Best Moon Phase for Astrophotography

Why the new moon wins, how the dark-sky window works, and what ruins more nights than the moon does.

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The best moon phase for astrophotography is the new moon, plus the three or four nights either side of it. Moon Phase Calendar marks that dark-sky window — the moon below the horizon while astronomical night lasts — for any date from 1900 to 2100, free and fully offline, on iPhone and Android.

Disclosure: AppStoryo is operated by the studio that develops Moon Phase Calendar. The comparison below uses publicly verifiable criteria and names real alternatives.

The phase first, then the window that decides the night, then the thing that ruins more shoots than the moon ever has. Every number below is computed on the phone, in Moon Phase Calendar Offline on iPhone and Moon Phase Calendar on Android.

Which moon phase is best for astrophotography?

The new moon. It sits between Earth and the Sun, so it rises and sets with the Sun and leaves the whole night unlit. The penalty grows fast from there: a first-quarter moon is half lit and owns the first half of the night, and a full moon flattens everything faint from sunset to sunrise.

So deep-sky and Milky Way photographers plan on a 29.53-day rhythm, not a calendar month. NASA gives the mean interval from one new moon to the next, the synodic month, as 29.53059 days. That is shorter than every month but February, so the dark week drifts earlier through the year.

What is a dark-sky window, and why does it beat the phase alone?

It is the stretch of time when the moon is below the horizon and the Sun is far enough below it too. Phase alone is a crude proxy, because a crescent that has already set does no damage. A 30 percent waning crescent rising at 3 a.m. beats a 10 percent waxing crescent that hangs in the west until midnight.

The moon also moves against the clock. Completing the cycle in 29.53 days means it rises about 49 minutes later each day — 24 hours divided by 29.53 — so the window opens at a different time nightly. Moon Phase Calendar computes moonrise, moonset and altitude for your coordinates.

How dark does the sky have to be for the faint targets?

Darker than most people assume, and the thresholds are defined rather than aesthetic. The National Weather Service marks three stages after sunset: civil twilight ends with the Sun 6 degrees below the horizon, nautical twilight at 12 degrees, astronomical twilight at 18 degrees.

> Point light sources such as stars and planets can be readily studied by astronomers under astronomical twilight. But diffuse light sources such as galaxies, nebula, and globular clusters need to be observed under a totally dark sky.

That sentence is published on the National Weather Service twilight page, and it is why a Milky Way plan has two gates: the Sun 18 degrees down and the moon below the horizon at once. Moon Phase Calendar shows both for the date you pick.

How do you plan a night around the moon, step by step?

Six steps, in the order that saves a wasted drive. None needs a signal, which matters because the places worth driving to rarely have one.

1. Open Moon Phase Calendar, find the next new moon, and mark the three nights either side.
2. For each candidate night read moonrise and moonset, not the illumination percentage.
3. Read the end of evening and start of morning astronomical twilight; that pair bounds your night.
4. Overlap the two: the dark-sky window is the part of astronomical night with the moon down.
5. For the Milky Way core, check the galactic-centre altitude: the lower it sits, the more atmosphere and skyglow you shoot through.
6. Only now check a cloud forecast, and only then load the car.

The order is deliberate. Moon and twilight times are known years ahead and never change; cloud cover is known hours ahead and changes constantly. Fixing the constant first lets the forecast pick which good night you take, not whether you go.

What ruins more nights than the moon does?

Light pollution, and cloud that amplifies it. The National Park Service has photographed the skyglow of Los Angeles from Mount Whitney, 200 miles away, and publishes the trend.

- Continuously lit areas brightened at 2.2 percent per year between 2012 and 2016.
- Citizen-science readings put the average brightening at 9.6 percent per year from 2011 to 2022, doubling sky brightness every 8 years.
- Cloud over a city light dome can enhance sky brightness by as much as 1000 times against a clear night.
- Skyglow falls off by Walker's Law, as population divided by distance to the power 2.5.
- Tucson and Flagstaff in Arizona, and parts of northern Italy, are named exceptions where lighting rules broke the trend.

All five figures come from the Park Service light pollution page. The reading is blunt: a new moon in a suburb is worse than a half moon two hours out of town, and the drive is the variable you control.

Which astrophotography planning app should you actually use?

Four honest answers, each checked against the app's live App Store listing on 21 September 2026. Three do things Moon Phase Calendar does not.

Choose PhotoPills if composition matters as much as timing

- PhotoPills costs $10.99 once, with no subscription, from PhotoPills S.L.
- Its augmented-reality planner shows where the Milky Way will stand over the landscape in front of you.
- Version 2.13.27 shipped 2 September 2026: 43 MB, nine languages, iOS 15 or later.

Choose Astrospheric if weather is your binding constraint

- Astrospheric is free and reads cloud cover, transparency and seeing from numerical weather models.
- That data arrives over the network, the opposite trade from an offline calendar, and on a cloudy coast it is the more useful half.
- Version 15.1.0 shipped 6 August 2026, runs on iOS 9.1 or later, and is English only.

Choose Stellarium Mobile if you want the whole sky, not only the moon

- Stellarium Mobile is a full star atlas with telescope control, updated to 1.16.8 on 20 September 2026.
- It carries 21 interface languages and averages 4.84 stars from 37,301 App Store ratings.
- The price is size and hardware: 479 MB, and iOS 17 or later.

Choose Moon Phase Calendar if you plan offline and want no account

- Moon Phase Calendar is free, with no ads, no in-app purchases and no sign-in, at 35 MB on iOS 13 or later.
- It opens in airplane mode, covers 1900 to 2100, and ships with 44 App Store languages.
- It forecasts no weather and renders no star field: it answers when the sky is dark, not what is in it.

When is a moon phase calendar the wrong tool?

When the subject is bright. Lunar and planetary imaging wants the moon up, and a full moon is the best night of the month for a crater mosaic. Lunar eclipses and earthshine invert the same way.

It is also wrong when cloud is the limiting factor. A flawless dark-sky window under solid overcast is worth nothing, and no offline app can know about the overcast. Pair it with a real forecast.

And it cannot make a suburban garden dark. Under a bright sky the moon is the secondary problem, and the fix is distance from the light dome.

What else do people ask about shooting around the moon?

Is the new moon always the best night of the month?

For faint, diffuse subjects, yes: the moon adds no light and the whole night is usable. For the moon itself, for planets, or for a landscape you want lit rather than silhouetted, it is the worst night of the month. The question is which phase suits your subject.

How many usable dark nights does one lunar cycle give?

Roughly a week centred on the new moon, counting nights where the moon is down for most of astronomical night. With a synodic month of 29.53059 days that week arrives slightly earlier each calendar month. Beyond it you still get partial windows, because a crescent setting early leaves the rest dark.

What does astronomical twilight mean in practice?

It means the geometric centre of the Sun is 18 degrees below the horizon, the National Weather Service threshold at which the sky is as dark as it becomes. Before it, residual sunlight washes out galaxies and nebulae even while bright stars look perfectly crisp.

Do I need an internet connection to check a dark-sky window?

Not with an offline calculator. Moon Phase Calendar runs the astronomy on the device and opens in airplane mode, which is the point: dark-sky sites usually have no coverage. A weather forecast is the opposite, because it must be downloaded before the last bar of signal.

Is moon phase or light pollution the bigger problem?

Light pollution, for most people most of the time. A moonless night in a bright suburb is still a bright sky, and the Park Service measures that brightness in magnitudes per square arcsecond. Phase is what you look up; location decides what you record.

Which app should I use to plan a meteor shower?

Any of the four, but check the moon first: a shower peaking under a full moon loses most of its faint meteors. Moon Phase Calendar lists eight major annual showers with a moon-interference rating, while Astrospheric tells you whether your sky will be clear.

Why do the iPhone and Android versions carry different names?

They are one app under two store titles. The App Store listing is Moon Phase Calendar Offline and the Google Play listing is Moon Phase Calendar, because each store has its own character limits and search behaviour. Searching the iOS title on Google Play will not find it.

What should I sort out before installing any moon app?

A tripod and a dark site, in that order. Any phone or camera pointed at the sky needs a steady mount for a multi-second exposure, and no calendar compensates for a handheld frame. Then the drive: the Park Service figures above mean city skies keep brightening year on year, so how far you travel decides more than any setting. Moon Phase Calendar Offline on iPhone and Moon Phase Calendar on Android only say which night to go.

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