LUNAR LASER RANGING PROJECT AT THE TOKYO ASTRONOMICAL OBSERVATORY

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ABSTRACT

A Lunar ranging laser radar is now under construction at the Tokyo Astronomical Observatory, University of Tokyo.

The system will be completed in 1975, and will be installed at the Dodaira station of the Tokyo Astronomical Observatory. The station is located at about 100 km north-west of downtown Tokyo.

The ranging accuracy of our system is expected to be about 1.5 meters, which is confined by transmitting laser pulse width.

The transmitting laser is a ruby laser with output of several Joules. The pulse width is about 20 nano-seconds and the pulse rate is 0.2 pps. The transmitting optics are consist of 50 cm offset Cassegrain reflecting telescope with X-Y mount and Coúde type optical system. Hence, the laser equipments are placed at an air-conditioned room. By switching the optical system, this telescope will be used as a satellite tracking laser radar, too.

The receiving telescope is a 3.8 m Cassegrain metal reflector. The reflector is divided into seven segments, that is, one central part with 1.7 meters of diameter and six circumferential parts. All are made of super-duralmin, and the optical surface is spattered by alminium and coated by SiO_2. The receiving telescope is alt-azimuth mount.

Both transmitting and receiving telescopes are controlled by a mini-computor at an accuracy of 5 seconds of arc. This computor is also used as the output data processor and controls the range gate according to the lunar ephemeris.