A high spatial resolution multispectral remote sensing by the RISESAT microsatellite

*栗原 純一[1]、桒原 聡文[2]、藤田 伸哉[2]、坂本 祐二[2]、高橋 幸弘[1]
*Junichi Kurihara[1], Toshinori Kuwahara[2], Shinya Fujita[2], Yuji Sakamoto[2], Yukihiro Takahashi[1]

1. 北海道大学 大学院理学研究院、2. 東北大学 大学院工学研究科
1. Graduate School of Science, Hokkaido University, 2. Graduate School of Engineering

Microsatellites for Earth observation have been developed jointly by Hokkaido and Tohoku Universities in Japan. The High-Precision Telescope (HPT), which is a high (3-5 m) spatial resolution multispectral sensor, was developed by Hokkaido University. The HPT has been installed on the RISING-2 (launched in 2014), DIWATA-1 (2016), and DIWATA-2 (2018) microsatellites developed mainly by Tohoku University. However, the HPT installed on the RISESAT microsatellite using the liquid crystal tunable filter (LCTF) technology for wavelength scanning in the visible (420–700 nm) and the near-infrared region (650–1050 nm) is the greatest in terms of number of spectral bands. The advantages offered by the LCTF technology are reductions in the size, weight, and power consumption of the sensor, the flexibility of the spectral bands and data volume, and compatibility with off-nadir pointing. The central wavelength of the spectral bands is electrically tunable for every image acquisition; hence, the data volume could be reduced by choosing appropriate spectral bands for specific purposes. This flexibility allows a single multispectral sensor on a nano/microsatellite to be applied to various remote sensing fields, making it comparable with hyperspectral sensors.

The RISESAT microsatellite was successfully launched by the Epsilon-4 launch vehicle on 18 January 2019 from Uchinoura Space Center, Kagoshima, Japan. The satellite was injected into a Sun-synchronous, low Earth orbit at about 500 km. In this paper, we present preliminary results of multispectral imaging by the HPT and review its performance evaluation. We also discuss the scientific collaboration with other microsatellites and the possible contribution to the Asian Microsatellite Consortium.

キーワード：地球観測、超小型衛星、マルチスペクトルセンサ、リモートセンシング
Keywords: Earth observation, microsatellite, multispectral sensor, remote sensing

