

Current Affairs search results for tag: science-and-technology

### **1. America's Frontier supercomputer has become the world's fastest supercomputer ( June 11, 2022 )**

America's Frontier supercomputer has become the world's fastest supercomputer, surpassing Japan's Fugaku, according to the Top 500 list of the world's most powerful supercomputers.

- The Frontier supercomputer, built for the US Department of Energy's Oak Ridge National Laboratory (ORNL), has a speed of 1.1 exaflops, making it the world's first supercomputer operating at exascale speeds.
- This supercomputer is built using Hewlett Packard Enterprise Architecture, coupled with Advanced Micro Devices (AMD) processors.
- Its speed exceeds that of Japan's Fugaku supercomputer (442 petaflops), which was by far the fastest supercomputer in the world.
- Frontier is also ranked first in the Green 500 list as the world's most energy efficient supercomputer. It measures supercomputing energy use and efficiency with 52.23 gigaflops of performance per watt, making it 32% more energy efficient than the Fugaku supercomputer.
- In the latest edition of the Top 500 list, LUMI is followed by Frontier and Fugaku. The third place is given to the supercomputer, which is installed in Kajani, Finland.
- **Super computer of india**

NAME	MOTION	PLACE
Param Anant	838 Teraflops	IIT, Gandhinagar (Gujarat)
Param Pravega	3.3 Petaflops	IISc Bangalore
Param Ganga	1.67 Petaflops	I.I.T. Roorkee
Param shakti	1.66 petaflops	I.I.T. Kharagpur

### **2. Russia supplies new fuel for Kudankulam reactors ( June 11, 2022 )**

Russia's Rosatom State Corporation has supplied the first batch of TVS-2M nuclear fuel, which is a more reliable and cost-effective nuclear fuel, to India for Units 1 and 2 of the Kudankulam Nuclear Power Plant (KNPP).

- Once the new TVS-2M fuel is in use, the reactor will start operating with a fuel cycle of 18 months.

- This means that the reactor, which has to be shut down every 12 months to remove spent fuel and insert new fuel bundles and associated maintenance, will now have to shut down every 18 months.

- **Benefits of TVS-2M fuel**

- TVS-2M fuel assemblies have several advantages that make them more reliable and cost-effective.
- The fuel combinations in the reactor core maintain their geometry.
- one TVS-2 M assembly contains 7.6% more fuel material than that of UTVS.
- Its main feature is the new generation anti-debris filter ADF-2, which protects the bundles from damage caused by debris (small objects in the reactor core).
- Operating in a longer fuel cycle also increases the economic efficiency of a plant.

- **Kudankulam Nuclear Power Plant (KNPP)**

- located - coastal Tamil Nadu
- built by - India in joint-collaboration with Russia.
- Construction on the plant began on 31 March 2002
- it is India's Critical Information Infrastructure
- It has an installed capacity of 6,000 MW of electricity

### **3. PM Modi launches projects worth ₹3,050 crore in Gujarat ( June 11, 2022 )**

On June 10, Prime Minister Narendra Modi laid the foundation stone for several development projects worth Rs 3,050 crore in Navsari district, Gujarat. In Navsari, Prime Minister Modi took part in the 'Gujarat Gaurav Abhiyan.'

- He inaugurated the AM Naik Healthcare Complex, Nirali Multi Speciality Hospital and Kharel education complex in Navsari.
- He inaugurated the headquarters of the Indian National Space Promotion and Authorisation Centre (**IN-SPACe**) at Bopal, Ahmedabad.
- It will play an anchoring role in transforming the space sector of India.
- He performed the Bhumi Pujan for **13 water supply projects** for residents of Tapi, Navsari and Surat districts, worth ₹961 crores.
- He also inaugurated the Madhuban Dam based **Astole Regional Water Supply Project** constructed at a cost of about Rs 586 crore.
- He also inaugurated '**Nal Se Jal**' projects worth ₹163 crores.
- These projects will provide safe and adequate drinking water to the residents of Surat, Navsari, Valsad and Tapi districts.

**Indian National Space Promotion and Authorisation Centre (IN-SPACe)**

- The establishment of IN-SPACe was announced in June 2020 by the Government.
- It will be the nodal agency, which will allow space activities and non-government private entities to use the facilities belonging to the Department of Space.
- It aims to ensure maximum private participation for the space sector.
- It will also allow setting up of facilities within the ISRO campus based on safety norms and feasibility assessment.
- It will give an opportunity to the youth to showcase their talent.

**4. NASA's DAVINCI Mission ( June 10, 2022 )**

NASA is planning to launch a mission named "DAVINCI Mission". DAVINCI stands for "Deep Atmosphere Venus Investigation of Noble Gases, Chemistry and Imaging Mission".

**• About DAVINCI Mission**

- This mission will fly near Venus in 2029 and explore its harsh atmosphere.
- It will reach the surface of Venus by June 2031.
- The mission will capture data about Venus, which scientists have been trying to measure since the early 1980s.

**• DAVINCI Spacecraft Chemistry Laboratory**

- The DAVINCI spacecraft will serve as a flight chemistry laboratory.
- It can measure various aspects of Venus's atmosphere and climate.
- The spacecraft's instruments will be able to map the surface of Venus as well as trace the composition of the mountain highlands of Venus.

**• About the planet Venus**

- It is the second planet in terms of distance from the Sun. Due to its structural resemblance to Earth, it is also called the twin planet of the Earth.
- The atmosphere on Venus is quite dense and toxic, consisting mainly of carbon dioxide gas and sulfuric acid clouds.
- Venus is one of only two planets that rotate from east to west. Only Venus and Uranus rotate like this.
- On Venus, one day-night cycle is equal to 117 Earth days because Venus rotates around the Sun in the opposite direction of its orbital rotation.

**• Venus related missions**

- ISRO Shukrayan: The Indian Space Research Organisation (ISRO) is also planning a mission related to the planet Venus, which is currently called 'Shukrayan Mission'.

- Akatsuki (Year 2015- Japan)
- Venus Express (2005 - European Space Agency)
- NASA's Magellan (1989)

## **5. New Cancer-Killing Drug : Dostarlimab ( June 9, 2022 )**

A trial of 18 colorectal cancer patients in the US found that the cancer is curable without chemotherapy or surgery. All the patients involved in the trial were given a drug called Dostarlimab. The drug was given to the patients every three weeks for six months.

- Experts say this is perhaps the first time in the history of modern medical science that an experimental procedure has been successful against the most dreaded disease.

### **• What is Dostarlimab?**

- It is an immunotherapy drug from GlaxoSmithKline.
- It consists of molecules created by the laboratory.
- It acts as a substitute antibody. It is sold under the brand name Gemperly.
- It was approved for medical use in the United States and the European Union in 2021.
- Its side effects include vomiting, joint pain, itching, rash, fever, etc.

### **• Findings of the experiment**

- The trial showed that immunotherapy alone (without chemotherapy, radiotherapy or surgery) has been the basis of cancer treatment.
- It can completely cure patients with a specific type of rectal cancer called 'mismatch repair deficit' cancer.
- No cases of progression of disease or recurrence had been reported during the treatment.
- Within nine weeks of starting treatment, 81% of patients had less symptoms and a faster physical response.

### **• How does the drug work?**

- It is a type of monoclonal antibody that blocks proteins called checkpoints that are made by immune system cells, such as T cells and some cancer cells.
- The test used checkpoints that allow T cells to kill cancer cells.
- When these checkpoints are blocked, T cells are free to kill cancer cells more efficiently.
- Examples of checkpoint proteins found on T cells or cancer cells include PD-1, PD-L1, CTLA-4 and B7-1.

**6. Botanical Survey of India (BSI) have discovered the Indian Lipstick plant ( June 7, 2022 )**

Researchers from the Botanical Survey of India (BSI) have discovered a rare plant after more than a century in Anjou district of Arunachal Pradesh. It is known as 'Indian lipstick plant'.

- Scientists had collected some specimens of 'Eschinanthus' from Huiliang and Chipru in Anjou district in December 2021 during flower studies in Arunachal Pradesh.
- After review of documents and study of fresh specimens it was confirmed that specimens belong to *Aeschynanthus monetaria*, which has not been found in India since the year 1912.
- This plant was first discovered in Arunachal Pradesh in 1912 by the British botanist Stephen Troyt Dunn.
- The discovery was based on plant samples collected from Arunachal Pradesh by another English botanist, Isaac Henry Burkill.

- **About 'Indian Lipstick Plant'**

- It is known in botany as '*aeschynanthus monetaria* dun'.
- The word *aeschynanthus* is derived from the Greek word *aishine* or *aishine*, which means feeling ashamed or embarrassed, while *anthos* means flower.
- Some species under the genus *Eschinanthus* are called lipstick plants due to the presence of the tubular red corolla.
- This plant grows in moist and evergreen forests at a height of 543 to 1134 metres.
- The flowering and fruiting time of this plant is between October to January.
- The International Union for Conservation of Nature (IUCN) has placed the lipstick plant species in the 'endangered' category.

**7. Strategic missile Agni-4 successfully test fired ( June 7, 2022 )**

India on 6 June successfully test-fired nuclear-capable long-range ballistic missile Agni-IV from APJ Abdul Kalam Island, Odisha.

- The test was part of the routine user training launch conducted under the aegis of Strategic Forces Command.
- The launch of the missile recognized all the operational parameters as well as the reliability of the system.
- This successful test reaffirms India's policy of having 'reliable minimum deterrence'.
- In May 2022, India successfully test-fired an extended range version of the BrahMos supersonic cruise missile from a Sukhoi fighter jet.

- This was the first launch of the extended range version of the BrahMos missile from a Su-30MKI aircraft.

- **About Agni-IV Missile**

- It is an intermediate range ballistic missile with a range of about 4,000 km.
- It is developed by the Defence Research and Development Organisation (DRDO).
- It can carry a payload of 1,000 kg and can reach an altitude of 900 km.
- The first flight test of Agni-4 took place on 10 December 2010.
- The missile crashed into the sea soon after launch because of errors in its control system.

- **Features of Agni-IV Missile**

- It is a two-stage, solid-fueled missile weighing 17,000 kg.
- It is about 20 metres long and 1.2 metres in diameter at its lower stage.

- **Agni class of missiles**

- **Agni I** - Range of 700-800 km.
- **Agni II** - Range more than 2000 km.
- **Agni III** - Range of more than 2,500 Km.
- **Agni IV** - Range is more than 3,500 km and can fire from a road mobile launcher
- **Agni V** - The longest missile of the Agni series, with a range of over 5,000 km.
- These missiles are built under Integrated Guided Missile Development Programme (IGMDP).

## **8. Chinese astronauts enter Tiangong space station module after successful launch ( June 6, 2022 )**

The China Manned Space Agency (CMSA) announced that three Shenzhou-14 astronauts successfully entered the Tiangong Space Station on June 6 with the Tianzhou-4 cargo craft.

- The three astronauts Chen Dong, Liu Yang and Kai Xuje will collaborate with the ground team to complete the assembly and construction of the Tiangong space station.
- Astronauts will grow the space station from a single-module structure with core module Tianhe, two lab modules Wentian and Mengtian into a National Space Laboratory.

- **About Tiangong Space Station**

- This is a planned permanent space station of China which will be placed in Low Earth Orbit.
- It was launched on September 15, 2016.

- This is China's longest manned space mission so far.
- China had launched Tiangong-1 in 2011 as a proof-of-concept of technologies for future stations.
- Tiangong will be fully operational by the end of 2022.

## **9. India's First Liquid Mirror Telescope ( June 4, 2022 )**

The country's and the world's first Liquid Mirror Telescope has been set up in Uttarakhand. This telescope has been set up on top of a hill in Devasthal Observatory located in Nainital.

- Through this telescope, it will be helpful to take information about supernova, gravitational lens and asteroids etc. in space.
- The Indian Liquid Mirror Telescope (ILMT) will help in surveying the sky.
- This will also make it easy to observe many galaxies and other astronomical sources.
- In 2017, with the help of countries like Belgium, Canada, Poland, Aeries started the International Liquid Mirror Telescope Project with the help of 500 million.
- **What is a Liquid Mirror Telescope (LMT)?**
- It has been made by India with the help of astronomers from Belgium and Canada.
- It is like a 4 metre diameter rotating mirror made of a thin film of liquid mercury, which collects and focuses the light.
- It has been installed at Devasthal Observatory at an altitude of 2450 metres above sea level.
- This observatory is situated in the Aryabhata Research Institute of Observational Science (ARIS), an autonomous institute of the Department of Science, Government of India.
- To prepare the telescope, scientists created a pool of mercury, which is a reflective liquid. This causes the surface of the telescope to become curved.
- This is ideal for focusing light.
- A thin transparent film over it protects the mercury from the air.
- It also has a large electronic camera, which records the images.
- The telescope was designed and built in Belgium by the Advanced Mechanical and Optical Systems (AMOS) Corporation and the Center Spatial de Lige.
- This telescope has taken a clear picture of the NGC 4274 galaxy, 95 thousand light years away.
- Along with this, it has also easily captured the stars of the Milky Way in the camera.

## **10. D2M Technology ( June 4, 2022 )**

The Department of Telecommunications (DoT) and Prasar Bharati are exploring the feasibility of 'direct-to-mobile' (D2M) broadcasting.

- **What is D2M Technology?**

- This technology is based on the convergence of broadband and broadcast, using which mobile phones can receive terrestrial digital TV.
- This would be similar to how people listen to FM radio on their phones, where a receiver within the phone can tap into the radio frequency.
- Using D2M, multimedia content can also be beamed to phones directly.

- **Benefit and need of D2M Technology**

- It allows video and other forms of multimedia content to be transmitted directly to mobile phones without the need for an Internet connection.
- It improves consumption of broadband and utilisation of spectrum.
- This technology can be used to directly broadcast content related to citizen-centric information.
- It can also be used to combat fake news, issue emergency alerts and provide assistance in disaster management.
- In addition, it can be used to broadcast live news, sports, etc. on mobile phones.

- **Government's initiative to facilitate D2M technology**

- The Department of Telecommunications (DoT) has constituted a committee to study the feasibility of a spectrum band to provide broadcast services live on users' smartphones.
- Band 526-582 MHz is envisaged to work in sync with both mobile and broadcast services.
- Currently, this band is used by the Ministry of Information and Broadcasting for TV transmitters across the country.