## Thirty Meter Telescope (TMT) project

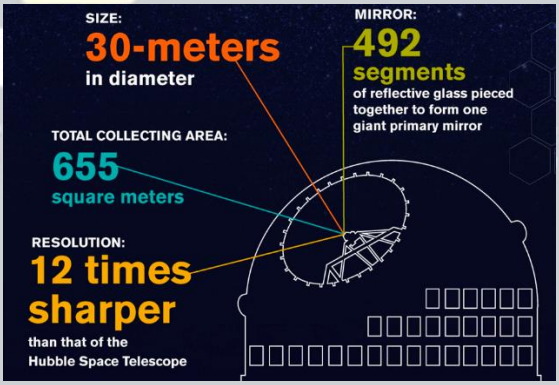
- In a signal of renewed enthusiasm for a global scientific project, an official delegation from the Department of Science and Technology visited Mauna Kea, an inactive volcano on the island of Hawaii in the U.S., to discuss "challenges" to the Thirty Meter Telescope (TMT) project, a press release said.
- The TMT has been conceived as a 30-meter diameter primary mirror optical and infrared telescope that will enable observations into deep space.
- It is proposed as a joint collaboration involving institutions in the U.S., Japan, China, Canada, and India. Indian participation in the project was approved by the Union Cabinet in 2014.
- India expects to be a major contributor to the project and will provide hardware worth $200 million. Mauna Kea hosts multiple telescopes.

## Maunakea

- Maunakea is a truly unique place.
- The clarity and stability of the atmosphere above Maunakea allows incredibly detailed visual observations of the night sky. It is one of the best places on earth for TMT to capture the precise data needed to test fundamental theories of physics and detect the faint signatures of life on far-off worlds.

## The Thirty Meter Telescope (TMT)

- The Thirty Meter Telescope (TMT) is a planned extremely large telescope (ELT) that has become controversial due to its location on Mauna Kea, on the island of Hawai'i.
- The TMT would become the largest visible-light telescope on Mauna Kea.



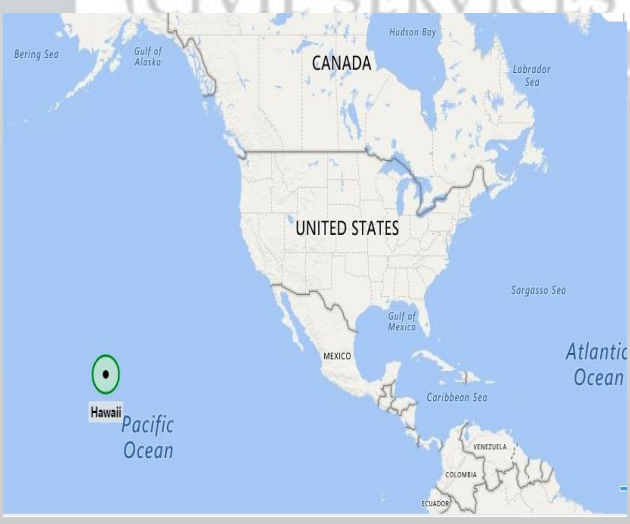

## TMT's Science and Technology

TMT is an extraordinary international scientific endeavor that will

**revolutionize our understanding of the universe and our place within it. Its unprecedented design will feature unique capabilities for the exploration of black holes, dark matter, and the possibility of life outside the solar system.**

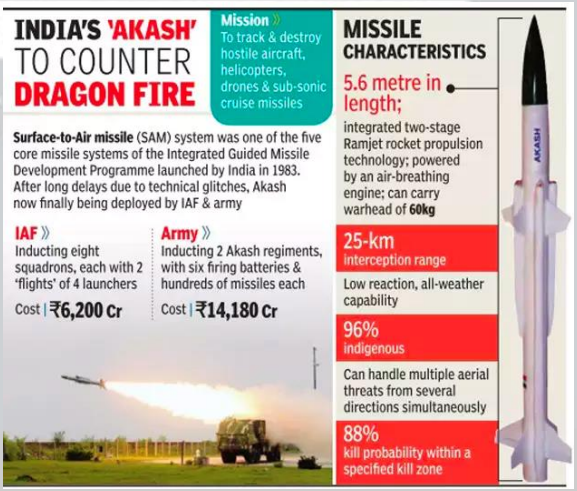
**TMT will explore some of the most important questions facing astronomers:**

- **What is the nature and composition of the universe?**
- **When did the first galaxies form and how did they evolve?**
- **What is the relationship between black holes and galaxies?**
- **How do stars and planets form?**
- **What is the nature of extrasolar planets?**
- **Is there life elsewhere in the universe?**




## Aakash missile

- **The Defence Research and Development Organisation (DRDO) conducted a successful flight test of the new generation Akash surface-to-air missile (SAM) from the Integrated Test Range (ITR), Chandipur, off the coast of Odisha, on Friday.**
- **"The flight test was conducted against a high-speed unmanned aerial target at very low altitude.**
- **The target was successfully intercepted by the weapon system and destroyed.**

## Police reform

- The three-day conference in Jaipur (in the first week of January) of police officers (Director General of Police level) from across India.
- police have still to earn the trust and confidence of a majority of the populace.
- The 'New Delhi conceived and managed' Indian Police Service (IPS) is perceived to be 'a permanent irritant' to some States who look upon the IPS as unreliable intruders over whom they have no control.
- we have more educated policemen in the lower echelons
- Knowledge and integrity will have to go together alongside genuine empathy for the common man if the image of India's police force has to improve.
- It is unfortunate that the structure of the hierarchy works against spending quality time with the constabulary.
- Why cannot DGPs and their immediate subordinates spend an hour a day to teaching their ranks how to expand their frontiers of knowledge a
- how to insulate our policemen from political caprice dominates all debates on the police?
- This knotty problem is intertwined with the democratic system of government.
- It is an art to politely say 'no' to a downright illegal demand made by grassroots politicians. Not many can do it with tact.

The Hindu

## Optical 8 satellite

- Japan successfully launched a rocket carrying a government intelligence gathering satellite on Friday on a mission to watch movements at military sites in North Korea and to improve responses to natural disasters.
- The H2A rocket, launched by Mitsubishi Heavy Industries Ltd., lifted off from the Tanegashima Space Center in southwestern Japan, carrying the optical satellite as part of Tokyo's reconnaissance effort to rapidly build up its military capability.
- Optical 8 satellite can capture detailed images, though its capability is limited in severe weather.
- Japan began the satellite program after a North Korean missile flew over Japan in 1998.
- Japan aims at setting up a network of 10 satellites, including those carrying radars that can operate at night or in

**severe weather, to spot and provide early warning for possible missile launches.**

**The Hindu**

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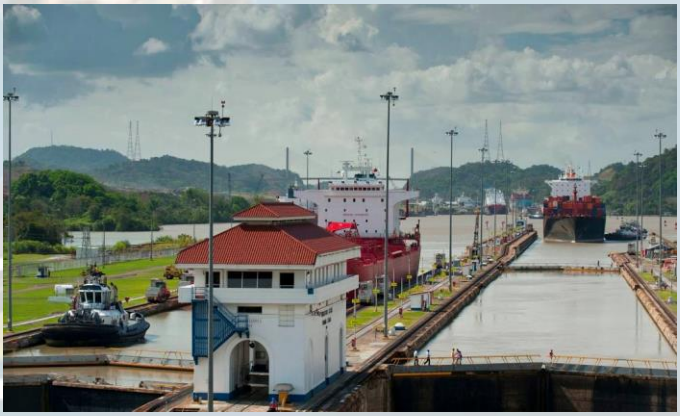
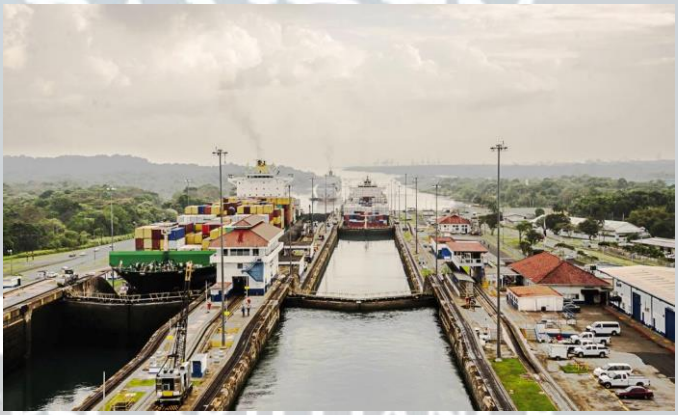
**Panama Canal**

- **With the Red Sea crisis paralyzing the global shipping industry, there is more trouble for the sector due to the severe shortage of water in the Panama Canal.**
- **The artificial 82 kilometer waterway connects the Atlantic Ocean with the Pacific Ocean.**






- **The Canal's locks at each end lift ships up to Gatun Lake, an artificial freshwater lake 26 meter above the sea level created by damming the Chagres River and Lake Alajuela to reduce the amount of excavation work required for the canal, and then lower the ships at the other end.**

- An average of 20,00,00,000 liter of fresh water is used during the single passage of a ship.
- based on the current and projected water levels in Gatun Lake, the Panama Canal Authority had to make reductions to the amount and weight of vessels that can pass through the canal.
- The Panama Canal cuts across the Isthmus of Panama and is a key conduit for international maritime trade.

**All about Atal setu**

- Atal Setu is the longest bridge and also the longest sea bridge in the country.
- The prime minister's vision is to improve the 'ease of mobility' of citizens by strengthening urban transport infrastructure and connectivity. In line with this vision, Mumbai Transharbour Link (MTHL), now named 'Atal Bihari Vajpayee Sewri-Nhava Sheva Atal Setu' has been built.
- It is a 21.8-km long six-lane bridge having 16.5 km length over the sea and about 5.5 km on the land.
- It will provide faster connectivity to Mumbai International Airport and Navi Mumbai International Airport. It will also reduce the travel time from Mumbai to Pune, Goa, and South India. It will also improve connectivity between Mumbai Port and Jawaharlal Nehru Port.
- The lights used in Atal Setu do not disturb the aquatic environment and its construction involved several technologies that were used for the first time in India
- River circulation rings have also been used to minimize sound and vibrations to safeguard marine life.
- One of the most important features of this bridge is its environmental sustainability.
- The Bombay Natural History Society, an organization that works for the environment, has also given a certificate of appreciation to this landmark.

**Technology used**

- Reverse circulation rigs: These specialized rigs help in reducing sound and vibrations, hence protecting marine life around the bridge.
- Eco-friendly lighting: The bridge's lighting. lights that are designed to be non-disruptive to the aquatic to the aquatic environment

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