



ALMA Telescope

Why in News?

The **Atacama Large Millimetre/submillimetre Array (ALMA)** is a [radio telescope](#) located in the **Atacama Desert of northern Chile**. It is set to receive software and hardware upgrades.

- The upgrades will enable ALMA to collect more data and **produce sharper images**.

What is ALMA?

▪ About:

- ALMA is a **state-of-the-art telescope** that studies celestial objects at **millimetre and submillimetre wavelengths** — they can penetrate through dust clouds and help astronomers examine dim and distant galaxies and stars out there.
- ALMA is an international partnership of the **European Southern Observatory (ESO)**, the **U.S. National Science Foundation (NSF)** and the **National Institutes of Natural Sciences (NINS) of Japan**, together with NRC (Canada), MOST and ASIAA (Taiwan), and KASI (Republic of Korea), in cooperation with the Republic of Chile.

▪ Properties:

- It also has **extraordinary sensitivity**, which allows it to detect even extremely faint radio signals.
- Each of its **66 antennas is equipped with a set of receivers** that are designed to detect **specific ranges of wavelengths on the electromagnetic spectrum**.
- To combine the data collected by each antenna into a single image, **ALMA uses a correlator**.
 - The correlator is a **powerful supercomputer** that processes the vast amounts of data collected by the antennas and creates detailed images of celestial objects with exceptional resolution.
 - This technology allows astronomers to study distant galaxies, stars, and other celestial bodies with a level of detail never before possible.

▪ Discoveries Made by ALMA:

- In 2013, ALMA discovered [starburst galaxies](#) that existed earlier in the universe's history than previously thought.
- ALMA also provided detailed images of a protoplanetary disc around a young star, **HL Tauri, in 2014**, which challenged existing theories about planetary formation.
- In 2015, the telescope helped scientists observe the [Einstein ring phenomenon](#), where light from a galaxy or star passes by a massive object on its way to Earth.

Why is ALMA located in Chile's Atacama Desert?

- It is situated at an **altitude of 16,570 feet (5,050 metres)** above sea level on the Chajnantor plateau in **Chile's Atacama Desert** as the **millimetre and submillimetre waves** observed by it are very **susceptible to atmospheric water vapour absorption** on Earth.
- Moreover, the **desert is the driest place in the world**, meaning most of the nights here are clear of clouds and free of light-distorting moisture — making it a perfect location for examining the universe.

[Source: IE](#)

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