

Planning an astrophotography session



1. What You Need to Decide *Before* You Go Out

Good planning prevents 80% of beginner frustration.

• Key Questions

- **What am I imaging?** (one clear target only)
- **How long will I image it?** (realistic total time)
- **Where in the sky will it be?** (altitude matters more than direction)
- **What could ruin the session?** (Moon, clouds, wind, dew, software updates)
- **Am I completely familiar with my equipment and software?**
(esp. in the dark)

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2. Target Selection

Choose targets that are **bright, large, and forgiving**.

Beginner-Friendly Target Traits

- ✓ High surface brightness
- ✓ Above 40–45° altitude
- ✓ Large enough for camera lenses
- ✓ Visible for ≥ 2 hours

Avoid Early On

- ✗ Small faint galaxies
- ✗ Low-altitude objects
- ✗ “Instagram targets” taken with big observatories

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3. Sky Conditions That Matter

Moon Phase & Position (VERY Important)

- New Moon \pm 5 days = best
- Avoid imaging when the Moon is:
 - Above the horizon
 - Within $\sim 60^\circ$ of your target
- **Exception:** Moon, planets, star clusters

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3. Sky Conditions That Matter (cont.)

☁ Cloud Cover

- **High cloud = bad** (kills contrast)
- Broken low cloud can sometimes work – planetary and lunar “shooting the gaps”
- Always check *hour-by-hour* forecasts

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3. Sky Conditions That Matter (cont.)

≡ Transparency and Seeing

Transparency

- describes how *clear and light-absorbing* the atmosphere is.
- It affects **how much faint light reaches your camera.**

Transparency controls contrast and depth

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3. Sky Conditions That Matter - Transparency (cont.)

What Causes Poor Transparency

- High thin cloud
- Haze or smoke
- Dust and aerosols
- Humidity
- Light pollution scatter
- Moonlight
- Least affected: moon, planets, bright star clusters

Transparency controls contrast and depth

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3. Sky Conditions That Matter - Transparency (cont.)

How to Recognise Transparency Conditions

- **Visual clues:** Milky Way washed out or invisible; sky looks grey instead of black; halo around the Moon or bright stars
- **In images:** Background noisy and flat; stretching reveals little extra detail; gradients become harder to remove
- **How to treat transparency:** Prioritise transparency over seeing; avoid Moon entirely for deep sky; check hourly cloud and haze forecasts; choose bright targets when transparency is mediocre

Transparency controls contrast and depth

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3. Sky Conditions That Matter - Seeing

≈ Seeing

- describes how *steady or turbulent* the Earth's atmosphere is.
- It affects **how sharp stars and fine detail appear.**

Seeing controls sharpness

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3. Sky Conditions That Matter - Seeing (cont.)

What Causes Poor Seeing

- Atmospheric turbulence
- Temperature differences between air layers
- Jet stream activity
- Heat rising from buildings, roads, and roofs
- Low-altitude targets (looking through more atmosphere, ie “airmass”)

Seeing controls sharpness

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3. Sky Conditions That Matter - Seeing (cont.)

How Seeing Affects Astrophotography

- Stars appear bloated or “boiling”; fine detail is smeared or lost; high-magnification imaging suffers the most
- **Most affected by poor seeing:** Planetary imaging; lunar imaging; small galaxies; high focal length telescopes
- **Least affected:** Wide-field imaging; large nebulae; Milky Way shots

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3. Sky Conditions That Matter - Seeing (cont.)

How to Recognise Seeing Conditions

- **Visual clues:** Stars twinkle strongly → poor seeing
Stars look steady → good seeing
- **At the telescope:** Planet edges shimmer; high magnification won't hold focus
- **In images:** Stars look soft even with good focus; guiding graph looks fine but stars are still bloated

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3. Sky Conditions That Matter - Seeing (cont.)

How to treat Seeing

- Don't obsess over it early on
- Avoid imaging over rooftops
- Image targets when high in the sky
- Use shorter focal lengths on poor seeing nights

Seeing controls sharpness

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3. Sky Conditions That Matter (cont.)



Light Pollution

- Darker skies = better contrast
- You *can* image from suburbs with:
 - Bright targets
 - Longer integration
 - Careful processing
 - (non-beginners: narrowband imaging)
- Bortle scale: describes **sky brightness only**. It measures the impact of **artificial light pollution** on visible stars and deep-sky objects.
- It does **not** measure Seeing, Transparency, Cloud cover
- It simply quantifies how much *artificial light* brightens the night sky

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4. Timing Your Session

Key Timing Concepts

- Astronomical twilight (true darkness)
- Target rise and set times
- Meridian crossing (highest point)

Beginner rule:

 Image when your target is **highest in the sky**

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1. Moon rise and set times
2. Various times of night
3. Object of search
4. Altitude diagram (*info changes as you move the mouse L to R over the graph*)

4. Timing Your Session

TELESCOPIUS TARGETS TOOLBOX ASTROPHOTOGRAPHY

OBSERVATORY SETTINGS
Lat. -34.0, Lon. 150.7 Feb 14
lat -34.0 lon 150.7 GMT+11

1 **WANING CRESCENT MOON**
02:43 am 05:57 pm

2 **DAYLIGHT**
sunset / sunrise: 07:53 pm - 06:32 am
civil night: 08:20 pm - 06:06 am
nautical night: 08:51 pm - 05:34 am
astronomical night: 09:24 pm - 05:01 am
noon: 01:13 pm (Altitude 69°)
midnight: 01:13 am

3 Orion Nebula · M 42 · HII Region ORI

4 **ALTITUDE**
Now: alt 4.69°, az 93.35° (E)
Next Opposition: December 17
daily yearly at 09:00 pm

alt 61° · north · 08:53 pm · Moon 140° away
05:08 pm 12:44 am

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5. Framing & Field of View

Before imaging, confirm:

- Target fits your lens or scope
- Orientation looks good
- You won't clip important features
- This saves wasted data.

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6. Session Length & Expectations

Realistic Beginner Goals

- 30–60 min total = good start
- 1–2 hours = solid result
- Anything more = bonus
- Multiple short subs > few long ones.

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7. Practical Night-Time Considerations

Often forgotten—but important:

- Dew heater or lens warmer, even in summer (humidity!)
- Warm clothing (even in Sydney!)
- Red torch
- Fully charged battery, plus spares
- Placement of the mount – it may sag on grass or soft soil
- Checklist for the session - focus, polar alignment, framing, tracking on etc
- Know your equipment and software well, *before* darkness sets in (practice beforehand)
- Patience
- Don't forget to look up and enjoy the sky

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Websites and apps useful for planning

Stellarium	stellarium.org/
Telescopius	telescopius.com/
Astrobin	app.astrobin.com/ Australian astrophotographers
Sky Safari	skysafariastrometry.com/
Sky Warden <i>new</i>	astro-planner.adfr.io/en
Gary Imm Deep Sky Compendium	https://garyimm.com/compendium (Excel spreadsheet)
<i>new</i> Sky Compendium	skycompendium-online.web.app
Astro Target Planner <i>new</i>	astrotarget-planner-30718389249.us-west1.run.app/
Astronomy Setup Calculator	byronbayobservatory.com.au/astronomy-calculator/