Qascom
Trust is Nice, Control is Better.

The Lunar GNSS Receiver Experiment (LuGRE)

United Nations,

Vienna, 27/09/2021

Dr. Oscar Pozzobon, Director

Qascom

Trust is Nice, Control is Better.

Services Domain

Engineering

- Space Engineering
- GNSS Authentication
- R&D

Technologies

Advanced Navigation

- Space Receivers
- Test Receivers
- PRS

Simulation & Test Systems

- GNSS Simulators
- Test Equipment
- Security Testing

SIGINT & Cybersecurity

- Jam/Spoof monitoring
- Cyberange & SOC
- NAVWAR

Galileo System

GPS/Galileo receiver

GPS/Galileo Simulator

Security Monitoring

Qascom
Trust is Nice, Control is Better.

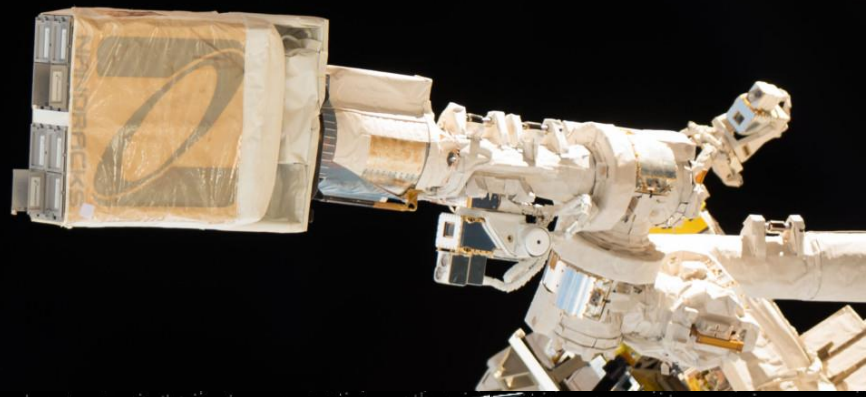
Our Missions

NASA SL14 2019

Mission Status:
Completed-SUCCESS

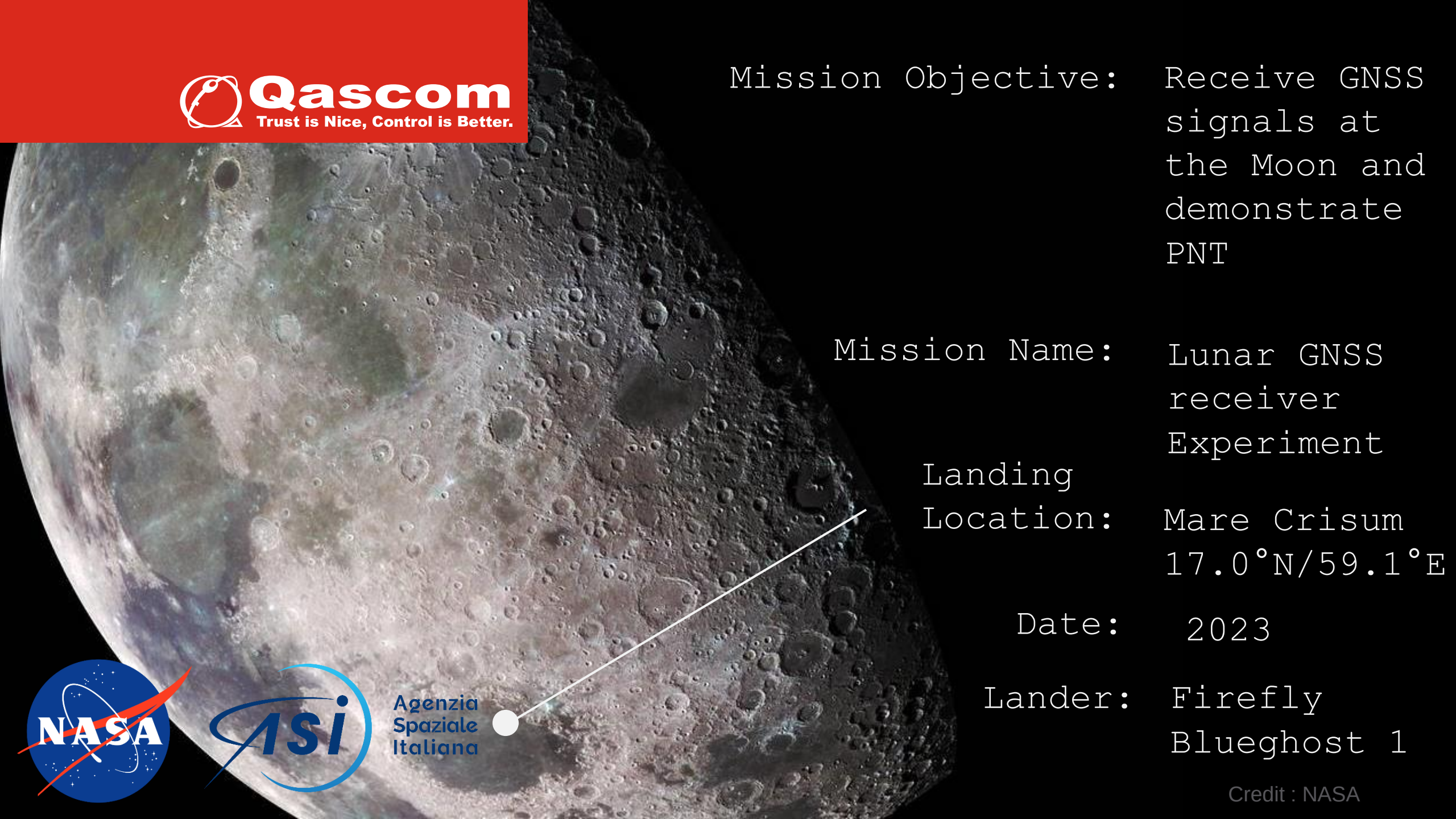
NASA BOBCAT-1 20202

Mission Status:
Ongoing - SUCCESS



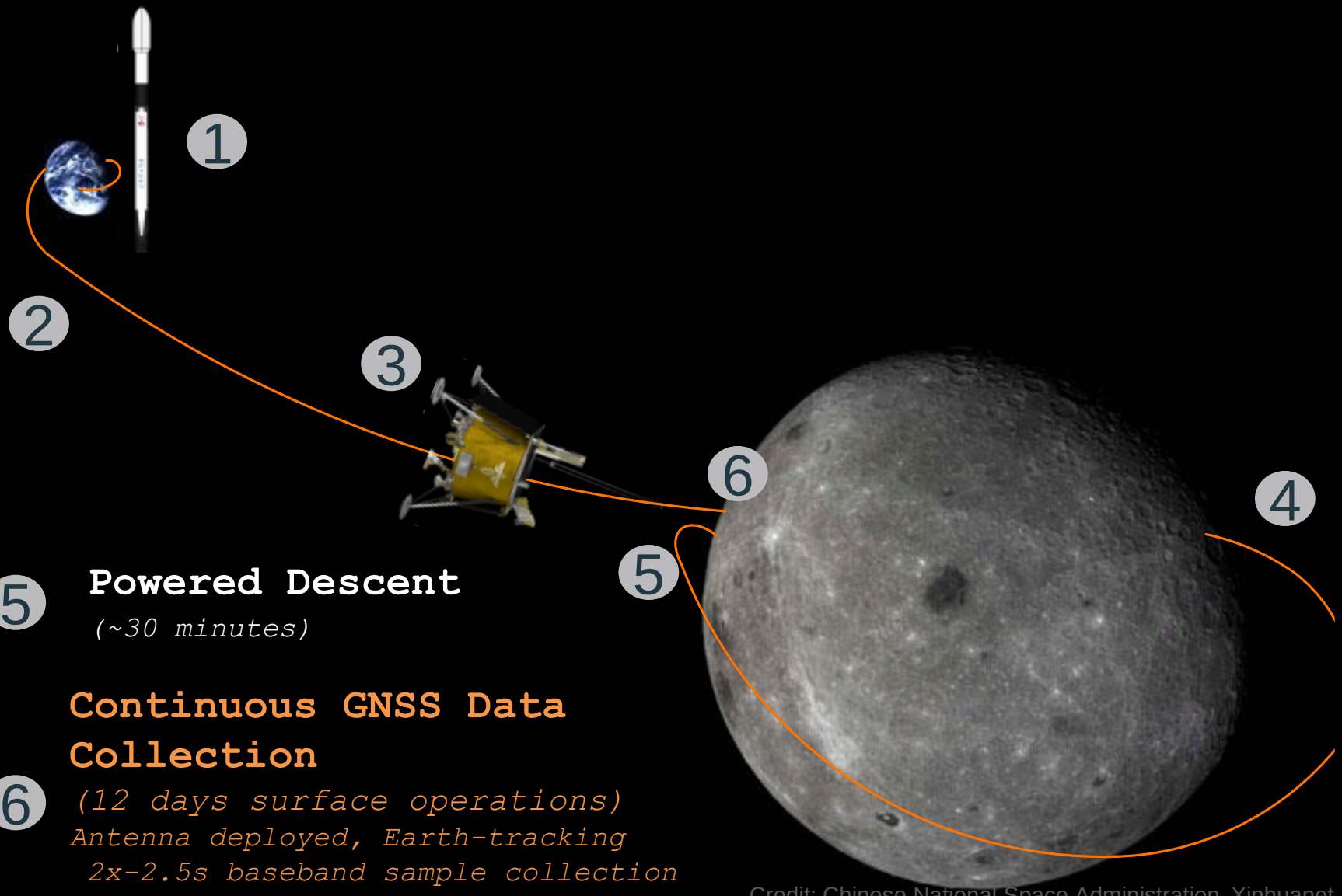
ESA NASA GARISS 2018

Mission Status:
Completed-SUCCESS


Qascom
Trust is Nice, Control is Better.
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
NASA
ASI
Agenzia Spaziale Italiana
Credit : NASA

Qascom
Trust is Nice, Control is Better.

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)

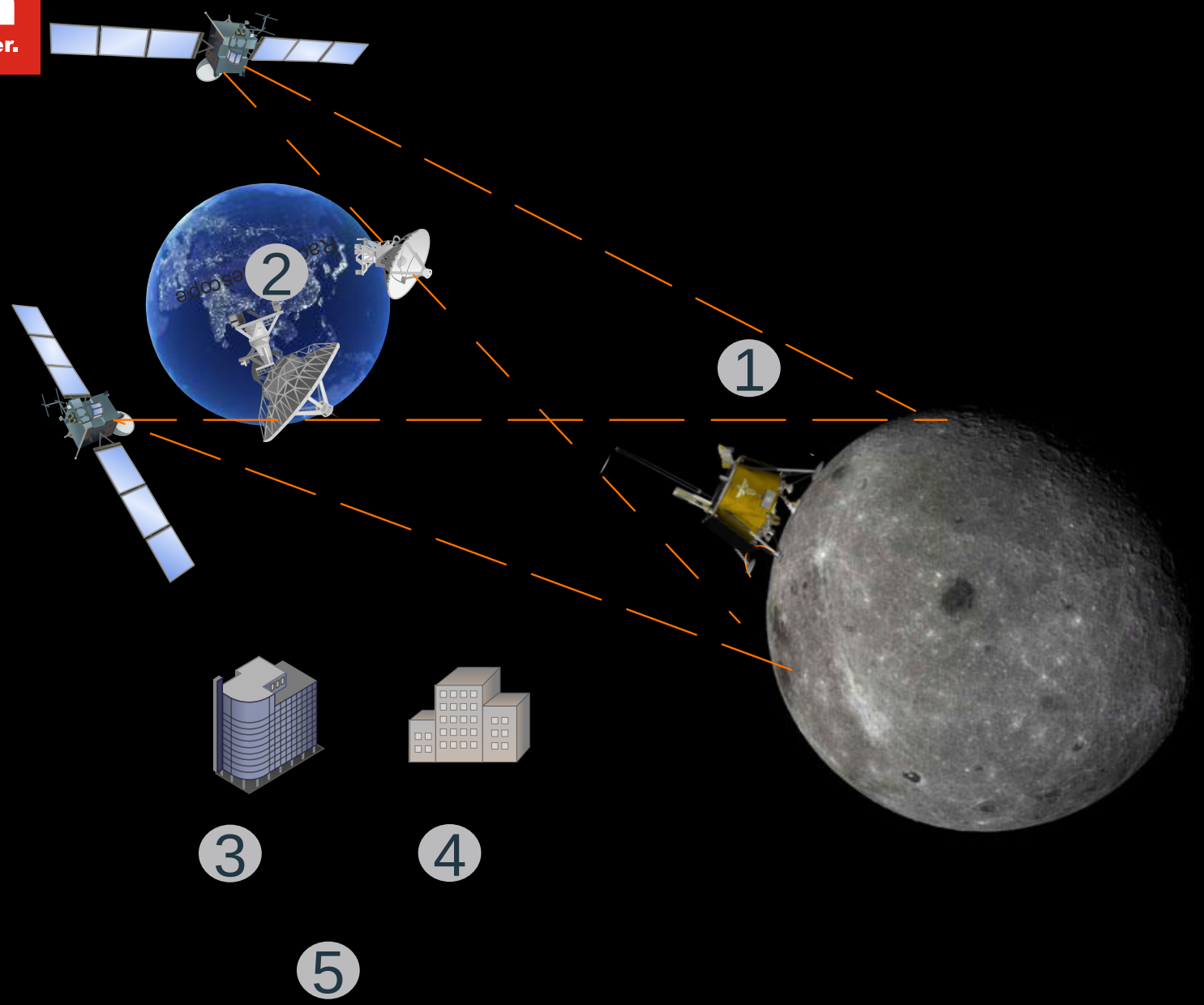
6. **Continuous GNSS Data Collection**
   (12 days surface operations)
   Antenna deployed, Earth-tracking
   2x-2.5s baseband sample collection

Credit: Chinese National Space Administration, Xinhuanet

Qascom
Trust is Nice, Control is Better.

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

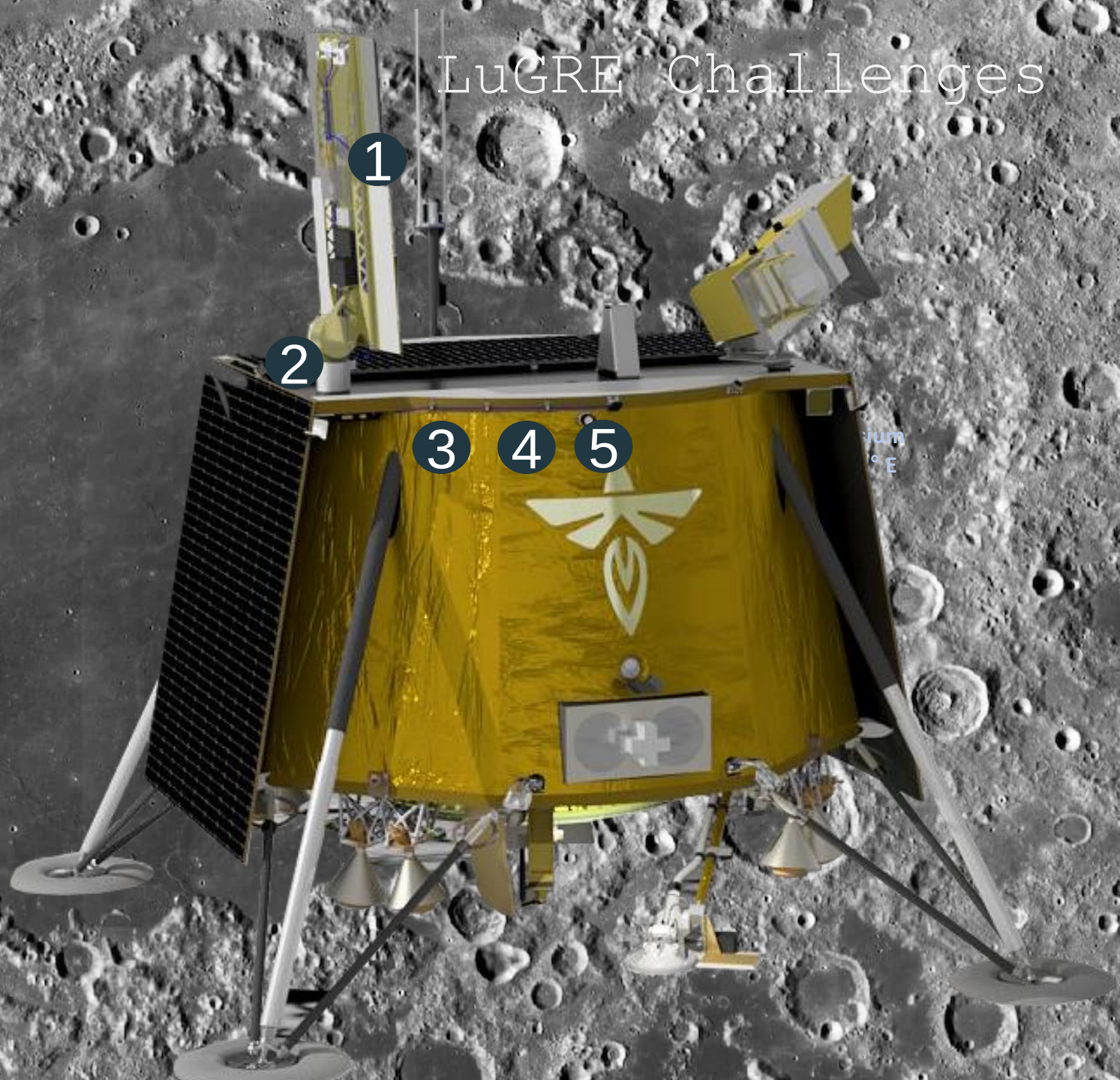


Credit: Chinese National Space Administration, Xinhuanet

Qascom
Trust is Nice, Control is Better.

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



Qascom
Trust is Nice, Control is Better.

LuGRE Opportunities

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

Qascom
Trust is Nice, Control is Better.

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) Worlwide potentials for partnership

Credit : NASA

Qascom
Trust is Nice, Control is Better.

Thank you!

info@qascom.it