

ASTRODYNAMICS SYMPOSIUM (C1)
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VISUAL NAVIGATION PERFORMANCE FOR PRECISE LUNAR LANDING: STATUS OF A
TECHNOLOGICAL BREAKTHROUGH**Abstract**

Future lunar exploration missions foresee to precisely land in a certain target area of scientific interest in order to deliver cargo or carry out scientific activities. Current studies show that the target accuracy of a few hundreds of meters can be achieved by use of a navigation system which analyzes camera images of the lunar surface in order to locate the position and orientation of the camera with respect to a map of the surface. This improvement in the final performance of the navigation system is achieved with a very limited increase of complexity, weight and power requirements.

This kind of navigation technique is very well known in the robotics community as well as the connected technical problems. Those are mainly compelling with: the definition of image processing algorithms, the precision of the available maps, the dynamics of the acquisition sensor, the camera calibration and mounting accuracy.

This paper aims to outline the current activities involved within the research workframe of Astrium Space Transportation, providing the current status of the technique and a short explanation of the challenges there connected. Results of simulations and of hardware-in-the-loop tests for most of the problems discussed above are provided and discussed. Finally an overview of the next steps in the development of a robust visual navigation system are outlined.