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NASA's New Spacecraft: NEA Scout

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Why in News

Recently, **National Aeronautics and Space Administration (NASA)** has announced that its new spacecraft, named **Near-Earth Asteroid Scout or NEA Scout**, has completed all required tests and has been safely tucked inside the **Space Launch System (SLS) rocket**.

Key Points

- **About NEA Scout:**

- Near-Earth Asteroid Scout, or NEA Scout, is a **miniaturized spacecraft**, known as a **CubeSat**, developed under **NASA's Advanced Exploration Systems (AES) Program**.
 - AES pioneers new approaches for rapidly developing prototype systems, demonstrating key capabilities, and validating operational concepts for future human missions beyond **low-Earth orbit**.
- Its **main mission** is to fly by and collect data from a **near-Earth asteroid**.
 - It will take about **two years to cruise to the asteroid** and will be about **93 million miles away from Earth** during the asteroid encounter.
- It will also be **America's first interplanetary mission** using a **special solar sail propulsion**.
 - So far, **spacecraft have been using solar energy to power them** and execute critical functions.
 - This will be the **first time that a spacecraft uses it as wind to generate thrust and move forward**.
- It is **one of several payloads** that will hitch a ride on **Artemis I**, which is expected to be launched in **November, 2021**.
 - **Artemis I** will be an **uncrewed testflight** of the **Orion spacecraft and SLS rocket**.
 - It is the first in a series of increasingly complex missions that will enable human exploration to the Moon and Mars.
- NEA Scout **launches to the Moon in 2021 with a fleet of other small satellites aboard Artemis 1**.
 - At the Moon, NEA Scout will deploy its 86-square-meter solar sail and slowly spiral out of lunar orbit.
 - It will travel to a near-Earth asteroid and perform a slow fly-by, capturing up-close images of the surface.

- **Significance:**

- The images gathered by NEA Scout will **provide critical information** on the asteroid's physical properties such as orbit, shape, volume, rotation, the dust and debris field surrounding it, plus its surface properties.
- The spacecraft **will pave the way for the Solar Cruiser**, which will use a sail 16 times larger when it flies in 2025.
- **Studying Near-Earth asteroids can help in developing strategies for reducing the potential damage** caused in the event of an impact.
- Data can be used to determine what is required to **reduce risk, increase effectiveness, and improve the design and operations of robotic and human space exploration**.

- **Near-Earth Objects (NEOs):**

- NEOs are **comets and asteroids** pushed by the gravitational attraction of nearby planets into orbits which allow them to enter the Earth's neighbourhood.
- These objects are **composed mostly of water ice with embedded dust particles.**
- NEOs occasionally approach close to the **Earth as they orbit the Sun.**
- NASA's **Center for Near-Earth Object Study (CNEOS)** determines the time and distances of these objects, when their approach to the Earth is close, through the **Asteroid Watch Widget.**

Asteroids

- These are **rocky objects that orbit the Sun**, much smaller than planets. They are also called minor planets.
- According to NASA, **9,94,383 is the count of known asteroids**, the remnants from the formation of the solar system over 4.6 billion years ago.
- Asteroids are divided into three classes:
 - **First**, those found in the **main asteroid belt between Mars and Jupiter**, which is estimated to contain somewhere between 1.1-1.9 million asteroids.
 - The **second group** is that of **trojans**, which are asteroids that share an orbit with a larger planet.
 - The third classification is **Near-Earth Asteroids (NEA)**, which have orbits that pass close to the Earth. Those that **cross the Earth's orbit are called Earth-crossers.**
 - More than 10,000 such asteroids are known, out of which over 1,400 are classified as **Potentially Hazardous Asteroids (PHAs).**
 - **PHAs** are currently defined based on parameters that measure the asteroid's potential to make threatening close approaches to the Earth.
 - Specifically, all asteroids with an Earth Minimum Orbit Intersection Distance (MOID) of 0.05 au or less and an absolute magnitude (H) of 22.0 or less are considered PHAs.

Source: IE