The Lunar Geophysical Network (LGN) is a mission proposed to explore the Moon's interior using a network of geophysical stations. The goal is to gather comprehensive data that can advance our understanding of the Moon's geology and composition. Here are the key principles and objectives of the LGN:

**Overarching Principles:**
1. Must be better than Apollo (coverage, duration, instrument performance).
2. Learn from the Apollo experience.

### Why LGN?

**Planetary Science:**
- Moon represents an end-member in planetary evolution (large small body, small rocky planet).
- Primary planetary differentiation preserved.
- Key to understanding terrestrial planet initial differentiation.

**Lunar Science:**
- Heat flow probes yield crustal heat budget estimates.
- Combined with EMS, the temperature profile of the deep interior can be modeled along with mineralogy.
- Seismic and LLR data also yield structure and compositional information of the lunar interior.
- High fidelity data from LGN would enhance the usefulness of the GRAIL and SELENE gravity data.

**Human Exploration:**
- LGN must be established *prior* to renewed human lunar activity; we do not know the exact locations or causes of the shallow moonquakes (SMQs) – the largest magnitude seismic events recorded by Apollo (1 event/year of magnitude ≥5; [4,5]).
- Establishing surface infrastructure near SMQ epicenters must be avoided.

### Technology Development

**Underway:**
- Seismometer [6,7,8]
- Heat Flow Probes [9,10]

**Needed:**
- Reliable landers. Leverage the MSFC International Lunar Network [1] experience, MoonRise, etc.
- EMS deployment mechanisms.
- Long-lived (≥10 years) power supply for each station
- Miniaturization, ruggedization, & cold electronics.
- Autonomous operations, data based decision making, and networking.

### Secondary Payloads

**Ground/Lunar Penetrating Radar:** Aid with heat flow probe deployment and shallow structure determination (e.g., Chang'E-3 Yutu Rover).

**Gravimeter:** Long duration tidal tomography.

**MEMS (Micro-Electro-Mechanical-Systems) Seismometers**

### References:


[2] University of Notre Dame (neal.1@nd.edu), 2NASA JPL-Caltech, 3UCLA, 4University of Maryland, 5Laboratori Nazionali di Frascati (LNF) dell’INFN, 6UC-Santa Cruz 7Southwest Research Institute, 8German Aerospace Center, 9NASA-MSCF, 10Texas Tech Univ., 11NASA-GSFC, 12Planetary Science Institute, 13Observatoire de la Côte d’Azur, Laboratoire Lagrange, 14Honeybee Robotics.