

EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

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FROM GEOSS TO GERSS – A PERSONAL PROSPECT

Abstract

The purpose of this paper is to investigate the technical aspects to go from the Global Earth Observation System of Systems (GEOSS) to the real time Global Earth Rescue System of Systems (GERSS). These aspects include the number of Earth Observation Satellite (EOS) required, the number of ground station required, the required communication and coordination network, etc. Currently, the “real time” could mean several hours and longer. A personal prospect, with enough resources and efficient network, is to shorten it to about one hour. Many difficulties still exist to prevent Earth observation such as nighttime disaster, bad weather condition, etc. However, it is necessary to consider how soon is the real time when everything is just correct. There are 9 GEOSS social benefit areas: disasters, health, energy, climate change, water, weather, ecosystems, agriculture, and biodiversity. Disasters are considered to be the first social benefit area of GEOSS. For humankind, the best strategy is to prevent the occurrence of any kind of disasters. However, many kinds of disasters are so far unpredictable and inevitable. Therefore, what we can do is going to “rescue as soon as possible” whenever disaster happens. This paper is going to discuss the idea of a real time GERSS from the technical point of view. In other words, to discuss “to what degree” or “how real time” we can achieve by coordinating the current EOSs. Furthermore, in order to shorten the time between disaster occurrence and rescue initiation, what technological problems we shall face. The Formosa Satellite No. 2 (FORMOSAT-2) is a typical high resolution EOS. Its mission operations in disaster observation consist of the following processes: 1) Acquisition of information: to know the type and place of the occurrence of disaster. 2) Settlement of observation strategy: to pinpoint the observation area and arrange the satellite time slot for observation, including weather check of the observation area. 3) Programming of command: to transform the observation strategy to command program that can be uploaded to FORMOSAT-2. 4) Command uploading: to upload the command to FORMOSAT-2. 5) Disaster observation: to observe the disaster and take images. 6) Image downloading: to download the observed images. 7) Image processing and distribution: to process the observed images and deliver to the rescue agency. Investigation and discussion in this paper are performed based on the current and near future EOSs, network of ground stations, above typical processes, and new requirements.