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Next-generation International Scientific Observation Satellite Project

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Professor Shinichi Nakasuka of the University of Tokyo is now leading a small satellite development activity within the scope of a Japanese FIRST (Funding Program for World-Leading Innovative R&D on Science and Technology) program. In this program at least five micro-satellites are going to be developed including one scientific satellite under international cooperation, which is the second one of the series. Tohoku University is in charge of project management of this satellite and is playing the central role in inviting and selecting international scientific instruments from all over the world, designing the satellite bus system, and arranging the total project management activities.

The above mentioned scientific micro-satellite is a 50-kg class one dedicated to scientific research by different types of scientific instruments mainly focusing on Earth observation. The invitation process of the international instruments has already been started and indeed our group officially gave an announcement of Call for Letter of Intent inviting scientific instruments for this micro-satellite at the International Astronautical Congress held in Prague in September/October 2010. In this Call, it is also mentioned that we strongly encourage the participation by inexperienced groups in developing countries and for these groups we plan to start a capacity building course in space-instrument fabrication at Japanese universities. Though the time schedule was tight, as the deadline of this Call was the end of October, we were successful in receiving more than 10 LOI's from worldwide academic/research institutions. Some institutions submitted even more than one LOI's. Within these proposed instruments, we have some radiation measuring instruments of different types of radiation sources, a CMOS/CCD camera system, a thermal luminescence detector, an electro-dynamic tether and so forth, which are of our great interest.

The selection of scientific instruments will be completed by the end of the Japanese fiscal year 2010, namely, by the end of March 2011. The engineering models of selected instruments are planned to be delivered by the end of second quarter of the fiscal year 2011, and flight models in one year later from that point, so that the engineering model of the satellite system can be developed by the end of the fiscal year 2011, and the flight model by the end of the fiscal year 2012 (ready for launch). For the instruments selection, we take into account their scientific values, the feasibilities of their development schedules in terms of the above mentioned satellite development master schedule, the heritages and capabilities of the candidate institutions, and the regional arrangement. We are interested in accommodating as many instruments as feasible.

The satellite bus system is designed in the way that the observation capabilities of the scientific instruments can be dramatically improved than recent general micro-satellites in terms of observation time duration, attitude control pointing accuracy, and amount of data. Also a great attention is paid to the system's reliability and operability.

In the presentation the results of instruments selection, the instruments themselves and their mission objectives, satellite system design and its operational scenario will be described in detail.

Keywords: Micro-satellite, International Scientific Mission