

# Magnetospheric multiscale mission

April 11, 2020

## Why in news?

The Magnetospheric Multiscale Mission (MMS) recently used high-resolution instruments to perform the first precise measurements of an interplanetary shock.

## What is this mission?

- NASA's MMS investigates how the Sun's and Earth's magnetic fields connect and disconnect, explosively transferring energy from one to the other in a process that is important at the Sun, other planets, and everywhere in the universe, known as magnetic reconnection.
- Reconnection limits the performance of fusion reactors and is the final governor of geospace weather that affects modern technological systems such as telecommunications networks, GPS navigation, and electrical power grids.
- For the first time, MMS shows the small-scale three-dimensional structure and dynamics of an elusively thin and fast-moving field of electron diffusion. It does this in both of the key reconnection regions near Earth, where the most energetic events originate.
- By observing magnetic reconnection in nature, MMS provides access to predictive knowledge of a universal process that is the final governor of space weather, affecting modern technological systems such as communications networks, GPS navigation, and electrical power grids.

MMS will develop expertise, methods and technologies relevant to future space weather missions and space

weather forecasting for the future growth and development. MMS sensors will measure charged particle velocities, as well as electric and magnetic fields, with unprecedented (milliseconds) time resolution and accuracy needed to capture the elusively thin and fast-moving electron diffusion region.