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Enabling precise geo-spatial calibration of the GLM sensor on board the GOES-R satellite using ground-based Laser beacons from NASA Moblas 4 and 7

The Geostationary Lightning Mapper (GLM) is one of the most important capabilities of the next generation NOAA GOES-R series weather satellites, the first of which is scheduled for launch on Nov 4, 2016. These satellites will allow near real-time imaging of severe weather conditions and locations to provide improved weather warnings. The alignment calibration of the on-board GLM sensor is desired for the accurate mapping of the sensor pixels to geo-spatial coordinates. The purpose of the one-way GLM beacon is to create “artificial lightning”, to mimic the oxygen triplet emission line around 777.2 nm associated with lightning, for onboard sensor detection. To perform this task, NASA and NOAA plan to locate laser beacons on the East and West coasts of the USA using the precise geodetic locations of MOBLAS 7 (Greenbelt) and MOBLAS 4 (Monument Peak). A semiconductor diode laser in a MOPA scheme will be used to generate the 777.2 nm laser beacon output and a fiber optically-coupled beam expander will be used to transmit the beam to the S/C. An auxiliary refractive optics telescope with a high QE camera payload and image processing capability will be piggybacked to the main telescope for satellite acquisition. The laser will be tied to the SLR station safety interlock with the added logic for a single laser firing at any one time. The GLM test will be performed during the Post Launch Test (PLT) window beginning Jan, 2017. Details are discussed.