

ADEOS-II TT&C operation with space network system

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Advanced Earth Observing Satellite-II (ADEOS-II: Midori-II) was launched on December 14, 2002. After Initial checkout phase for about four months, routine operation phase started on Apr. 14, 2003.

One of the most characteristic operations of ADEOS-II is global-scale observation. In order to accomplish this mission, ADEOS-II has various communication ways. One of them is to use the space network system (SN). SN consists of ground stations, data relay satellite and SN user spacecrafts. By launching ADEOS-II, NASDA has been established all elements which compose SN on NASDA's own technology. As a user of SN, ADEOS-II has the Inter-Orbital Communications Subsystem (IOCS). With IOCS, ADEOS-II is able to communicate to ground station via data relay satellite by using S-band and Ka-band. Main data relay satellite of ADEOS-II is Data Relay Test Satellite (DRTS: Kodama), which was launched in Sep. 2002. Additionally, in initial checkout phase, ADEOS-II also succeeded to communicate to ARTEMIS (launched by ESA).

The most agreeable reason why ADEOS-II use SN is that SN operation time for each pass is much longer than GN one. This means ADEOS-II can get global data and high resolution data. It is beneficial to use SN not only to get global data but to operate TT&C. It is necessary that ADEOS-II send a large amount of commands nominally. So By using SN, more commands are uploaded for a pass and we can manage ADEOS-II operation planning easily. When ADEOS-II communicates a lot of data to ground system, it is very useful for ADEOS-II to operate with SN. And because of long real pass operation, we will find satellite troubles early. As a result, we will be able to deal with satellite anomaly things. This advantage will apply to not only ADEOS-II but Advanced Land Observing Satellite (ALOS) and Japan Experiment Module (JEM) which are going to use SN in the near future.

Because SN is a large system, SN influences user satellite when SN goes wrong. For example, when heavy rain degrades SN operation, it has a big impact on planned satellite operation. The most important thing is ground network (GN) resource. When SN operation plan stops, all SN user satellites, including DRTS, require GN resource to keep satellite operation. But GN resource has limit. Now SN user satellite is only ADEOS-II. But the more satellite which use SN increase near future, the harder SN user satellite achieve required pass operation. This is one of the items to discuss with SN user satellite.

¹ NASDA will change to Japan Aerospace Exploration Agency (JAXA) from October 1, 2003.