

## Thirty Meter Telescope (TMT)

The Thirty Meter Telescope is a new class of extremely large telescopes that will allow us to see deeper into space and observe cosmic objects with unprecedented sensitivity.

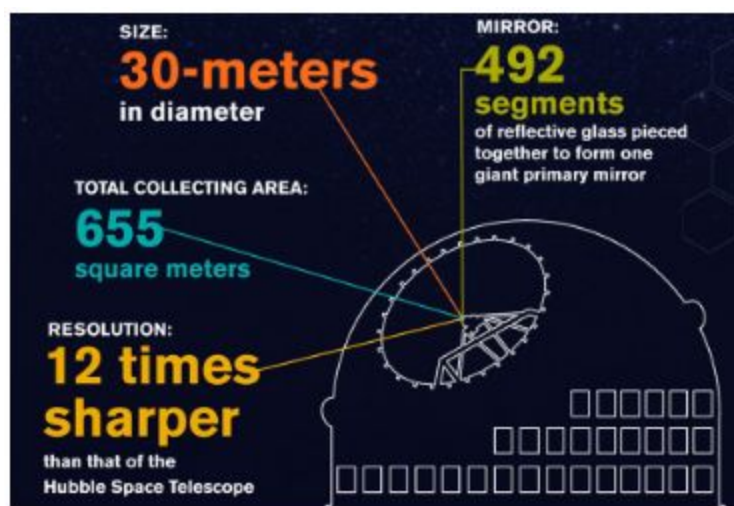
Given below in the table, is some important information regarding the Thirty Meter Telescope Project:

Thirty Meter Telescope - Key Points	
<b>Location **</b>	Mauna Kea Observatory in Hawaii, United States
<b>Organization</b>	TMT International Observatory
<b>Diameter</b>	30 m
<b>Collecting area</b>	655 m <sup>2</sup>
<b>Countries Involved</b>	India, China, Japan, Canada, US
<b>First Light (Approximately)</b>	July 2027

\*\* In 2020, many proposals have been made to change the location of the Thirty Meter Telescope (TMT) from Mauna Kea to an alternative site. This reason for this is that it is considered sacred to indigenous Hawaiians, and also has many observatories in that region.

Also Read, [UPSC Comprehensive News Analysis - January 22, 2020](#)

### What is the Thirty Meter Telescope?



- This project is expected to create one of the largest visible-light telescope in the world, which would have a 30 m prime mirror diameter, three times more wide and with nine times more area than the current largest telescope
- The telescope will open a wider range of opportunities for people studying and researching on astrophysics
- A non profit organisations, TMT International Observatory LLC (TIO) was established to manage the construction, maintenance, and operation of the telescope
- It will produce 12 times sharper images than the Hubble Space Telescope, which is the largest and most versatile telescope in the world till date

## About Mauna Kea

Mauna Kea is a dormant volcano on the island of Hawaii, United States. The Mauna Kea Observatories (MKO) are a number of independent astronomical research facilities and large telescope observatories, which are located on this island.

This site is said to be appropriate for the project because of its dark skies, lack of light pollution, high elevation position, and good astronomical seeing.

### Observatorio del Roque de los Muchachos (ORM) - Another Suitable Site

Because of the conflict for the confirmation of TMT site, Observatorio del Roque de los Muchachos (ORM) on La Palma in the Canary Islands, Spain, is another location which can be explored for this project.

Related Links	
<a href="#">Giant Metrewave Radiowave Telescope</a>	<a href="#">Astrosat satellite - Mission on Astronomy</a>
<a href="#">Indian Space Research Organisation (ISRO)</a>	<a href="#">List Of Space Centres &amp; Indian Space Agencies</a>
<a href="#">Science, Technology and Innovation Policy (STIP)</a>	<a href="#">Cosmos - New Dimensions: RSTV - In Depth</a>

## Organisations Involved in Building the Thirty Meter Telescope (TMT)

A total of 8 organisations from different parts of the world are a part of the construction of the Thirty Meter Telescope. Discuss bed below are the same:

1. **Caltech, California Institute of Technology**
  - It is one of the world's major research organisations
  - The Caltech faculty and alumni have been awarded with 32 Nobel Prizes, since 1932
2. **Department of Science and Technology, India**
  - The department was established in May 1971 with an aim to promote Science and Technology and promote it for the development of the country

### **3. National Astronomical Observatories of the Chinese Academy of Sciences**

- The Chinese Academy of Sciences (CAS) comprises of a comprehensive research and development network
- It was found in 2001 and brings together scientists and engineers from China and around the world to address both theoretical and applied problems using world-class scientific and management approaches

### **4. National Institutes of Natural Sciences/National Astronomical Observatory of Japan**

- These two organisations form the core of research and development in Japan

### **5. National Research Council, Canada**

- It is the Canada Government's premier organisation for research and development

### **6. University of California**

### **7. Gordon and Betty Moore Foundation**

- It is an Observer and not a Full time member of the TMT International Observatory

### **8. Association of Universities for Research in Astronomy (AURA)**

- It is a consortium of 39 US institutions and 6 international affiliates that operates world-class astronomical observatories
- It is an Associate Member of TMT International Observatory's governing board since 2014

Of all the Member Organisations stated above, AURA and Gordon and Betty Moore Foundation are the only members which are not Full time members.

## **Significance of Thirty Meter Telescope**

- This telescope will help people explore deep into space and act as a tool to answer the various questions based on astronomy
- It will help scientists detect black holes which may be residing in far-off galaxies
- Once the project is successful, and the installation and working of TMT starts, it may even increase the knowledge of scientists about the formation of planets and other celestial objects

A lot about the evolution of the Universe can be studied and researched through the Thirty Meter Telescope.

Candidates can also prepare themselves with the best [Science and Technology Notes for UPSC](#), at the linked article.

## **Challenges & Issues with TMT**

The \$2 billion project has had its share of protests and challenges even before its installation.

Discussed below are a few important issues with the Thirty Meter Telescope:

- Although the Supreme Court of Hawaii had approved the construction of the telescope in 2018, the progress was obstructed twice once before the judgement of the court in 2015, and once after the judgement in 2019

- In 2019, the scientist at the site was were allowed access to the other telescope facilities in Mauna Kea
- The project is already delayed by a time span of 5 years
- The delay in the project, has also affected the manufacturing and production
- With the issues regarding the installation and construction of TMT in Mauna Kea, finding another suitable site for its construction is another hindrance for the project

## India and Thirty Meter Telescope

- India is proposed to give \$200 million for the project which is about one-tenth of the entire project cost
- Both, the Department of Atomic Energy, and the Department of Department of Science and Technology shall be working together on this project
- Other Indian Institutions included in the TMT project include:
  - Inter-University Centre for Astronomy and Astrophysics, Pune
  - Indian Institute of Astrophysics, Bangalore
  - Aryabhata Research Institute of Observational Sciences, Nainital
- The telescope sensors, actuators and its mechanical support structure are to be created by the Indian organisations
- Also, a total of 492 mirrors are to be added in the telescope, of these, 83 are to be contributed by India

Other Related Links	
<a href="#">Government Exams</a>	<a href="#">Militarisation Of Space</a>
<a href="#">UPSC MCQ On Science &amp; Technology</a>	<a href="#">List of Government Schemes in India</a>
<a href="#">Indian National Space Promotion and Authorisation Centre (IN-SPACe)</a>	<a href="#">Current Affairs Quiz</a>