



Standing on the Shoulders of Apollo: MEMS seismometers for the Lunar Geophysical Network

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INTRODUCTION

Commercial Lunar Payload Services (CLPS) is a NASA program to acquire end-to-end commercial payload services between the Earth and lunar surface.

Micro-Electro-Mechanical Systems (MEMS) sensors are small, lightweight sensors etched on a silicon wafer.

Are MEMS sensors suitable for deployment on the Moon?

Will the sensor detect sufficient moonquakes, if the mission extends for a single lunar day (approximately two weeks

SSP SENSOR - CURRENT SENSOR AND IMPROVEMENTS

The performance of the current generation of SEIS-SP sensor is limited by the thermal noise floor from gas damping within the package [2]. The near- vacuum of the lunar surface will reduce the thermal noise floor.



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ESTIMATING DETECTION RATES

The Apollo missions included surface deployments of seismometers that ran at multiple landing sites over periods between 1969 and 1977.

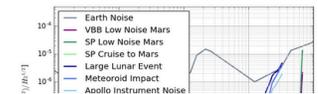
We removed the instrument response and set the seismometer output to acceleration.

We estimated the maximum acceleration for many events and counted the number of events in each group.

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PERFORMANCE OF THE SSP SEISMOMETER

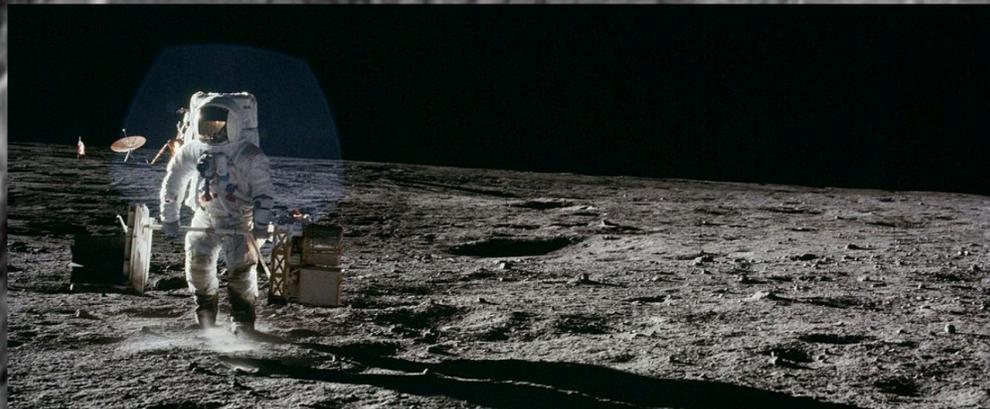
The measured spectral amplitude of the lunar seismic signals measured by Apollo compared to the performance of the InSight SP microseismometer, and the SSP target performance.



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COMMERCIAL LUNAR PAYLOAD SERVICES

Commercial Lunar Payload Services (CLPS) is a NASA program to acquire end-to-end commercial payload services between the Earth and lunar surface.



LUNAR GEOPHYSICAL NETWORK

The Lunar Geophysical Network is a proposed mission. A mission concept study was funded in October 2019. It would operate four or more nodes on the Moon.

DISCLOSURES

ABSTRACT

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