

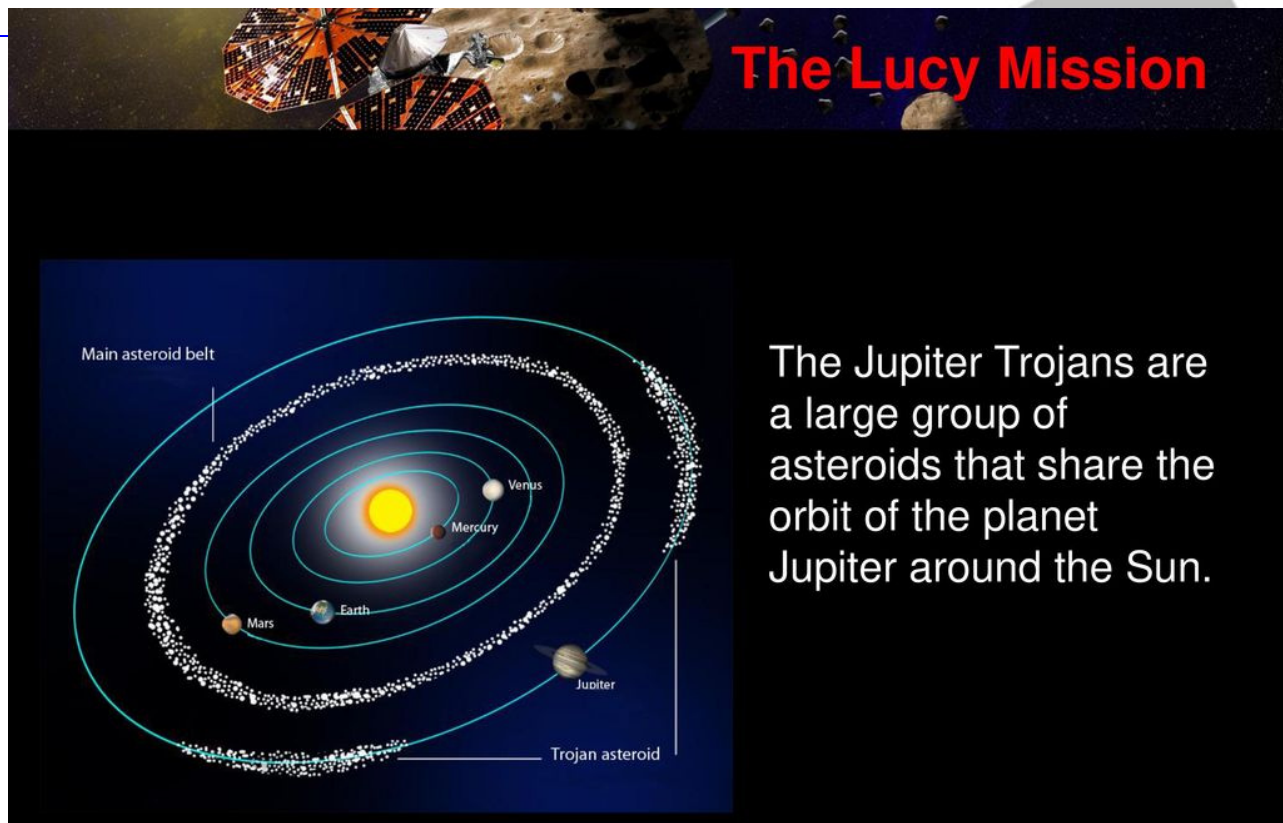


# Mission Lucy: NASA

## Why in News

[National Aeronautics and Space Administration \(NASA\)](#) is set to launch 'Lucy', its first mission to explore the [Jupiter Trojan Asteroids](#).

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## Key Notes

### ▪ Mission Lucy:

#### ◦ Duration:

- The **solar-powered mission is estimated to be over 12 years long**, during which the spacecraft will visit **eight asteroids covering a distance of about 6.3 billion km** to deepen the understanding of the “young solar system”.

#### ◦ Name and Launch:

- The mission is **named after 'Lucy', a 3.2 million-year-old ancestor** who belonged to a species of **hominins** (which include humans and their ancestors). The spacecraft will be **launched on an Atlas V 401 rocket**.

- **Asteroid Donald Johnson:**

- The spacecraft's first encounter will be with an asteroid that lies in the main belt that can be found between **Mars and Jupiter**. This asteroid is named '**Donald Johnson**' after the paleoanthropologist who discovered the fossilised remains of 'Lucy'.

- **Significance:**

- The Trojan asteroids are believed to be **formed from the same material that led to the formation of planets nearly 4 billion years ago** when the solar system was formed.
- Therefore, the mission is designed to **understand the composition of the diverse asteroids** that are a part of the Trojan asteroid swarms, to **determine the mass and densities of the materials** and to look for and study the satellites and rings that may orbit the Trojan asteroids.
- Studying them will **help scientists understand its origins and evolution**, and why it looks the way it does.

## Asteroids

- **About:**

- Asteroids are **rocky objects that orbit the Sun**, much smaller than planets. They are also **called minor planets**.

- **Categories:**

- **Main Belt of Asteroids:**

- First, those found in the **main asteroid belt, between Mars and Jupiter**. This region is estimated to contain somewhere between 1.1-1.9 million asteroids.

- **Trojan:**

- The second group is that of **trojans** (the name comes from Greek mythology), which are asteroids that **share an orbit with a larger planet**.
- NASA reports the presence of **Jupiter, Neptune and Mars trojans**. In 2011, they reported an Earth trojan as well.
- The Jupiter asteroids can be found in what are referred to as **"swarms" that lead and follow the planet Jupiter along its orbit around the Sun**.

- 'Lucy' will reach the first swarm of these asteroids that precede Jupiter by August 2027.

- These asteroids are believed to be the **remnants of the early solar system**.

- **Near-Earth Asteroids:**

- The third classification of asteroids is under **Near-Earth Asteroids (NEA)**, which has **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, of which over 1,400 are classified as **[Potentially Hazardous Asteroids \(PHAs\)](#)**.

## Jupiter

- Fifth in line from the Sun, Jupiter is, by far, the **largest planet in the solar system** - more than twice as massive as all the other planets combined.
  - **Jupiter, Saturn, Uranus and Neptune are called Jovian or Gas Giant Planets**. These have thick atmospheres, mostly of helium and hydrogen.
- Jupiter **rotates once about every 10 hours** (a Jovian day), but takes about 12 Earth years to complete one orbit of the Sun (a Jovian year). Jupiter has more than 75 moons.

- The major moons of Jupiter are named **Io, Europa, Ganymede, and Callisto**, which are each distinctive worlds.
- In 1979, the **Voyager mission discovered Jupiter's faint ring system. Nine spacecraft have visited Jupiter.** Seven flew by and two have orbited the gas giant. **Juno**, the most recent, arrived at Jupiter in 2016.

**Source: IE**

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