Daekdeok Station Receive Optical System Upgrade

S.-Y. Yu[1], J. Na[1], J.-G. Jang[1], B. Jang[1], S. Bang[1], N. Ka and H.-C. Lim[1], [1]Korea Astronomy and Space Science Institute, syyu@kasi.re.kr

Abstract: Korea Astronomy and Space Science Institute (KASI) has been developing two SLR systems, one mobile system (0.4m, ARGO-M) and one fixed system(1m, ARGO-F). The development of ARGO-M was completed in 2011 and the system was registered as station (Daedeok, 7359) to the ILRS. KASI is upgrading the Daedeok station by implementing : 1) the Automatic Transmitter Receiver Alignment System (ATRAS) 2) an operating software and ARGO Range Gate Generator (A-RGG) for 10 kHz laser ranging 3) the new optical receiving system for more efficient daytime tracking. Here we discuss on the receive optical system.

The new design improves three points : 1) The new design divides the optical path for the observation and the laser direction monitoring. In the case of the old optical design, the monitoring has the same FOV as the C-SPAD because the iris is located at the common optical path. This case make ATRAS difficult to operate only in the daytime tracking because the C-SPAD FOV is small, about 10 arcseconds. But the new design keeps the monitoring FOV constant even though the C-SPAD FOV changes. 2) The new design uses the reflective dichroic filter instead of the transmissive dichroic filter for dividing optical path between observation and monitoring. The transmissive dichroic filter implemented in the old design can be influenced by the surrounding temperature because the center wavelength of the transmissive filter is shifted depending on temperature. 3) The new design adds a temperature controller to the bandpass filter for constant temperature. Like the transmissive dirchroic filter, the center wavelength of the bandpass filter also changes depending on surrounding temperature. So the new optical design will increase the return rate and ranging precision for both daytime and nighttime tracking.