

Japanese Participation to MMS: Current Status and Future Plan

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MMS was successfully launched on 12 March 2015 and is continuing to produce highest quality data ever we had. Based on the results obtained by Geotail observations, Japanese researchers have been interested in the main target of MMS that is to understand the micro process of the magnetic reconnection. The same group that developed the low energy particle experiment (LEP) on Geotail has been participating to the development of one of the instruments on MMS that is FPI-DIS (Fast Plasma Investigation - Dual Ion Sensor). Design, fabrication, assembly, and the initial tests of the 16 Flight Model DIS sensors were made in Japan collaborating with U.S. and French colleagues. Currently, Japanese scientists are also participating to the initial analysis of the obtained data and evaluation of the performance of the 16 DIS sensors.

Since the time resolution of the FPI is high, the amount of the data is quite large. FPI data are delivered to Japan periodically using hard drives since it takes too long time to transfer all the data from the data center over the internet. ISAS is operating a data server for FPI data, that can be accessed by Japanese FPI team members.

The collaborative observation between MMS and Geotail is also making progress. After July 2015, the operation time of Geotail in Japan is increased in order to make collaborative observation with MMS. Since Geotail has unique orbit with apogee of 30Re and perigee of 9Re, Geotail - MMS pairs will realize multiple scale measurements of the key regions of the magnetic reconnection region. In some of the period, Geotail can be used as a solar wind monitor, that is closer to the magnetosphere than solar wind monitor at L1 point.

Since many Japanese researchers have great interest in the night side phenomena in the Earth's magnetotail, we are placing high expectations on the MMS Phase2 data that will be obtained in the near future. The time resolution of the Geotail low energy particle observation was 12 seconds. Therefore it was difficult to see the detailed structure of the the Earth's magnetotail. Although the sensitivity of the FPI sensors are not enough high for tenuous plasma measurements in the magnetotail, they can make observation much faster than 12sec. FPI- DIS will be able to measure low energy ions with more than an order higher time resolution than Geotail-LEP even taking into account the sensitivity. Many new discoveries are expected to be made also in the Earth's magnetotail in the near future.

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