Trends In Ground Based Laser Tracking Global Network For Deep Space Applications

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As the number of deep space missions increases many fold, the telecommunications demand of future deep missions will also increase by factors of 10 to 100, or even higher. NASA and other users of the Deep Space Network have envisioned various approaches to provide architecture of the future satellite-tracking network. Among the options considered are the arraying of high gain and large reflector antennas, a large array of small aperture antennas, and an optical tracking network. Each of these networks renders new challenges for deep space satellite tracking, particularly at frequencies high enough to be impacted by either atmosphere-induced phase front distortions, or attenuation. Although several satellite laser tracking demonstrations, such as GOPEX (Galileo Optical Experiment) and the Ground/Orbiter Laser Communication Demonstration (GOLD) have been conducted in the past, an over view of a more complete global ground-based laser tracking network for deep space applications has not been discussed much in the literature. Therefore, the objective of this paper is to provide key architectural review of a ground-based network for high precision tracking and communication applicable to deep space laser communication.

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Brief Biography of the principal author: Farid Amoozegar received his Ph.D. degree in Electrical Engineering with minor in optics and applied math from University of Arizona, in 1994. He served as a lecturer at the University of Arizona for two years and joined Hughes Aircraft in 1996. He is with Jet Propulsion Laboratory since 10/02 in Communications System and Research section. His areas of interest are wireless communications, multi-target tracking, and free space laser communications. His current project is Optical Deep Space Network architecture study.