A Tutorial on Retroreflectors and Arrays for SLR

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This 30 minute tutorial covers the basics of retroreflector theory and how they are used in arrays to service satellites in different altitude orbits. We begin with a discussion of the relative advantages and disadvantages of solid vs hollow cube corners and the functional dependence of their cross-sections and far field patterns on cube diameter. Because of velocity aberration effects, the design of an array for a particular space mission depends on many factors, including the desired range accuracy and its orbital altitude, speed, and pass geometry relative to the tracking stations. This design usually requires the reflectors to be "spoiled" by perturbing one or more of the 90 degree angles defining a perfect cube corner or by adding a curved surface to a hollow cube. Finally, we discuss possible approaches to developing mm accuracy arrays having both large cross-sections and ultrashort satellite signatures.