

NASA AIM Spacecraft [UPSC Notes]

NASA's AIM mission has come to an end due to battery failure, after more than 15 years of observation of the rarest and highest clouds in our atmosphere. In this context, know what is the AIM of NASA, what was its purpose and components, and other details, for the [IAS exam](#) GS-3 Science & Technology segment.

What is the AIM Spacecraft Mission?

The AIM (Aeronomy of Ice in the Mesosphere) spacecraft is a NASA mission that was launched on April 25, 2007, to study noctilucent clouds and the mesosphere.

- The mesosphere is the layer of the Earth's atmosphere that is located between 50 and 85 kilometres above the Earth's surface.
- It is a region that is not well understood, and the AIM spacecraft was designed to study the dynamics and composition of this region.

Read more on the [composition and layers of the atmosphere](#) in the linked article.

Noctilucent Clouds

- Noctilucent clouds, also known as polar mesospheric clouds (PMCs), are thin and wispy clouds that form at high altitudes in the mesosphere during the summertime in the polar regions.
- They are the highest clouds in the Earth's atmosphere, and they are composed of ice crystals. These clouds are of interest to scientists because they can help to understand the connections between the Earth's atmosphere and the space environment.

Components of AIM Spacecraft

The AIM spacecraft is equipped with three instruments that allow it to study noctilucent clouds and the mesosphere.

- The first instrument is the Cloud Imaging and Particle Size (CIPS) instrument, which takes high-resolution images of the clouds and measures their particle size.
- The second instrument is the Cosmic Dust Experiment (CDE), which measures the amount and size distribution of micrometeoroids in the mesosphere.
- The third instrument is the Solar Occultation for Ice Experiment (SOFIE), which measures the composition and temperature of the mesosphere.

Key scientific discoveries:

- The formation of noctilucent clouds has been steadily increasing since the past decade.
- Global warming consequences such as a rise in water vapour, [greenhouse gas](#) and decreasing upper-atmosphere temperatures, may be contributing to the increased presence of PMCs.
- When meteors burn up in Earth's atmosphere, ice crystals in noctilucent clouds form on tiny micro particles.
- Track heat movement in the upper atmosphere, showing that heating in the mesosphere is more likely linked to heat circulation in the atmosphere rather than direct heating from the sun.
- The AIM spacecraft has been a highly successful mission, providing scientists with unprecedented information about the mesosphere and noctilucent clouds.
- It has provided valuable insights into the connections between the Earth's atmosphere and the space environment and has helped to improve our understanding of the dynamics of the mesosphere.

