

OVERVIEW OF GUTS SLR STATION

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Abstract

Japan Aerospace Exploration Agency's (JAXA) Satellite Laser Ranging system (GUTS-SLR) has been completed in the spring of 2004. Its SLR station is located in Tanegashima Island, southern part of Kyushu. GUTS-SLR has capability of ranging to various satellites from low earth orbit to geostationary orbit. The 1-meter Cassegrain telescope, with its associated 5 meters diameter Dome assembly will be used to precisely point the outgoing Laser beam and to acquisition the reflected signals from various targets with Az: 25 degrees/sec and El: 10 degrees/sec maximum slew rate. The Laser subsystem generates both 50mJ/pulse (for LEO) and 300mJ/pulse (for GEO) with wavelength of 532nm. The pulse width of Laser is designed to be 60 psec (for LEO) and 300 psec (for GEO) respectively in order to avoid the damage on the optical components. The ranging subsystem provides the optical interfacing hardware, range measurement electronics, standard frequency sources and system control signals needed for the SLR application. The GUTS-SLR system will be able to range to LAGEOS satellites with a single-shot RMS of less than 10 mm RMS, less than 30 mm RMS for ETS-VIII (JAXA geostationary satellite). The GUTS-SLR is operated by remote control from the Tsukuba Space Center (TKSC). An approximate distance between TKSC and SLR station is 1100km. 512-kbps communication line is used for transmission of system status, operational parameters and observation data, 256kbps for the transmission of surveillance monitor image (ITV camera). The operation of GUTS-SLR station will be kept almost autonomous manner according to the automatic sequence. Operator only intervenes in the initial power supply on/off, manipulate for the initial acquisition when the orbit prediction has an error and regular maintenance of system. An operational plan of the whole GUTS system is unitary planned by master control and operation planning subsystem, which is called COPs, and COPs also monitors operational conditions of each subsystem.



Exterior of GUTS-SLR facility Exterior of 1m Telescope