

Making Sense of Astronomy Terminology



Peterborough Astronomical Association

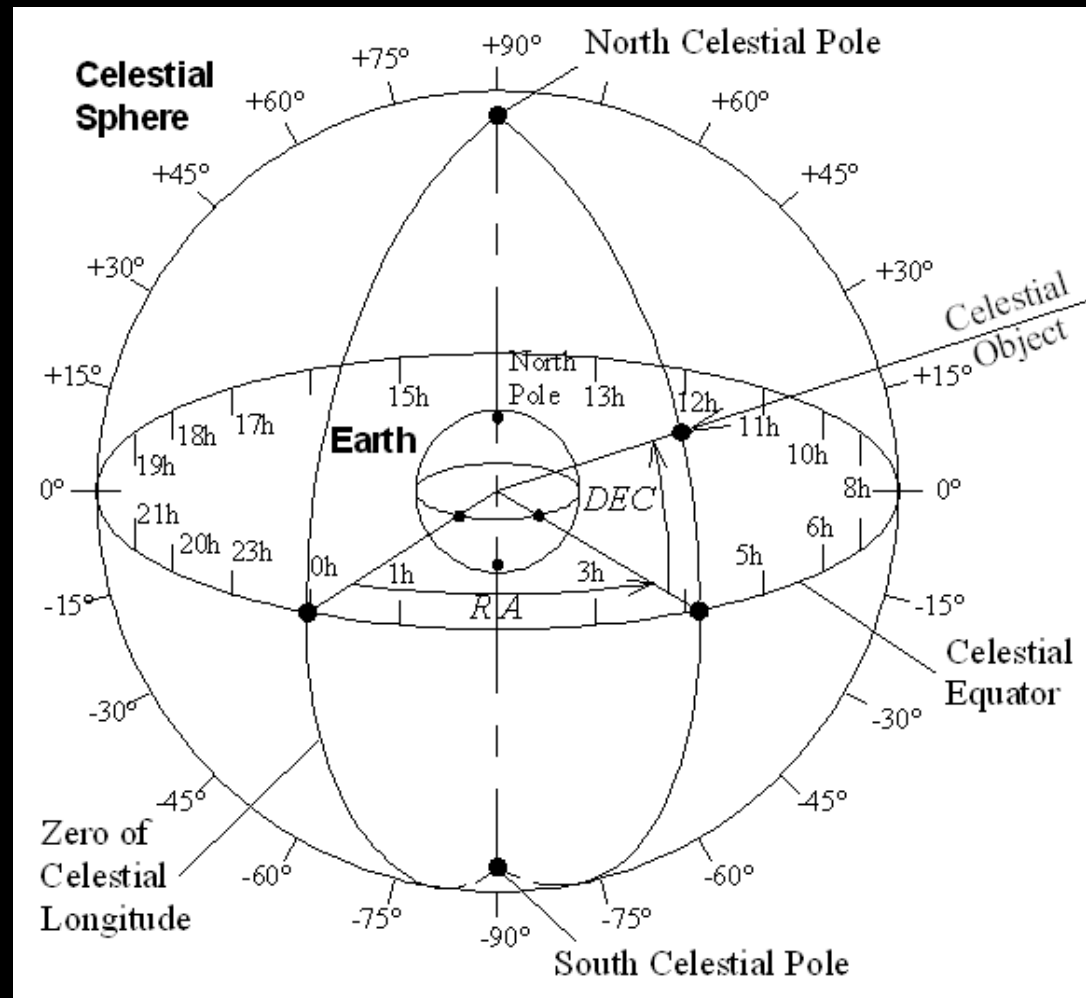
Novice Astronomy Class #27

December 6, 2024

Brett Hardy

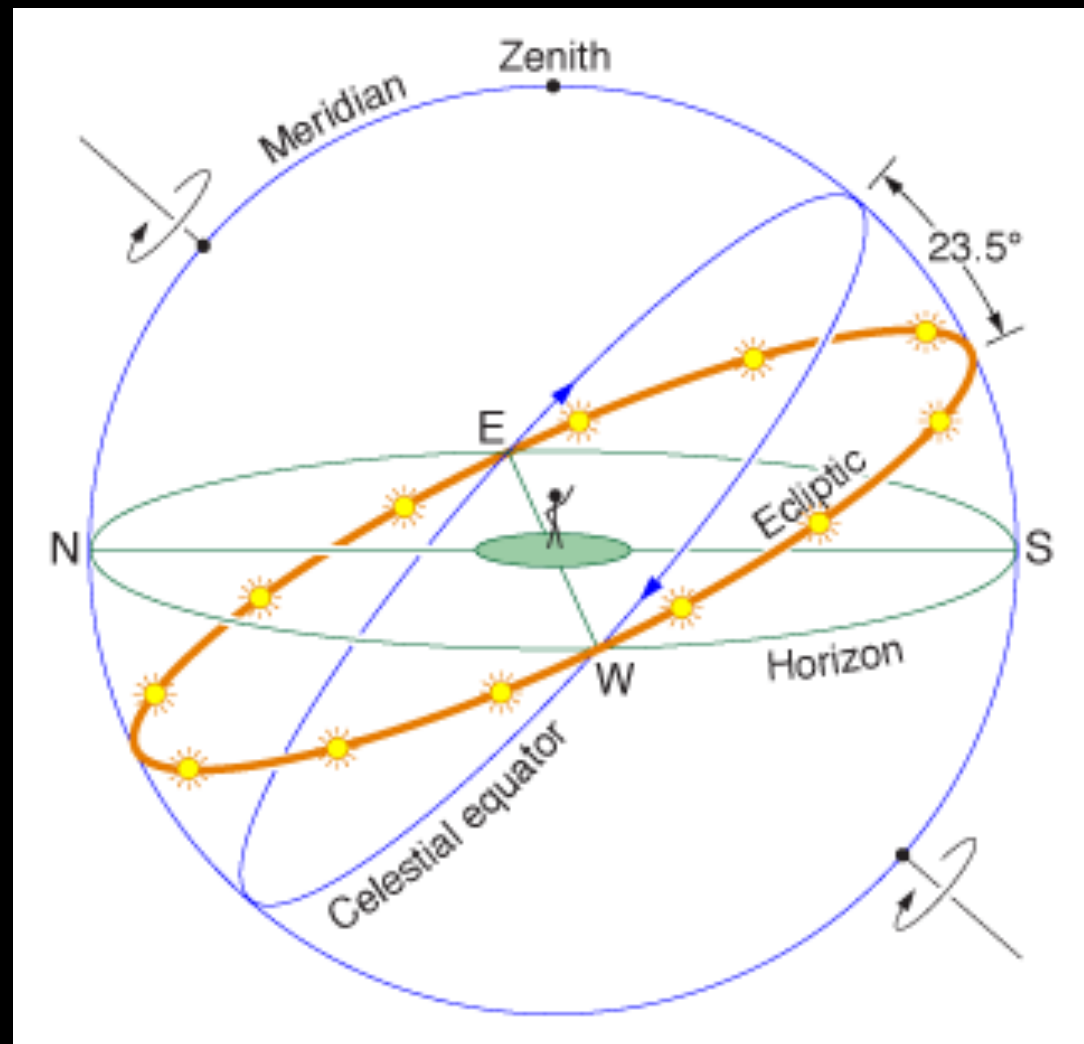
Celestial Sphere

- Right Ascension (RA)
- Longitude equivalent
- RA 0h – 23h on Celestial Equator
- Measured in hours, minutes, seconds
- Example: 00h 48m 36.79s
- Declination (Dec)
- Latitude equivalent
- Dec 0° to +/- 90° from Celestial Equator
- Measured in degrees, arcminutes, arcseconds
- Example: -25° 10' 13.9"
- Altitude and azimuth (alt-azimuth)
- Altitude north or south of celestial equator measured in degrees
- Azimuth: north = 0°, east = 90°, south = 180°, west = 270°
- Measured in degrees, arcminutes, arcseconds
- Example: Azimuth: 097° 15' 16.4"
- Altitude: -28° 47' 20.8"



Celestial Sphere

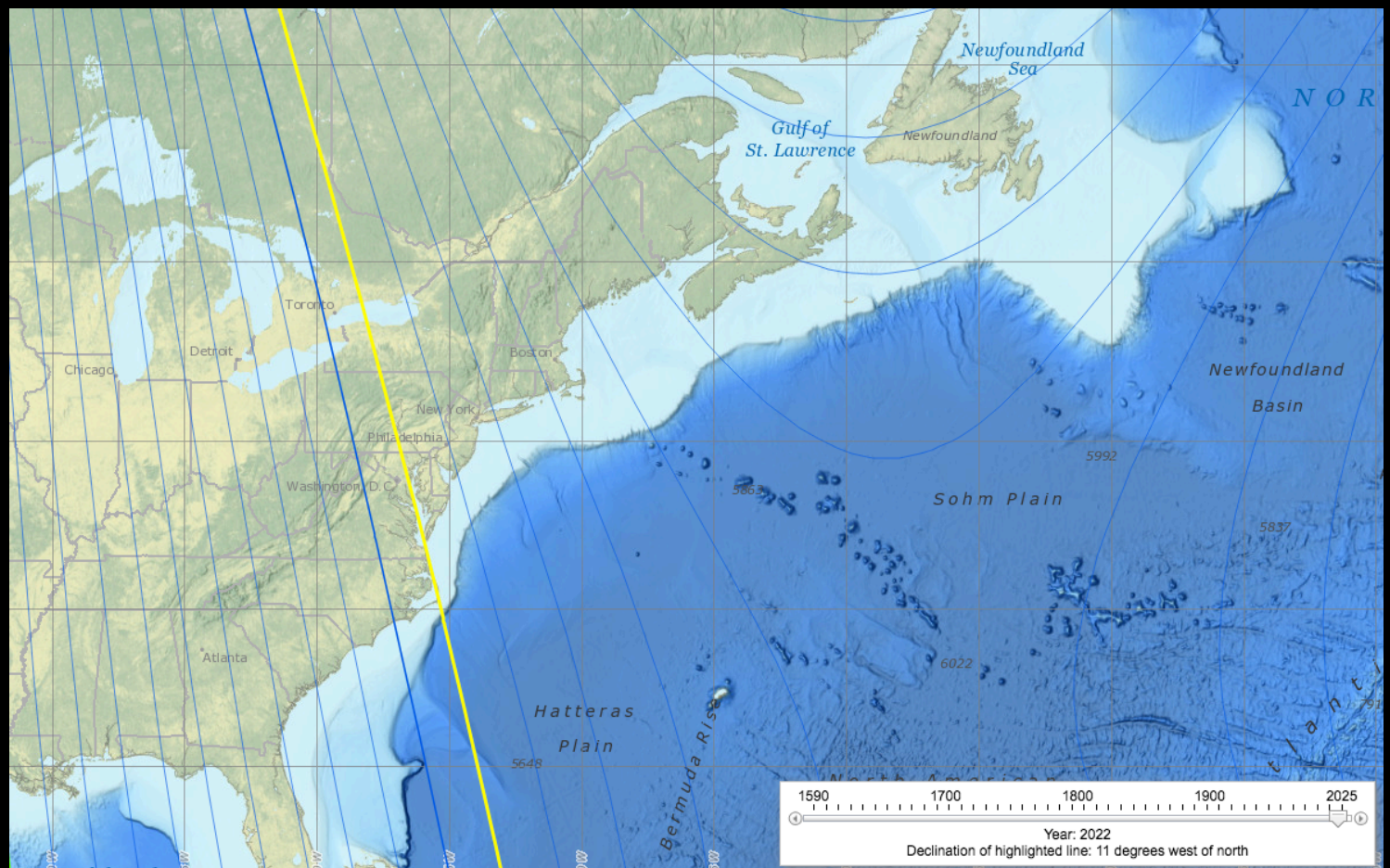
- Zenith
- Meridian
- Ecliptic
- Celestial equator



Daniel V. Schroeder

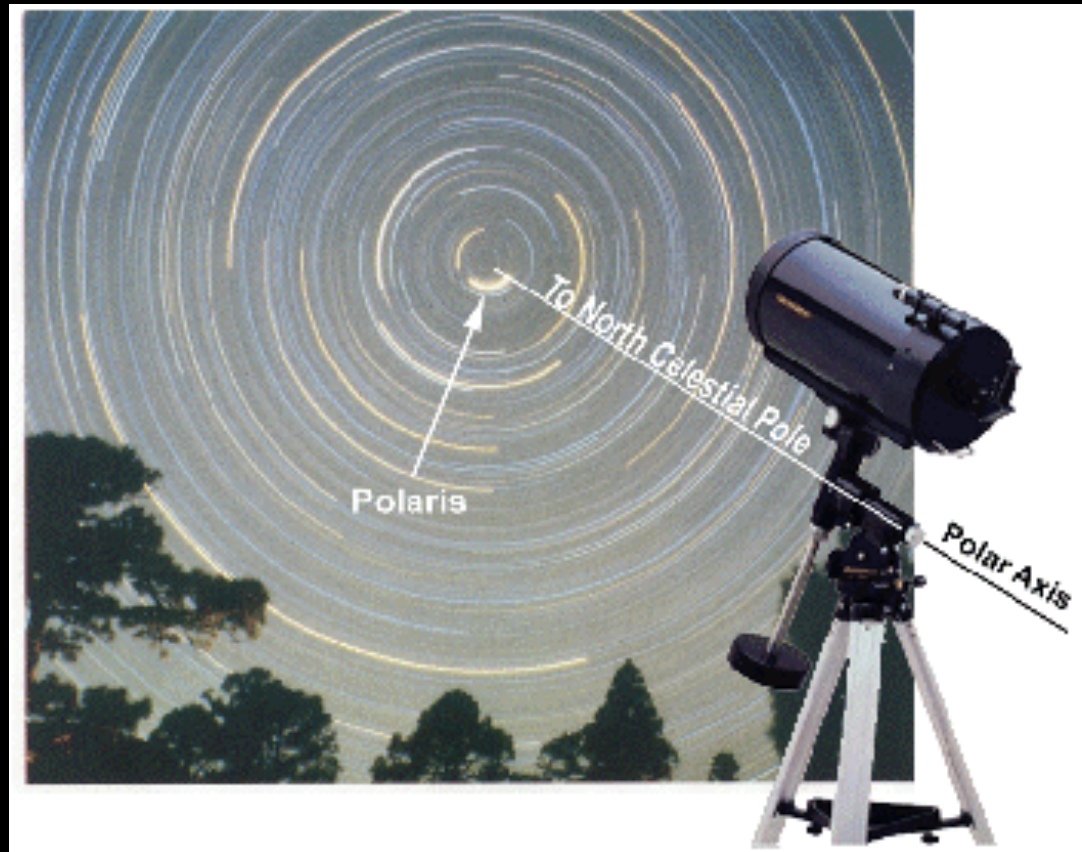
Direction

- Simple, right?
- Magnetic North V.S. True North
- Magnetic declination
 - - 11° 24.41' west of north
- East/West reversal



Polar Alignment

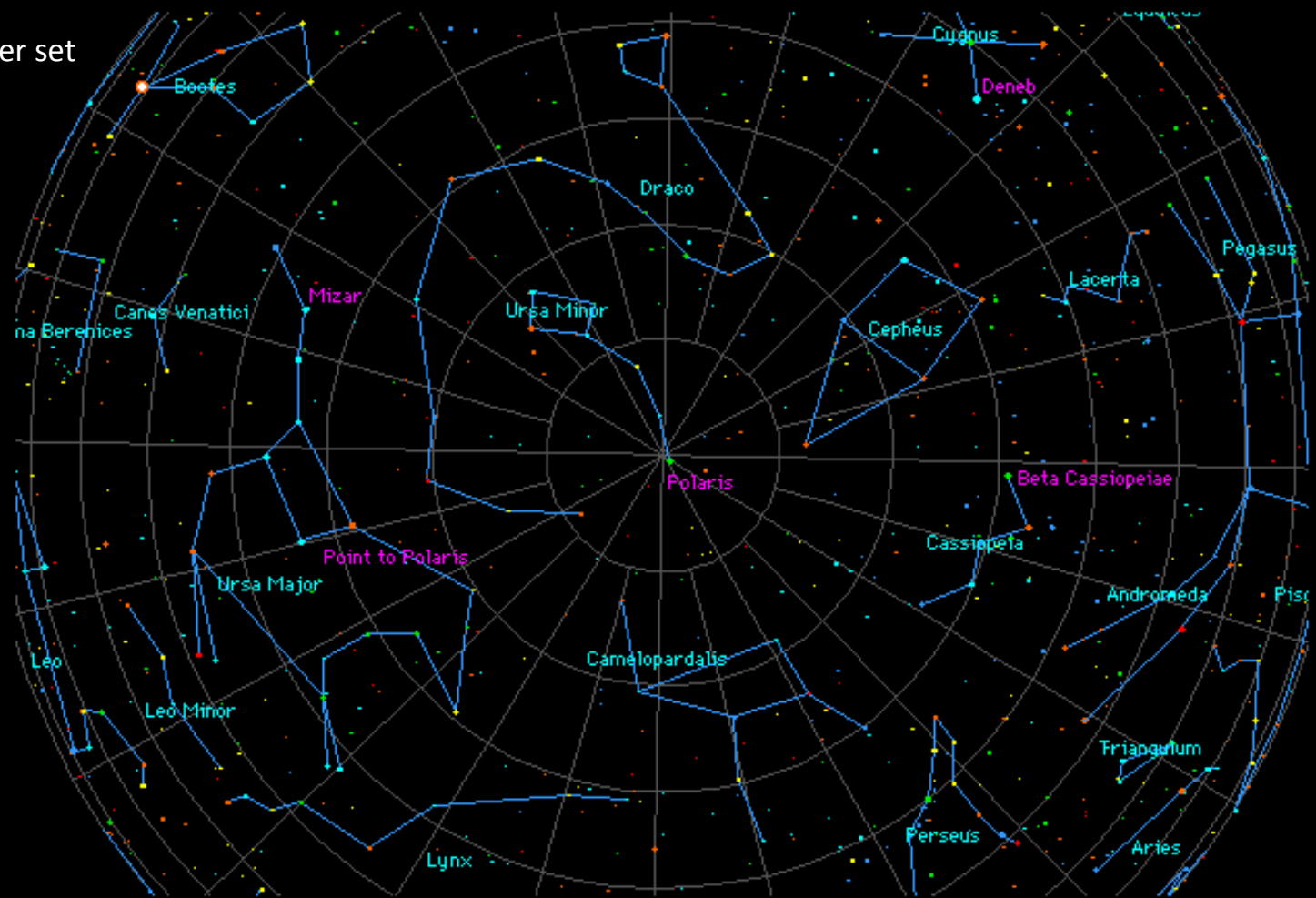
- North Celestial Pole
- North Star – Polaris
 - $\sim 1/2^\circ$



TelescopesPlus.com

Object Visibility

- Circumpolar
- Never rise/never set

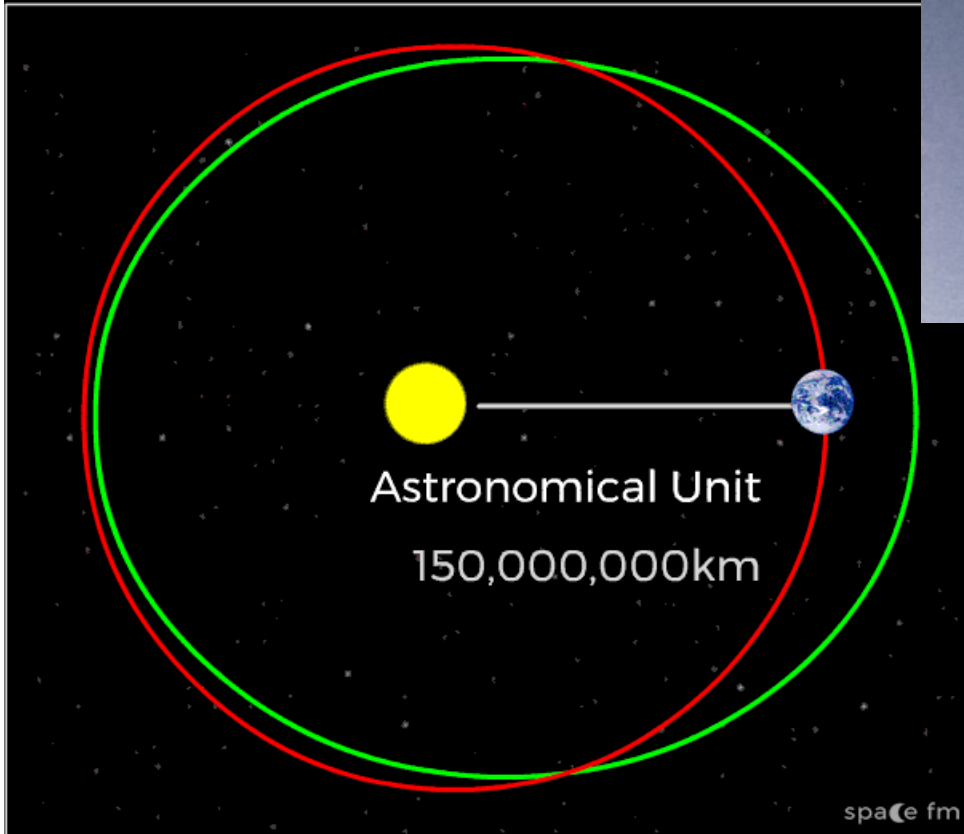


Distance

- Astronomical Unit (AU)
 - 150 million km
- Light Year
 - 9,460,528,405,000 km
- Parallax second (parsec)
 - 3.26 light years

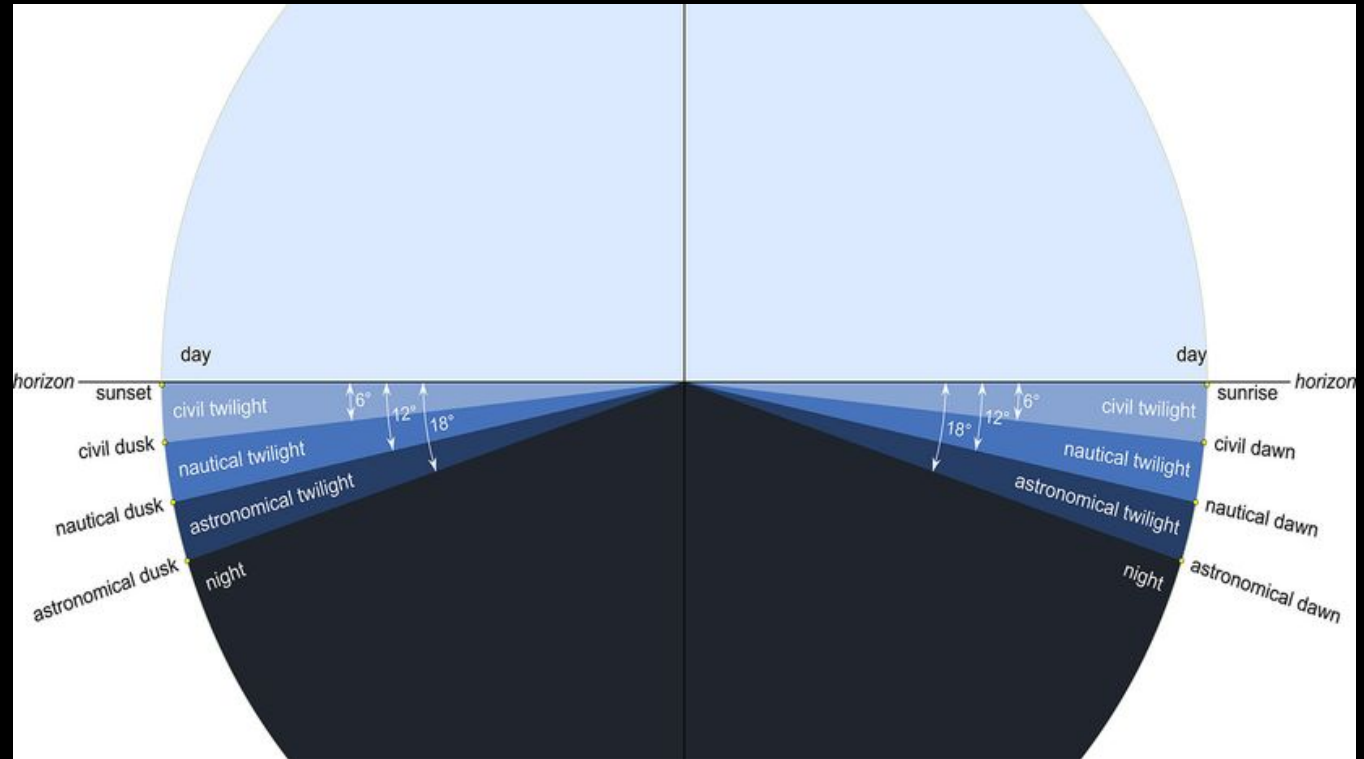


NASA/JPL-Caltech



Time

- Coordinated Universal Time (UTC)
 - 24-hour clock
 - local time offset
 - - 5 hours (Standard Time)
 - - 4 hours (DST)
- Sunset $\neq$ night



TWCARLSON/WIKIPEDIA/CC BY-SA 3.0

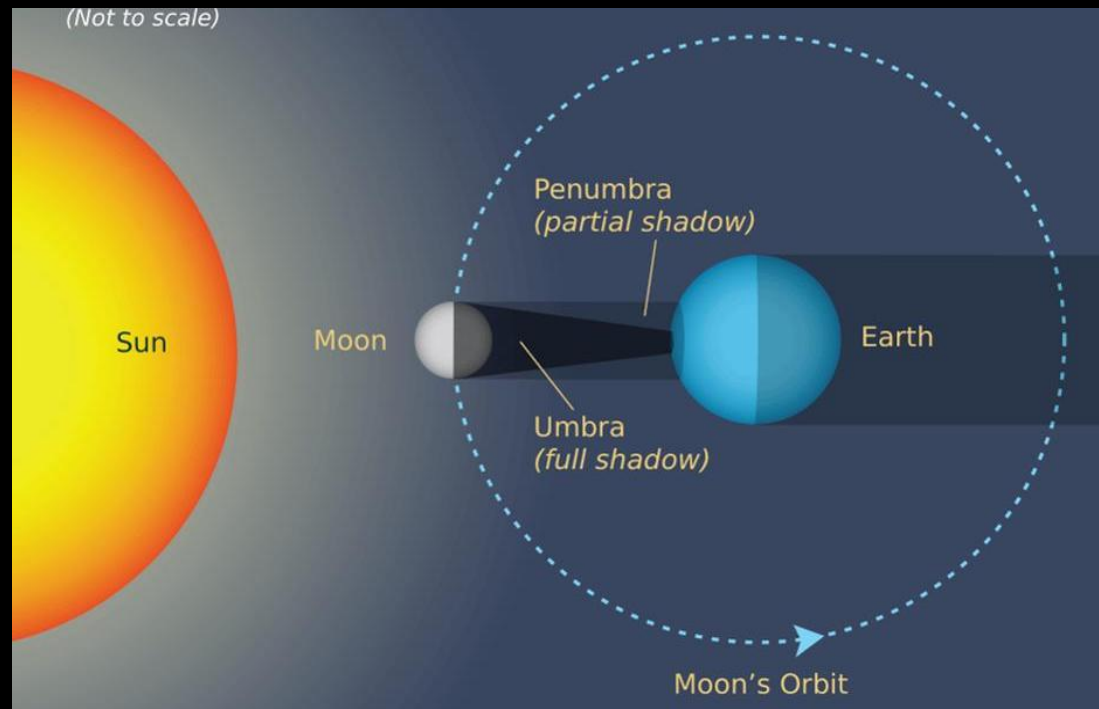
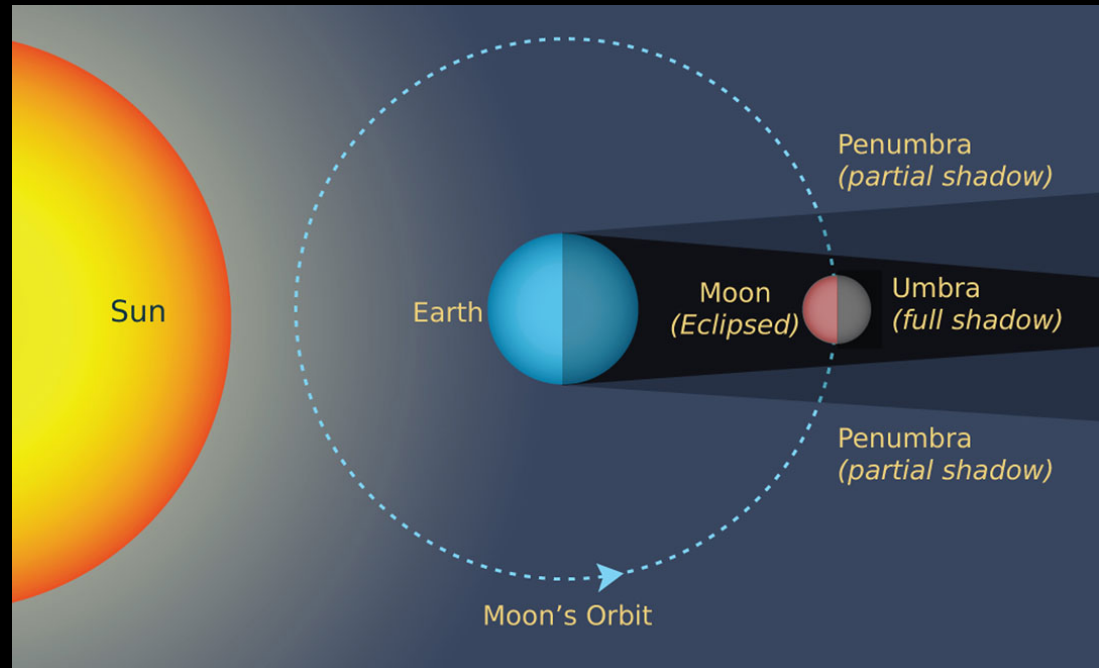
Moon Terminology

- Limb
- Terminator
- Mare (Maria)
- Lunar phases
- Libration



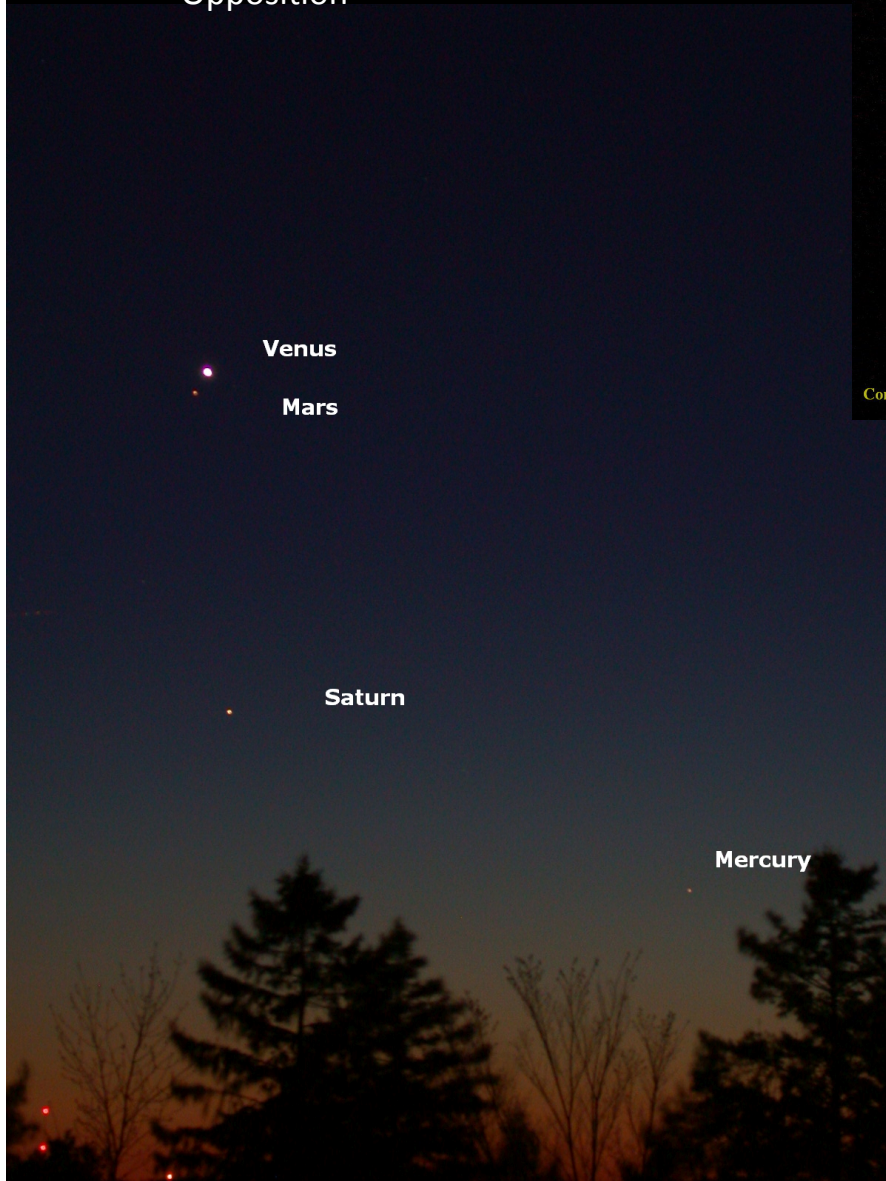
Eclipses

- Lunar eclipse
 - Penumbra
 - Umbra
 - Partial
 - Total
- March 13 - 14, 2025
- Solar eclipse
 - Partial
 - Annular
 - Total
- August 12, 2026



Positional Astronomy

- Conjunction
- Opposition



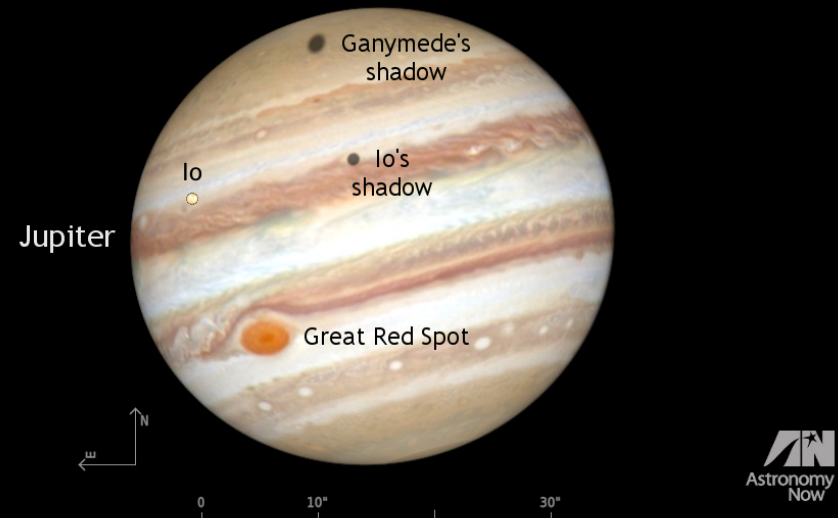
Conjunction of Jupiter and Saturn showing 8 Satellites - 2020-12-18 18:09:19 - LX90/Sony a6000 1.5 secs. @ f/10, ISO 3200 - Sean Dunne, PAA.

Rick Stankiewicz

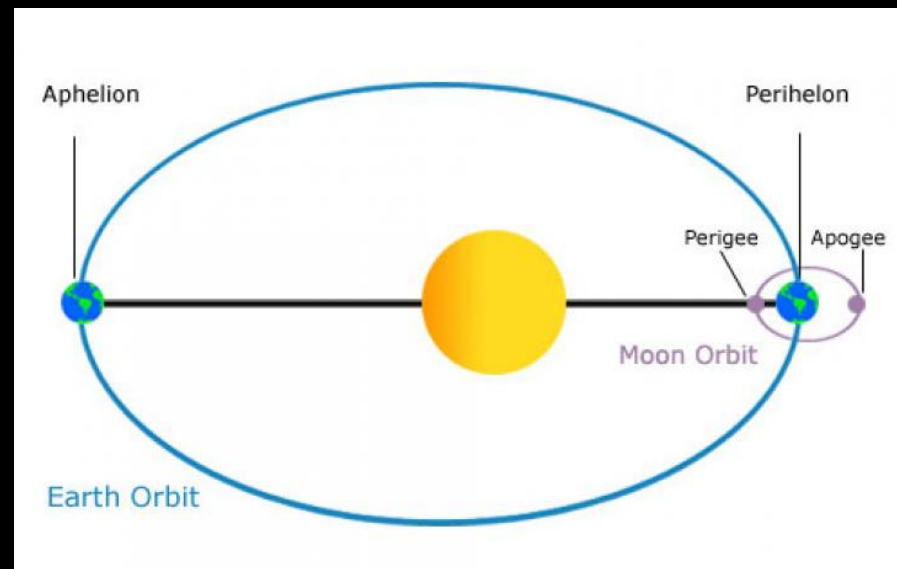
Positional Astronomy

- Occultation
- Ingress, transit, egress
- Perihelion
- Aphelion
- Perigee
- Apogee

Saturday, 24 March 2018, 22:20 UT — midst of double shadow transit



Simultaneous shadow transit of Io & Ganymede from 21:20–23:07 UT



NASA

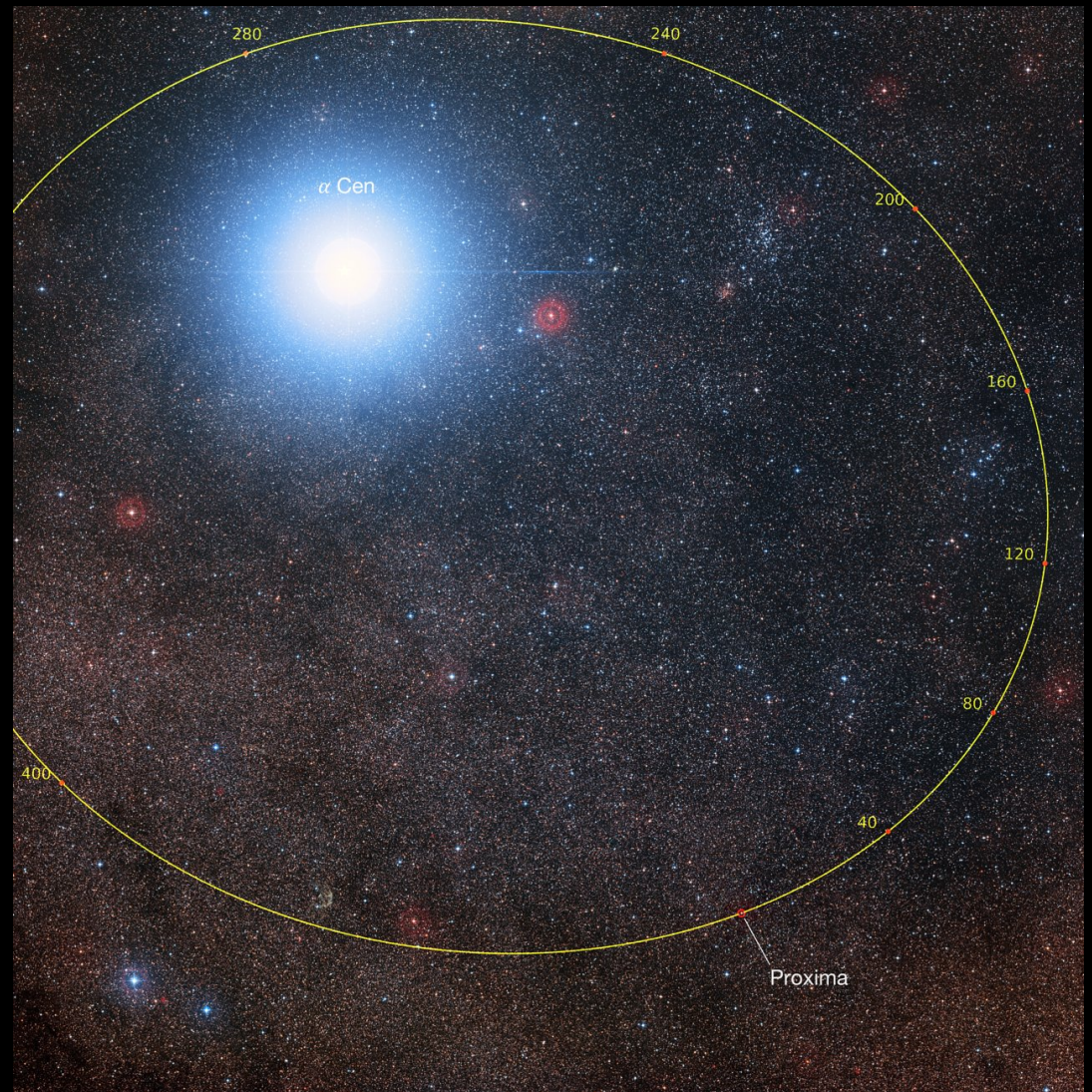
Positional Astronomy

- Multiple star systems
 - Components (AB, AC, etc.)
 - Separation (arcseconds & angle °)
 - Alpha Centauri AB: 4.1" @ 313°
 - Alpha Centauri AC: 2" @ 211°
- Apparent motion
- Proper motion
- Ephemeris (object coordinates)

ALPHA CEN X-RAY CLOSE-UP



NASA/CXC/U of Colorado, T.Ayres et al.



P. Kervella, ESO, Digitized Sky Survey2, D. De Martin/M. Zamani

Brightness

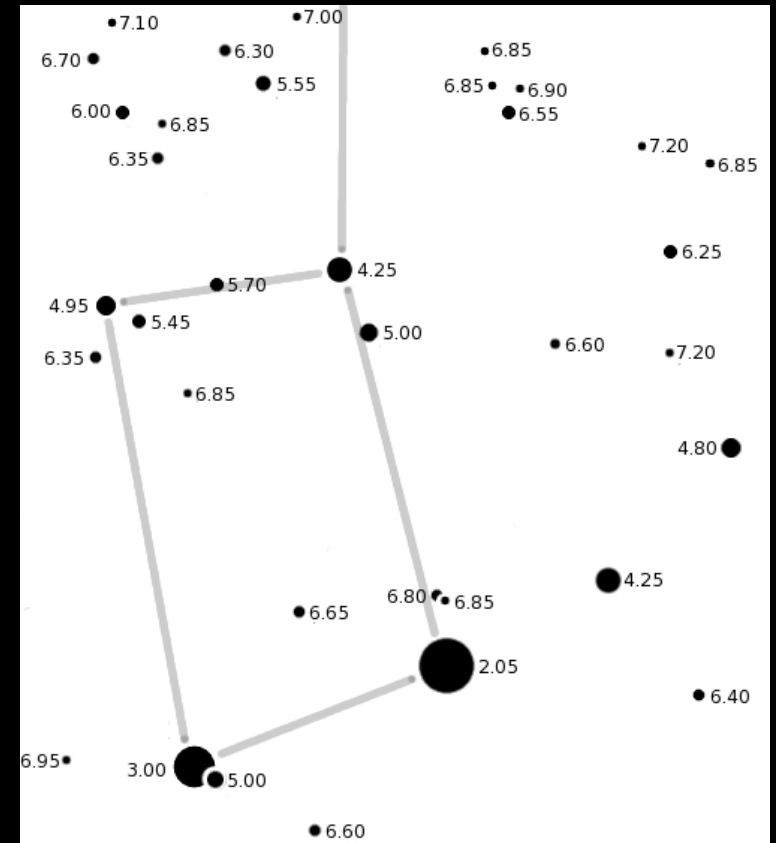
- Luminosity
- Magnitude (apparent magnitude)
- Scale (2.5x)
- Absolute magnitude
- Limiting magnitude

Apparent vs Absolute Magnitude

	<u>stars</u>	<u>absolute magnitude</u>	<u>apparent magnitude</u>	<u>distance</u>
Orion	Rigel	-6.69	+0.18	772 l.y.
	Sun	+4.83	-26.75	1AU
	Sirius	+1.42	-1.46	8.6 l.y.
Canis Major				
	Sirius			

If $M_{\text{App}} < M_{\text{Abs}}$ obj is closer than 10pc
 If $M_{\text{App}} > M_{\text{Abs}}$ obj is further than 10pc

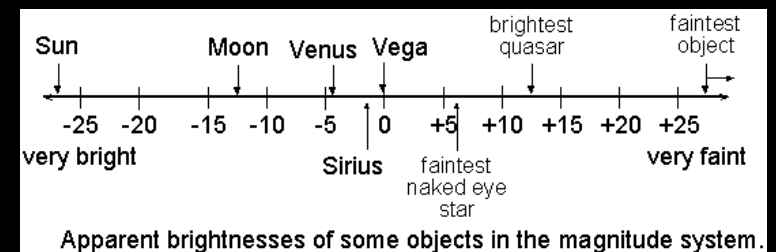
ilectureonline.com



Naked Eye Limiting Magnitude Chart

This chart shows the 34 brightest stars around the "body" of Ursa Minor, down to magnitude 7.2, the very faintest star visible to the naked eye. Use this chart to locate the faintest star visible from any location, giving your Naked Eye Limiting Magnitude, NELM. This is best done when these stars are $> 60^\circ$ above the horizon.

Created by Steve Owens @darkskyman



Apparent brightnesses of some objects in the magnitude system.

Nick Strobel

Atmospheric Terminology

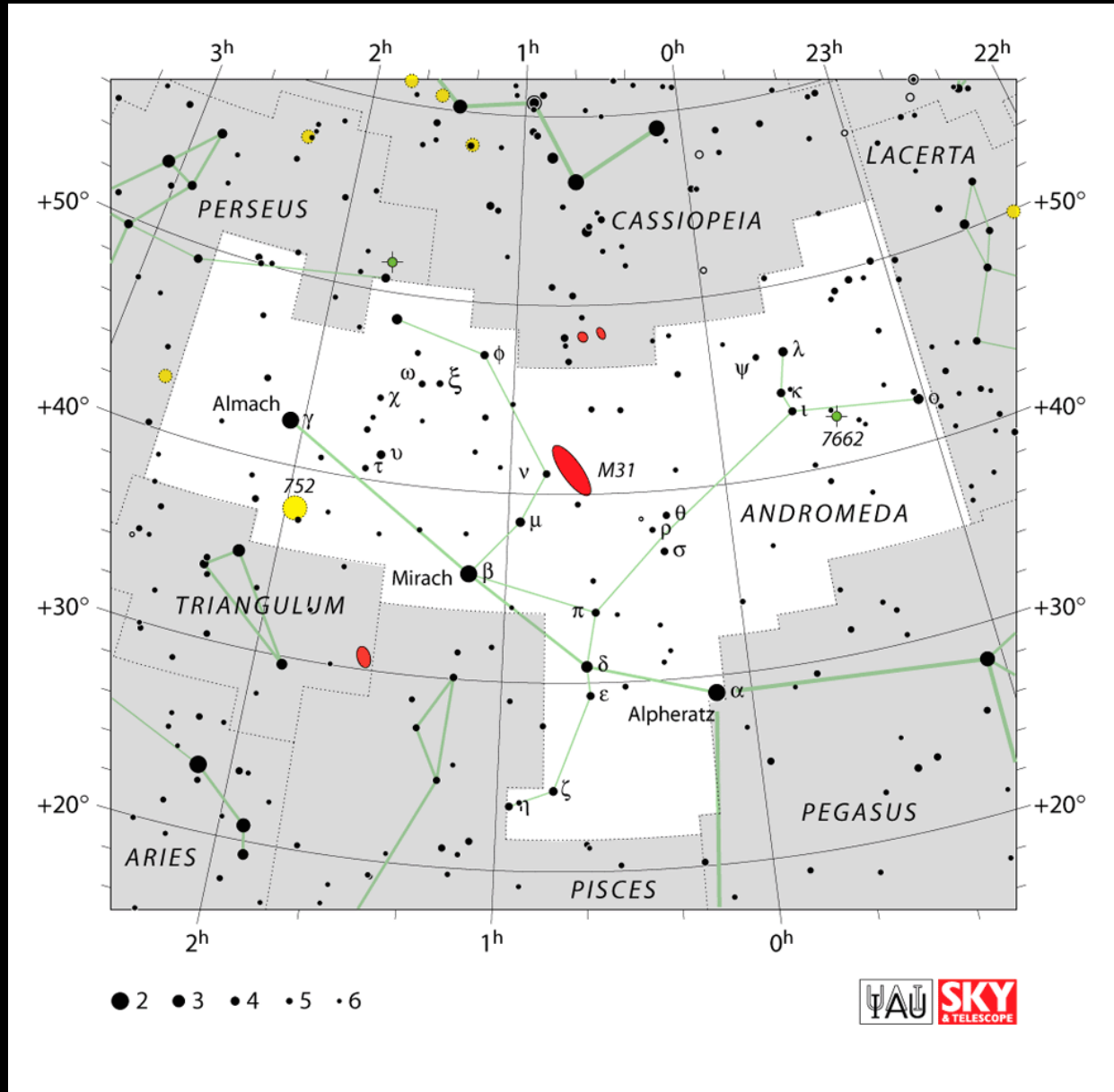
- Seeing
- Transparency
- Air mass
- Atmospheric extinction



Astrospheric screen capture

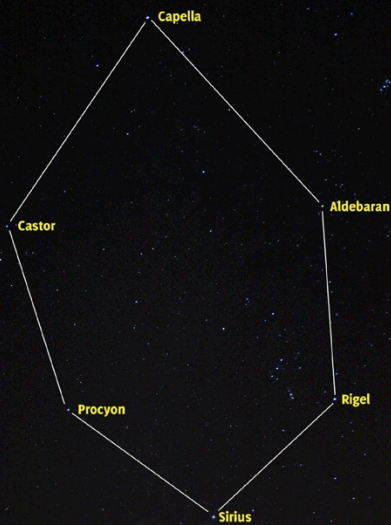
Star Names

- Brightest stars
- Greek letter designations
- Numerical designations



Asterisms

- Part of a constellation
 - Big Dipper
 - Little Dipper
 - "W" of Cassiopeia
 - The Square of Pegasus
 - The Keystone
 - Orion
- Multi-constellation asterisms
 - Summer Triangle
 - The Winter Hexagon



Winter Hexagon: Rick Stankiewicz

Small Bodies

- Dwarf planet
- Asteroid
- Meteoroid
- Meteor
- Meteorite



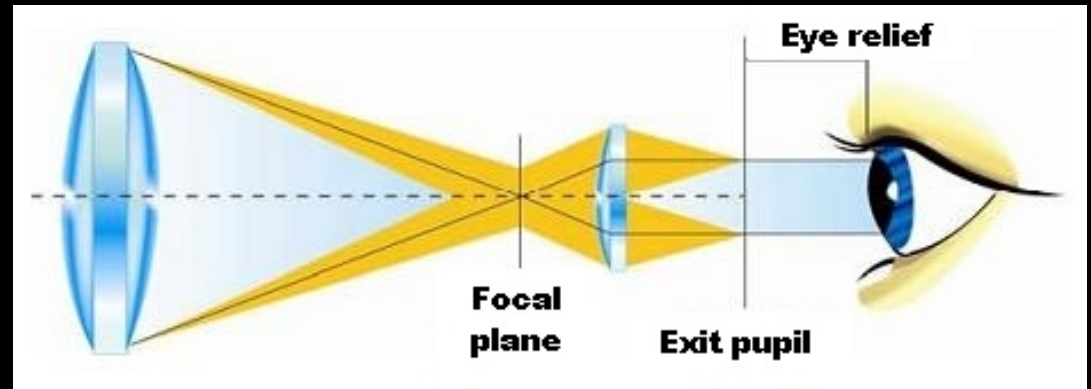
162173 Ryugu: JAXA/Hayabusa 2



Pluto: NASA/New Horizons

Eyepiece Jargon

- Magnification (power)
- Eye relief
- Field of view
- Apparent field of view



50°



68°



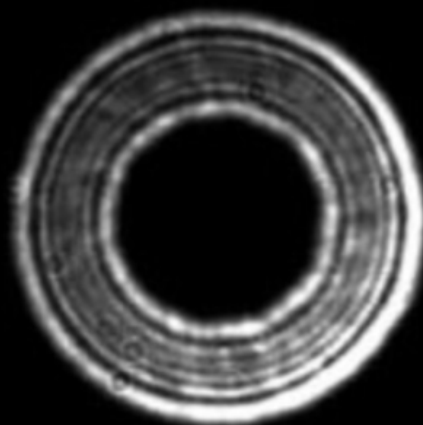
82°

Orthogonal

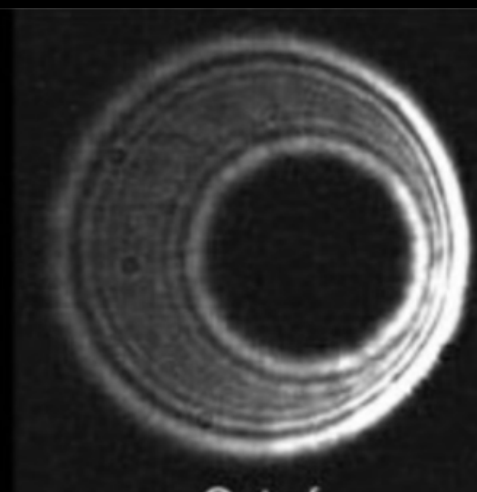
- Finder scope
- Collimation
- AI's Collimation Aid



GigOptix



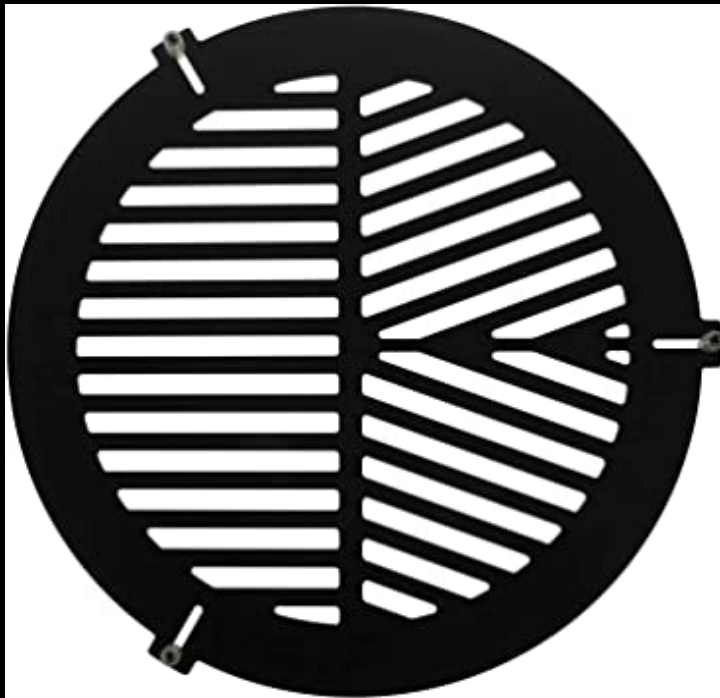
Perfect
collimation



Out of
collimation

Focusing Aids

- 10:1 fine focusing knob
- Motorized focuser
 - NINA
- Bahtinov mask
- Bahtinov Grabber



January 3, 2025

HELP WANTED!

