



EPSC Abstracts

Vol. 15, EPSC2021-150, 2021, updated on 09 Dec 2021

<https://doi.org/10.5194/epsc2021-150>

Europlanet Science Congress 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



## Line of Sight Analysis

Emily Law, **Natalie Gallegos**, and Shan Malhotra

NASA JPL, Pasadena, United States of America ([emily.law@jpl.nasa.gov](mailto:emily.law@jpl.nasa.gov))

The Line of Sight (LoS) is one of the latest tools to join the analytics suite of tools for the Solar System Treks (<https://trek.nasa.gov>) portals. The LoS tool provides a way to compute visibility between the entities in our solar system. More concretely, this utility searches for windows of communication or a “line of sight” between any two entities. Entities include orbiters, rovers, planetary bodies, ground stations, and other topographical locations. In addition to establishing communications between the two entities, the tool also takes into account local terrains of the entities in question.

The software seeks to answer questions about establishing communications between a rover and an orbiter, or an orbiter to a ground station. In mission planning, LoS can be used to determine possible traverses for a rover that must maintain communications with a lander, or find time intervals of communication to an orbiter when a rover or lander are near an obstructing surface feature such as a crater rim or mound. Computations can be even more granular and lines of sight can be computed between mission instruments, thus allowing to ask questions such as “Is the High Gain Antenna on a rover visible from an orbiter?”

The initial release of the software focuses on the lunar surface and the LRO spacecraft. Users can ask whether a topographical location on the moon is visible from the orbiter or a discrete set of ground stations on Earth. The tool uses NAIF SPICE and various mission kernels for computing planetary geometries. LoS also uses high resolution Digital Elevation Model (DEM) to model the terrain surrounding the points of interest. In-house software is used to convert high resolution DEMs into a format compatible with the tool. Users can provide their own DEMs to model the terrain on different topographical locations to use for their own computations.