SSTL LUNAR

Lunar Pathfinder Launching Next Year!

ESTEC Space for Inspiration - January 2024

Lunar Pathfinder

- Commercial mission offering lunar data relay services for **commercial** and **institutional missions**
- Testbed for navigation mission technology
- Source of space weather data

In development for several years, currently in manufacture, scheduled for launch end of 2025

Lunar Pathfinder is the first node in ESA's Moonlight system which will offer both communications and navigation services

Lunar Pathfinder Commercial Model

SSTL Lunar develops, builds, owns and operates the Lunar Pathfinder relay service, available to commercial and institutional customers

ESA secured as anchor customer, procuring communications services from SSTL Lunar to enable future lunar missions

ESA and NASA MoU. NASA deliver Lunar Pathfinder to lunar orbit under the CLPS Programme (CS-3 Firefly). ESA will provide NASA with access to lunar telecommunications

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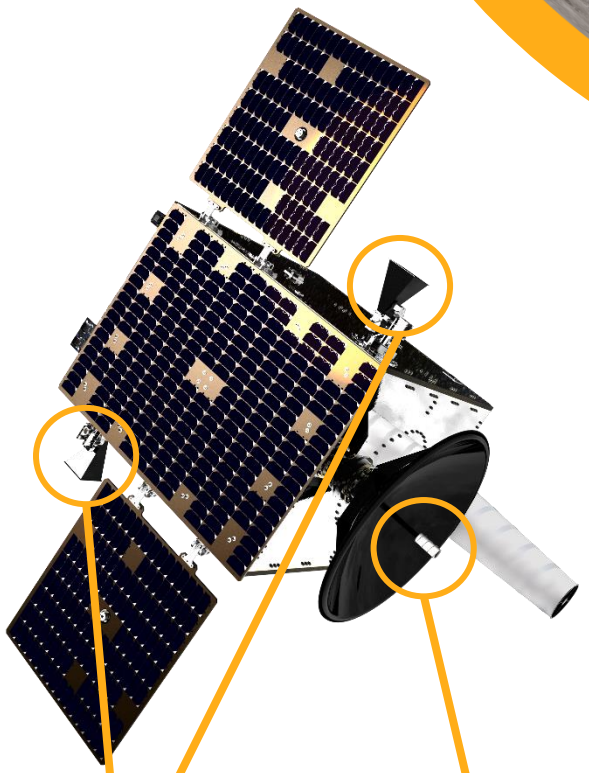
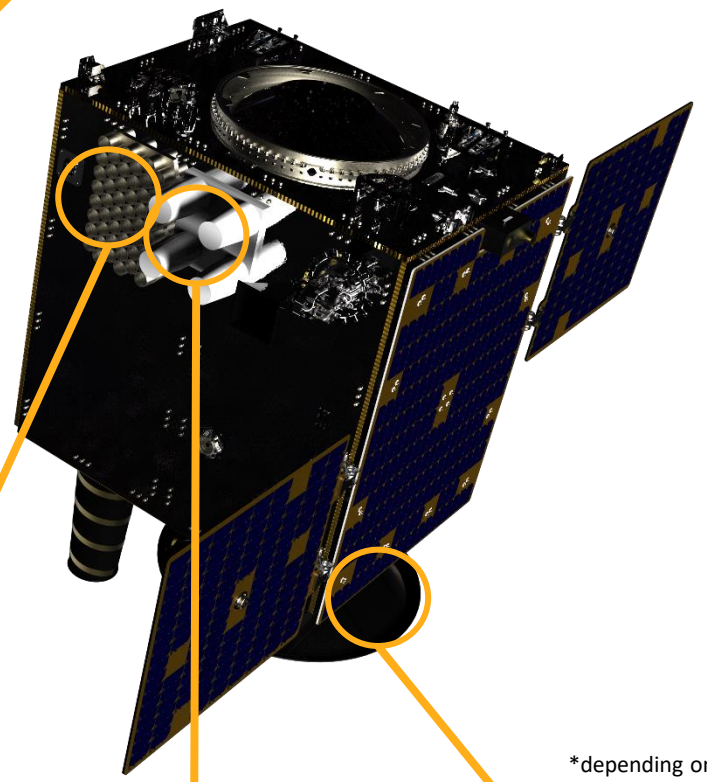


Lunar Pathfinder Capabilities

User return data-rates:

- **Earth Link**
  - 5Mbps X-band
- **Moon Link***
  - 4Mbps S-band

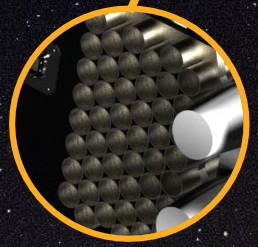


*depending on location

X-Band Earth Link

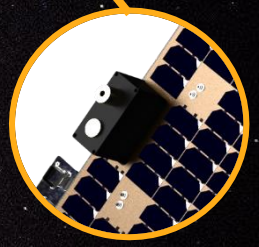
S-Band Moon Link (High Gain and Wide Beam

Communications



Laser Retro Reflector

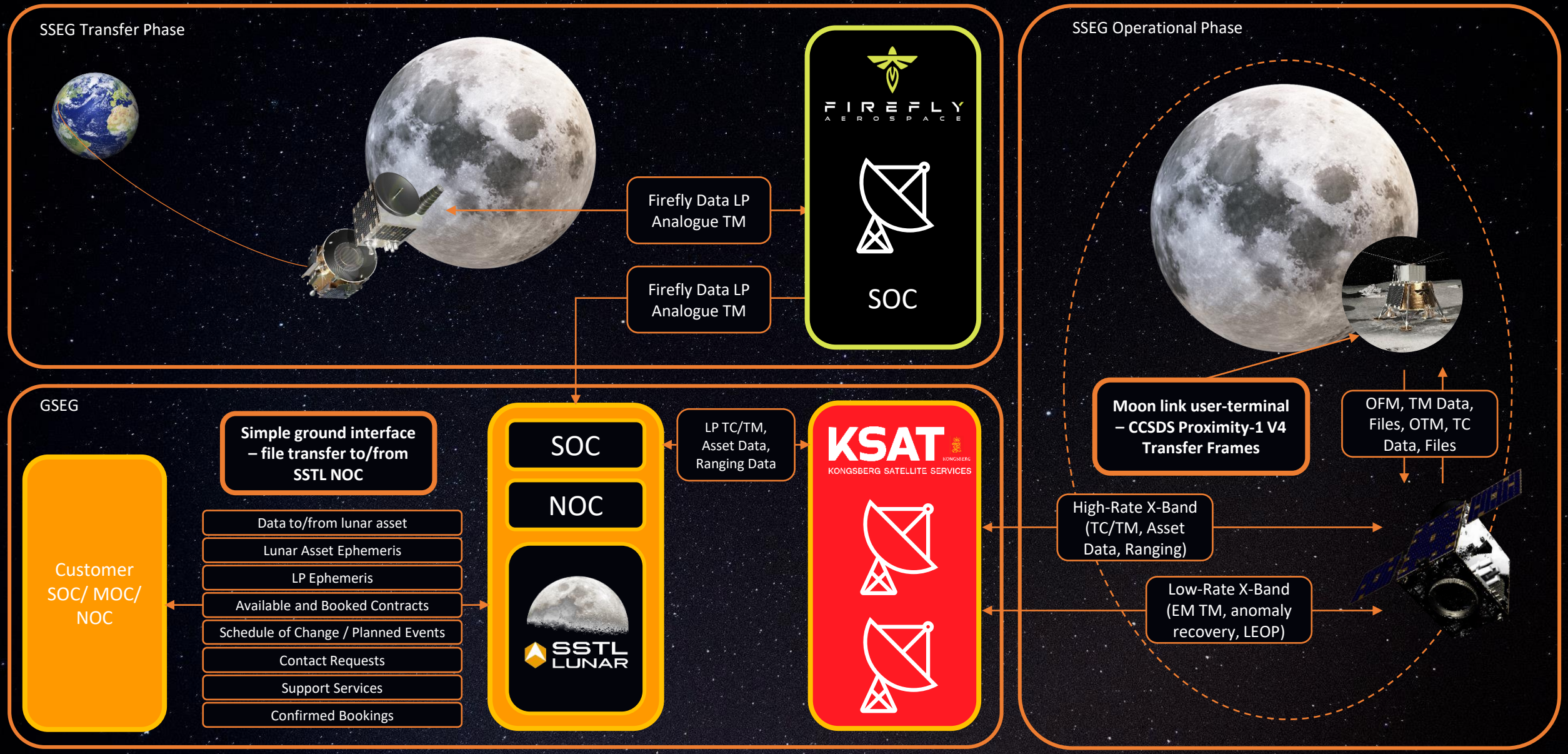
GNSS Weak Signal Detection



Radiation Monitor

Hosted Payloads

Mission Architecture



Lunar Pathfinder Communication Services

Pre-Launch Services

- Customers provide basic technical information
- Ensures compatibility with:
  - Lunar Pathfinder
  - Earth Ground Stations
- Expected performance estimate

Baseline Services

Autonomous Service
- Automated contact planning
- Cost effective

Scheduled Service
- Customer defined contact
- Priority over Autonomous

Emergency Service
- Re-tasking of service to assist asset in emergency
- Priority service

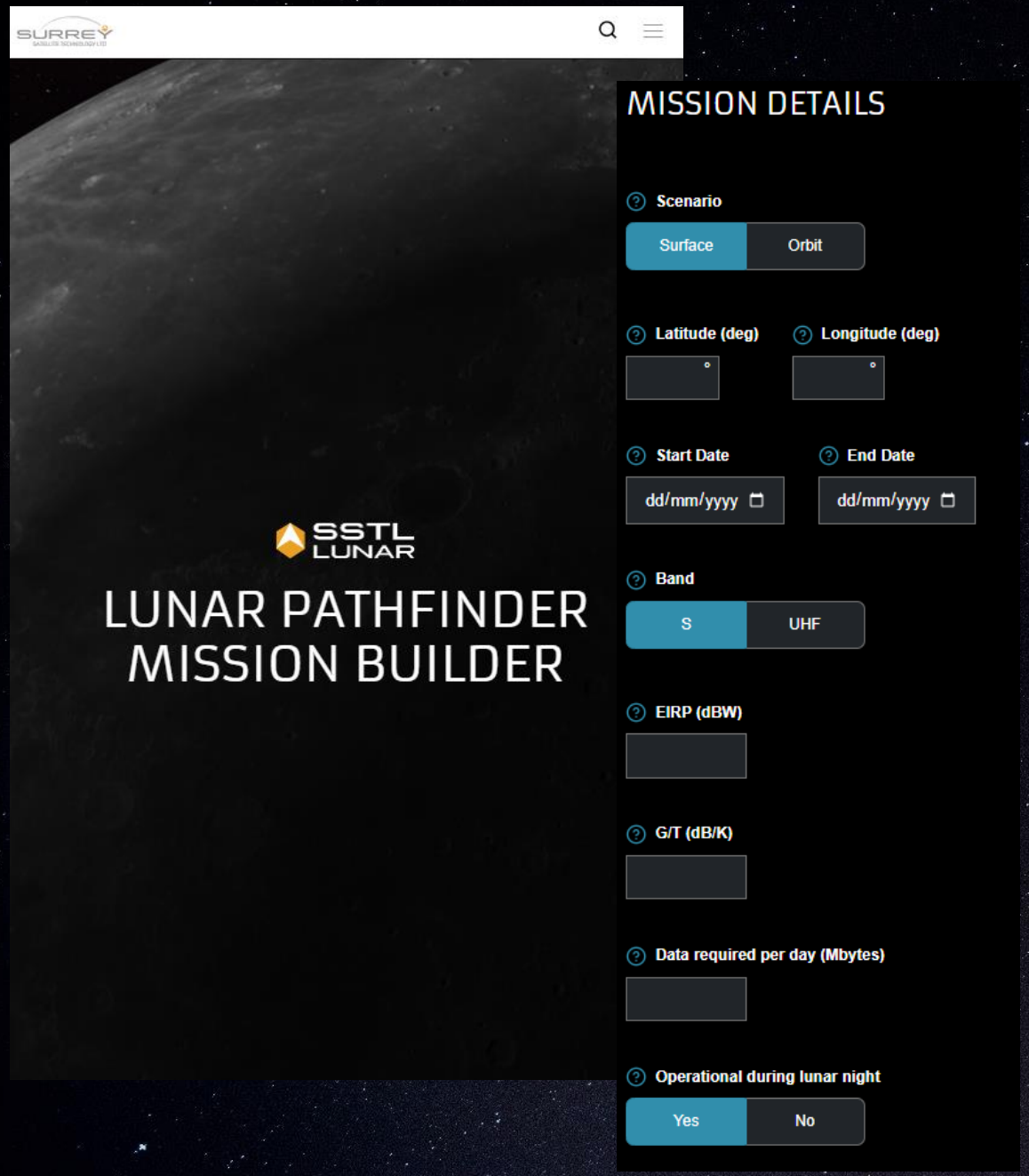
Future Development

- Highest level of performance
- Lowest latency

- Customer uses LPF as backup
- Regular hailing of asset by LPF

- Data sent asset-to-asset
- No need to involve ground station

Lunar Pathfinder Mission Builder



User Inputs

- Location of asset (orbit or surface)
- Lat/Long
- Time window
- Transmit power (EIRP)
- G/T
- Data volume

App Output

- Assessment of LP ability to handle defined scenario

Mission builder app available at sstl.co.uk

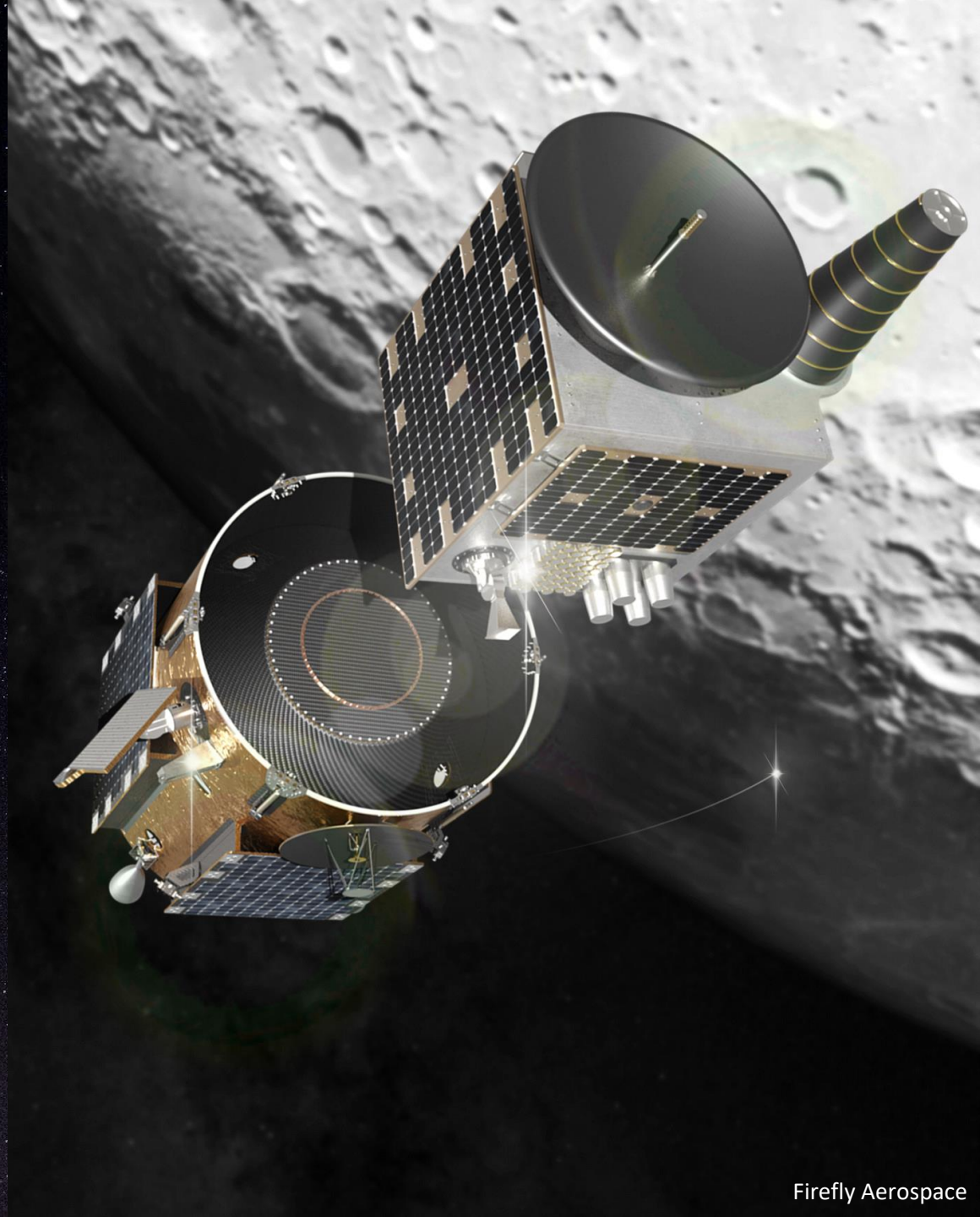
Lunar Pathfinder Launch

NASA CS-3 mission – Firefly Lead Contractor

Blue Ghost Transfer vehicle places Lunar Pathfinder into its target Elliptical Frozen Orbit (ELFO) – highly elliptical and inclined stable orbit with peri-selene on southern hemisphere

Launch: Late 2025, services from Early 2026 for 8+ years

Blue Ghost lander will deliver US Department of Energy's Lunar Surface Electromagnetic Experiment at Night (LuSEE-Night) - the first operational radio telescope to the far side Lunar Surface



Firefly Aerospace


Lunar Pathfinder will launch in 2025...
...commercially available data relay...
...mission enabler...
...first node in Europe's Moonlight system

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Thank you

Further info, please contact lunar@sstl.co.uk and visit our dedicated webpage
https://www.sstl.co.uk/what-we-do/lunar-mission-services

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