

In the near future, the deployment of the next generation lunar laser retroreflectors, in particular the “Lunar Laser Ranging Retroreflector for the 21st Century” (LLRRA-21) is planned via various missions to the moon. With proper robotic deployment using the anchored technology, these LLRRA-21 arrays will support single photo-electron ranging accuracy at the 100 micron level or better. There are available technologies for the support of lunar laser ranging at the level of this accuracy by advanced ground stations. However, the major question for this type of deployment to be supported is the limit on the ranging accuracy due to the earth’s atmosphere. In particular, there are questions concerning the jitter in the delay due to atmosphere fluctuations (turbulence) and concerning the long term effects (biases) on the measured time delay. Theoretical, simulation and experimental results will be discussed that address estimates of the magnitudes of these effects and the issue of precision vs. accuracy.