

# NASA'S MMS Mission Breaks Guinness World Record (Download PDF)

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NASA's Magnetospheric Multiscale (MMS) mission made the Guinness world record for highest altitude fix of a Global Positioning System (GPS) signal achieving closest flying separation of a multi-spacecraft formation with only 7.2 km between the four satellites.

 NASA's Magnetospheric Multiscale

*NASA's Magnetospheric Multiscale*

- Mission still in the first year of its primary mission providing vision into Earth's magnetosphere.
- Four MMS satellites operating in a highly near elliptical orbit set the signal record at 70,000 kilometers ASL
- Satellites incorporate GPS measurements into their exact tracking systems.
- Require very sensitive position and orbit calculations to guide fitted flying formations.

## About Magnetospheric Multiscale (MMS) Mission

- NASA's unmanned space mission to study the Earth's magnetosphere using 4 identical spacecraft flying in a tetrahedral or pyramid formation.
- Launched on 13 March 2015.
- Each spacecraft has launch mass of 1,360 kg (2,998 lb).
- Satellites are closest to Earth, moving at up to 35,405 km/hour, making them the fastest known operational users of a GPS receiver.

## Objectives

- Mission maps magnetic reconnection, a process that occurs as the sun and Earth's magnetic fields interact.
- Understanding causes of magnetic reconnection is important for understanding:
  - Occurrences of flares on surface of sun
  - Auroras on Earth
  - Areas surrounding black holes (and event horizons)
- Designed to gather information related to:
  - Microphysics of magnetic reconnection

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- Energetic particle acceleration and turbulence
- Processes that occur in many astrophysical plasmas

## Magnetosphere

- Region of space surrounding an astronomical object where charged particles are controlled by that object's magnetic field.
- Magnetospheres structure and behavior depend on several variables.
- This magnetic field near the surface of various astronomical objects resembles that of a dipole-William Gilbert discovered this magnetic field on the surface of Earth.

 Image of Magnetosphere

*Image of Magnetosphere*

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