Title: A Review of Options for Autonomous Cislunar Navigation

Abstract:

NASA's Orion CEV has many functional requirements to provide accurate inertial navigation during all stages of Earth-Lunar transit and return missions. One of the most stressing navigation requirements is to “provide safe return following loss of communications” at the Moon. This is a requirement for autonomous navigation. Considering many possible sensors that may be used for navigation, this research has initially focused on the identification and assessment of several different measurement types that may support autonomous cislunar navigation.

During the early days of spaceflight, and especially during the Apollo Program, significant advances were made in developing methods for cislunar navigation. However, some of these techniques were astronaut labor intensive and/or not suitable for autonomous operations. Since then, new technologies and data processing methods have been created that enable navigation options that were not available during the Apollo era. By reviewing the options, both new and old, suggestions can be made for performing autonomous cislunar navigation.

Speaker Bio:

Dr. E. Glenn Lightsey is an associate professor in the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin. He holds the position of Fellow of the W. R. Woolrich Professorship in Engineering. Dr. Lightsey specializes in the dynamics and control of vehicles using avionics sensors such as the Global Positioning System (GPS) for navigation and attitude determination. He has also served as Principal Investigator and Faculty Advisor on 3 student satellite projects. He has authored more than 50 technical publications on the dynamics and control of vehicles using sensors such as GPS, and holds a patent in GPS attitude determination. Prior to joining The University of Texas at Austin in 1999, Dr. Lightsey worked at NASA’s Goddard Space Flight Center for 13 years.