenary, the President of the ISA assembly and India's Power and New and Renewable Energy Minister R.K. Singh said **solar energy has come a long way in the last five years and is now the fastest growing energy source globally**.
5. **Solar energy is already contributing around 2.8% of global electricity**, and if trends were to continue, by 2030, **solar will become the most important source of energy for electricity production** in large parts of the world.
6. **Six programmes and two projects** are now underway covering various aspects of solar energy.
7. A robust pipeline of more than \$5 billion has been developed for solar energy applications to meet **lighting, irrigation, drinking water and productive energy requirements of the ISA member countries**, which have so far been largely deprived of modern energy services.

Flashback

1. The membership of the ISA has continued to grow since the **Second Assembly in 2019**. The **ISA is now supported by 68 member countries**, and a further 20 countries are in the process of becoming members.
2. The **ISA is an initiative that was launched by the Prime Minister of India and the President of France on November 30, 2015 in Paris on the side-lines of the COP-21**.
3. The overarching objective of the ISA is to collectively address key common challenges to the **scaling up of solar energy in ISA member countries**.
4. The organisation has often been seen as **New Delhi's response to China's OBOR (One Belt One Road) initiative** that aims to expand Beijing's influence through massive investments in infrastructure projects.

8. The ISA has aggregated a demand for **more than 270,000 solar pumps across 22 countries**, more than **1 GW of solar rooftop across 11 countries**, and **more than 10 GW of solar mini-grids across nine countries** under its respective programmes.
9. The **first project is being launched in Mozambique** with the **support of France and the European Union**.

INDIA NOW HAS BFBS

India finally has made it to the list of nations with Blue Flag Beaches (BFB). The **Blue Flag beaches** are considered cleanest beaches in the world. An international jury from FEE, Denmark has upheld a recommendation made last month by a national jury composed of scientists, environmentalists that had recommended **India's eight beaches**, including two in Karnataka for consideration for **coveted International eco-label – the Blue Flag certification**.

What

1. The **international jury has awarded the Blue Flag certification to 4664 beaches**, marinas and boats from 46 countries **have got the Blue Flag certification**.
2. **Spain has the highest number of Blue Flag tagged sites**. India had none until 10 October 2020.
3. **India launched its own eco-label – BEAMS** under its **Integrated Coastal Zone Management (ICZM) project**.
4. **Blue Flag certification** was one of the projects India lined up under the ICZM project.
5. **India has also bagged third prize** under the “**International Best Practices**” in pollution abatement in coastal regions.
6. The beaches to receive the certification are **Shivrajpur (Gujarat), Ghoghla (Diu), Kasarkod and Padubidri (both in Karnataka)**, Kappad (Kerala), Rushikonda (Andhra), Golden (Odisha) and Radhanagar (Andaman).
7. **India is now among 50 Blue flag nations in the world**. Foundation for Environmental Education, headquartered in Copenhagen, Denmark operates the Blue Flag programme.
8. It is **one of the world's most recognised voluntary eco-labels**.

ATAL TUNNEL INAUGURATED

Prime Minister on 3 October 2020 inaugurated **Atal Tunnel in Rohtang**, which is the **highest altitude tunnel in the world** and **has strategic significance**. The **historic decision to construct a strategic tunnel below the Rohtang Pass was taken on 3 June 2000** when Atal Bihari Vajpayee was the Prime Minister. The **Union Cabinet decided in 2019 to name the Rohtang Tunnel as Atal Tunnel** to honour the contribution made by Atal Bihari Vajpayee. **Rohtang in persian means a pile of dead bodies**.

Few facts about Atal Tunnel

1. The **feasibility study for the Atal Tunnel was first done in 1990**. The foundation stone for the access road to the south portal of the tunnel was laid on 6 May 2002.
2. The **first blast took place in 2010** and the **last blast in 2017**. The tunnel was constructed using drill and **blast NATM (New Austria Tunnelling Method)**

techniques.

3. The **9.02 km long tunnel connects Manali to Lahaul-Spiti valley throughout the year**. Earlier the road remained impacted for **about six months every year owing to snowfall**.
4. The tunnel is built with **ultra-modern specifications in the Pir Panjal range of Himalayas** at an **altitude of 3000 metres (10,000 feet)** from the **Mean Sea Level (MSL)**.
5. It reduces the road distance by **46 km between Manali and Leh** and the time by about four to five hours. The hard work put in by the **Border Roads Organisation** in the last 10 years is reaching the final stage.
6. The **South Portal (SP) of Atal Tunnel** is located at a **distance of 25 km from Manali at an altitude of 3,060 metres**, while the North Portal (NP) of the tunnel is located near village **Teling, Sissu, in Lahaul Valley** at an **altitude of 3,071 Metres**.
7. It is **horseshoe-shaped**, single tube double lane tunnel with a roadway of 8 metres. It has an **overhead clearance of 5.525 metres**. Also, it is 10.5-metre wide and has a 3.6 x 2.25 metres fire-proof emergency egress tunnel built into the main tunnel itself.



VAIBHAV SUMMIT INAUGURATED

Prime **Minister** inaugurated **Vaishwik Bharatiya Vaigyanik (VAIBHAV) Summit** on 2 October 2020. The **VAIBHAV summit is a global virtual summit of overseas and resident Indian Researchers and Academicians** and is organized from October 2 to October 31. **Vaibhav summit** brings together scientists as well as researchers from the Indian diaspora.

What

1. **Vaishwik Bharatiya Vaigyanik (VAIBHAV) Summit** is a **collaborative initiative by S&T and Academic Organisations of India** to enable deliberations on thought process, practices and R&D culture with a **problem solving approach for well defined objectives**.
2. The **aim of the summit is to bring Indian origin luminaries in academic institutes and research and development (R&D) organizations across the world** and resident counterparts on a single platform to debate upon collaboration mechanisms to strengthen academic and a **Science and Technology (S&T) base in India** for global development.

3. The **initiative involves multiple levels of interactions among overseas experts** and Indian counterparts over a month-long series of webinars, video-conferences, etc.

4. The concluding session will be held on October 31, on the occasion of **Sardar Patel Jayanti**.

PM Inaugurates Vaishwik Bharatiya Vaigyanik (VAIBHAV) Summit

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To bring together Indian-origin luminaries in academia & research across the world & resident counterparts on a single platform
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Aims to create an ecosystem of Knowledge and Innovation in the country through global outreach
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To debate upon collaboration mechanisms to strengthen academic and S&T base in India for global development
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Involves multiple levels of interactions over a month-long series of webinars, video conferences, etc.

INDIA LAUNCHES DOLPHIN SAFARIS

The **National Mission for Clean Ganga (NMCG)** launched **Dolphin-based ecotourism programme**, including **Dolphin safari**, at **six sites** in three states – **Uttar Pradesh, Bihar and West Bengal** -- along the country's national river on the occasion of the '**Ganga River Dolphin Day**' on 5 October 2020. The '**Ganga Praharis**' - trained volunteers from among the local community working for cleanliness of Ganga - will take the tourists at these sites on boat rides to view Dolphin in the Ganga river. Besides, a new campaign, '**My Ganga My Dolphin**', was also launched on the occasion to **conduct Dolphin census** in 250 km stretch **from Bijnor to Narora**.

What

1. **India celebrates October 5 every year as the 'Ganga River Dolphin Day'** as this day **Ganga Dolphins were declared national aquatic animals in 2010**.
2. As announced by the Prime Minister Narendra Modi on August 15, the Centre is also expected to launch '**Project Dolphin**' soon to give a **new impetus to the conservation and protection of the species in both riverine and marine ecosystems** – the way India has been implementing conservation schemes for **tigers and elephants** under its dedicated '**Project Tiger**' and '**Project Elephant**' programmes.
3. The Gangetic river Dolphins are found in the **Ganges-Brahmaputra-Meghna and Karnaphuli river system of India, Nepal and Bangladesh**.
4. In India, these Dolphins are sighted along deep river reaches in Assam, Bihar, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh and West Bengal.
5. As per available assessment reports, **there are about 3,700 Gangetic river Dolphins in the Indian river systems**.

INDIA'S FIRST AMHUB

The **Tamil Nadu government**, through its **nodal investment promotion and facilitation agency Guidance**, has **partnered with World Economic Forum (WEF)** to

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establish what it described as **India's first advanced manufacturing hub (AMHUB)** in the state.

What

1. The advanced manufacturing hub or **AMHUB is one of the 19 platforms designed by WEF.**
2. This platform focuses on engaging entire regional production ecosystems to identify and address regional opportunities and challenges brought by the **Fourth Industrial Revolution (4IR)** by amplifying regional success stories, sharing best practices and incubating new partnerships.
3. As per WEF, the **Fourth Industrial Revolution can be described as the advent of cyber-physical systems** involving entirely new capabilities for people and machines.
4. Tamil Nadu will utilise the AMHUB to adopt **IoT (Internet of Things)** and other emerging technologies for advanced manufacturing to sustain and create new avenues of manufacturing growth.

INDIA'S FIRST HFC HYBRID CAR

India's first Hydrogen Fuel Cell (HFC) electric hybrid car successfully completed its maiden test run in Pune. This **indigenously developed technology** was a collaborative effort between scientists from **two Council of Scientific and Industrial Research (CSIR) labs – National Chemical Laboratory (NCL), Pune and Central ElectroChemical Research Institute (CECRI), Karaikudi** along with KPIT, Pune. The technology, developed over four years, has the **potential to reduce dependence on petrol and diesel** once introduced in markets. This could mean **fewer polluting emissions due to fuel combustion from vehicles.**

About HFC technology

1. In the **HFC technology, hydrogen gas from the on-board gas cylinder** interacts with the **Membrane Electrode Assembly (MEA)** from the anode side to produce protons (positively charged particles) and **electrons (negatively charged particles).**
2. The protons, after passing through the proton exchange membrane, **interact with oxygen from the local air available on the cathode side to produce water.** The electrons flow through the outside circuit and produce electricity.
3. Unlike vehicles running on fossil fuels, which emit polluting gases like **carbon monoxide, sulphur dioxide and nitrogen dioxide**, the only by-product in HFC technology is water.
4. Another advantage is that this HFC is at least five to six times lighter than the

How does the hydrogen fuel cell work?

1. 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.
2. Put simply, the **fuel cell combines hydrogen and oxygen to generate electric current, water being the only byproduct.**
3. Like conventional batteries under the bonnets of automobiles, **hydrogen fuel cells convert chemical energy into electrical energy.**
4. 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.**

traditional HFCs presently available in India.

5. This technology **is better suited for heavy commercial vehicles** like trucks or buses, rather than passenger cars, and KPIT is also developing a similar technology for commercial vehicles.

ZOJILA TUNNEL CONSTRUCTION WORK BEGINS

Union Minister Nitin Gadkari on 15 October 2020 launched the **first blasting for construction related work** at the **14.15 km Zojila tunnel, one of the longest in Asia**, that will **provide all-year connectivity between Srinagar valley and Leh**. Initiating the blast in a virtual ceremony, Road Transport, Highways and MSMEs Minister Gadkari termed it a "**moment of pride**" for India. Blasting means blowing up or breaking apart something solid with explosives.

About tunnel

1. The **project holds strategic significance** as Zojila Pass is situated at an **altitude of 11,578 feet** on the **Srinagar-Kargil-Leh National Highway** and remains closed during winters due to heavy snowfall.
2. At present **it is one of the most dangerous stretches in the world** to drive a vehicle and this project is also **geo-strategically sensitive**.
3. The project involves **construction of a 14.15-km long tunnel** at an altitude of about 3,000 m under Zojila pass (presently motorable only for six months in a year) on **NH-1** connecting Srinagar and Leh through Drass and Kargil.
4. The tunnel will **provide all-weather connectivity between Srinagar valley and Leh (Ladakh plateau) on NH-1**, free from avalanches and would enhance safety and would reduce the travel time from more than 3 hours to 15 minutes.
5. Upon completion, **the tunnel will be of great importance to the defence of the country**, in view of the fact that massive military activities along our borders in **Ladakh, Gilgit and Baltistan regions are taking place**.
6. Zojila Tunnel project shall bring to fruition 30 years of overwhelming public demand of Kargil, Drass and Ladakh region.
7. **Re-modelling of the project will result in savings to the tune of Rs 4,000 crore** to the public exchequer without any compromise on safety, security and quality.
8. The project was re-awarded this year to **Megha Engineering & Infrastructure Ltd (MEIL)** which had emerged as the lowest bidder quoting Rs 4,509.5 crore for the project.
9. The other two bidders in the race were **Larsen & Toubro and Ircon International JV**.

INTERNATIONAL

NEW MOONSHOT RULES

The **NASA released a set of guidelines** on 13 October 2020 for its **Artemis moon-landing program**, based on the **1967 Outer Space Treaty** and other agreements. NASA's new moonshot rules also said that **No fighting and littering and no trespassing at historic lunar landmarks like Apollo 11's Tranquility Base**.

What

1. So far, **eight countries have signed** these so-called **Artemis Accords**.
2. **Founding members** include the **U.S., Australia, Canada, Italy, Japan, Luxembourg, United Arab Emirates and the United Kingdom**.
3. NASA Administrator Jim Bridenstine said he expects **more countries to join the effort to put astronauts back on the moon by 2024**.
4. It promises to be the **largest coalition for a human spaceflight program in history**, according to Bridenstine, and is expected to pave the way for **eventual Mars expeditions**.
5. It's important not only to travel to the moon "with our astronauts, but that we bring with us our values.

What the rule said

1. **Secrecy is banned**, and **all launched objects need to be identified and registered**.
2. All members agree to pitch in with astronaut emergencies.
3. **Space systems must be universal** so everyone's equipment is compatible, and scientific data must be shared.
4. **Historic sites must be preserved**, and **any resulting space junk must be properly disposed of**.
5. Rovers and other spacecraft cannot have their missions **jeopardized by others getting too close**.
6. Violators could be asked to leave, according to Bridenstine.
7. The coalition can say, "Look, you're in this program with the rest of us, but you're not playing by the same rules.
8. **The U.S. is the only country to put humans on the moon: 12 men from 1969 through 1972**.
9. Russia is still on the fence. The country's space agency chief, Dmitry Rogozin, said at an International Astronautical Congress virtual meeting on 12 October 2020 that the **Artemis program is U.S.-centric** and he would prefer a model of cooperation akin to the **International Space Station**.
10. China, meanwhile, is out altogether. **NASA is prohibited under law**, at least for now, from signing any bilateral agreements with China.

BONGOSAGAR BEGINS

India and Bangladesh begin the **second edition** of their "**Bongosagar**" naval exercise in the northern Bay of Bengal on 3 October 2020, which will be followed by a coordinated maritime patrol by their warships in the region. Indian deployed **INS Kiltan**, an **anti-submarine warfare corvette**, and **INS Khukri**, a **guided-missile corvette**, as well as maritime patrol aircraft and helicopters. Bangladesh, in turn, participated with **BNS Abu Bakr**, a guided-missile frigate, and **BNS Prottoy**, a guided-missile corvette.

What

1. The **aim of the exercise is to develop interoperability and joint operational skills** through conduct of a wide spectrum of maritime exercises and operations.
2. It included **surface warfare drills, seamanship evolutions and helicopter**

- operations**, among other things.
- The warships from the two nations will then undertake **joint patrolling along the international maritime boundary line**.
 - India has steadily stepped-up military ties with Bangladesh, which incidentally acquired its **first-ever diesel-electric submarines from China a couple of years ago**.
 - India, on its part, has been trying to counter Chinese inroads into its neighbourhood, ranging from **Sri Lanka, Maldives, Seychelles and Mauritius to Myanmar, Nepal and Bangladesh**.

SS KALPANA CHAWLA LAUNCHED

A commercial cargo spacecraft bound for the **International Space Station (ISS)** launched on 2 October 2020 night **carrying the name of deceased NASA astronaut Kalpana "K.C" Chawla (first Indian-born woman to enter space)** for her key contributions to human spaceflight. The **S.S. Kalpana Chawla** launched from the **Mid-Atlantic Regional Spaceport (MARS)** at NASA's Wallops Flight Facility in Virginia.

What

- On the **NG-14 mission**, the **S.S. Kalpana Chawla will deliver approximately 3,630 kilograms** of cargo to the station.
- Research flying aboard the **Cygnus includes the test of a biologic drug that could be used for the treatment of leukemia**, a plant growth study that will cultivate radishes as a model for future crops in space, a **compact toilet for astronauts to use on deep-space exploration missions** and a **360-degree virtual reality camera** that will be used to film during a spacewalk for an immersive cinematic production.
- The **flight is carrying 6,000 pounds of cargo** including refined radishes and a **3D camera** that's going to go on the outside of the space station to take images when the crew is doing a spacewalk.

ECONOMY

RBI'S MONETARY POLICY STATEMENT

Following are the highlights of RBI Governor Shaktikanta Das' statement and **resolution of the Monetary Policy Committee (MPC)** on 9 October 2020.

- Benchmark **lending rate kept unchanged at 4 pc**
- Indian economy expected **to contract 9.5 pc** this fiscal with downside risks
- Contraction 9.8 per cent projected in July-September; 5.6 pc in October-December and rebound in growth at 0.5 per cent in March quarter
- GDP growth for April-June quarter 2021-22 fiscal projected at 20.6 pc
- Accommodative monetary policy stance maintained to support growth
- Indian economy entering into decisive phase in fight against coronavirus**, focus must shift from containment to reviving economy
- Contraction in economic growth of Q1 behind; silver linings are visible

1 -15 OCT - 2020

8. GDP growth may break out of contraction and enter positive zone by March quarter of current fiscal
9. Inflation to remain elevated in September quarter, but ease gradually towards the target over December and March quarters
10. **Retail inflation projected at 6.8 percent** for September quarter
11. Current inflation hump transient; agriculture outlook looks bright, oil prices to remain rangebound
12. RTGS fund transfer system for real-time fund transfer to become 24X7 from December
13. Threshold for aggregate exposure of retail bank loans to one counterparty increased to Rs 7.5 crore from Rs 5 crore
14. System-based automatic caution-listing for exporters discontinued to help them negotiate better terms with overseas buyers
15. Comfortable liquidity position to be maintained; Rs 20,000 crore-OMO auction next week
16. **On-tap targeted long-term repo operations (TLTRO) to be conducted**, with tenors of up to three years for Rs 1 lakh crore at a floating rate linked to the policy repo rate up to March 31, 2021
17. All MPC members vote for keeping the policy repo rate unchanged and continue with the accommodative stance.

GAS MARKETING FREEDOM ALLOWED

The government on 7 October 2020 **allowed affiliate companies to buy gas produced from non-regulated fields** as part of giving **complete marketing freedom**. The government **between 2016 and 2019 gave pricing freedom for all fields** except those given to state-owned **Oil and Natural Gas Corp (ONGC) and Oil India Ltd (OIL)** on a nomination basis. But, **there were restrictions on marketing including a ban on affiliates of producers buying the fuel and in some cases**, a state nominee being mandated to offtake the gas. This restricted competition kept prices artificially low.

What

1. There will be **no change in the price of gas sold by ONGC and OIL from fields given to them on a nomination basis**. The rate at **USD 1.79 per million British thermal units** is half of the production cost.
2. The CCEA approved a standard procedure for discovering the price of gas through a transparent and competitive e-bidding as also **"permitting affiliates to participate in the bidding process for the sale of gas"**.
3. Complete marketing freedom has been provided where **production sharing contracts (PSCs)** already provide for pricing freedom.
4. This would benefit firms such as **Vedanta-owned Cairn** and Focus Energy who can now sell fuel to anyone and not necessarily to state-owned GAIL.
5. This **will add 40 million standard cubic metres per day of production from Krishna-Godavari basin** and other areas to the current output of 84 mmscmd.
6. Last year, **Reliance and its partner BP had bid out 5 mmscmd of new gas from their KG-D6 block** to firms such as Essar and GSPC.

7. The **objective of the policy is to prescribe a standard procedure to discover the market price of gas to be sold in the market by gas producers**, through a transparent and competitive process.
8. It permits affiliates to participate in the bidding process for the sale of gas and allows marketing freedom to certain **field development plans (FDPs)** where PSCs already provide pricing freedom.
9. The policy **aims to provide a standard procedure for the sale of natural gas in a transparent** and competitive manner to discover market price by issuing guidelines for sale by the contractor through e-bidding.
10. This will bring uniformity in the bidding process across the various contractual regimes and policies to avoid ambiguity and contribute towards **ease of doing business**.

SCIENCE AND TECHNOLOGY

THE NIRBHAY MISSILE TEST FAILS

The **flight test of India's homemade 1000-kilometer-range cruise missile Nirbhay failed** on 12 October 2020 following **technical problems**. **Nirbhay** — an **intermediate-range subsonic land-attack cruise missile** with terrain hugging — is an **Indian version of the American Tomahawk** and the **Russian Club SS-N-27 cruise missiles**. Defense scientists in India said the test failed within 8 minutes of the launch due to technical issues in the engine.

About Nirbhay

1. The **Nirbhay missile** is currently powered by the **Russian Saturn 50MT turbofan engine**.
2. Its **local development began in 2007** with the Defence Research and Development Organisation.
3. **Nirbhay is a stealthy missile** capable of delivering different warheads and is capable of loitering and attacking multiple targets.
4. The **cruise missiles like Tomahawk** and Nirbhay (when successful) do not follow a ballistic parabola but are terrain-hugging in their path.
5. Therefore, **they are more difficult to detect by conventional radars**. And hence more lethal and thus required by Indian Armed Forces.
6. Weighing **1,500 kilograms with a height of 6 meters** and a **speed of Mach 0.7 Mach**, the missile **can carry up to 300 kilograms of conventional and nuclear warheads**.
7. **Nirbhay is a two-stage missile**. Its solid-fuel rocket motor serves as its first stage and accelerates the missile after launch to cruise speed, when a **turbojet engine in the second stage takes over**.
8. It is equipped with a domestically made **ring laser gyroscope inertial navigation system**, a **GPS-enabled guidance system** and a **Russian seeker system**.
9. At least 20 more tests will occur before the missiles are inducted, another DRDO scientist said, which could take three to five years.
10. The **weapon is manufactured by the state-owned firm Bharat Dynamics Limited**,

and each Nirbhay missile system will cost about \$1.5 million.

NGRAM RUDRAM-1 SUCCESSFULLY TESTED

India on 9 October 2020 successfully tested a **new indigenous air-launched missile called `Rudram-1`**, which is designed to **destroy a variety of enemy surveillance, communication and radar targets** on the ground after being fired from **Sukhoi-30MKI fighters**. The **new generation anti-radiation missile (NGRAM) Rudram-1** has a **strike range from 100 to 200-km** depending on the altitude from which it is fired. The missile, with a **launch speed from Mach 0.6 to 2** (twice the speed of sound), was tested from a **Sukhoi jet** against a target on the **Long Wheeler island off the Odisha coast**.

What

1. The **Rudram-1 missile**, which has **INS-GPS navigation** with a passive homing head for the final attack, maneuvered towards the **target based on direction detected by the seeker and hit it with pinpoint accuracy**. All mission objectives were successfully met.
2. The Rudram-1 missile's passive homing head can **detect, classify and engage targets over a wide band of frequencies as programmed**.
3. The **missile is a potent weapon for IAF** in conducting operations to destroy air defence set-ups deep inside enemy territory, or **suppression of enemy air defences (SEAD)**, from large stand-off ranges. This will ensure IAF strike aircraft can carry out their missions without hindrance.
4. This is the first such **air-to-ground missile developed by DRDO for neutralizing surveillance and guidance radars**, communication towers, command and control centers, and other radiation emitting targets.
5. The missile, powered by **two pulse solid rocket motors for enhanced range**, can be launched from Sukhois from different altitudes, ranging from 500-meters to 15-km.
6. It has both **`lock on before launch (LOBL)`** and **`lock on after launch (LOAL) modes**.

SMART SUCCESSFULLY TESTED

India **successfully flight-tested the Supersonic Missile Assisted Release of Torpedo (SMART)** from Wheeler Island off the coast of Odisha on 5 October 2020. **All mission objectives**, including **missile flight upto the range and altitude**, separation of the **nose cone**, the release of Torpedo and deployment of **Velocity Reduction Mechanism (VRM)**, were met perfectly in the flight test.

What

1. The DRDO has successfully flight tested the Supersonic Missile assisted release of Torpedo, **SMART**.
2. This **will be a major technology breakthrough for stand-off capability** in anti-submarine warfare.
3. **SMART** is a missile assisted release of lightweight Anti-Submarine Torpedo System for **anti-submarine warfare (ASW) operations** for far beyond torpedo range.
4. This launch and demonstration are significant in establishing ASW capabilities.
5. The events of today were monitored by the **tracking stations (Radars, Electro**

- Optical Systems)** along the coast and the telemetry stations including down range ships.
- A number of DRDO laboratories, including **DRDL, RCI Hyderabad, ADRDE Agra, NSTL Visakhapatnam**, have developed the technologies required for SMART.
 - The flight testing of SMART follows the successful test firing on 3 October 2020 of its indigenously developed **nuclear capable hypersonic missile 'Shaurya'** with a strike range of around 1,000 km from the test range.

SHAURYA MISSILE SUCCESSFULLY TEST-FIRED

India on 3 October 2020 successfully test fired its **indigenously developed nuclear capable hypersonic missile 'Shaurya'** with a **strike range of around 1,000 km** from a test range in Odisha. 'Shaurya', which is the **land variant of Indias K-15 missile**, has a **strike range of 700 km to 1000 km** and is capable of carrying payloads of 200 kg to 1000 kg.

About Shaurya Missile

- The **surface-to-surface tactical missile** was blasted off from a **canister strapped to the ground launcher** from launch complex 4 of the **Integrated Test Range (ITR) in the APJ Abdul Kalam Island** and covered the desired range.
- It is **10 metres long, 74 cm in diameter** and **weighs 6.2 tonnes**. Its **two stages use solid propellants**.
- The **state-of-the-art missile** performed a manoeuvre in the closing stages of its flight and hit the impact point in the **Bay of Bengal with precision and accuracy**.
- A gas generator at the bottom of the canister pushed the missile out. Its **first stage ignited then and fell off**. The **second stage went into action after this**.
- During the test flight, **the missile was tracked by various telemetry stations and radars** and performed well.
- Shaurya is one of the top 10 missiles in the world** in its class with its high performance navigation and guidance systems, efficient propulsion systems, sophisticated control technologies and canisterised launch.
- The **missile can be launched from silos and canisters mounted on a truck** and fixed on the ground, it can be **easily moved around**. A truck itself can become a launching platform.

ATGM TEST FIRED SUCCESSFULLY

An **indigenously developed laser-guided anti-tank guided missile (ATGM)** was successfully test fired on 1 October 2020 in **Maharashtra's Ahmednagar**, defeating a target located at longer range. It was the **second such successful test firing of the missile**, having a **range of up to 5 km**, in the last 10 days. The weapon was test fired from an **MBT Arjun Tank at KK Ranges in Armoured Corps Centre and School (ACC&S)** in Ahmednagar, in continuation of a successful trial done on September 22.

What

- The ATGM employs a tandem heat warhead to defeat **Explosive Reactive Armour (ERA)** protected armoured vehicles in ranges from **1.5 to 5 km**, the Defence Ministry said.

2. The **ATGM** has been developed with a capability to launch from multiple platforms and is currently undergoing technical evaluation trials from 120 mm rifled gun of **MBT Arjun**.
3. The **Arjun is a third generation main battle tank developed by the DRDO**.
4. Pune-based **Armament Research and Development Establishment (ARDE)** developed the **ATGM** in association with **High Energy Materials Research Laboratory (HEMRL)**, Pune and **Instruments Research and Development Establishment (IRDE)**, Dehradun.
5. India on September 30, successfully **test-fired a new version of the surface-to-surface supersonic cruise missile BrahMos** having a range of around 400 km from an integrated test range at Balasore in Odisha.
6. The missile, featuring a number of indigenously developed sub-systems, was flight tested from a **land-based mobile launcher** for a designated range from the integrated test range in Balasore.

SHEPARD TEST SUCCESSFUL

Jeff Bezos' **Blue Origin space company** launched a **New Shepard rocket for a seventh time** from a remote corner of Texas on 13 October 2020, testing new **lunar-landing technology for NASA** that could help put astronauts back on the moon by 2024.

What is New Shepard?

1. **New Shepard has been named after astronaut Alan Shepard**, the first American to go to space, and offers flights to space over 100 km above the Earth and accommodation for payloads.
2. Essentially, **it is a rocket system that has been designed to take astronauts** and research payloads past the **Karman line** – the internationally recognised boundary of space.
3. The **idea is to provide easier and more cost-effective access** to space meant for purposes such as academic research, corporate technology development and entrepreneurial ventures among others.

TOP SPEED OF SOUND RECORDED

The **fastest possible speed of sound has been recorded for the first time** which is **about 36 km per second**. The **result is around twice as fast as the speed of sound in diamond**, the hardest known material in the world, said the researchers from Queen Mary University of London, the University of Cambridge and the Institute for High Pressure Physics in Troitsk, Moscow.

What the researcher found?

1. **Sound waves can travel through different mediums**, such as air or water, and move at different speeds depending on what they're travelling through.
2. For example, **they move through solids much faster than they would through liquids or gases**, which is why we are able to hear an approaching train much faster if you listen to the sound propagating in the rail track rather than through the air.
3. **Einstein's theory of special relativity** sets the absolute speed limit at which a wave can travel which is the **speed of light**, and is **equal to about 300,000 km per**

second.

4. However, **it was not known to date whether sound waves also have an upper speed limit** when travelling through solids or liquids.
5. **Sound waves in solids are already hugely important across many scientific fields.** For example, seismologists use sound waves initiated by earthquakes deep in the Earth interior to understand the nature of seismic events and the properties of Earth composition.
6. The study, published in the journal Science Advances, shows that **predicting the upper limit of the speed of sound is dependent on two dimensionless fundamental constants** -- the **fine structure constant** and the **proton-to-electron mass ratio**.
7. The new findings suggest that **these two fundamental constants can also influence other scientific fields**, such as **materials science** and **condensed matter physics**, by setting limits to specific material properties such as the speed of sound.
8. **Sound waves are also of interest to materials scientists** because sound waves are related to important elastic properties including the ability to resist stress.

RAISE 2020

The Prime Minister inaugurated a **global virtual summit on Artificial Intelligence (AI), RAISE 2020 - 'Responsible AI for Social Empowerment 2020'** on 5 October 2020. The summit was held from October 5 to 9, 2020 and is **organised by the Ministry of Electronics and Information Technology (MeitY) and NITI Aayog**.

What

1. In June this year, the **Global Partnership on Artificial Intelligence** was announced.
2. The **international initiative** was created by **15 countries** that include India, France, Canada, Australia, the European Union, Germany, Italy, Japan, Mexico, New Zealand, the Republic of Korea, Singapore, Slovenia, the United Kingdom and the United States of America.
3. The initiative essentially **seeks to guide responsible development** and use of **AI in a spirit of respect for human rights**, inclusion, diversity, innovation and economic growth.
4. The summit was a global meeting of minds **to exchange ideas and charter a course to use AI for social empowerment**, inclusion, and transformation in key areas like Healthcare, Agriculture, Education and Smart Mobility amongst other sectors.

SUN'S MAGNETIC FIELD DIGITALLY MAPPED

In possibly a first, the **Sun's magnetic field recorded over five decades of the 20th century** have been **digitally mapped**, which will facilitate solar physicists to better understand the **Sun's behaviour in future**. Solar observations recorded between 1915 and 1965 were gathered from **Kodaikanal Solar Observatory (KoSO)** run by the **Indian Institute of Astrophysics (IIA)**. Among **one of the oldest solar observatories in the world**, KoSO has been providing continuous and long-term uniform **solar observations for over a century now**, many of them taken in the form of photographic images.

What

1. Using **this magnetic field map**, it will be possible to make more accurate solar cycle

- predictions and **study the Sun's pole reversals in future**, Dipankar Banerjee, director, **Aryabhata Research Institute of Observational Sciences (ARIES)** said.
- Digital data observations of over 15,000 photo images**, captured through **Ca II-K and H-alpha filters**, were used for creating this map.
 - KoSO houses over 4 lakh photo images since 1904**, most of which have been preserved in their digital formats during the last three decades.
 - Like Earth has north and south poles, **Sun, too, has similar poles**. But, what makes poles of the Sun interesting is that they reverse their polarity at an **interval of 11 years**, which is the duration of one solar cycle. In December 2019, **solar cycle 25 commenced**.
 - Every solar cycle is different and the Sun's activities influence the overall space weather. Anomalous solar activities can have a direct impact on Earth's satellite-based communication systems, power grids and navigation.

INDIA WORLD'S LARGEST EMITTER OF SO₂

India's sulphur dioxide (SO₂) emissions, which **contribute to air pollution**, recorded a significant decline of approximately **six per cent in 2019** as compared to 2018, the steepest dip in four years, a report has said. However, **India continues to occupy the top emitter's position for the fifth consecutive year**, the report based on an analysis by Greenpeace India and the **centre for research on energy and clean air (CREA)**, released said. **Sulphur dioxide is a poisonous air pollutant that increases the risk of stroke, heart disease, lung cancer, and premature death.**

What

- In 2019, India emitted 21 per cent of global anthropogenic (human-made) SO₂ emissions**, nearly double that of second-ranked global emitter, Russia.
- China occupies the third position. The annual report ranks the world's biggest emitters of sulphur dioxide.
- As per the report, **the biggest emission hotspots in India are thermal power stations** (or clusters of power stations) at Singrauli, Neyveli, Sipat, Mundra, Korba, Bonda, Tamnar, Talcher, Jharsuguda, Kutch, Surat, Chennai, Ramagundam, Chandrapur, Visakhapatnam and Koradi.
- The report said **India has been faring reasonably well in its clean energy transition** and has set itself one of the world's most ambitious renewable energy targets but lack of FGD units in most power plants overshadows it.
- Renewable energy capacity has been increasing in India's power sector**, delivering more than two-thirds of the subcontinent's new capacity additions during the FY 2019-20.
- Greenpeace India has released an analysis of a national aeronautics and space administration (NASA) data, saying India has more than **15 percent of all anthropogenic sulphur dioxide (SO₂) hotspots** in the world detected by the **OMI (Ozone Monitoring Instrument) satellite**.

SPACE PROBE MAKES FIRST VENUS FLY-BY

A **spacecraft bound for Mercury swung by Venus** on 15 October 2020, **using Earth's neighbour** to adjust its course on the way to the solar system's smallest and

innermost planet. **Launched almost two years ago**, the **European-Japanese probe BepiColombo** took a black-and-white snapshot of Venus from a distance of 17,000 kilometers (10,560 miles), with some of its own instruments in the frame.

What

1. The **fly-by is the second of nine so-called planetary gravity assists** that the spacecraft needs for its **seven-year trip to Mercury**. The first, around Earth, took place in April.
2. The European Space Agency has described the 1.3 billion-euro (\$1.5 billion) mission as one of its most challenging yet. **Mercury's extreme temperatures**, the **intense gravity pull of the sun** and blistering solar radiation make for hellish conditions.
3. **BepiColombo** will make one more fly-by of Venus and six of Mercury itself to slow down before its arrival in 2025.
4. Once there, the spacecraft will split in two, releasing a European orbiter **nicknamed Bepi** that will swoop into Mercury's inner orbit while Mio, built by the **Japan Aerospace Exploration Agency**, gathers data from a greater distance.
5. Both probes are designed to cope with temperatures **varying from 430 degrees Celsius** (806 degrees Fahrenheit) on the side facing the sun, and **-180 degrees Celsius** (-292 F) in Mercury's shadow.
6. Researchers hope the **BepiColombo mission** will help them understand more about Mercury, which is only slightly larger than Earth's moon and has a massive iron core.
7. The **last spacecraft to visit Mercury was NASA's Messenger probe**, which **ended its mission in 2015** after a four-year orbit.
8. Before that, **NASA's Mariner 10** flew past the planet in the mid-1970s.

MISCELLANEOUS

WORLD STUDENTS' DAY 2020

Like every year, the **birth anniversary of the former President of India and scientist APJ Abdul Kalam** is being **celebrated as World Students' Day**. Kalam is best known for promoting education and his love for students. To honour his efforts, **in 2010**, the **United Nations Organisation (UNO) declared October 15 as World Students' Day**. This year, the **UNO's theme** is- **'Learning for people, planet, prosperity, and peace'**.

What

1. A renowned scientist, **Kalam is known for his missile defence programme**, and earned the title **'Missile Man of India'** for his role in the **Pokhran-II nuclear tests in 1998**.
2. In 2005, Kalam visited Switzerland, after which the country declared **May 26 to be observed as 'Science Day'** as a mark of respect and in honour of his visit.
3. The long list of awards conferred to Kalam includes the **Padma Bhushan in 1981** and **Padma Vibhushan in 1990**. He was later **awarded Bharat Ratna for his contributions to research in the field of science**.
4. Among the many feathers in his cap is the **successful testing of nuclear bombs at Pokhran**. He was an author as well and his books include **'Wings of Fire'**, **'My Journey'**, **'Ignited Minds – Unleashing the Power Within India'** and **'India 2020 – A Vision for the New Millennium'**.

5. The **renowned scientist passed away on July 27, 2015** during delivering a lecture to the students of IIM-Shillong.
6. Kalam fell down the stage suffering a stroke and passed away almost instantly.

NOBEL MEDICINE AWARD 2020

Americans Harvey J. Alter and Charles M. Rice, and British scientist Michael Houghton were awarded the **Nobel Prize for Medicine or Physiology** on 5 October 2020 for the **discovery of the hepatitis C virus**. Announcing the prize in Stockholm on 5 October 2020, the Nobel Committee noted that the **trio's work helped explain a major source of blood-borne hepatitis** that couldn't be explained by the **hepatitis A and B viruses**. Their work makes possible blood tests and new medicines that have saved millions of lives.

What

1. Their **discovery also allowed the rapid development of antiviral drugs** directed at **hepatitis C**.
2. **For the first time in history**, the disease can now be cured, raising hopes of eradicating hepatitis C virus from the world population.
3. The **World Health Organization** estimates **there are over 70 million cases of hepatitis worldwide** and **400,000 deaths each year**.
4. The disease is chronic and a major cause of liver inflammation and cancer.
5. The prestigious Nobel award comes with a gold medal and prize money of 10 million Swedish kronor (over \$1,118,000), courtesy of a bequest left **124 years ago** by the prize's creator, Swedish inventor **Alfred Nobel**.
6. The medicine prize carried particular significance this year due to the coronavirus pandemic, which has highlighted the importance that medical research has for societies and economies around the world.
7. The Nobel Committee often recognizes basic science that has laid the foundations for practical applications in common use today.
8. The **award is the first of six prizes being announced through Oct. 12**. The other prizes are for outstanding work in the fields of **physics, chemistry, literature, peace and economics**.

NOBEL PHYSICS PRIZE 2020

Three scientists won this year's Nobel Prize in physics on 6 October 2020 **for advancing our understanding of black holes**, the all-consuming monsters that lurk in the darkest parts of the universe. **Briton Roger Penrose received half of this year's prize** "for the **discovery that black hole formation is a robust prediction of the general theory of relativity**". **German Reinhard Genzel and American Andrea Ghez** received the **second half of the prize** "for the **discovery of a supermassive compact object at the center of our galaxy**".

What

1. The prize celebrates "**one of the most exotic objects in the universe,**" **black holes**, which have become a staple of science fact and science fiction and where time even seems to stand still.

2. **Penrose proved with mathematics that the formation of black holes was possible**, based heavily on **Albert Einstein's general theory of relativity**.
3. **Einstein did not himself believe that black holes really exist**, these super-heavyweight monsters that capture everything that enters them.
4. Penrose's detailed his studies in 1965, but it wasn't until the 1990s that Reinhard Genzel and Andrea Ghez, each leading a group of astronomers, trained their sights on the dust-covered center of our **Milky Way galaxy**, a region called **Sagittarius A(asterisk)**, where something strange was going on.
5. They both found that there was "an extremely heavy, invisible object that pulls on the jumble of stars, causing them to rush around at dizzying speeds."
6. It was a black hole. Not just an ordinary black hole, but a **supermassive black hole**, 4 million times the mass of our sun.
7. Now scientists know that **all galaxies have supermassive black holes**.
8. **In 2019**, scientists got the **first optical image of a black hole**, and Ghez, who was not involved, praised the discovery.

NOBEL PRIZE 2020 IN CHEMISTRY

The **Royal Swedish Academy of Sciences** on 7 October 2020 awarded the **2020 Nobel Prize in Chemistry** to **Emmanuelle Charpentier** and **Jennifer A. Doudna** for "development of a method for genome editing". "Emmanuelle Charpentier and Jennifer A. Doudna have discovered one of gene technology's sharpest tools: the **CRISPR/Cas9 genetic scissors**, the Academy said.

What

1. Using these, **researchers can change the DNA of animals, plants, and microorganisms with extremely high precision**.
2. This technology has had a revolutionary impact on the life sciences, is **contributing to new cancer therapies**, and may make the dream of **curing inherited diseases come true**.
3. **Charpentier, who is French**, and **Doudna, an American**, become the **sixth and seventh women to win a Nobel for chemistry**, joining the like of **Marie Curie (1911)** and **Frances Arnold (2018)**.
4. After **publishing her research in 2011**, Charpentier worked with Doudna to **recreate the bacteria's genetic scissors**, simplifying the tool so it was easier to use and apply to **other genetic material**.
5. They then reprogrammed the scissors to cut any DNA molecule at a predetermined site -- paving the way for scientists to **rewrite the code of life where the DNA is snipped**.
6. The **CRISPR/Cas9 tool has already contributed to significant gains in crop resilience**, altering their genetic code to better withstand drought and pests.
7. The technology has also led to innovative cancer treatments, and many experts hope it could one day make inherited diseases curable through gene manipulation.

8. The **first time a woman was honoured with the chemistry prize was in 1911** when **Marie Curie**, who also took the **physics prize in 1903**, won for discovering the elements **radium and polonium**.

NOBEL PRIZE 2020 FOR LITERATURE

The **Nobel Prize in Literature** was awarded on 8 October 2020 to **Louise Gluck**, one of America's most celebrated poets, "**for her unmistakable poetic voice that with austere beauty makes individual existence universal.**" The award was announced at a news conference in Stockholm.

What

1. Gluck, **who was born in New York in 1943**, has written numerous poetry collections, many of which deal with the challenges of family life and growing older.
2. They include **The Wild Iris**, for which **she won a Pulitzer Prize in 1993**, and **Faithful and Virtuous Night**, about mortality and grief, from 2014.
3. She was named the **United States' poet laureate in 2003**.
4. **Gluck is the first female** poet to be awarded the prize since **Wisława Szymborska, a Polish writer, in 1996**.
5. Other poets to have received the award include Seamus Heaney, the Northern Irish poet, who won in 1995. **She is the first American to win since Bob Dylan in 2016**.

NOBEL PEACE PRIZE 2020

The **Nobel Peace Prize 2020** on 9 October 2020 was **awarded to the World Food Programme (WFP)** for its **efforts to combat hunger and food insecurity around the globe**. The **World Food Program plays a key role in multilateral cooperation** in making **food security an instrument of peace**. It contributes daily to advancing the fraternity of nations mentioned in Alfred Nobel's will.

What

1. The **World Food Programme is the food-assistance branch of the United Nations** and the **world's largest humanitarian organization** addressing hunger and **promoting food security**.
2. WFP's efforts focus on emergency assistance, relief and rehabilitation, development aid, and special operations.
3. Along with enormous prestige, the prize comes with a 10-million krona (\$1.1 million) cash award and a gold medal to be handed out at a ceremony in Oslo, Norway, on December 10, the **anniversary of prize founder Alfred Nobel's death**.

NOBEL PRIZE 2020 IN ECONOMICS

The **Nobel Prize 2020 in Economic Sciences** on 12 October 2020 was awarded to **Paul R. Milgrom and Robert B. Wilson** "**for improvements to auction theory and inventions of new auction formats.**" The award caps a week of Nobel Prizes and is technically known as the **Sveriges Riksbank Prize in Economic Sciences** in Memory of Alfred Nobel. **Since its establishment in 1969**, it has been awarded 51 times

and is now widely considered one of the Nobel prizes.

What

1. This year's **Laureates in Economic Sciences** started out with **fundamental theory** and **later used their results in practical applications**, which have spread globally. Their discoveries are of **great benefit to society**.
2. **Robert Wilson**, awarded **this year's Prize in Economic Sciences**, showed **why rational bidders tend to place bids below their own best estimate of the common value**: they are worried about the winner's curse – that is, about paying too much and losing out.
3. 2020 Economic Sciences Laureate Paul Milgrom formulated a more general theory of auctions that not only allows common values, but also private values that vary from bidder to bidder.
4. This year's Economic Science Laureates -- **Paul Milgrom and Robert Wilson** -- have not just clarified **how auctions work** and **why bidders behave in a certain way**, but used their theoretical discoveries to invent entirely new auction formats for the sale of goods and services.

HUGHES INDIA SELECTED FOR SATELLITE BROADBAND

The **government has selected Hughes Communications India** to connect **5,000 village panchayats in border and Naxal-affected states** as well as in island territories with **satellite broadband under BharatNet project** by March 2021. The **5,000-gram panchayats** are located in **north-eastern states**, including Manipur, Meghalaya, Tripura, Mizoram, Arunachal Pradesh, and the Galwan Valley in Eastern Ladakh as well as in Andaman and Nicobar and Lakshadweep that lack terrestrial connectivity, such as **fiber or cable**, Hughes said in a statement on 13 October 2020.

What

1. The **BharatNet network being created by Bharat Broadband Nigam Limited (BBNL)**, is to **provide affordable high-speed broadband access to rural citizens** and institutions of all the Gram Panchayats of the country.
2. **Hughes is committed to the government's vision of enabling Digital India**, and we are excited about our partnership with TCIL and BBNL as part of BharatNet to bring high-speed connectivity to the remote gram panchayats, Hughes India president

Flashback

1. **Hughes India is a majority-owned subsidiary of Hughes Network Systems, LLC (HUGHES)**, the leading global provider of **broadband satellite networks and services**.
2. **Hughes India is the largest satellite service operator in India** providing a comprehensive range of broadband networking technologies, solutions, and services for businesses and governments, including Managed Services to meet every communications challenge.
3. For more than two decades, Hughes has been making progress in efforts to connect people, businesses and communities: bridging the digital divide and contributing to disaster preparedness and recovery.

said.

3. Under the agreement, Hughes India will enable internet service for each gram panchayat using capacity from **ISRO's GSAT-19 and GSAT-11 satellites** with the **Hughes Jupiter System**, the de facto standard for satellite broadband implementations, in **use on more than 40 satellites worldwide**.
4. The government **aims to connect all 2.5 lakh village panchayats in the country** with high speed broadband services by August 2021.
5. The **completion (of Hughes project) is expected by March 2021**. We have delivered 90 per cent of the sites as on date, and commissioned 50 per cent, Huges said.
6. **Hughes India will provide solar-powered user terminals**, and network operations, install the equipment at each site, and manage the service to deliver speeds **up to 10 megabit per second under the deal**.