NASA Space Apps Challenge 2026

MoonFrom Earth



Selini

Where to land at the Moon's south pole, and when.

For planners, teachers and anyone curious.

Compare 18 sites | See the reason | Find arrival windows



AI-generated logo

Team SBB, Athens
Lunar Landing Site Navigator challenge
www.moonfrom.earth



South pole, 87.5° S to the pole. Relief from NASA LRO LOLA terrain. Shading is illustrative.

The problem

A lander needs the Sun for power and Earth for radio. At the south pole, 2.1 km decides both.

744

sunlit hours
on the ridge

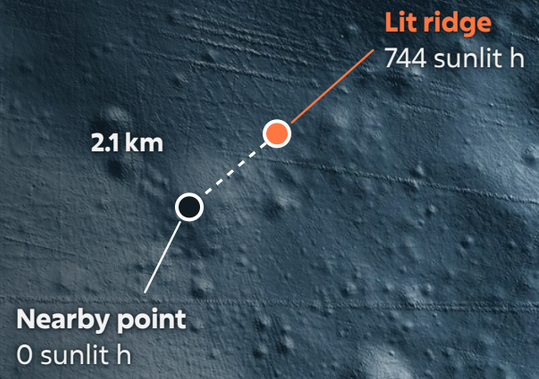
0

sunlit hours at
the nearby point

In January 2027, a ridge near Shackleton crater has 744 sunlit hours. A point 2.1 km away has zero.

With today's tools, each site and date is a separate lookup across several expert interfaces. **MoonFromEarth compares 18 sites across 14 years in one place.**

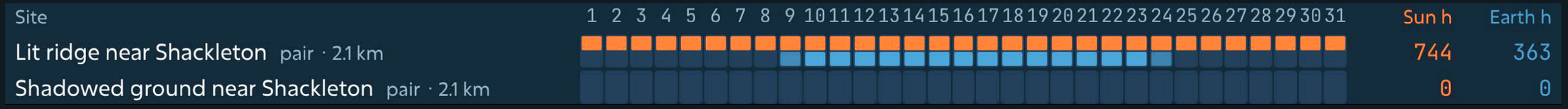
Hourly model in UTC, observer 2 m above the ground. An hour counts as sunlit when any part of the Sun's disc is above the terrain.



Shackleton crater

10 km

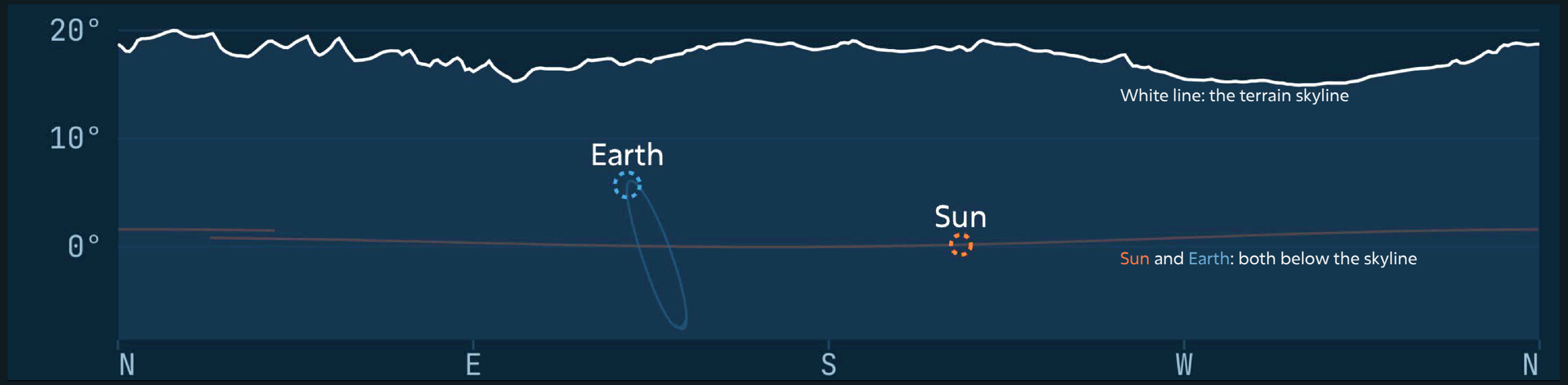
Terrain: NASA LRO LOLA, 5 m. Shading is illustrative, not real sunlight.



The same two sites in the app. January 2027, one square per day. Earth in view: 363 h on the ridge, 0 h at the nearby point.

Sun Earth in view

Surrounding terrain rises 15 to 20° above the level horizon. The Sun reaches only about 2°.



The sky all the way round the shadowed point on 16 January 2027, 07:00 UTC, as the app draws it. Up is angle above the level horizon. A hollow dot is behind terrain.

Terrain

NASA LRO LOLA

Elevation maps of the south pole at 5 m and 30 m. We trace the terrain skyline in 360 directions, out to 150 km.

Sun and Earth

NASA/JPL Horizons

Where the Sun and Earth sit in each site's sky, hour by hour, from 2027 to 2040.

Answer

Above the skyline, or not

For each of our 18 prepared sites, we compare the Sun and Earth with the terrain skyline at every hourly sample.

January to May: less Sun, more Earth.

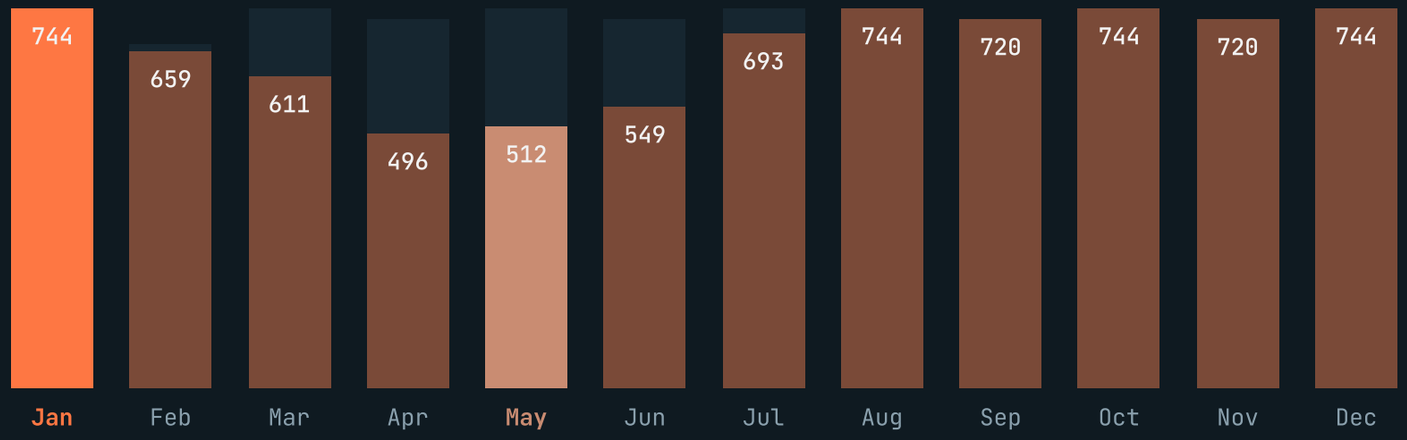
The same ridge, four months later. By May the Sun stands 1.5° north of the Moon's equator, so it is winter at the south pole. Earth's path shifts with libration.

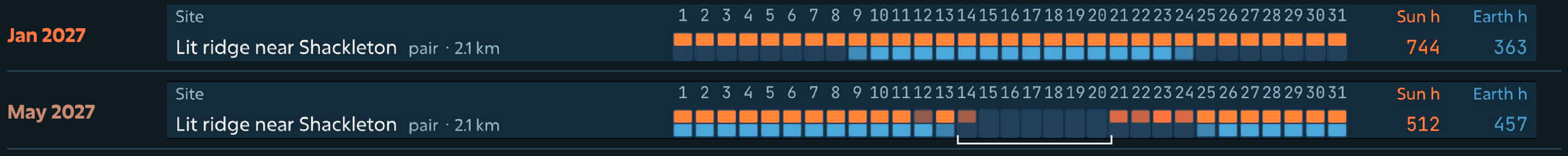
Lit ridge	Jan 2027	May 2027	Change
Sun in view	744 h	512 h	-232 h
Earth in view	363 h	457 h	+94 h

162 h Longest continuous darkness in May: 6 days and 18 hours.

Hours of Sun per month on the lit ridge, 2027

Dark column: every hour of the month





The lit ridge in the app, one square per day. Orange is Sun, blue is Earth in view. Stronger colour means more visible hours that day.

Our answer: mission needs in, sites and dates out

A 100-day rover

2 **of 18 sites offer arrival windows that meet these visibility requirements during 2027 to 2040.**

Illustrative scenario: 100 days at a fixed site

70%
of the stay with the Sun in view

50%
of the stay with Earth in view

50 h
longest continuous darkness allowed

Only two pass: the **best-lit point on Connecting Ridge** and the **lit ridge 1.1 km from it**. The first qualifying arrival is **1 July 2027, 17:00 UTC**.

Sun and Earth thresholds are adjustable assumptions. The 50-hour darkness limit draws on NASA's VIPER operations description.

	Site	2027 2029 2031 2033 2035 2037 2039	Days	Next landing
1	Best-lit point on Connecting Ridge		2057	1 Jul 2027, 17:00 UTC
2	Lit ridge near Shackleton		1910	17 Jul 2027, 02:00 UTC
3	Candidate near Amundsen		0	never, 2027 to 2040
4	Candidate near Cabeus		0	never, 2027 to 2040
5	Candidate near de Gerlache		0	never, 2027 to 2040
6	Candidate near Faustini		0	never, 2027 to 2040

First qualifying arrival

Mission planner in the app. A bright day contains at least one arrival hour that meets the selected visibility requirements. "Days" counts qualifying arrival days.
The 14-year bar shows the broad pattern, not single days.

The check

Compared with published simulations

Observer 10 m above the ground

0.4

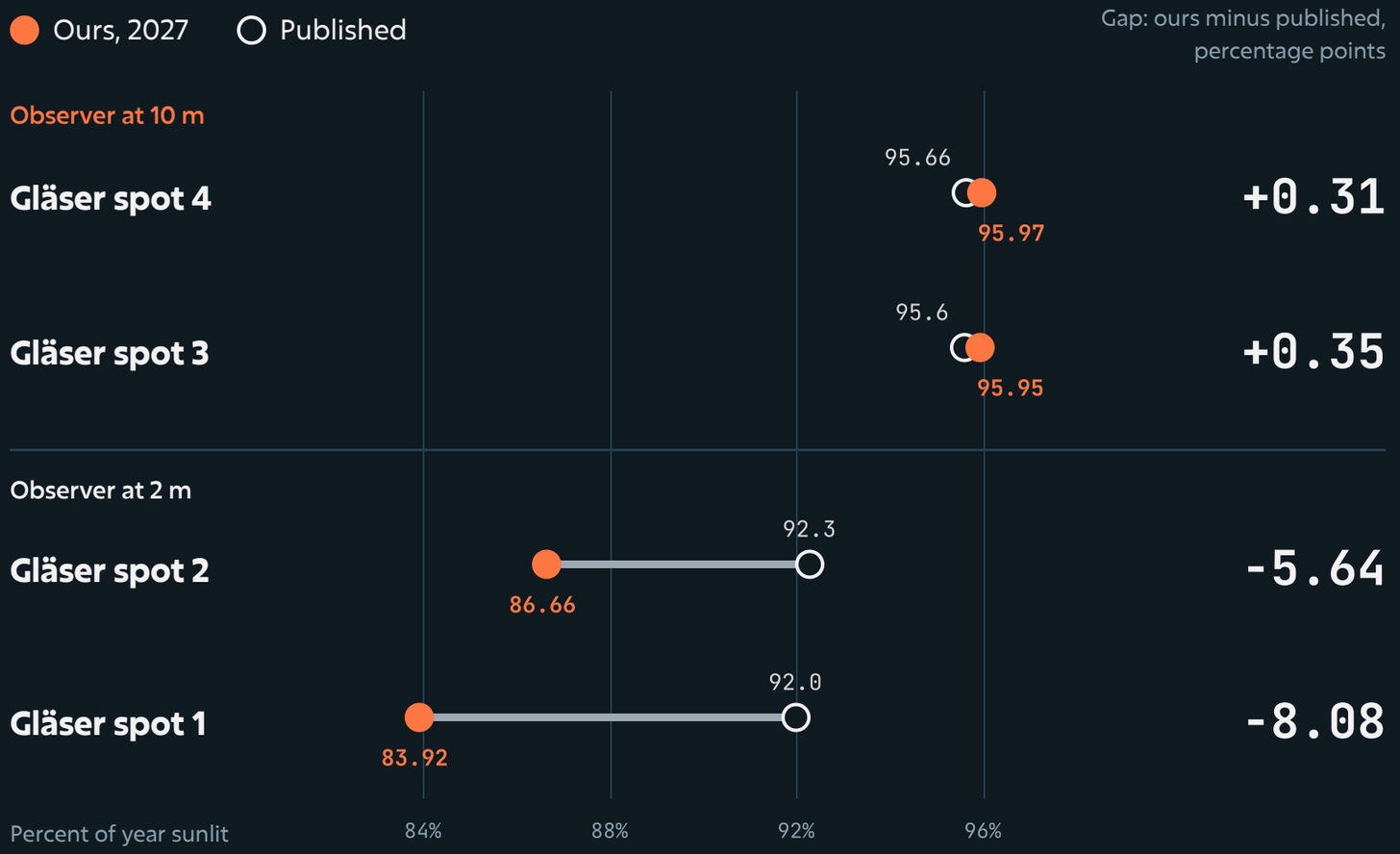
Within 0.4 percentage points at both tested points.

Observer 2 m above the ground

5.6 to 8.1

percentage points lower at the two published test points.

The 2 m results still differ. Terrain-model and simulation-period differences remain possible explanations requiring further investigation.



Percent of the year with sunlight at four published points. Ours is 2027. Published is Gläser et al., EPSC 2014, a 19-year simulation on a 20 m LOLA terrain model; ours uses 5 m. Spot 1 is 95 m from the lit ridge in this deck, which also uses a 2 m observer. This is a benchmark comparison, not proof of accuracy.

Try it

www.moonfrom.earth

Start from a mission, not a site. MoonFromEarth checks every site and hour, and returns the arrival windows.



1 Sort the sites by Sun, Earth or both

2 Step through the hours and watch the sky

3 Plan a mission: search arrival windows

4 Zoom in or add your own point



For learners

Selini, our guide, leads a tour in five steps: why nearby places get different skies.

For planners

Explore which sites and arrival times meet chosen visibility requirements.

Covers

18 south pole sites, with Artemis III candidates and IM-2
Every hour from 2027 to 2040, with countdowns to sunset and Earthset
Past landings and your own points

Limits

Visibility geometry only. It is not a power, temperature or radio link budget
Computed sites are points our scan found, not official landing sites
Past landings and custom points use a spherical Moon without local terrain

Data: NASA/JPL Horizons, NASA LRO LOLA DEM v4 via NASA Moon Trek, NASA PGDA, NASA NSSDCA. **Compared with:** Gläser et al., EPSC 2014.
Results are calculated from NASA inputs, not by AI. **AI assistance:** Claude Code, ChatGPT/Codex. The team logo is AI-generated. Selini, the tour guide, is drawn in code with Claude Code.
Open source. Code and full source register: github.com/nitrimandylis/moon-from-earth (story/sources.md)