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### **Progress on the multifunctional range receiver for SGSLR**

A preliminary concept for a multifunctional, multichannel range receiver for the new NASA SGSLR system was presented at the 2014 ILRS Workshop in Annapolis. The goals of the new receiver are: (1) to serve as an accurate (few psec RMS ) and self-calibrating Event Timer (ET) for photon start/stop events and other critical timing signals; (2) to provide a high resolution measurement of the satellite angular position relative to the receiver optical axis and correct for telescope pointing error during the acquisition and tracking of a satellite; and (3) to act as an Electronic Spatial Filter which eliminates the vast majority of noise counts and therefore greatly reduces potential noise induced bias in the range measurement, especially for weak satellite links. We have since finalized a design in which the sky image is broken into 45 parts, essentially a 7 x7 detector array with the four corner pixels removed, to better conform with the circular telescope Field of View (FOV). This number of pixels reduces cost by allowing all timing channels to be handled by a single Time-Of-Flight (TOF) card , while making several channels available for other critical timing signals. It also provides adequate angular resolution for effective pointing correction during both acquisition and tracking. Since signal strength varies greatly with satellite altitude and zenith angle, we have proposed a variable telescopic lens be added to the receive path to allow the receiver FOV to match a changing laser beam divergence. The latter is controlled by a programmable beam expander in the transmit path.