

15th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Novel Concepts and Technologies to Enable Future Building Blocks in Space Exploration and
Development (3)

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PASSIVE LASER RANGING NAVIGATION SYSTEM FOR LUNAR MISSIONS

Abstract

The present paper makes a preliminary assessment of the idea of installing on the surface of the moon an array of retro-reflector panels in well-known positions for the purpose of supporting the navigation needs of lunar missions. One proposes to use this set of retro-reflectors as an array of passive positioning pseudolites. A spacecraft flying from the Earth towards the Moon would be able to calculate its orbital position with respect to this passive reference array of retro-reflectors, by using the laser ranging of visible retro-reflectors subsets, at any time of its journey. For what concerns landing procedures, the position of the landing vehicle during the descent phase could also be estimated with respect to a retro-reflector array adequately distributed on the moon surface. Regarding the implementation of the proposed navigation concept, in addition to traditional laser ranging techniques, one explores the use of Michelson interferometry to carry out these type of measurements.