

Geostationary Optical Earth Observation Satellite

*Kazuo Oki¹, Toshiyoshi Kimura², Tadahito Mizutani², Takeo Tadono²

1. The University of Tokyo, 2. JAXA

Geostationary satellite is the most practical Earth Observation for its instantaneous observation and ability to choose target area on demand. Some kind of users, especially disaster monitoring, agriculture and national security users are demanding such unique character crucially. However, technical difficulties prevent from realization of the system, so far. Practical observation needs a certain fine ground resolution. But it means necessity for huge main mirror for the satellite optics. For an example, 5~7m resolution at Nadir position needs 3.6m diameter mirror. So far, 1~2m diameter one-piece mirrors were studied, in contrast. Recent optical technologies make it possible to have an extra large telescope using segmented mirrors for astronomical telescope on the ground, like Keck astronomy or TMT project. Using such technologies, we studied geostationary satellite telescope system with 3.6m diameter segmented telescope to materialize 7m ground resolution at Nadir position. Observation bands should have good correlation with ALOS-3 satellite on low Earth orbit, i.e. panchromatic, RGB, NIR and additional bands. To ensure the night observation, IR band is under consideration in addition. Such new Earth observation scheme improves time resolution dramatically, and it will make possible to observe movement of target like video camera. It will reveal many motile phenomena including Tsunami, Typhoon and human activities like car traffics. Also, it is expected that various social services unprecedented in cities, forests, agriculture, water (rivers and oceans), etc. are expected to be offered, and we believe that many users will appear in the field of science and practical use. The study started in 2018 and will end in 2020 to confirm the technical readiness level of required technologies, observation plan and algorithms for new earth observation data products.

Keywords: Geostationary Satellite, Extra large telescope, Geostationary satellite telescope system, ALOS-3, Social services, New earth observation data products