Japan Geoscience Union Meeting 2015
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Science Missions and Payload Specifications of Philippines' First Earth-Observation Microsatellite

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On average, there are eighteen to nineteen typhoons entering the Philippines' area of responsibility in a year. It is also situated in the pacific ring of fire making it vulnerable to earthquakes and volcanic activities. Driven by these natural hazards, the Philippines, under the Department of Science and Technology (DOST), funded the program, "Development of Philippine Earth Observation Microsatellite (PHL-MICROSAT)", which aims to launch the Philippines' first Earth-observation microsatellite, PHL-MICROSAT-1, by 2016.

The microsatellite will be launched from the International Space Station with an expected altitude of 400 km and a near circular orbit similar to that of the ISS. It aims to provide robust and efficient near real-time status of the country's environment particularly for applications on disaster risk management, land-use and aquatic resource assessment and monitoring. On-board the microsatellite are four science and engineering payloads: (1) High Precision Telescope (HPT) with a 3 m GSD and the capability to capture images in the visible and near infrared region which will be used in determining the extent of damages from natural hazards such as typhoons, earthquakes and volcanic eruptions; (2) Space Borne Multi-Spectral Imager (SMI) with Liquid Tunable Filter (LCTF) which can capture images at 80 m GSD with a spectral range of 420-1050 nm. This payload will be used in determining the health and composition of the Philippine oceans; (3) a panchromatic Wide Field Camera (WFC) with a field of view of 180?x134? which will be used to capture images of cloud patterns and distribution as well as weather disturbances such as tropical cyclones; and (4) a colored Middle Field Camera (MFC) with 185 m GSD which will assist in the microsatellite's attitude determination.

キーワード: microsatellite, science missions, payload specification
Keywords: microsatellite, science missions, payload specification

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Development of MicroDragon for ocean color observation
Development of MicroDragon for ocean color observation

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MicroDragon is the first 50 kg class microsatellite of Vietnam National Satellite Center (VNSC). It is being developed by VNSC researchers under instruction of the Japanese professors come from five universities including Hokkaido University, The University of Tokyo, Keio University, Tohoku University and Kyushu Institute of Technology. Hokkaido University has been responsible for the development of the science payloads based on the demands and requirements from the scientific point of view.

Vietnam has a long coastal line with about 7% households in the fishery. Seafood plays an important role in developing Vietnam economics. However, with increasing exploitation, natural aquatic resources are decreasing quickly. Development of aquaculture is necessary for a sustainable economics. To do this, Vietnam needs an effective system which is an integration of remote sensing and sea water sampling to monitor coastal water quality. Therefore, Mission of MicroDragon is ocean color observation to provide data to researchers in fishery field and scientists in oceanography for assessing water quality and locating living resources. We will use three imagers being composed of Space-borne multispectral Imager, Infra-Red Imager, and Triple Polarization Imager onboard and Fluoro probes in the sea for the missions.

キーワード: Microsatellite
Keywords: Microsatellite

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Spaceborne Hyperspectra Imaging Development in Malaysia
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The remote sensing activities in Malaysia began in 1990s with concentration on the theoretical modeling of scatterers. Later on, Malaysia started the sensor development and measurement which included the development of anechoic chambers as well as ground based multifrequency and multiporalized scatterometer. In 2000s, the design and development of airborne remote sensing sensor such as synthetic aperture radar (SAR) and optical sensor was initial. Plan to developed own airborne SAR and multisepctra camera as well as collaboration with overseas research institute was took place. In year 2012, sensors on board UAV (both SAR and EO) have been successfully developed and tested, several high resolution images are obtained. In order to obtain larger coverage of the illumination footprint, the spaceborne remote sensing is necessary. A spaceborne Hyperspectra imaging sensor development project has been identified and initial by Centre of Remote Sensing and Surveillance Technologies, Multimedia University and Astronautic Technology (M) Sdn.Bhd. In this project, a small nano-class satellite with onboard Liquid Crystal Tunable Filter (LCTF) Hyperspectra Camera will be designed and constructed. LCTF hypersepectra camera will be designed to fit in the 10cm x 10 cm x 30cm nano-class satellite as well as confined to others electrical and mechanical constraint of spaceborne platform.The LCTF camera module consists of LCTF, Closed-circuit Television (CCTV) lens and Charge-couple device (CCD) board. LCTF sensor utilizes electronic controlled LCTF which allows rapid and vibrationless selection of wavelength from visible to IR range spectrum. The major advantages of this LCTF sensors are light weight (approximate 250g for sensor), larger number of band selection (about 600 bands) and lower cost compare to conventional multispectral camera. Therefore, it enables the usage of smaller space platform and further reduce the development cost and launching cost of satellite.Due to the large amount of data generated by the hyperspecta camera, it is necessary to reduce the size of the data so that the acquired data can be downloaded to the earth station during every satellite pass. An onboard FPGA-based multispectral image compression subsystem will be developed in this project to alleviate the memory and communication bottleneck of the small satellite.

キーワード: Hyperseptra Imaging, Spaceborne, LCTF
Keywords: Hyperseptra Imaging, Spaceborne, LCTF