The Lunar GNSS Receiver Experiment (LuGRE)

United Nations,

Vienna, 27/09/2021

Dr. Oscar Pozzobon, Director
Our Missions

NASA SL14 2019
Mission Status: Completed - SUCCESS

NASA BOBCAT-1 20202
Mission Status: Ongoing - SUCCESS

ESA NASA GARISS 2018
Mission Status: Completed - SUCCESS
Mission Objective: Receive GNSS signals at the Moon and demonstrate PNT.

Mission Name: Lunar GNSS receiver Experiment

Landing Location: Mare Crisum 17.0°N/59.1°E

Date: 2023

Lander: Firefly Blueghost 1
LuGRE Mission Profile

1. CLPS 19D Mission
   - Launch July 2023
     (SpaceX Falcon 9)

2. Phasing Orbits
   - (1.5–4.5 orbits in 15–49 days)

3. Transit GNSS Data Collection
   - ≥60 min every 14hr via reorient
     Antenna stowed

4. Lunar Phasing Orbits
   - (2–12 days)

5. Powered Descent
   - (~30 minutes)

6. Continuous GNSS Data Collection
   - (12 days surface operations)
     Antenna deployed, Earth-tracking
     2x-2.5s baseband sample collection

Credit: Chinese National Space Administration, Xinhuanet
LuGRE Operations

1. GNSS SSV Signals Collection and processing
2. Joint operations, Telemetry data collection
3. NASA Science Processing Center
4. ASI / Qascom Science Processing Center
5. Public Distribution

Credit: Chinese National Space Administration, Xinhuanet
LuGRE Challenges

1. Deep Space Antenna
   L1-L5 14dBi GNSS Antenna

2. Antenna Bending Mechanism

3. RF Cabling and Harness

4. Low Noise Amplifier

5. Lunar GNSS Receiver
LuGRE Operations

1. Investigate Advanced High Sensitivity signal processing techniques
2. Investigate Moon Signal acquisition and processing on earth
3. Experiment Lunar Navigation for space stations and rovers
4. Experiment Lunar Time transfer
5. Disseminate Lunar Data to the entire scientific community
Can we Achieve SDG With Lugre?

Goal 4) Education with moon data
Goal 7) Energy monitoring in developing countries
Goal 8) New Jobs in scientific domain
Goal 9) Innovation in GNSS products and technologies on earth
Goal 17) Worldwide potentials for partnership
Thank you!

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