



# Pete and Paul's Observing Challenges

2023



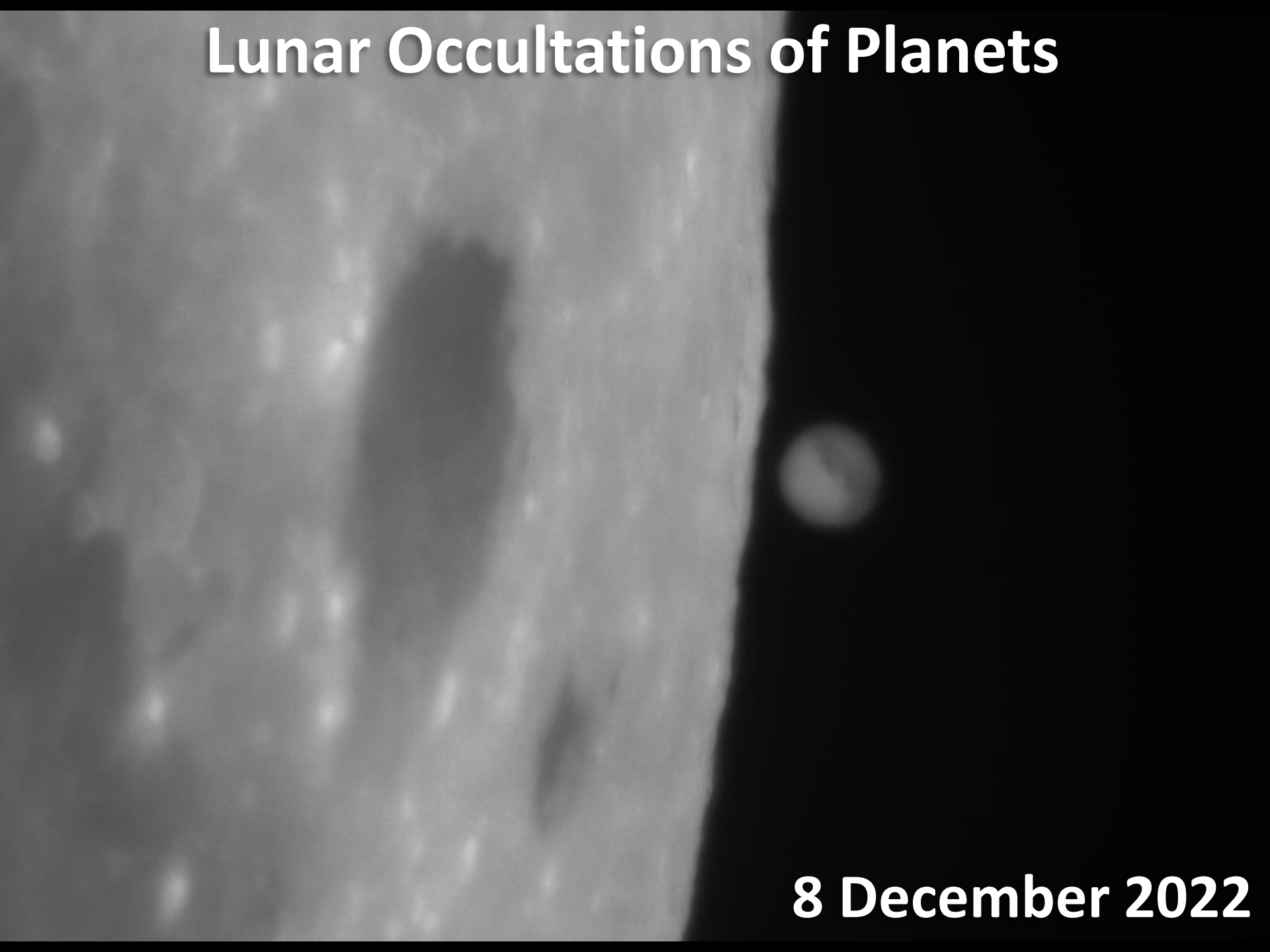
**Challenge Number One**  
**Daylight Jupiter**

# Lunar Occultations of Planets

5 December 2022



# Lunar Occultations of Planets



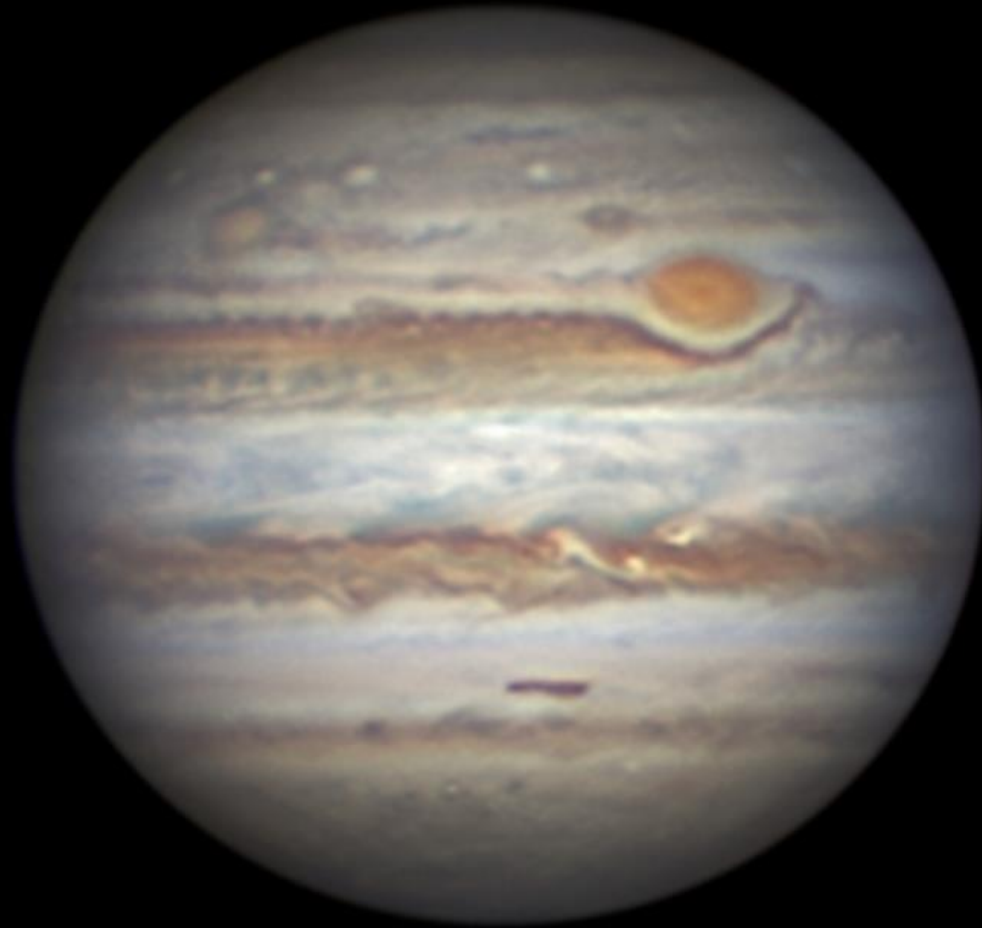
8 December 2022

# Lunar Occultations of Planets



8 December 2022

# Lunar Occultations of Planets



**17 May 2023**

# Lunar Occultations of Jupiter

**Catch #1:** *Limited visibility*



Full  
occultation

Graze

Near miss

**17 May 2023**

# Lunar Occultations of Jupiter

**5%-lit waning crescent**

**Jupiter mag. -1.9**

**Central UK**

**17 May 2023**



# Lunar Occultations of Jupiter

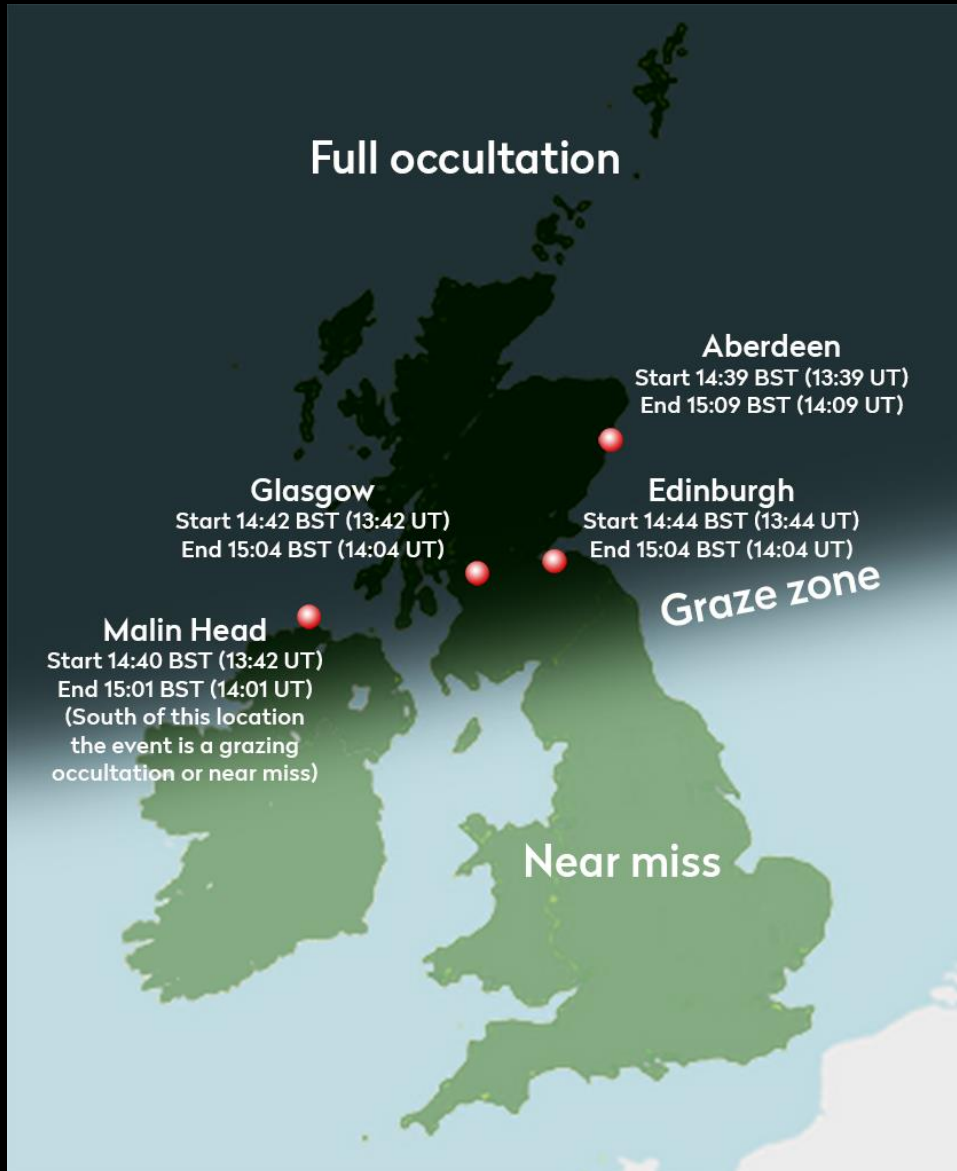
**Catch #2:** *It occurs during daylight hours!*



**17 May 2023**

# Lunar Occultations of Jupiter

**Catch #2: *It occurs during daylight hours!***



# Jupiter by Day



**17 May 2023**



2014-08-18 11:39 UTC Venus and Jupiter

Pete Lawrence

# Finding the Moon



**17 May 2023**

17 May 2023, 11:24 BST (10:24 UT)

Sun 27 degrees  
from the Moon



47 degrees\*



Moon



South

\* from the centre of the UK, other UK locations will be similar

17 May 2023, 11:24 BST (10:24 UT)

Sun 27 degrees  
from the Moon

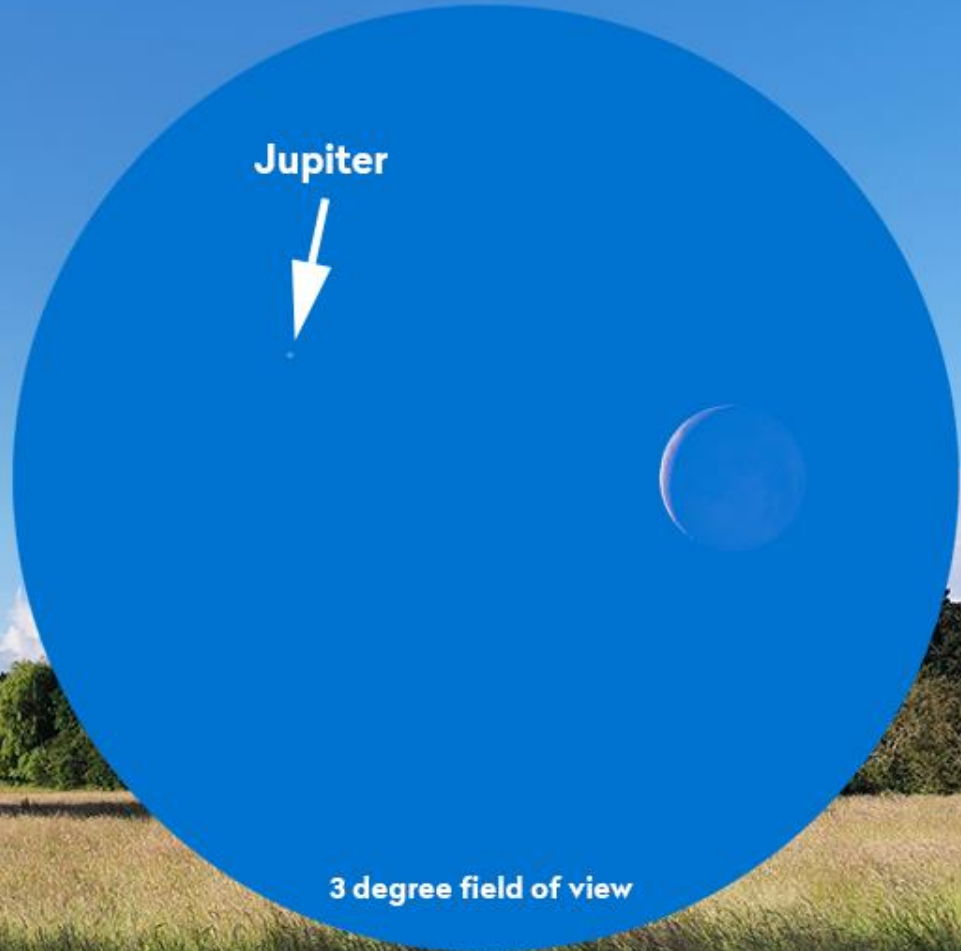


47 degrees\*



South

Jupiter



3 degree field of view

\* from the centre of the UK, other UK locations will be similar

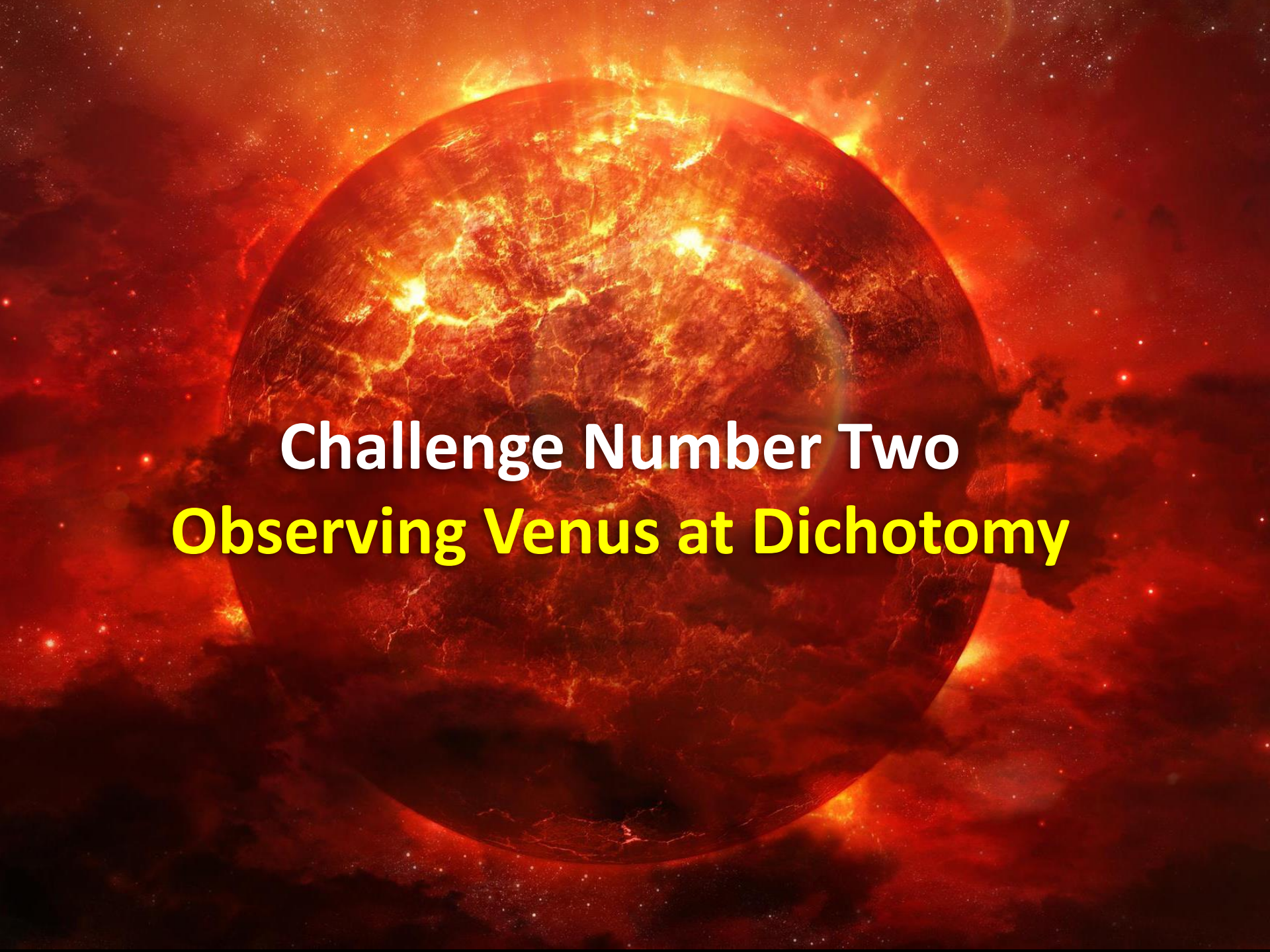
Moon's apparent  
direction of travel

Moon

Jupiter



**17 May, start observing from 14:20 BST (13:20 UT)**  
**Moon's altitude approximately 35 degrees at this**  
**time, above the southwest horizon**



**Challenge Number Two**  
**Observing Venus at Dichotomy**



# Venus

2023-04-03 16:42 UT

C14@ f/28

Player-One Uranus C

IR 1000nm (left)

IR 1000nm + L (right)

N  
E W  
S



CM I 49.7 °

CM II 135.8 °

Phase 76.5%

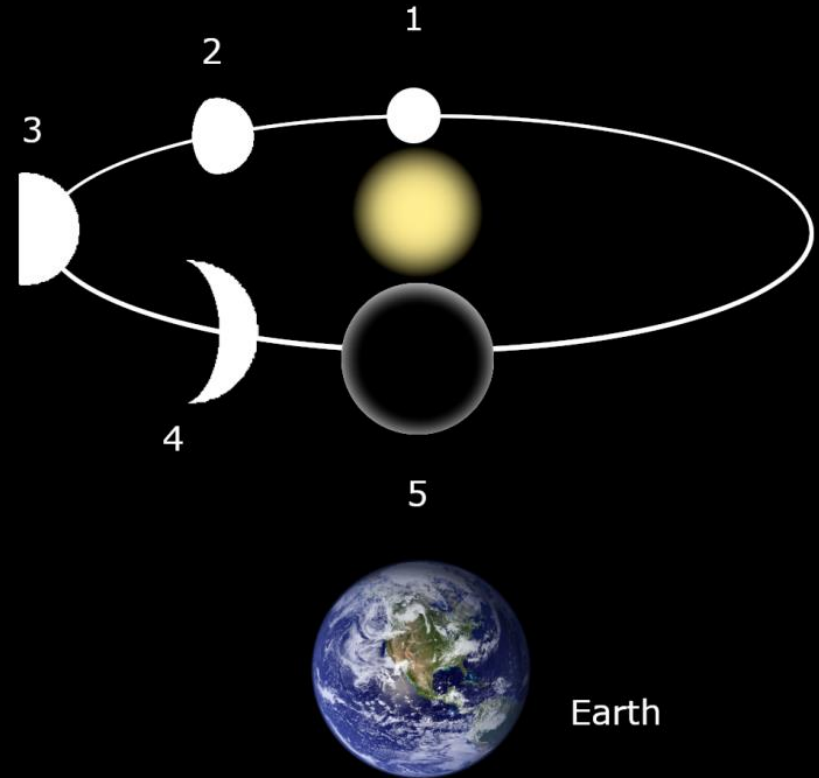
Diameter: 14.2"

Altitude: 49°

Pete Lawrence  
Thornton, Leicestershire

# Observing Venus at Dichotomy

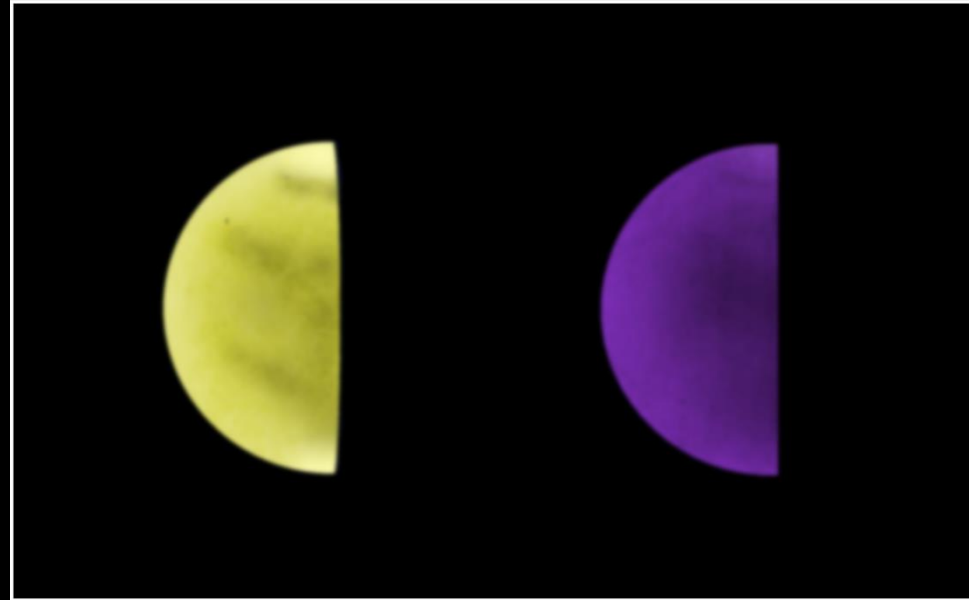
- Venus shows phases as it goes around the sun
- At position 3, Venus is 50% illuminated - this is 'dichotomy'
- This will occur on 4<sup>th</sup> June
- To see Venus 50% illuminated - need to be aware of the *phase anomaly*



# Observing Venus at Dichotomy

- The observed phase of Venus is always less than the predicted phase
- This is called the phase anomaly.
- Effect is more obvious in blue/violet filter
- Actual dichotomy is early in eastern elongations

Venus Observation



Disk Drawing (W15): 1734UT, x111, Seeing: All  
CM1: 163.4" CM2: 107.2"

Disk Drawing (W47): 1740UT, x111, Seeing: All  
CM1: 163.4" CM2: 107.6"

2018 July 31, Start: 1714UT, Finish: 1744UT, Sky: Bright, Seeing: All-IV, Transparency: Good.  
203mm Newtonian Reflector, x111, Filters: W15 and W47.  
Phase(Th)= 57%, Phase(W15)= 53%, Phase(W47)= 50%, Disk Size= 20.3", Ls= 255°

Paul G. Abel, Leicester UK

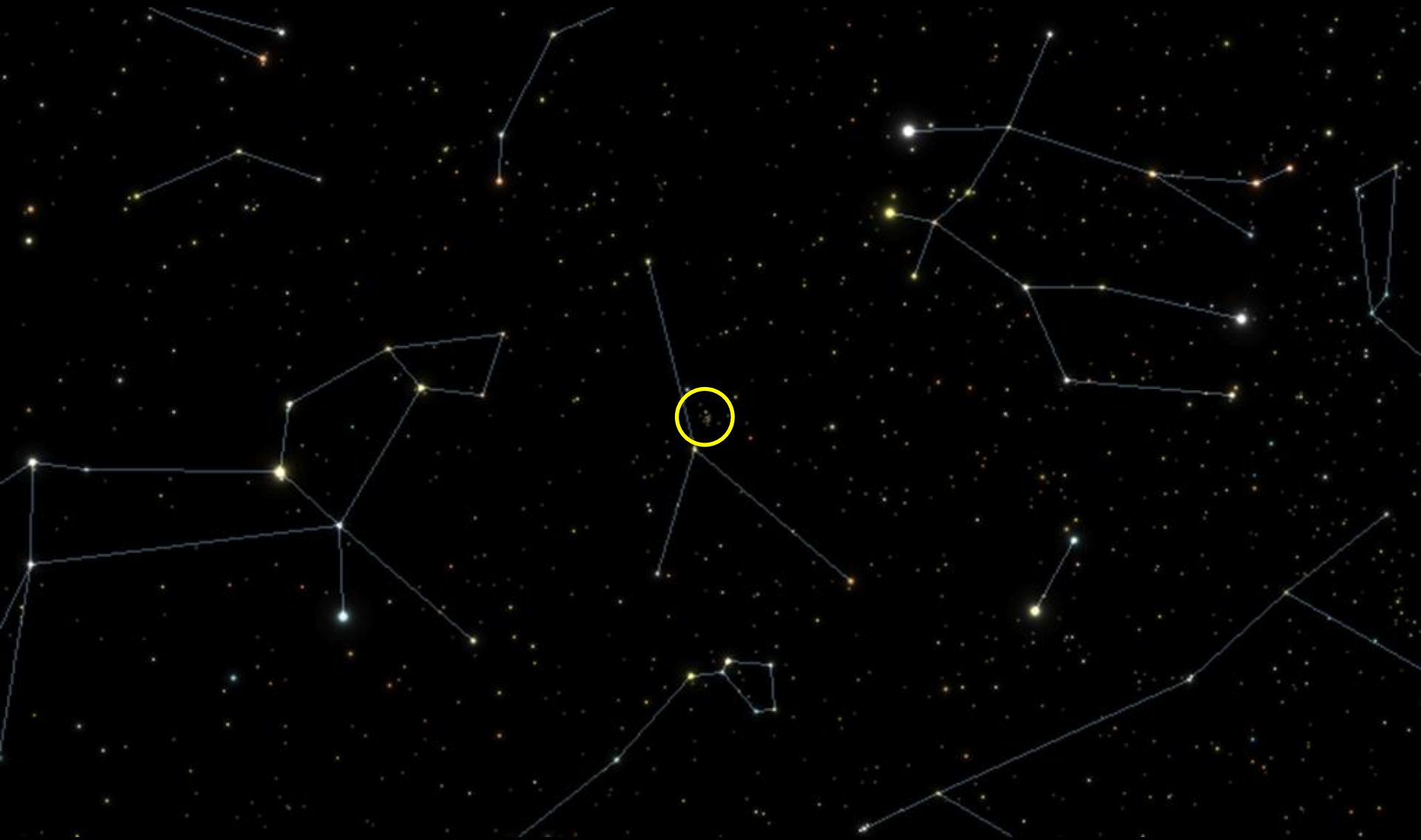
# Observing Venus at Dichotomy

- It is best to start observing Venus a week or so before theoretical date 4<sup>th</sup> June.
- A telescope of 3 inches or more is required to see phase clearly (powers of about x100)
- Try to observe Venus in a light sky (at dusk)
- A yellow filter will help reduce glare from the disk.
- When you think Venus is at 50% illumination - record the date and time and let me know!



**Challenge Number Three**  
**Mars and the Beehive at Sunset**

# Mars and the Beehive



# Mars and the Beehive



# Mars and the Beehive





# Mars and the Beehive

Locate Venus approximately 1 hour after sunset, then wait for the sky to darken sufficiently to find Mars followed by the fainter background stars

**CANCER**

M44

**Mars**  
25 May

**Pollux**

**Castor**

**GEMINI**

**Venus**  
25 May

**NW**



# Mars and the Beehive

Locate Venus approximately 1 hour after sunset, then wait for the sky to darken sufficiently to find Mars followed by the fainter background stars

CANCER

Mars  
1 Jun  
M44

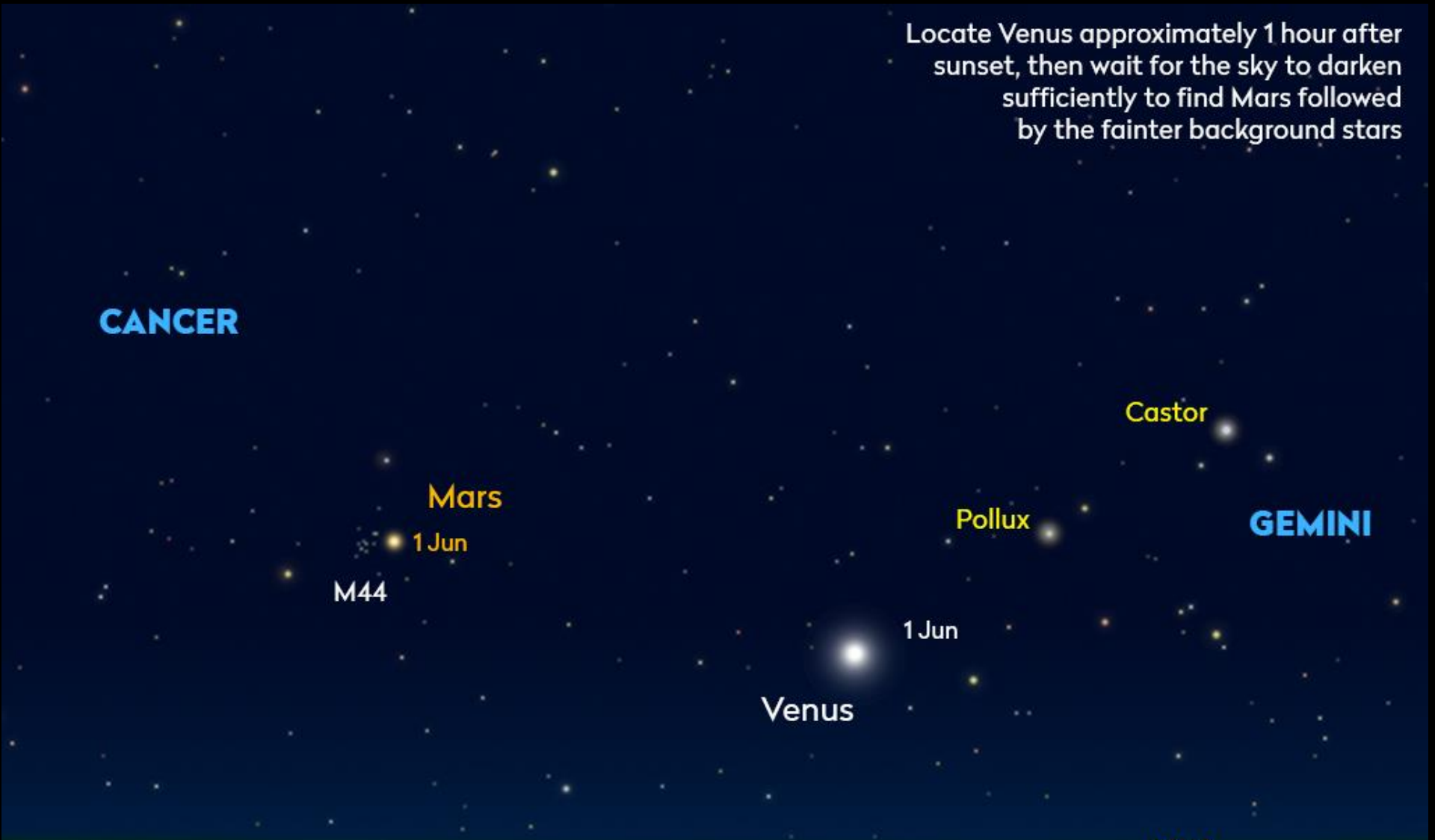
Venus  
1 Jun

Pollux

Castor

GEMINI

NW



# Mars and the Beehive

Locate Venus approximately 1 hour after sunset, then wait for the sky to darken sufficiently to find Mars followed by the fainter background stars

**CANCER**

7x50 binocular  
field of view

**Mars**

1 Jun

M44

**Castor**

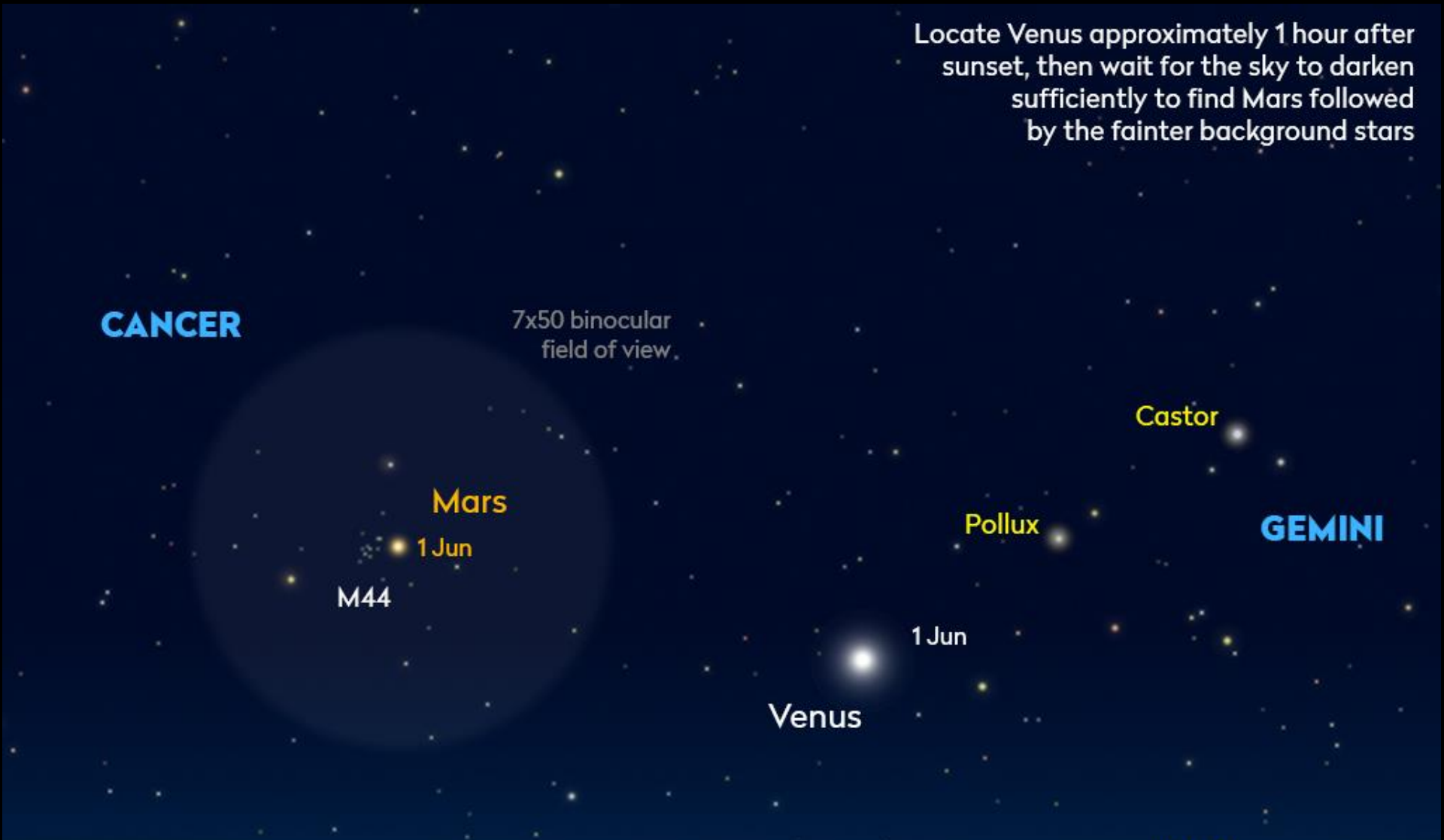
**Pollux**

**GEMINI**

1 Jun

**Venus**

**NW**



# Mars and the Beehive

Locate Venus approximately 1 hour after sunset, then wait for the sky to darken sufficiently to find Mars followed by the fainter background stars

**CANCER**

7x50 binocular  
field of view

**Mars**  
3 Jun 1 Jun  
M44

**Castor**

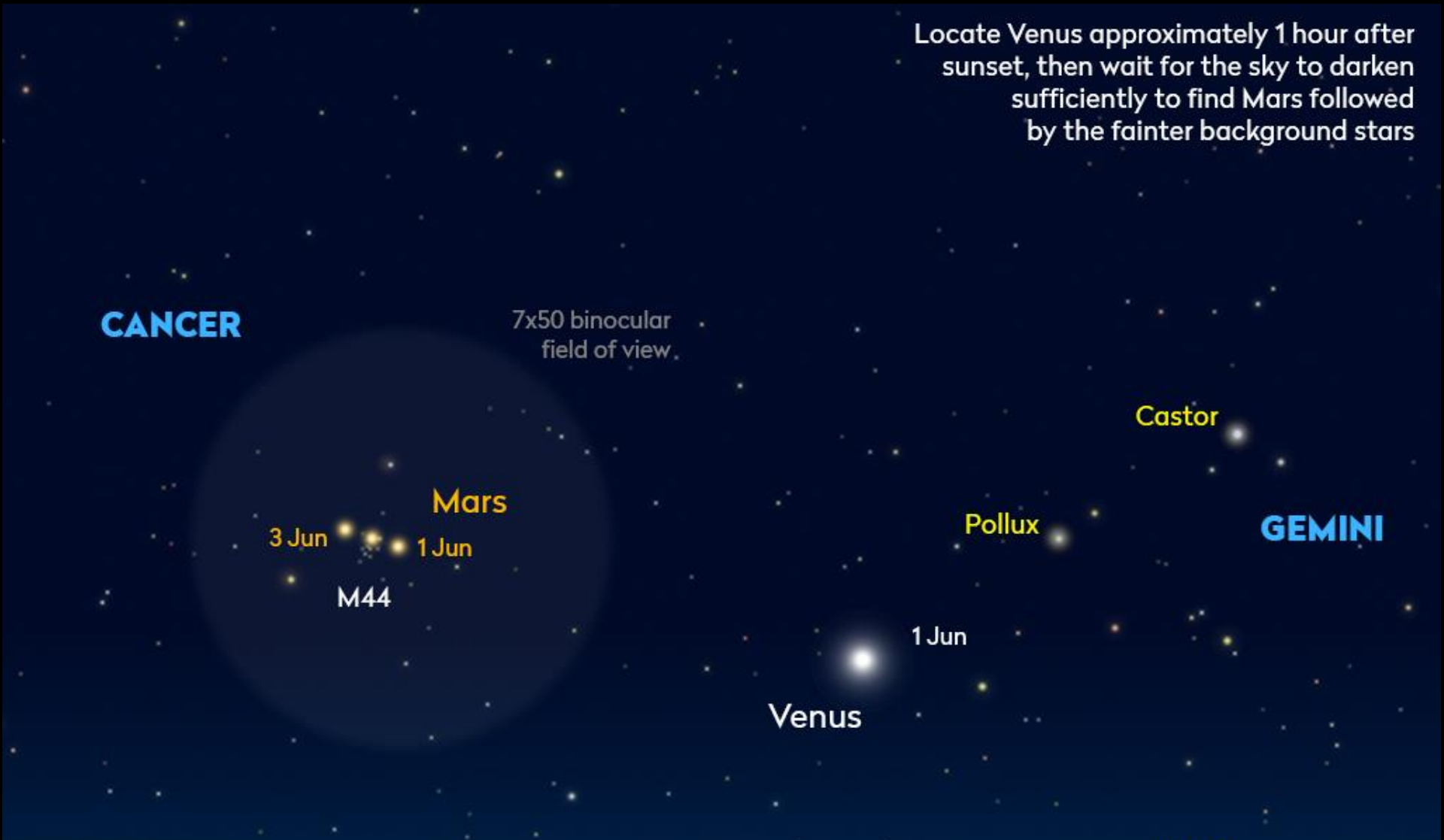
**Pollux**

**GEMINI**

**Venus**

1 Jun

**NW**



# Mars and the Beehive

Locate Venus approximately 1 hour after sunset, then wait for the sky to darken sufficiently to find Mars followed by the fainter background stars

**CANCER**

7x50 binocular  
field of view

Venus  
12 Jun

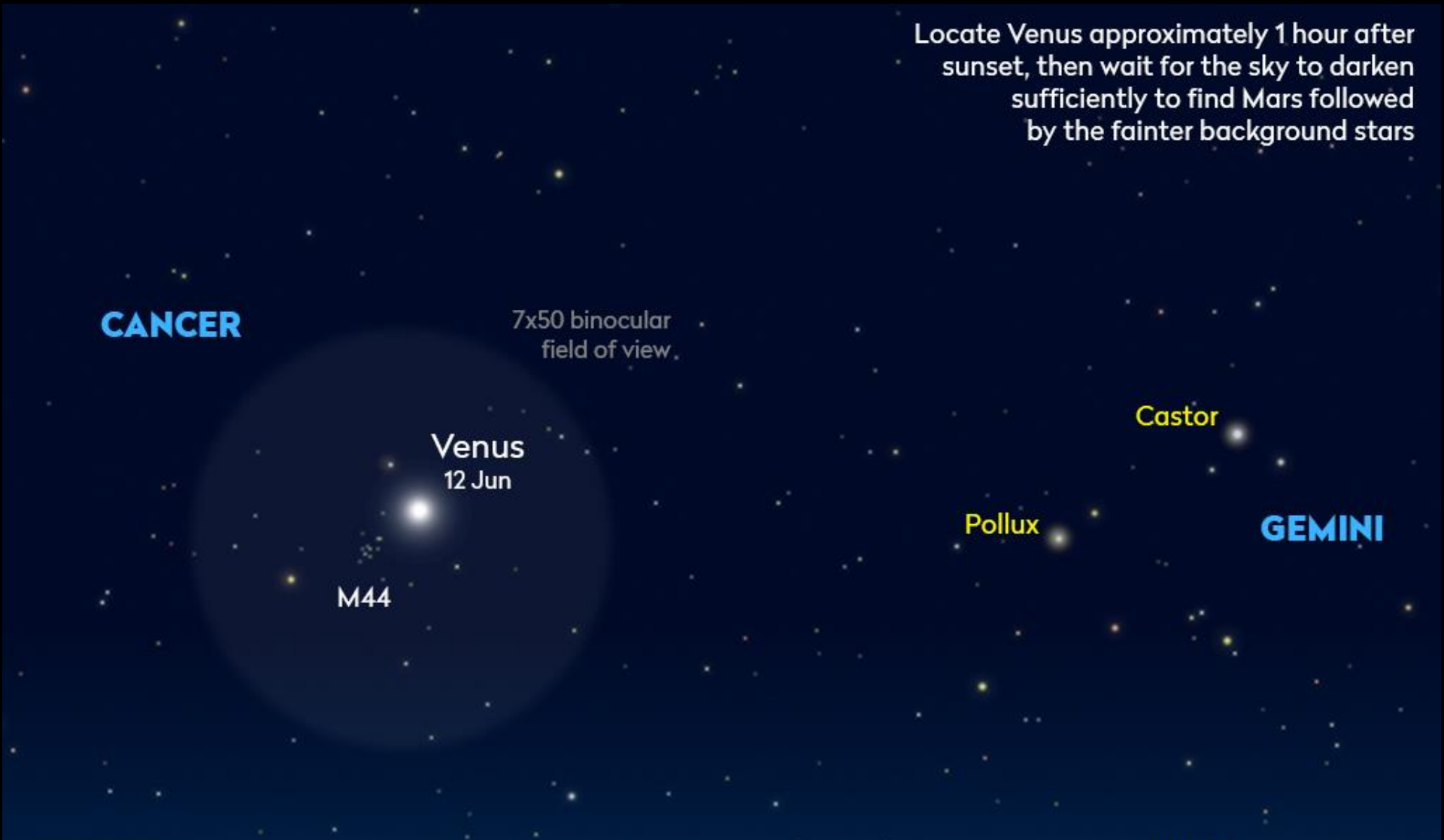
M44

Castor

Pollux

**GEMINI**

**NW**





**Challenge Number Four**  
**Observe the Summer**  
**Globular Cluster M4**

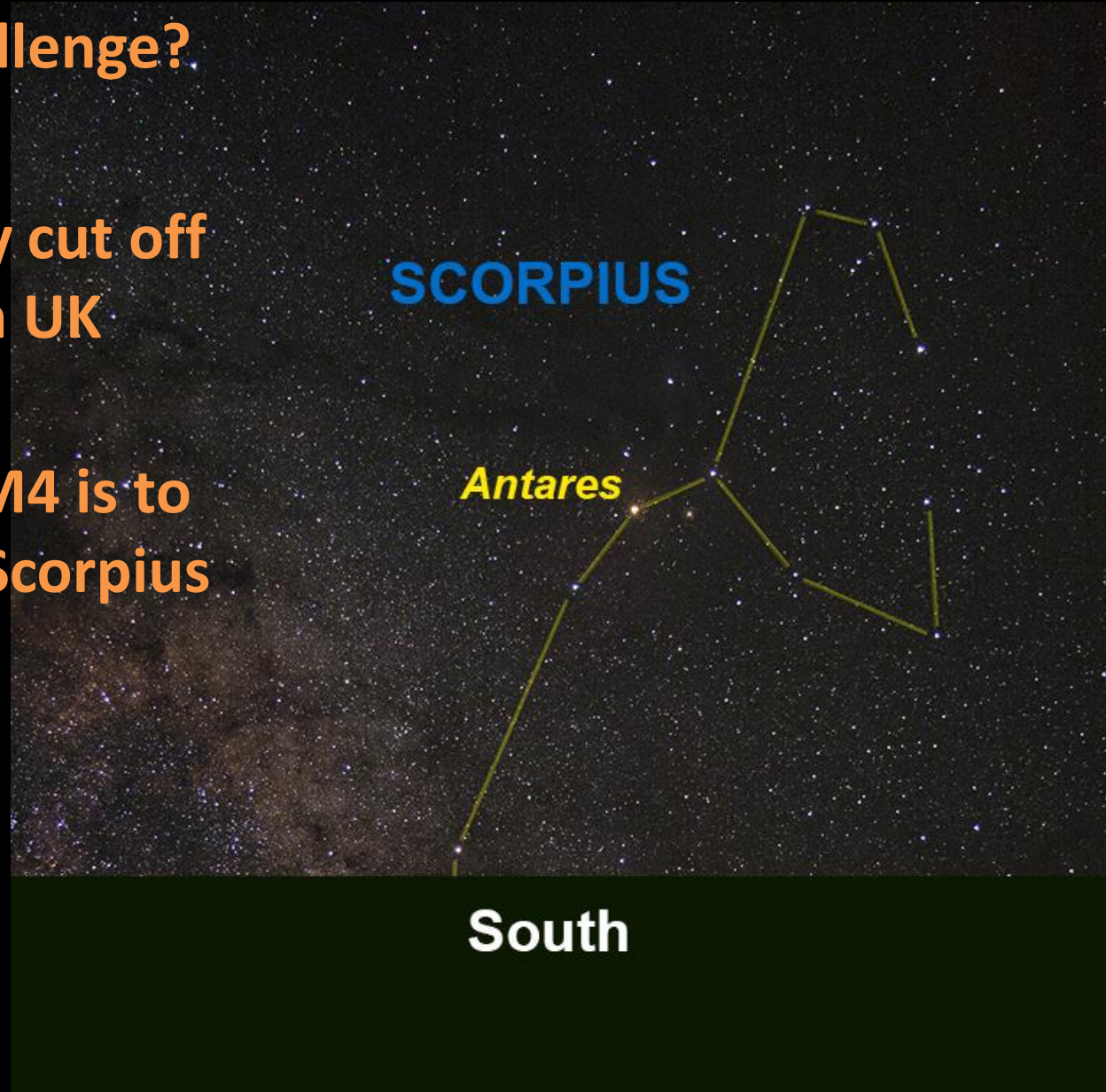
# Observe the Globular Cluster M4

- **M4 (also NGC 6121) is a globular cluster in Scorpius**
- **Discovered in 1745, Messier added it to his catalogue in 1764.**
- **M4 is 7200 light years away and about 12.2 billion years old**
- **$M_v \sim 5.6$  so technically unaided eye visibility**



# Observe the Globular Cluster M4

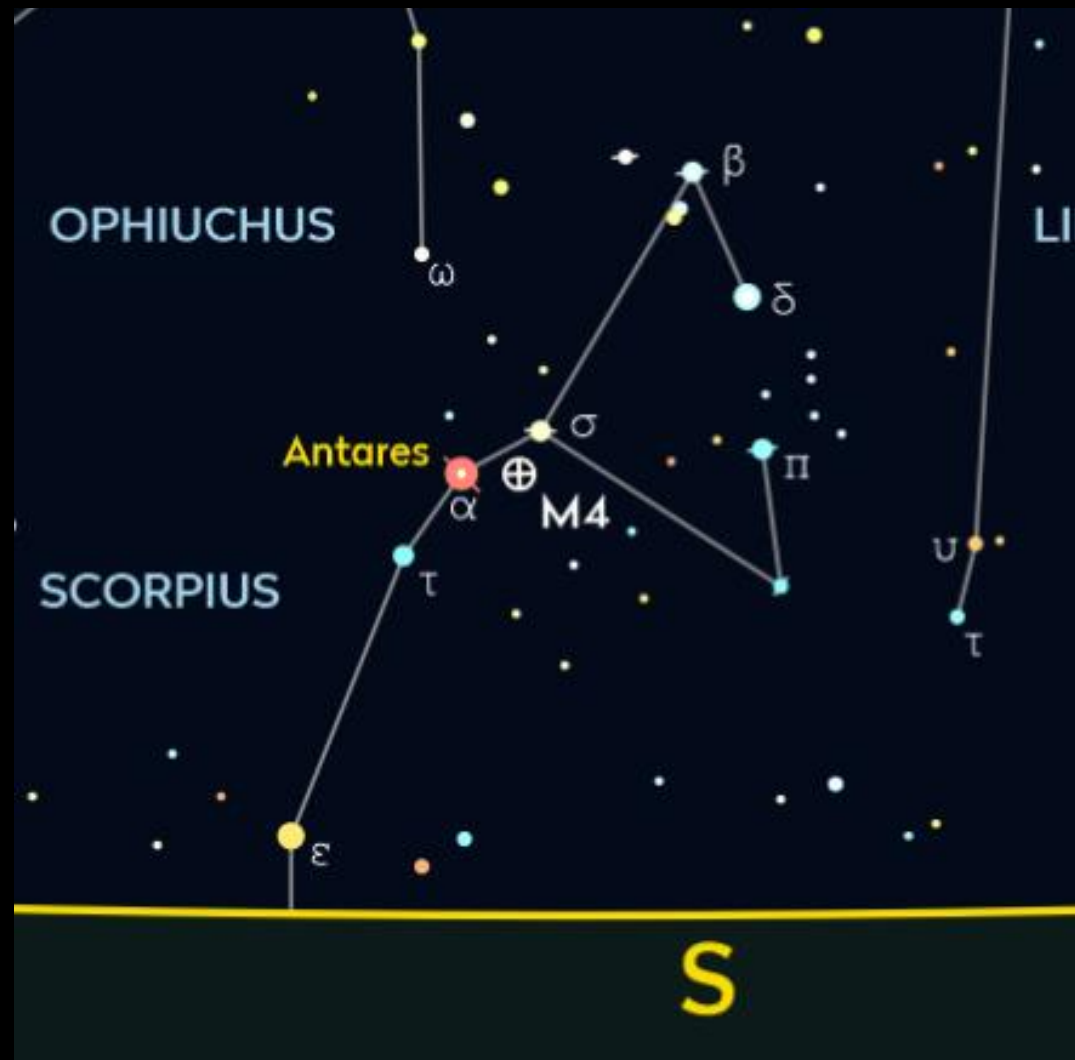
- Why is M4 a challenge?
- Altitude!
- Scorpius is partly cut off by the horizon in UK skies.
- Trick to finding M4 is to work out when Scorpius is due south
- Also, no Moon!





# Observe the Globular Cluster M4

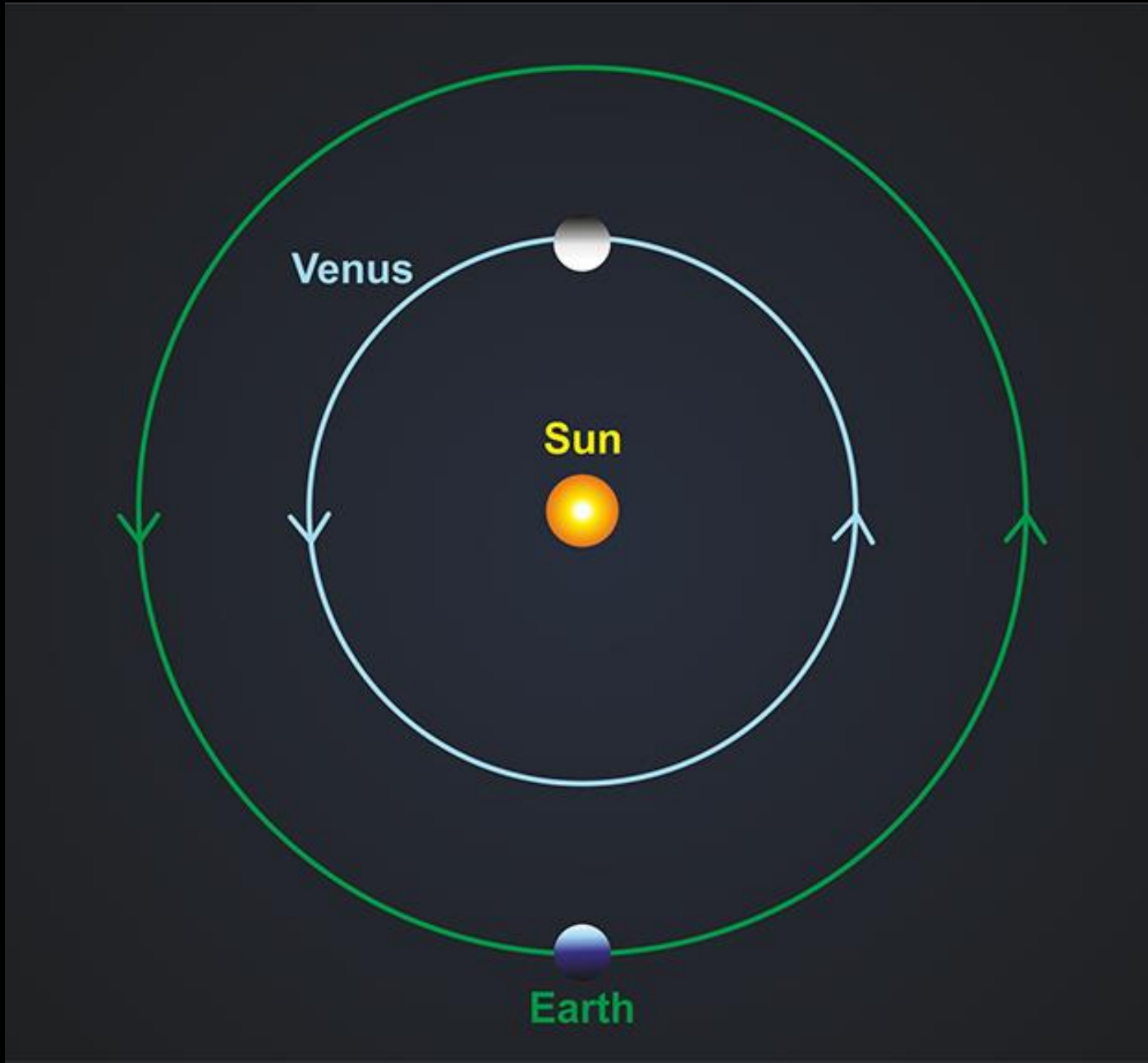
- Scorpius is located beneath Ophiuchus
- The brightest star is a red supergiant called Antares
- If you locate Antares and look in the 3 o'clock position, you'll see M4
- Easy in binoculars, splendid in a small telescope



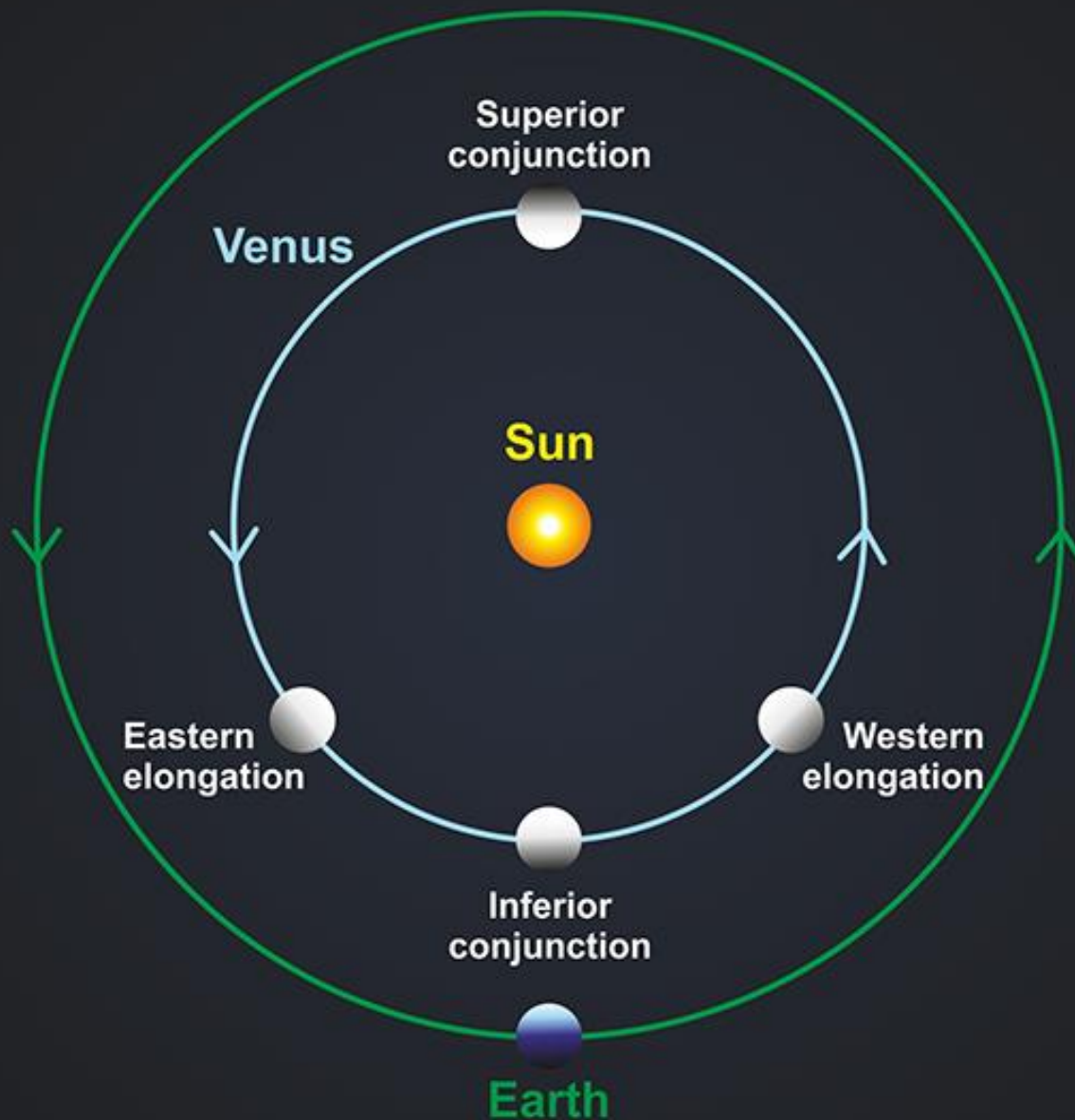


**Challenge Number Five**  
**Venus at Inferior Conjunction**

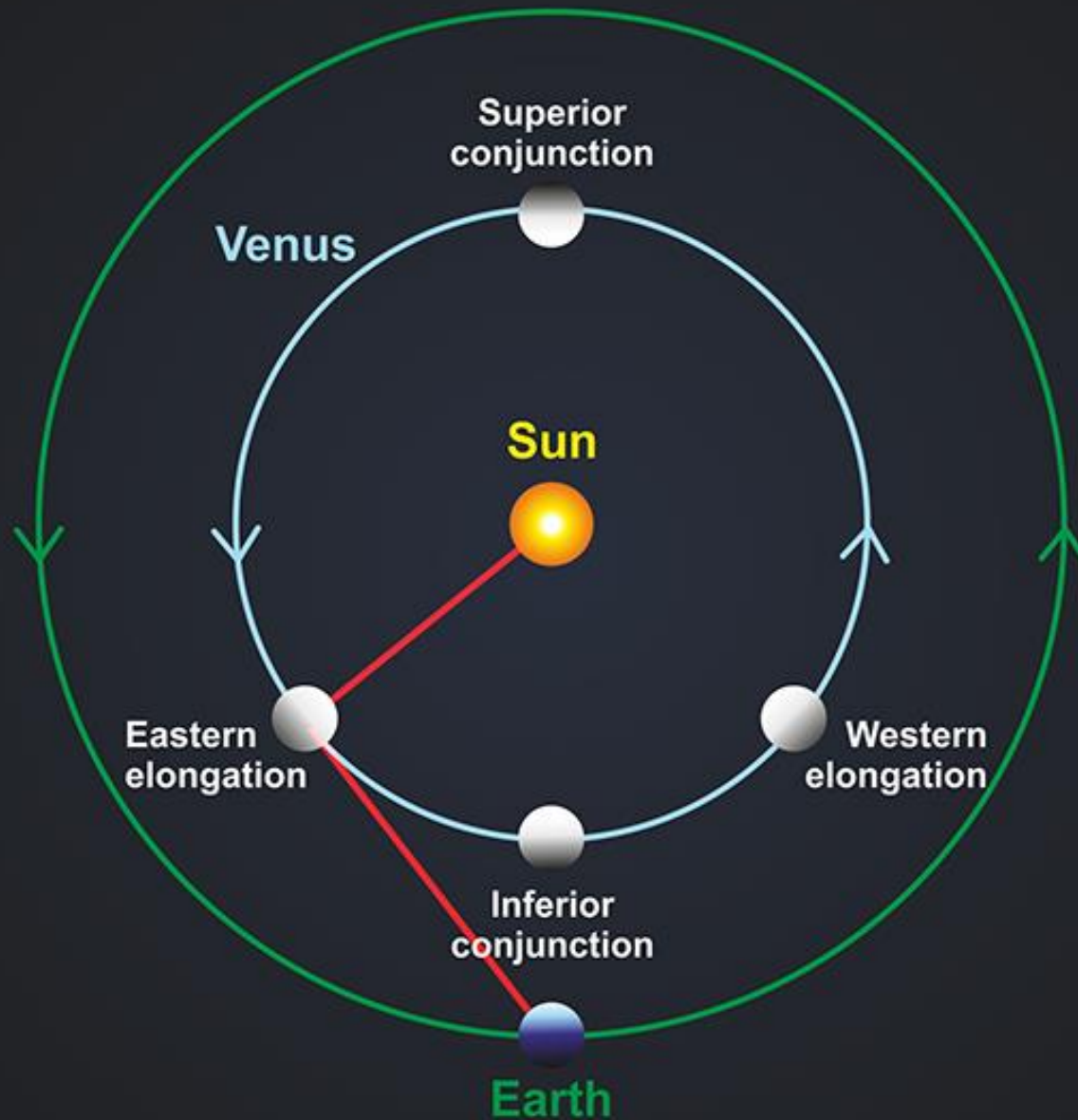
# Venus at Inferior Conjunction



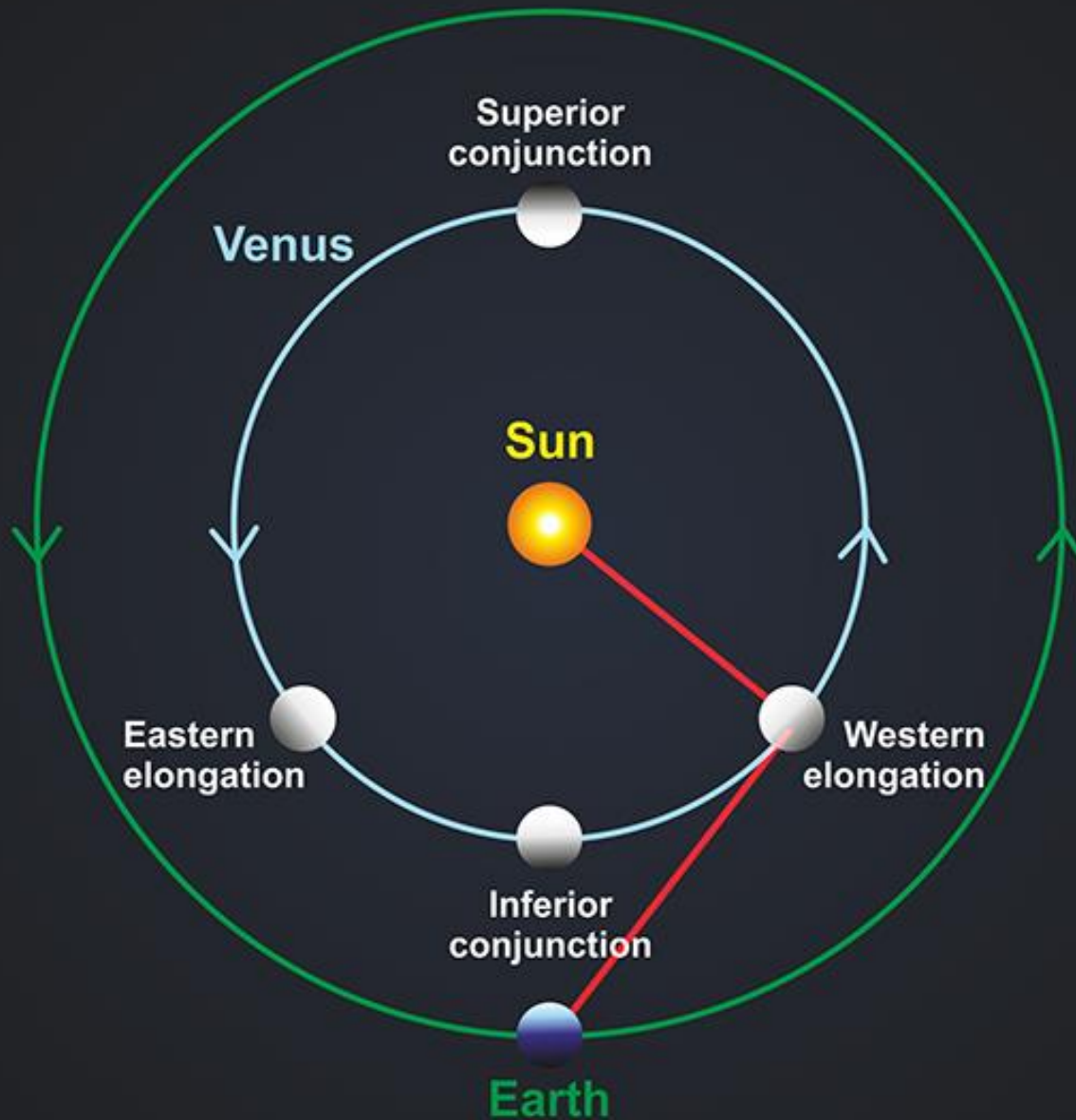
# Venus at Inferior Conjunction



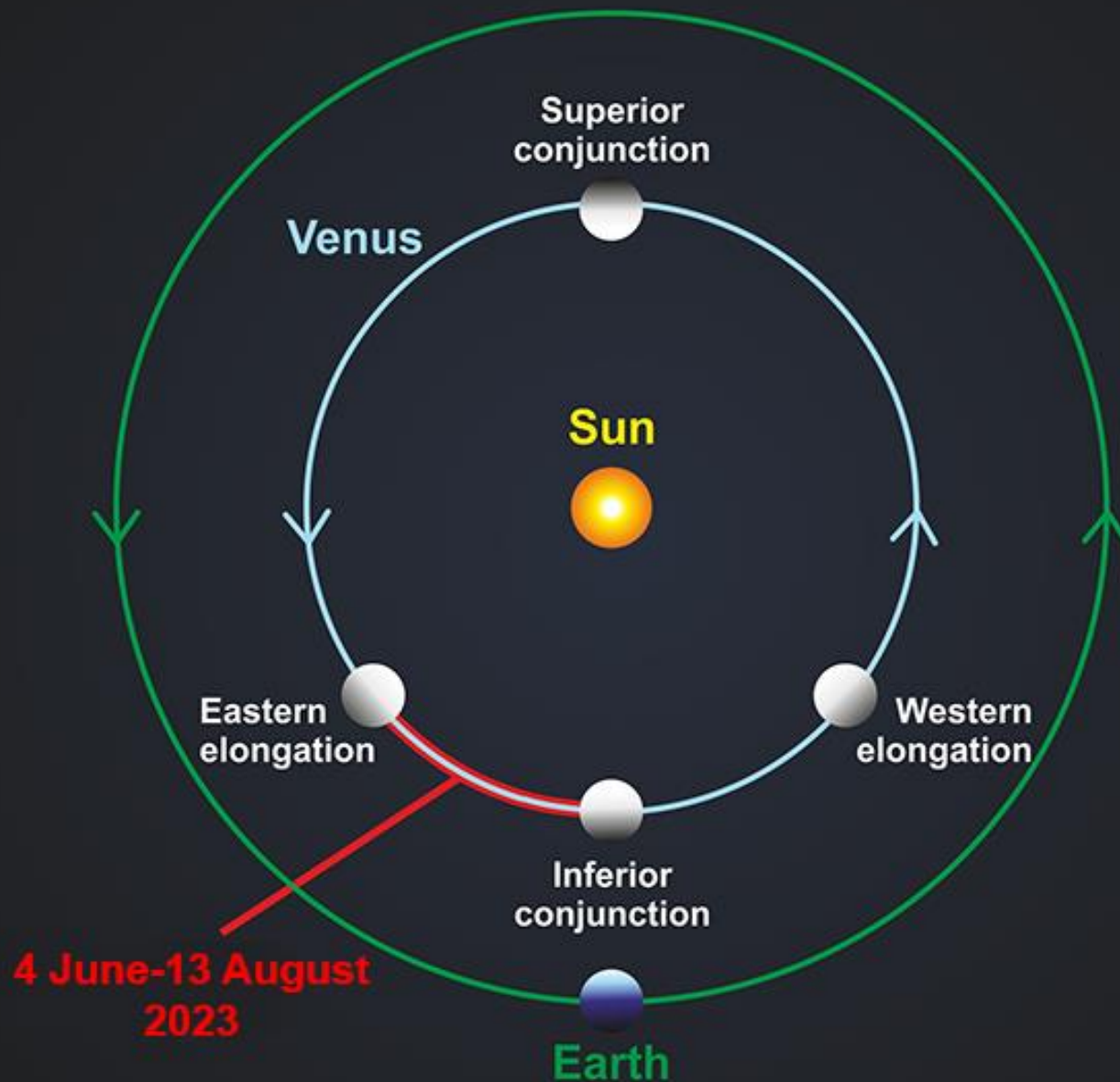
# Venus at Inferior Conjunction



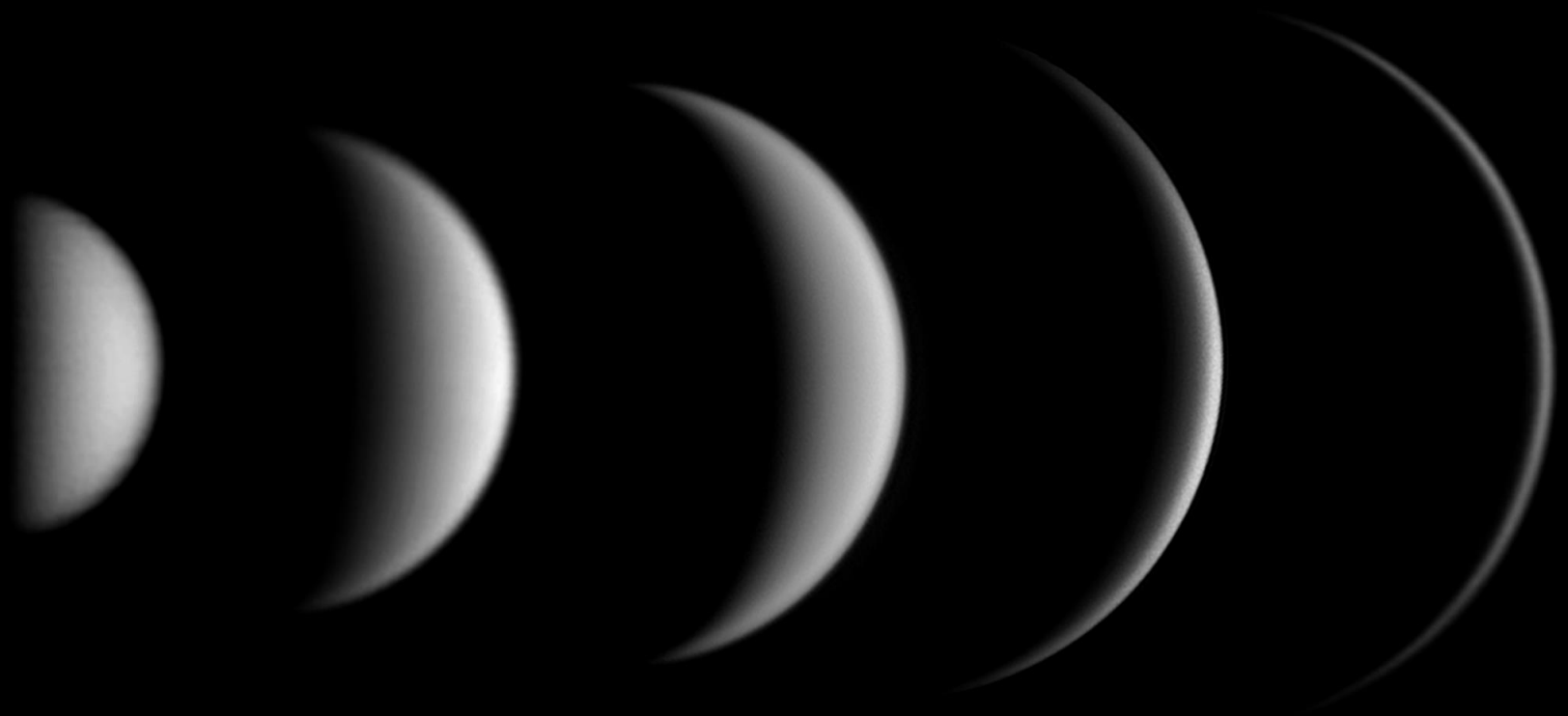
# Venus at Inferior Conjunction



# Venus at Inferior Conjunction



# Venus at Inferior Conjunction





# Venus at Inferior Conjunction



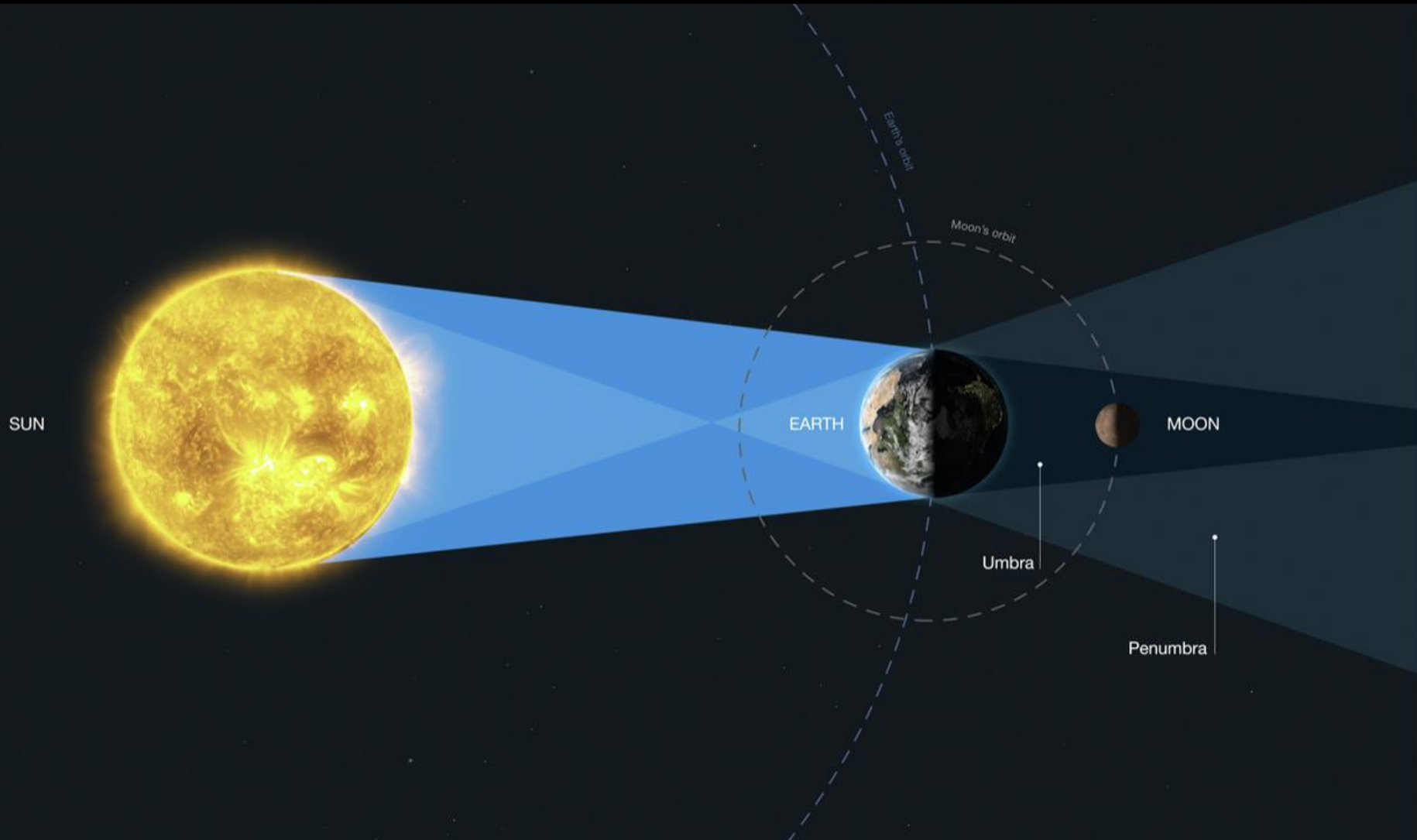
# Venus at Inferior Conjunction





**Challenge Number Six**  
**A Small Partial**

# Partial Lunar Eclipse - 28 Oct 2023



# Partial Lunar Eclipse - 28 Oct 2023

## Key times...

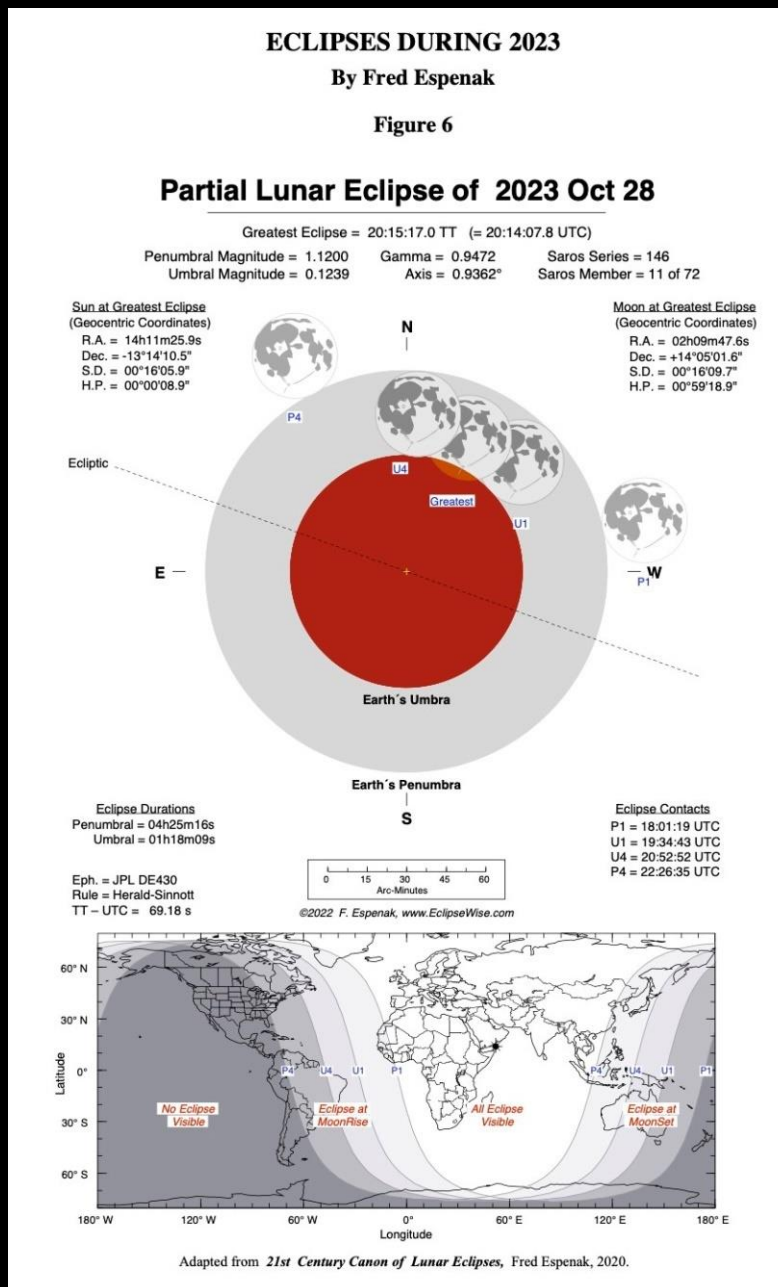
**18:01 UT** Eastern limb of the moon enters penumbra

**19:35 UT** First contact

**20:15 UT** Greatest eclipse

**20:52 UT** Last contact

**22:26 UT** Moon leaves penumbral shadow



# Partial Lunar Eclipse - 28 Oct 2023

- **The challenge is to be able to see the small part of the moon passing into the umbra**
- **Don't need any instruments for this!**
- **Is there a strong colour change present?**

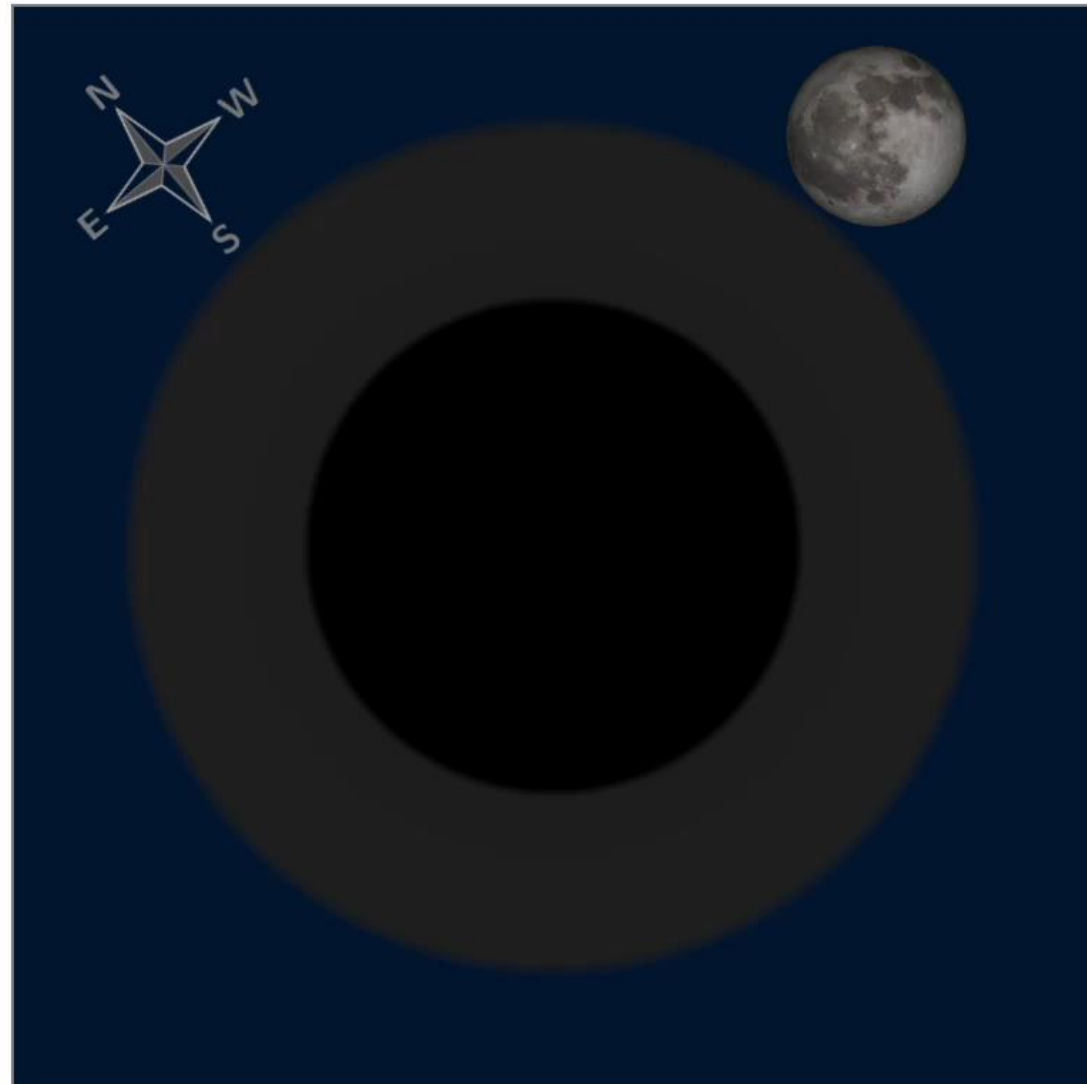
Jupiter

Moon



# Partial Lunar Eclipse 28 Oct 2023

Simulation of the eclipse as seen from [London](#)



Time: 19:02 BST

Altitude:  $13^\circ$

Azimuth:  $85^\circ$

20h

21h

22h

23h



**Credit: Dominic Ford**  
in-the-sky.org



**Challenge Number Seven**  
**Catch a Falling Star**  
*(but don't put it in your pocket!)*



# Photograph a Meteor



# Photograph a Meteor



# Photograph a Meteor



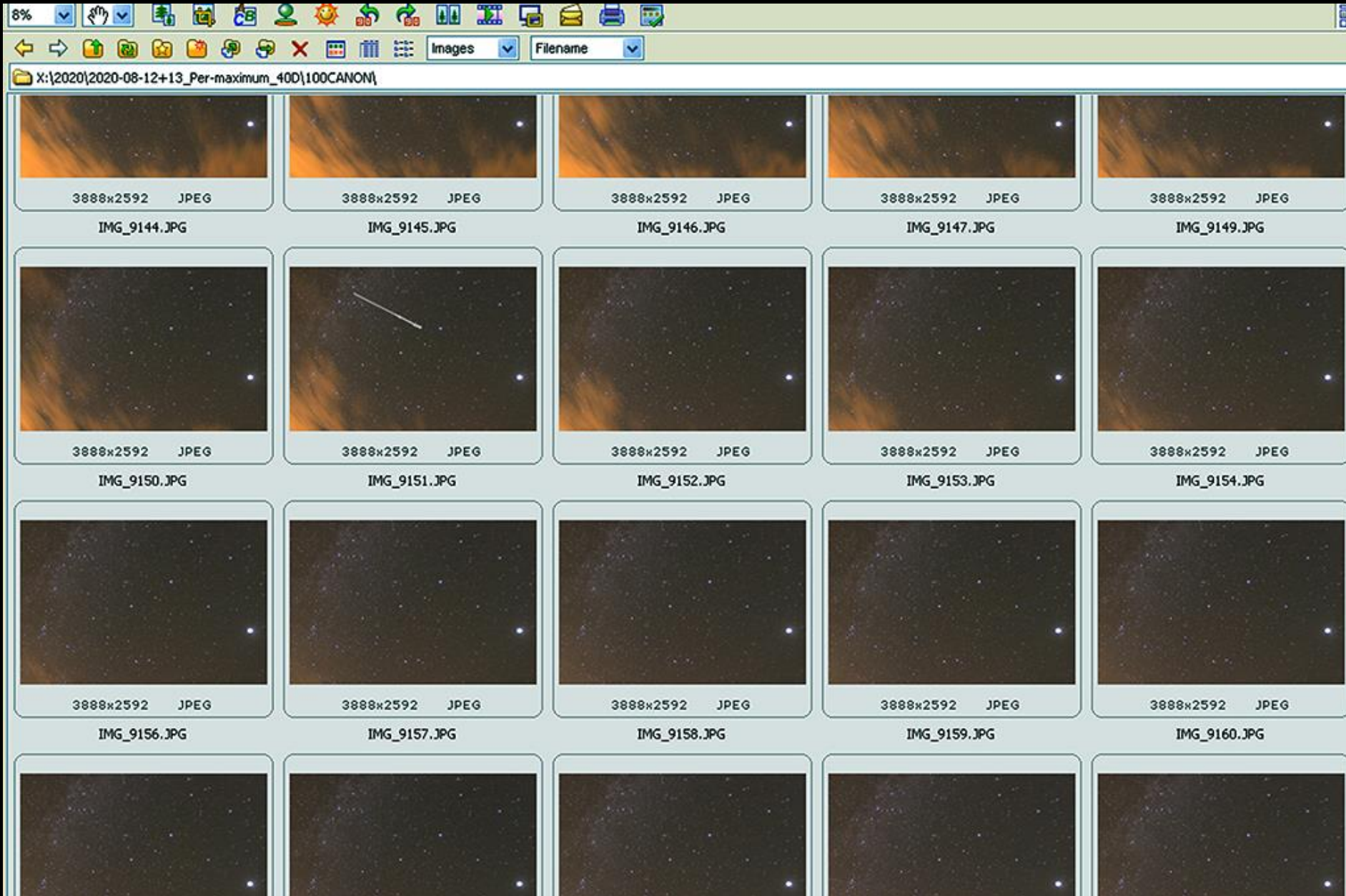
# Photograph a Meteor



# Photograph a Meteor

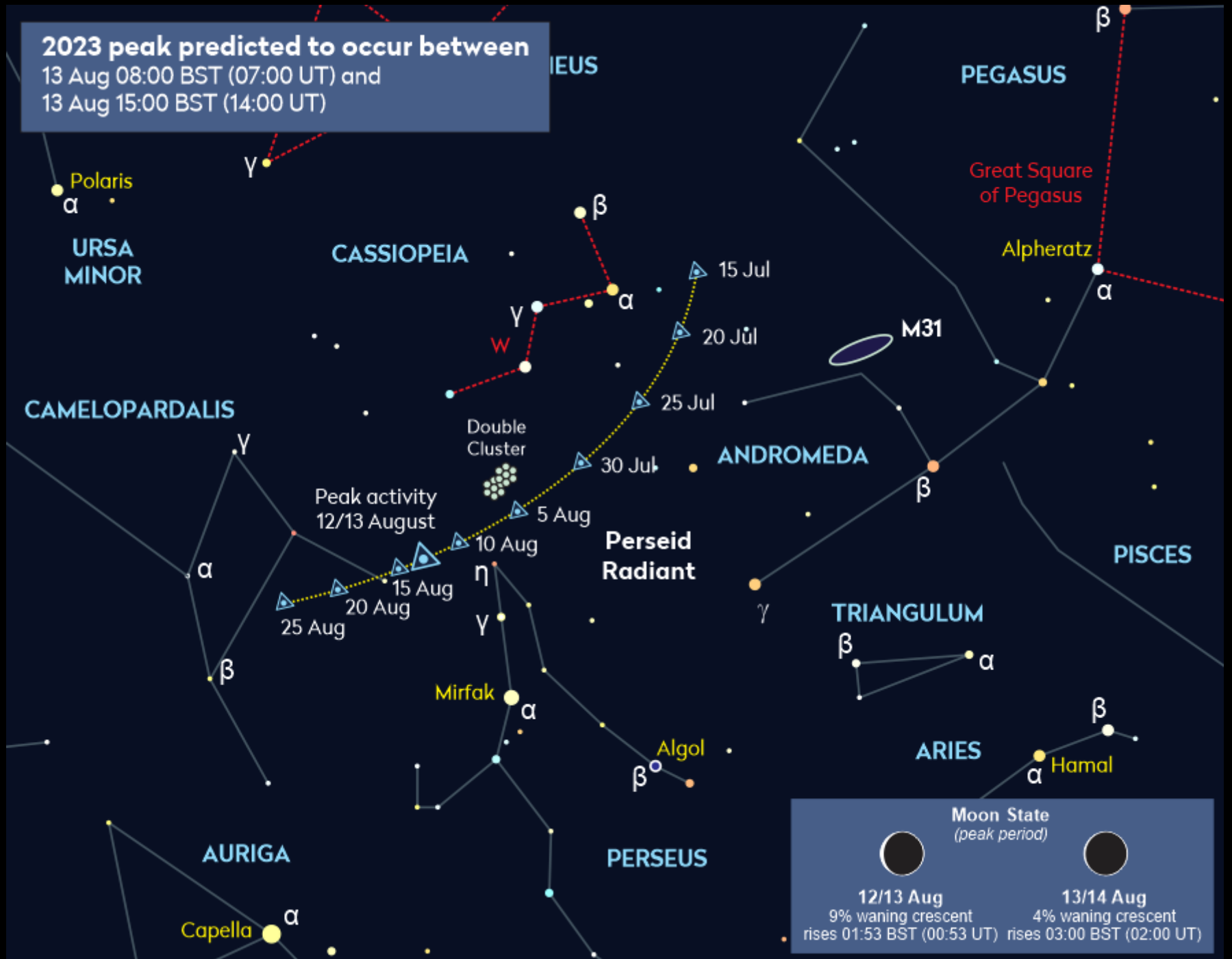


# Photograph a Meteor

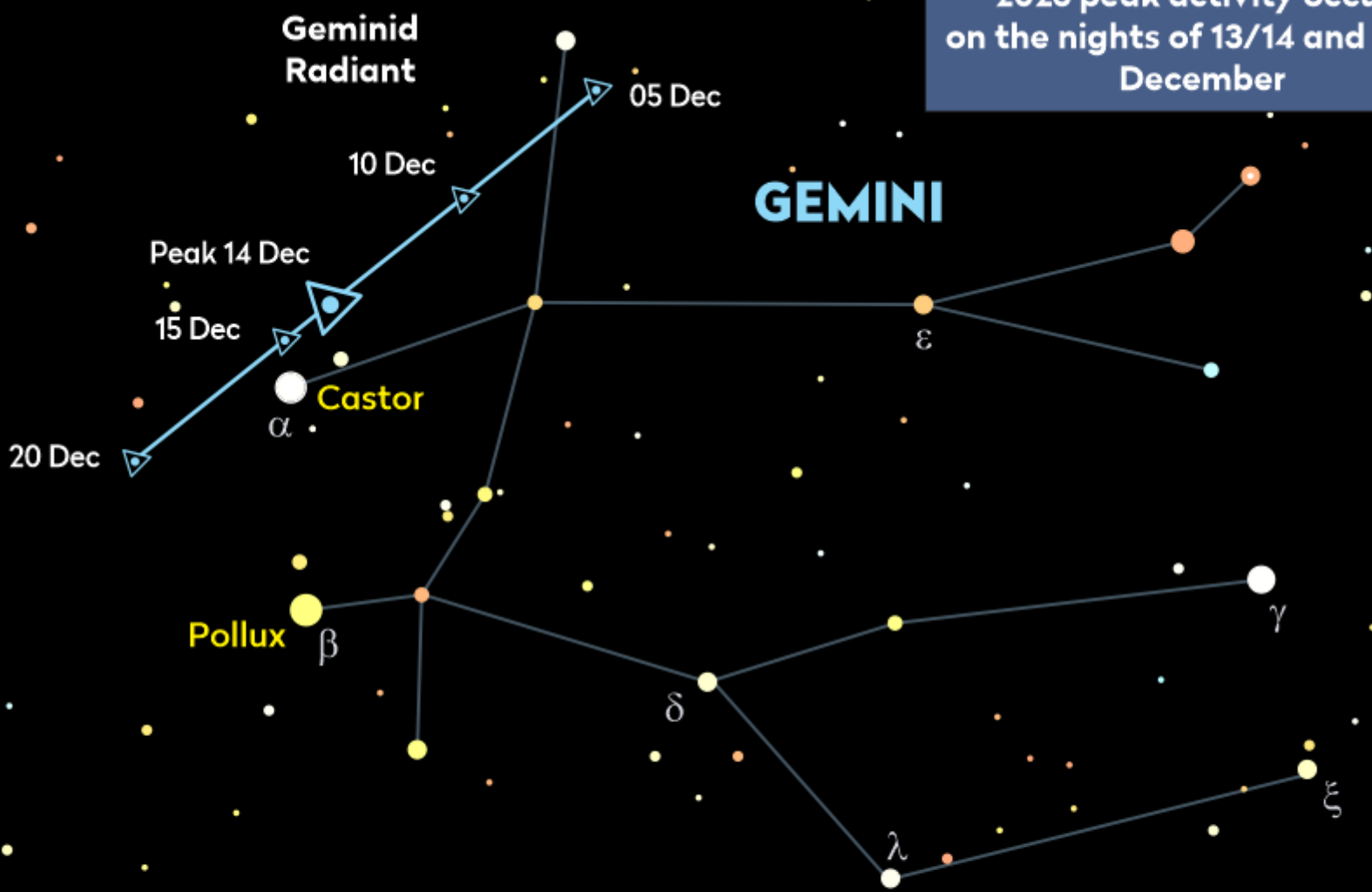


**2023 peak predicted to occur between**

13 Aug 08:00 BST (07:00 UT) and  
13 Aug 15:00 BST (14:00 UT)



2023 peak activity occurs on the nights of 13/14 and 14/15 December



Moon State		
<b>13/14 Dec</b> <1%-lit waxing crescent sets at 15:39 UT	<b>14/15 Dec</b> 3%-lit waxing crescent sets at 16:47 UT	<b>15/16 Dec</b> 9%-lit waxing crescent sets at 18:13 UT





**Challenge Number Eight**  
**Catching Chi Cygni at Maximum**

# Chi Cygni at Maximum

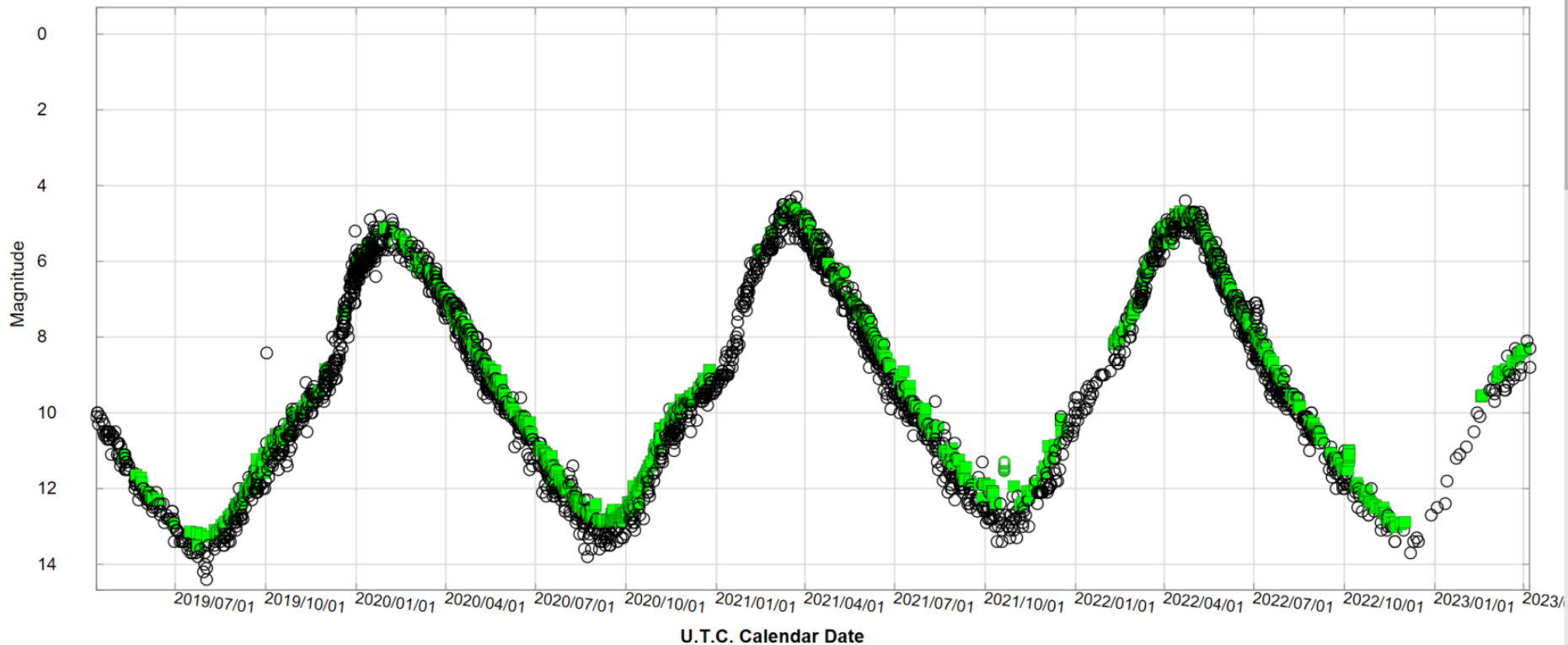
- $\chi$  Cygni is a Mira type variable star 590 ly away
- Lies in Cygnus the Swan - easy from the UK.
- Red giant star which expands and contracts
- Large magnitude range: bright as +3.3, faint as +14.2!



# Chi Cygni at Maximum

(c) AAVSO

☐:All (4335) ○(2694) ☑Vis ▼(76) ☐Faint ★(435) ☐B ■(713) ☑V ◆(108) ☐R ●(374) ☐I ○(11) ☑TG



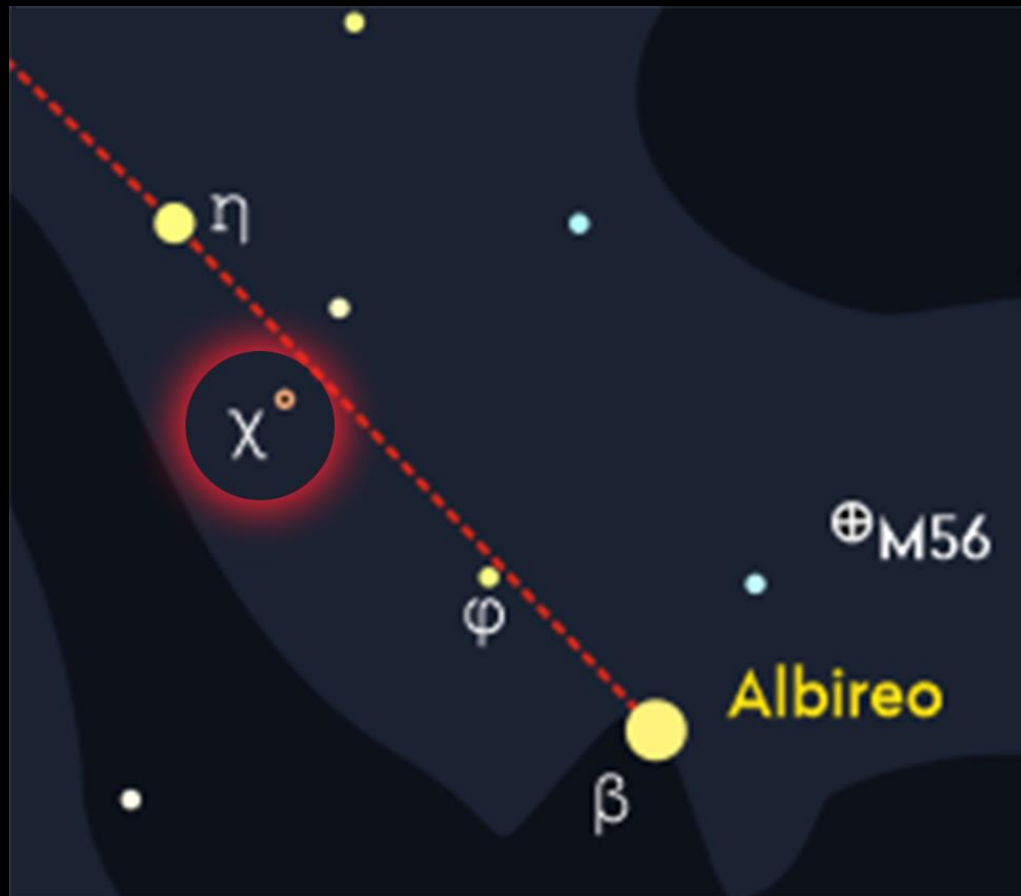
- Average period between maxima about 409 days
- Currently building up to maximum

# Chi Cygni at Maximum



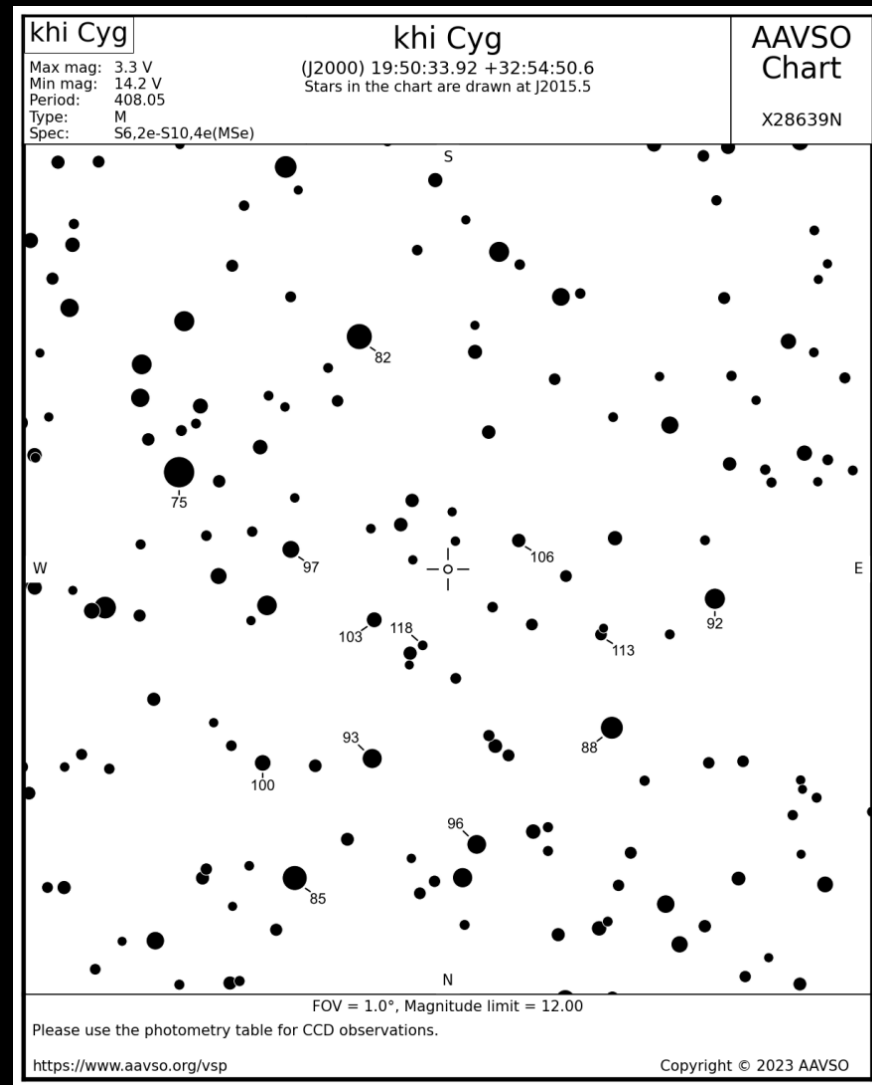
# Chi Cygni at Maximum

- Once you have located Cygnus, Chi Cyg is easy to find.
- Look for Eta Cyg, Chi Cyg lies just below it.
- The star appears red in bins/small telescope
- See when you can detect it without binoculars.



# Chi Cygni at Maximum

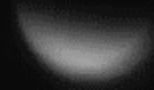
- Make useful observations of Chi Cyg!
- Make visual magnitude estimates of the star
- To do this we need suitable comparison stars
- Generate a chart via AAVSO which shows stars and their magnitudes
- BAA VSS website explains how to estimate magnitudes





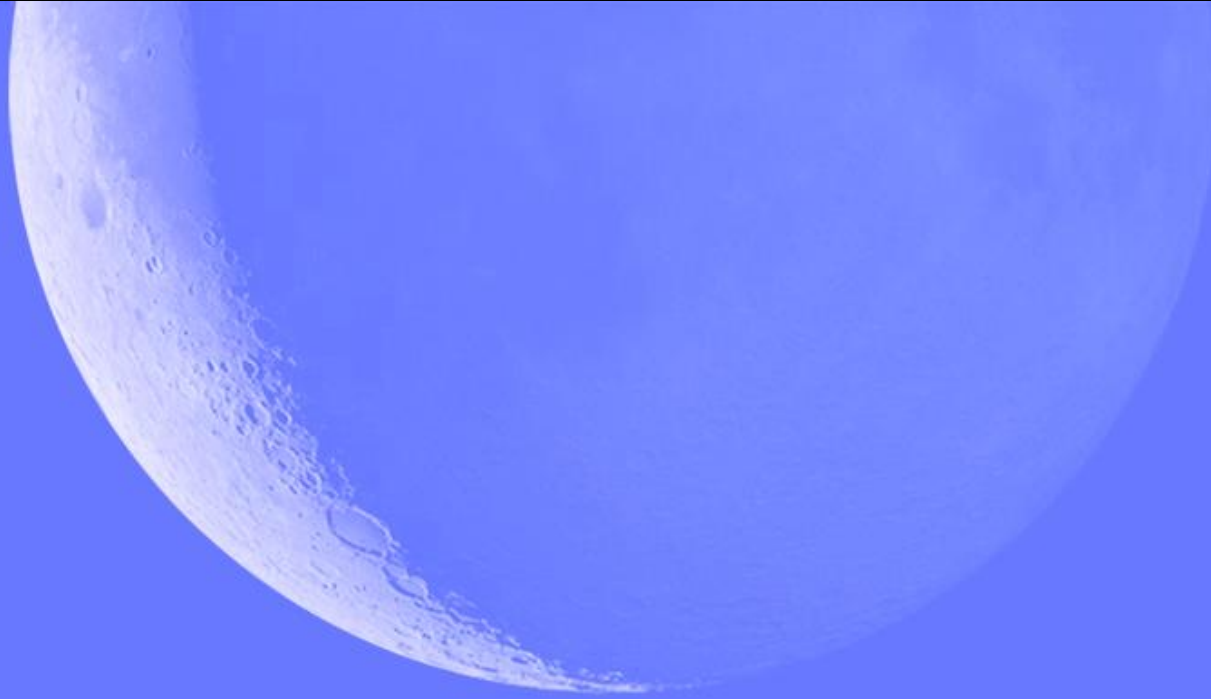
**Challenge Number Nine**  
**Lunar Occultation of Venus**

# Lunar Occultation of Venus





# Lunar Occultation of Venus



**Daylight lunar  
occultation of Venus  
9 November 2023**

# Lunar Occultation of Venus

*Apparent  
direction  
of travel*



**Moon**  
Phase 14%

**Daylight lunar  
occultation of Venus  
9 November 2023**

# Lunar Occultation of Venus

*Apparent  
direction  
of travel*



**Moon**

Phase 14%

**Venus**

Phase 58%

Disappearance 09:43 UT\*

**Daylight lunar  
occultation of Venus  
9 November 2023**

\* Times will vary by up to 15 minutes depending on location. Observe from at least 20 minutes before the stated times for safety.

# Lunar Occultation of Venus

*Apparent  
direction  
of travel*



**Moon**

Phase 14%

**Venus**

Phase 58%

Reappearance 10:40 UT\*

**Venus**

Phase 58%

Disappearance 09:43 UT\*

**Daylight lunar  
occultation of Venus  
9 November 2023**

\* Times will vary by up to 15 minutes depending on location. Observe from at least 20 minutes before the stated times for safety.

# Lunar Occultation of Venus



**Phase 58%**

**Apparent diameter 20"**

# Lunar Occultation of Venus



2007 June 18th 14h02m31s

**Moment of Disappearance**

*Pete Lawrence, Selsey, UK*

# Lunar Occultation of Venus





**Challenge Number Ten**  
**Uranus at Opposition**



# Uranus at Opposition

- Uranus is the 7<sup>th</sup> planet from the sun
- It is an ice giant, and telescopically quite small but distinctive
- On 13<sup>th</sup> November it will be at opposition in Aquarius
- It will shine at mag +5.6 and appear 3.8" across

Uranus Observation

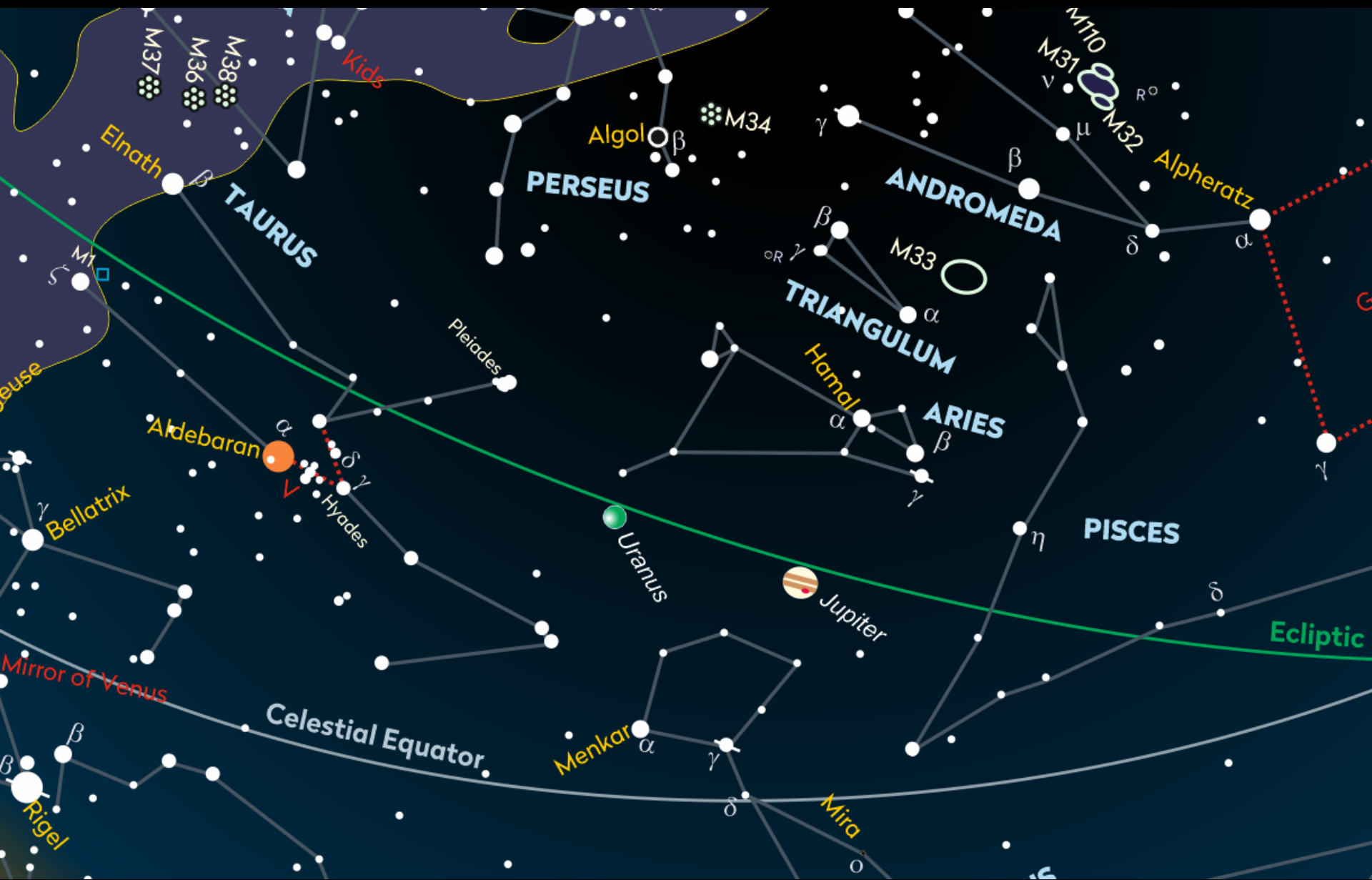


Disk Drawing: 2137UT, x320 & x640. CM: 248.1°. Seeing: All

2022 October 17, Start: 2129UT Finish: 2139UT, Seeing: All  
305mm Newtonian Reflector, x320 & x640. Filter(s): None  
B= 59.1°, Ds= 57.9°, Ls= 47°, Disk Diameter= 3.8"

Paul G. Abel, Leicester UK

# Uranus at Opposition



# Uranus at Opposition

- **Chart showing the location of Uranus can be found in the BAA Handbook**

2022-01-12 21:31 UT

Uranus

C14 @ f/28, 610nm

Planet image combined with over-exposed moon image

Pete Lawrence

# Uranus at Opposition

## Two challenges...

- **1) Find Uranus - use binoculars or a small telescope to track it down**
- **2) Once found, can you see it with the unaided eye???**

Uranus Observation



Disk Drawing: 2137UT, x320 & x640. CM: 248.1°. Seeing: All

2022 October 17, Start: 2129UT Finish: 2139UT, Seeing: All  
305mm Newtonian Reflector, x320 & x640. Filter(s): None  
B= 59.1°, Ds= 57.9°, Ls= 47°, Disk Diameter= 3.8"

Paul G. Abel, Leicester UK



# Pete and Paul's Observing Challenges

2023