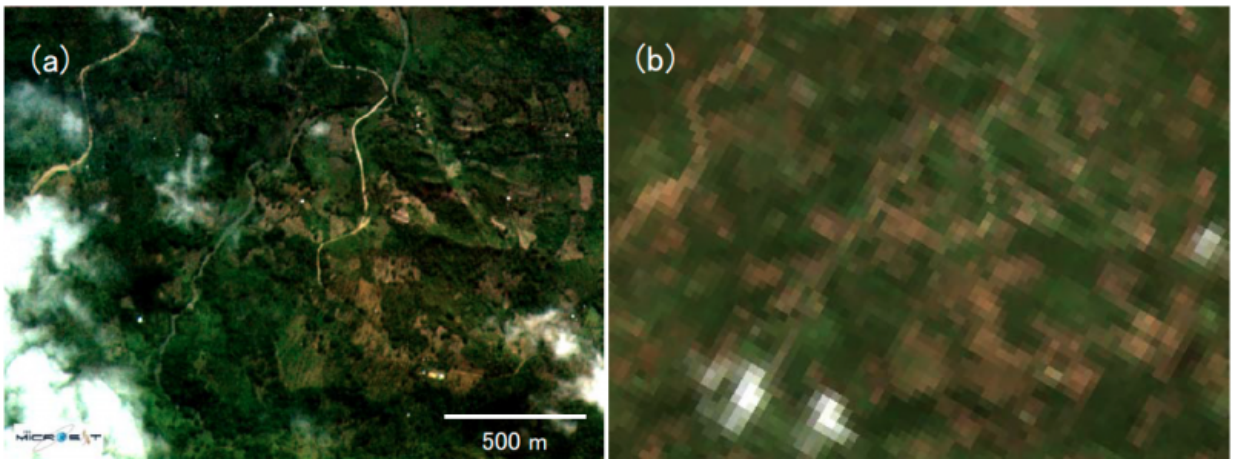
Philippines' microsatellite captures best-in-class high-resolution images

September 21 2016, by Naoki Namba



This graphic compares two RGB images of Dumingag on the island of Mindanao, Philippines. Image (a) was taken by the HPT installed in DIWATA-1, while image (b) was taken by Landsat 8's OLI. These results demonstrate that DIWATA-1 can observe the Earth at significantly higher resolutions than existing large satellites. Credit: Hokkaido University

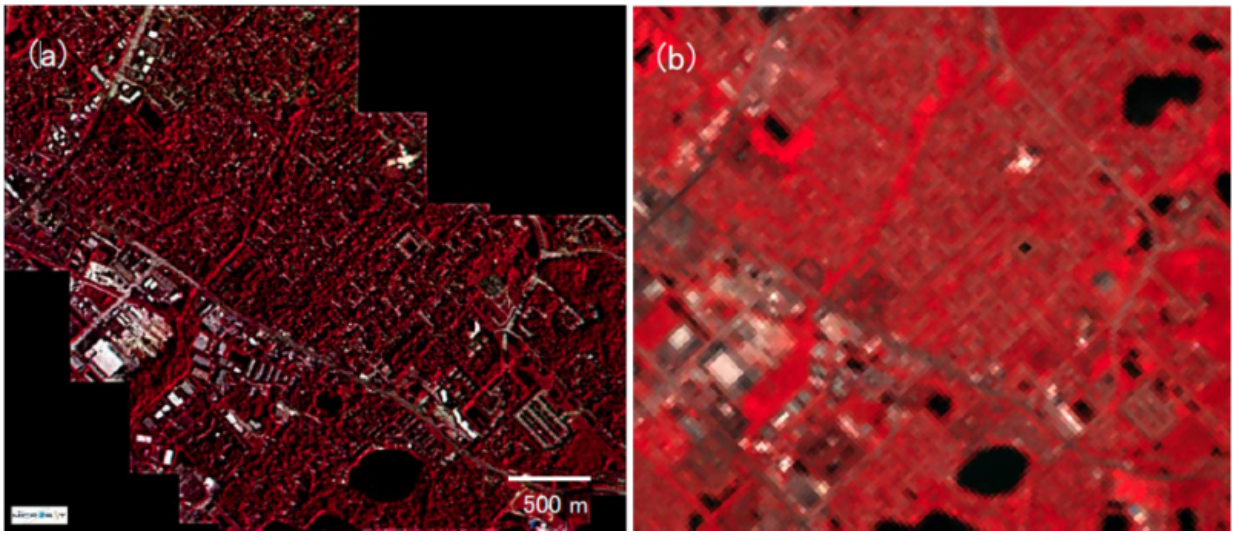
The High Precision Telescope (HPT) installed in the Philippine's DIWATA-1 microsatellite jointly developed by Hokkaido University and other institutions has successfully captured images with a ground resolution of about 3 meters—a world-best for a 50 kg-class microsatellite.

DIWATA-1 was created under a collaborative initiative by Hokkaido

University, Tohoku University, the Philippines' Department of Science and Technology (DOST), and the University of the Philippines Diliman (UPD). It was the first 50 kg-class microsatellite to be developed and manufactured in Japan for a foreign nation. The microsatellite is equipped with four imaging devices with different magnifications, including the HPT and a fish-lens camera, which are used to remotely observe a wide variety of phenomenon including weather hazards such as typhoons and torrential rain. The devices are also used to monitor agriculture, fishing, forestry and the environment, among other subjects.

On April 27 this year, DIWATA-1 was released into orbit by Kibo—the Japanese Experiment Module that is part of the International Space Station.

On May 19, the HPT successfully captured a three-color RGB (red, green and blue) image of the island of Mindanao in the Philippines at a ground resolution of about 3 meters, eclipsing the resolution of a photograph taken of the same location by the large-scale Landsat 8 satellite's Operational Land Imager (OLI). The OLI image has a ground resolution of 30 meters.



This graphic compares two false-color images of a suburban area in Florida, United States. Image (a) was taken by the HPT installed in DIWATA-1, while image (b) was taken by Landsat 8's OLI. To emphasize areas of vegetation, near-infrared-band data was used to create the image. Credit: Hokkaido University

Furthermore, while observing a suburban area of Florida in the United States on June 30, an advanced technique known as target pointing was used to control the attitude of the satellite and direct the camera at a specific location. To emphasize areas of vegetation, the image was created using the near-infrared-band data.

The successful imaging not only proves that it is possible to shoot high-resolution images with high frequency, but also establishes a powerful technique for microsatellites to capture spectral images at several tens of bands (wavelengths) or higher.

Hereafter, Hokkaido University will strive to improve the technology required to capture high-resolution images anywhere in the world twice a day, on average, while challenging space-based spectral imaging that uses liquid crystal filters equipped with the world's largest selection of wavelengths. If the precision of these technologies can be further enhanced, it is expected to improve the accuracy of spectral information used for agriculture, the fisheries industry, forest management, resource development, and disaster monitoring, etc.

Provided by Hokkaido University