High-Resolution Monitoring of Thunderclouds by the High Precision Telescope on the RISING-2 Micro Satellite

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We developed the High Precision Telescope (HPT) which will be installed on a micro satellite, RISING-2. The RISING-2 satellite is the succession mission of the RISING satellite, which was successfully launched on 23 January 2009. These two 50 kg class satellites have been developed in-house by the universities. The HPT uses a zero thermal expansion pore-free ceramics (ZPF) mirror for the optical system, a liquid crystal tunable filter (LCTF) for the spectrometry, and high-sensitivity charge coupled device (CCD) cameras for the imaging. The HPT is a highly-functional multi-purpose space telescope that can be widely used for visible and near-IR observations of the Earth and planets, such as the Jupiter and Venus. One of the applications is a high-resolution observation of thunderclouds in the Earth. Detailed information on a thundercloud structure will help to issue early-warnings of floods caused by heavy rains. The thundercloud structure observations from space are useful for improving early warning systems, especially in Asia-Pacific region where a dense weather radar network is not established. The HPT on RISING-2 will give a technology demonstration of the multi-spectral telescopic imaging for global remote sensing of weather disasters. In the future, it will be possible to monitor thunderclouds over Asia-Pacific region continuously from space by a micro satellite constellation.