

2020



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SCIENCE & TECHNOLOGY

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BusinessLine



1. Indian Data Relay Satellite System (IDRSS)

Why in News?

India is planning to put up a new satellite series called the Indian Data Relay Satellite System (IDRSS).

- The IDRSS is planned **to track and be constantly in touch with Indian satellites**, in particular those in low-earth orbits (LEO) which have limited coverage of earth.

About IDRSS

- It will help Indian Space Research Organisation (ISRO) with advanced LEO missions such as space docking, space station, as well as distant expeditions to the moon, Mars and Venus.
 - At present, without data relay satellites, spacecrafts are not visible all the time.
- It will also be useful in monitoring launches.
- IDRSS satellites of the 2,000 kg class would be launched on the Geosynchronous Satellite Launch Vehicle (GSLV) to geostationary orbits (GEO) around 36,000 km (approx.) away.
 - A satellite in GEO covers a third of the earth below and therefore three satellites in GEO can provide total coverage.
- The first beneficiary would be the prospective crew members of the Gaganyaan mission of 2022.
 - With this, they can be fully and continuously in touch with mission control on ground throughout their travel.
- **Upcoming IDRSS:** Work on the two IDRSS satellites planned initially has begun:
 - The first will be sent towards the end of 2020, which will precede the pre-Gaganyaan experimental unmanned space flight.
 - A second one will follow in 2021.
 - Both will offer near total tracking, sending and receiving of information from the crew 24/7.
- **World Scenario:**
 - U.S. and Russia have their own relay satellite systems.
 - Currently, the U.S. is putting up its third-generation advanced fleet of Tracking & Data Relay Satellites (TDRS).
 - Russia has its Satellite Data Relay Network.
 - Europe is building its own European **Data Relay System**.
 - China is into its second generation **Tianlian II series**, which is its data relay satellite to provide data relay, measurement and control services for its manned spacecraft.

About LEO and GEO

- **Low Earth Orbit (LEO):**

- This orbit lies at an altitude between 160 km to 2000 km above the earth's surface.
- In LEO, the satellite's orbital period is smaller than the Earth's rotational period.
- LEO is the circular orbit in which Remote Sensing Satellites (RSS) are launched.
- Moreover, within LEO, high bandwidth communication can be experienced with low time lag.

- **Geosynchronous Earth Orbit (GEO):**

- GEO lies at the highest altitude of approximately 36000 km above the earth's equator.
- The orbital period is equal to the earth's rotational period around its axis, which allows satellites to match Earth's rotation.
- This position is a valuable spot for monitoring weather, communications and surveillance.
- Satellites in this orbit can be used for military and commercial purposes such as telephone, internet and television.
- It also ensures a stable connectivity.

2. New Facility to Tackle Cyber Crimes

Why in News?

Recently, Union Home Minister inaugurated the state-of-the-art **Indian Cyber Crime Coordination Centre (I4C) and National Cyber Crime Reporting Portal**.

Indian Cyber Crime Coordination Centre (I4C)

- The scheme to set up I4C was approved in October 2018, to deal with all types of cybercrimes in a comprehensive and coordinated manner.
- It has **seven components**:
 - National Cyber Crime Threat Analytics Unit
 - National Cyber Crime Reporting Portal
 - National Cyber Crime Training Centre
 - Cyber Crime Ecosystem Management Unit
 - National Cyber Crime Research and Innovation Centre
 - National Cyber Crime Forensic Laboratory Ecosystem

- Platform for Joint Cyber Crime Investigation Team.
- 15 States and Union Territories have given their consent to set up Regional Cyber Crime Coordination Centres.
- This state-of-the-art Centre is located in **New Delhi**.

National Cyber Crime Reporting Portal

- It is a citizen-centric initiative which will enable citizens to report cyber crimes online and all the complaints will be accessed by the concerned law enforcement agencies for taking action as per law.
 - The portal specifically focuses on crimes against women, children, particularly child pornography, child sex abuse material, online content pertaining to rapes/gang rapes, etc.
 - It also focuses on crimes like financial crime and social media related crimes like stalking, cyberbullying, etc.
- The portal was launched on a pilot basis in August 2019.
- So far, more than 700 police districts and more than 3,900 police stations have been connected with this Portal.
- After successful completion, this portal can improve the capacity of the law enforcement agencies to investigate the cases by improving coordination amongst the law enforcement agencies of different States, districts and police stations.

3. Global Drosophila

Why in News?

The fifth edition of the Asia Pacific Drosophila Research Conference (APDRC5) commenced in Pune, Maharashtra on January 6 for a period of five days.

- The conference is being organised in the country for the first time by the Indian Institute of Science Education and Research (IISER).

Key Points:

- It is a biennial conference and it aims to promote the interaction of Drosophila researchers in the Asia-Pacific region with their peers in the rest of the world.
- Two Nobel laureates, professors Eric Wieschaus and Michael Rosbash, attended the conference.

Drosophila

- Drosophila is derived from the **Greek** word *drósos* which means dew loving.

- These belong to the Drosophilidae family and are most frequently known as fruit flies or vinegar, wine or pomace flies.
- Their main distinguishing characteristic is that they stay on ripe or rotten fruits.
- Drosophila is one of the most widely-used and preferred model organisms in biological research across the world for the last 100 years.

Indian Institute of Science Education and Research System

- It is a network of institutions devoted to science education and research.
- These were set up on the recommendations of the Scientific Advisory Council to the Prime Minister under the chairmanship of Professor C.N.R. Rao.
- There are seven such institutes in:
 - Bhopal
 - Kolkata
 - Mohali
 - Pune
 - Thiruvananthapuram
 - Tirupati
 - Berhampur
- Aim:
 - They are high calibre research centres, where teaching and education in the basic sciences is integrated with state-of-the-art research.

4. Coronaviruses

Why in News?

A new virus has been identified by Chinese researchers- responsible for a new pneumonia-like illness in Wuhan, China since last month.

- The researchers described the infectious agent as a “coronavirus”.

Coronaviruses

- Coronaviruses are a specific family of viruses causing the common cold, respiratory and intestinal diseases.
- The regularly arranged protrusions on the surface of virus-particle gives it a look like an emperor’s crown, hence the name “coronavirus”.
- Human coronaviruses were first identified in the mid-1960s.
- Coronavirus antibodies do not last for a very long time; a person can catch the virus again within months.
- There are currently no vaccines available against human coronavirus infection.

- **Transmission:** Communicable through Coughing and sneezing; close personal contact, such as touching or shaking hands.
- **Coronaviruses-**
 - **Middle East Respiratory Syndrome (MERS)**
 - MERS was first reported in Saudi Arabia in 2012.
 - It is caused by a coronavirus called Middle East Respiratory Syndrome Coronavirus (MERS-CoV).
 - **Severe Acute Respiratory Syndrome (SARS)**
 - SARS coronavirus (SARS-CoV) was identified in 2003.
 - It first infected humans in China in 2002.

5. TOI 700 d

Why in News?

Recently, **National Aeronautics and Space Administration (NASA)** reported the discovery of an Earth-size planet, named **TOI 700 d**.

- The planet was found by NASA's **Transiting Exoplanet Survey Satellite (TESS) mission**, which it launched in 2018.
- With TOI 700 d, TESS has discovered its first Earth-size planet in its star's TOI 700, habitable zone or '**Goldilocks zone**'.
- The find was confirmed by the **Spitzer Space Telescope**, which sharpened the measurements that TESS had made, such as orbital period and size.

About TOI 700 d

- TOI 700 d is the **outermost planet**, and the only one in the star's (TOI 700) habitable zone. It is **20% larger than Earth**.
- It orbits its star once every 37 days and receives an amount of energy that is equivalent to 86% of the energy that the Sun provides to Earth.
- The star, TOI 700, is an "**M dwarf**" located just over 100 light-years away in the southern constellation Dorado.
- It is roughly 40% of our Sun's mass and size, and has about half its surface temperature.

Goldilocks Zone

- A habitable zone, also called the "Goldilocks Zone", is the area around a star where it is not too hot and not too cold for liquid water to exist on the surface of surrounding planets.
- Earth is in the Sun's Goldilocks zone. If Earth were where the dwarf planet Pluto is, all its water would freeze; on the other hand, if Earth were where Mercury is, all its water would evaporate.

M-dwarf Star

- M dwarf or M-type star, also called Red Dwarf Star, are the most numerous type of star in the universe and the smallest type of hydrogen-burning star.
- These have masses from about 0.08 to 0.6 times that of the Sun.
- In the Milky Way Galaxy, about three-fourths of the stars are red dwarfs.

6. The Chinese Paddlefish (*Psephurus gladius*)

Why in News?

The Chinese paddlefish, one of the largest freshwater fish, has been declared extinct in a recent study. Once declared extinct, a species is not eligible for protective measures and conservation funding; therefore, the declaration has significant consequences.

The Chinese Paddlefish

- It is a part of an ancient group of fish known to have existed since the Lower Jurassic, 200 million years ago.
- **Habitat:** Yangtze River basin.

Reasons for Extinction

- Habitat Fragmentation due to construction of dam.
- Overfishing

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