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### **A-RGG development for 10 kHz Laser Ranging of Sejong station**

Korea Astronomy and Space science Institute(KASI) has developed the range gate generator, named A-RGG, for 10 kHz laser ranging of Sejong station. The A-RGG can generate the range gate with maximum speed of 13.89kHz, and the laser fire gate with maximum speed of 20kHz using Lagrange interpolator implemented in the FPGA H/W. The FIFO size is 56x2048 bit for the storage of event epochs from start and stop signal detectors. It can be synchronized with a GPS timing device(XLI) through the IRIG-B, 1PPS and 10MHz input ports. It has two lookup tables with 64x256 bit size to switch laser ranging operation quickly between two adjacent satellites. The A-RGG consists of RG signal generator for C-SPAD, FIRE signal generator for laser, 3 output ports to control external device and 7-segment display. RGG port has H/W delay chip(DS1023S-50) to fulfill the 0.5ns resolution. Both Fire port and 3 output ports have the 100ns resolution. Two functions, time bias and range shift, are implemented for satellites with inaccurate orbit ephemeris. Even though the ground target has a short distance, it can also support the calibration ranging. The operator can control all A-RGG functions and diagnose the internal operation status from the computer through RS-232 serial communication. In addition it has a display panel in the front of the A-RGG to monitor its status.