

## Assessment of Vision-Based Terrain Relative Navigation Algorithms

### Abstract:

The Lunar Orbital Platform-Gateway (LOP-G), currently being developed by NASA and other international partners, will act as a cislunar space station in a Near-Rectilinear Halo Orbit (NRHO). The DSG will need to be able to navigate without ground communication, and so autonomous navigation is of increasing interest for this mission. Current work in this field shows that terrain relative navigation (TRN) is a key part of autonomous navigation strategies near other spacecraft or planetary bodies, providing pose estimates from measurements to known or unknown surface landmarks. Our work considers four different front-end algorithms for TRN: known feature finding, template matching, crater matching using shadows, and crater matching using machine learning. This presentation compares these algorithms based on a number of metrics for use in navigating an NRHO trajectory.