Hubble Space Telescope

Why in News

NASA has **returned the science instruments on the Hubble Space Telescope (HST) to operational status**, almost a month after suspending their work due to trouble with its payload computer.

Key Points

- **About:**
  - It is **named after the astronomer Edwin Hubble.**
  - The observatory is the **first major optical telescope** to be placed in space and has made groundbreaking discoveries in the field of astronomy since its launch (into **Low Earth orbit** in 1990).
    - It is said to be the “most significant advance in astronomy since **Galileo’s telescope.”**
  - It is a part of **NASA's Great Observatories Program** - a family of four space-based observatories, each observing the Universe in a different kind of light.
    - The other missions in the program include the visible-light Spitzer Space Telescope**, Compton Gamma-Ray Observatory (CGRO)**, and the Chandra X-Ray Observatory (CXO)**.**
- **Large and Versatile:**
  - It is larger than a school bus in size (13.3 meters), and has a 7.9 feet mirror.
  - It **captures images of deep space** playing a major role in helping astronomers understand the universe by observing the most distant stars, galaxies and planets.
- **Data Open to People:**
  - NASA also allows **anyone from the public to search the Hubble database for which new galaxy it captured**, what unusual did it notice about our stars, solar system and planets and what patterns of ionised gases it observed, on any specific day.
- **Important Contribution of HST:**
  - **Expansion of the Universe was accelerating (1990s)**, this in turn led to a conclusion that most of the cosmos was made up of mystery **"stuff" called** dark energy**.**
  - **Snapshot of Southern Ring Nebula (1995)**, it showed two stars, a bright white star and a fainter dull star at the centre of the nebula where the dull star was indeed creating the whole **nebula**.
  - **Collusion of two dwarf galaxies (1998)** one of which is I Zwicky 18. This led to the **formation of a new Star.**
  - **Colourful patterns of gases** in a black hole powered galaxy known as the **‘Circinus Galaxy’(1999).**
  - **Collision between two galaxies UGC 06471 and UGC 06472** (2000).
  - **Snapshot of Neptune** (2011): The image of the most distant planet revealed the

formation of high-altitude clouds composed of methane ice crystals.
    - The **disc surrounding a star 'Beta Pictoris'**, which was discovered in 1984, was found to be constituted by two planets, light-scattering dust and debris in 2012.
    - It **captured the 'Galaxy Cluster Abell 2744'** in 2013. It is 3.5 billion light-years away and has several clusters of small galaxies in it.
        - It also poses a strong gravitational field which acts as a lens to reflect the light of almost 3,000 background galaxies.
    - Captured **an encounter of a** comet **named C/2013 A1 with Mars in 2014.**
        - The **'Comet Siding Spring'** passed with a distance of just 87,000 miles to that of Mars.
    - The **'Gum 29', a vibrant stellar** being ground, which is 20,000 light-years away, consisting of a giant cluster of 3,000 stars was captured in 2014.
        - This behemoth cluster of stars is called **'Westerlund 2'.**
    - Captured the **disintegration of an ancient comet 332P/Ikeya-Murakami** in 2016.
    - The **Triangulum Galaxy was snapped** depicting the specific areas of star birth with a bright blue light spreading across the galaxy in beautiful nebulas of hot gas in 2017.
    - Picture of **'Galaxy ESO 243-49**, which had a **medium-sized black hole** in 2012.
        - The 20,000 suns sized black hole was positioned on a glacial plane of the galaxy.
- **Successor of HST:**
    - A successor to Hubble, the **James Webb Space Telescope (JWST)**, is scheduled to launch later this year.
    - But many astronomers hope that the two will be able to operate alongside each other - at least for some period of time.

James Webb Space Telescope

- The James Webb Space Telescope (also called JWST or Webb) will be a large infrared telescope with a 6.5-meter primary mirror.
- The telescope will be launched on an Ariane 5 rocket from French Guiana in 2021.
- It will study every phase in the history of our Universe, ranging from the first luminous glows after the Big Bang, to the formation of solar systems capable of supporting life on planets like Earth, to the evolution of our own Solar System.
- Webb is an **international collaboration between NASA, the European Space Agency (ESA), and the Canadian Space Agency (CSA).**

Source: IE