EnVision Mission to Venus: European Space Agency

Why in News

Recently, **European Space Agency (ESA)** has announced a new mission- **EnVision mission** to Venus**.**

Key Points

- **About:**
  - It is an European Space Agency (ESA) led mission with contributions from the **National Aeronautics and Space Administration (NASA).**
  - It is likely **to be launched sometime in the 2030s.** Once launched on an Ariane 6 rocket, the spacecraft will take about 15 months to reach Venus and will take 16 more months to achieve orbit circularisation.
- **Aim:**
  - The mission will carry a range of instruments to study the **planet's atmosphere and surface, monitor trace gases in the atmosphere** and **analyse its surface composition.**
- **Significance:**
  - EnVision will follow another ESA-led mission to Venus called **'Venus Express' (2005-2014)** that **focussed on atmospheric research and pointed to volcanic hotspots** on the planet's surface.
- **Other Missions:**
  - **US:**
    - NASA has announced two new robotic missions to Venus - **DAVINCI+ and VERITAS**. It will be launched between 2028-2030.
    - Mariner series 1962-1974, Pioneer Venus 1 and Pioneer Venus 2 in 1978, Magellan in 1989.
  - **Russia:**
    - **Venera** series of space crafts 1967-1983, **Vegas** 1 and 2 in 1985.
  - **Japan:**
    - **Akatsuki spacecraft** has been studying the planet's atmosphere since 2015.
- **Indian Initiative:**
  - India plans to launch a new orbiter named **Shukrayaan to Venus in 2024.**
- **Importance of Studying Venus:**
  - It will help to learn **how Earth-like planets evolve** and what conditions exist on Earth-sized **exoplanets** (planets that orbit a star other than our sun).
  - It will help in **modelling Earth's climate,** and serves as a cautionary tale on how dramatically a planet's climate can change.

- Scientists speculate about the existence of life on Venus in its distant past and the **possibility that life may exist** in the top layers of its clouds where temperatures are less extreme.
    - In 2020, scientists detected the **presence of phosphine** (a chemical produced only through biological processes) in the atmosphere of Venus.

DAVINCI+

- DAVINCI+ is short for **'Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging'** and is the first US-led mission to the planet's atmosphere since 1978.
- It will try to **understand Venus' composition** to see how the planet formed and evolved.
- This mission also consists of a descent sphere that will **pass through the planet's thick atmosphere** and make observations and take measurements of noble gases and other elements.
- It will also try to return the first high resolution photographs of a geological feature-**tesserae.**
    - **Tesserae** may be comparable to Earth's continents. The presence of tesseraes may suggest that Venus has tectonic plates like Earth.

VERITAS

- VERITAS is short for **'Venus Emissivity, Radio Science, InSAR, Topography, and Spectroscopy'** and will map the planet's surface to determine its geologic history and understand the reasons why it developed so differently from Earth.
- It will orbit Venus with a radar that will help to create a three dimensional reconstruction of its topography which might be able to confirm if processes such as plate tectonics and volcanism are still active there.
- This mission will also map the emissions from Venus's surface that may help in determining the type of rocks that exist on Venus.
- It will also determine if active volcanoes are releasing water vapour into the atmosphere.

Source: IE