

A Piggyback Micro-Satellite for Aurora Observation

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Recently quite a number of 50kg-class micro-satellite has been developed. However, due to the limited function of the satellite as well as the limitation in the mass of the payload instruments, 50kg-class micro-satellite that can make comprehensive measurements of space plasma including plasma particles, plasma waves and electro-magnetic field does not exist. The multi-point in-situ measurements of space plasma by formation flying spacecraft have become usual in the field of Solar Terrestrial Physics (STP). In order to realize multi-point space plasma measurements by formation flying satellites with relatively small launch vehicle in Japan, it is indispensable to develop high performance micro satellite. 50kg-class micro-satellite for aurora observation will verify that even 50kg-class micro satellite can make world first class space plasma observation including magnetic field, electric field, plasma waves, plasma particles and optical aurora observations. We are planning to launch a 50kg-class micro-spacecraft as a piggyback satellite and to put the spacecraft into an orbit that crosses the auroral regions. If we succeed in realizing this 50kg-class micro-satellite, it will also become possible for us to plan a future mission with 5 formation flying spacecraft for aurora observation using a launch vehicle as small as Japanese Epsilon rocket. It will also give a way to realize future larger scale formation flying spacecraft mission with affordable cost. Although a 50kg-class micro-satellite was used for a daughter spacecraft of the Russian spacecraft Interball, the micro-spacecraft did not have enough performance necessary for world first class plasma in-situ measurements. The preliminary study on the piggyback micro-satellite for aurora observation is being made by a scientists' group who have been participating to the spacecraft missions such as REIMEI and ERG together with ISAS Research Group on micro-satellite. This piggyback micro-satellite mission is a precursor of the future small-class or medium-class spacecraft mission of Japanese STP community.

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