

2019



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SCIENCE & TECHNOLOGY

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BusinessLine



1. Solar Eclipse in India

Why in News?

An annular **solar eclipse** occurred on December 26th, 2019.

- **Cheruvathur** in Kerala became the first place in India where solar eclipse was visible.

Solar Eclipse

- Solar Eclipse occurs when the **Sun, Moon and Earth all fall in the same line** so that the Moon passes between Earth and the Sun, leaving a moving region of shadow on Earth's surface.

Annular Solar Eclipse - It occurs when the sun is covered in such a manner that only a small ring-like sliver of light is seen from the sun's disc. This ring is known as the **ring of fire**.

- An annular eclipse happens when the moon is farthest from Earth. As the moon is farther away from Earth, it seems smaller and is unable to block the entire view of the sun, because of which the ring-like structure could be observed.
- In India, the annularity phases was visible within a narrow path including the southern Indian peninsula:
 - Karnataka
 - Kerala
 - Tamil Nadu

2. BrahMos Missile

Why in News?

The Defence Research and Development Organisation (DRDO) carried out two successful tests of the latest variant of the BrahMos missile, one from the land and the other from air. The first version of the BrahMos supersonic cruise missile was inducted into the Indian Navy in 2005.

BRAHMOS

- BRAHMOS is a **joint venture** between the Defence Research and Development Organisation of (DRDO) India and the NPOM of **Russia**.
- BrahMos is named on the rivers Brahmaputra and Moskva.
- It is a two-stage (solid propellant engine in the first stage and liquid ramjet in second) supersonic cruise missile with a flight range of around 300 km.
- BrahMos is one of the fastest cruise missiles currently operationally deployed with speed of Mach 2.8.

- BrahMos is the heaviest weapon to be deployed on Su-30 MKI fighter aircraft, with a weight of 2.5 tonnes.
- BrahMos is a **multiplatform** i.e. it can be launched from land, air, and sea and multi capability missile with pinpoint accuracy that works in both day and night irrespective of the weather conditions.
- It **operates** on the "**Fire and Forgets**" **principle** i.e. it does not require further guidance after launch.
- BrahMos missiles are equipped with stealth technology and guidance system with advanced embedded software.

3. US Space Force

Why in News?

United States President has signed the **2020 National Defense Authorisation Act**, authorising the establishment of US Space Force (USSF).

- China and Russia have criticised US of turning the cosmos into a battlefield and pursuing the weaponisation of outer space.

About US Space Force

- Space Force would become the **youngest US military branch**, and the first new service since the establishment of the US Air Force back in 1947.
- The Space Force would be part of the **Department of the Air Force**.
- The Space Force will be the **sixth formal force of the U.S. military**, after the Army, Air Force, Navy, Marines, and Coast Guard.
- It will be comprised of about 16,000 air force and civilian personnel, some already taking part in the **Space Command**- established earlier this year as the overseer of military space operations.
- It is not designed or intended to put combat troops in space.
- **Objectives:**
 - Maintaining and enhancing the competitive edge of the Department of Defense (DOD) in space.
 - Developing military space professionals, acquiring military space systems, maturing the military doctrine for space power and organising space forces, etc.
 - Protecting US assets such as the hundreds of satellites used for communication and surveillance.

The Space Race

- Major world powers have used space for military purposes such as communication or surveillance for many years.
- During the Cold War, the US and the Soviet Union were not actually fighting in space, but did use satellites to spy on each other.

- The creation of a US space force may in part be a response to Chinese and Russian satellite and missile programmes that are now producing results.
 - The number of Chinese military satellites deployed in space has been increasing and Russia has rebuilt its own military satellites.
 - In 2007, China tested an anti-satellite missile that destroyed its own weather satellite orbiting the globe at a height of 500 miles.

4. SnowEx Programme

Why in News?

NASA has launched a seasonal campaign- part of a five-year programme called SnowEx, which was initiated in 2016-17.

- The aim is to better understand how much water is contained in each winter's snowfall and how much will be available when it melts in the spring.

About SnowEx Programme

- The geographical focus of SnowEx is **North America**.
- NASA's overall target is optimal strategies for mapping global snow water equivalent (SWE) with remote sensing and models leading to a Decadal Survey "Earth System Explorer" mission.
- Within its geographic range, SnowEx assesses where snow has fallen, how much there is and how its characteristics change as it melts.
- The programme is important as around 1.2 billion people, or nearly one-sixth of the world, depend on seasonal snow and glaciers for their water supply.



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