

SLR retroreflectors designed for velocity aberration

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Satellite laser ranging measures the round-trip time between a ground station and a satellite that carries corner cube reflectors (CCR).

The relative velocity of the ground station and the satellite amounts to 3 to 8 km/sec, and we need to take this into consideration. If a CCR returned a laser pulse exactly to the direction it came, the ground station would not be able to detect the signal. It is common to make the CCR dihedral angle slightly differ from the right angle so that the return pulse have sufficient spatial coverage. We have developed software that simulates the far-field diffraction pattern of CCRs, and tested it with existing satellites.

This study is also applied to the simulation of ASTRO-G satellite to be launched in 2012. Proper combination of CCRs are being investigated for its highly elliptic orbit.