An Introduction to the Night Skies
Week 1

Presented by:
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Mike Bradley, Garth Jones
and the RASC Sunshine Coast Centre

An Introduction to the Night Skies

- Week 1
  - Opening Discussion – what topics interest you?
  - Practical astronomy, telescopes, binoculars, star-finders
  - Terms and reading materials
- Week 2
  - An astronomical timeline – prehistory to present day
- Week 3
  - An introduction to the night sky – objects
  - Measurements, Tools and Techniques
  - Basics of Cosmology and the “Cosmological Principle”
- Week 4
  - The solar system
  - The expanding universe or the Milky Way

} May change based on on class interests

Online support material

- PDF copies of the various presentations will be made available after each weeks class is finished.
- The site is password protected to restrict access to course participants only.
- The URL is :
  http://www.sunmoonstars.ca/elderu/
- Password is: elderu24
- Supporting documentation will also be available from the site.

Observing session

- At some time during the month we will organise an evening observing session. Warm clothing essential.
- Location and date will be announced as far in advance as possible, bearing in mind weather conditions and cloud cover.
- If we are unable to conduct the session during February , we'll have a "rain check" date for later in the year.

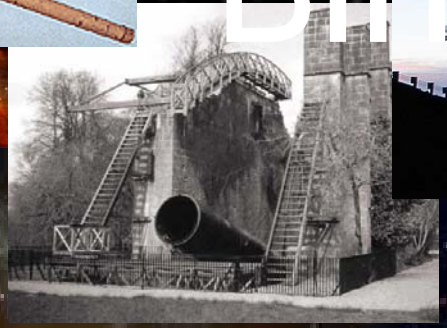
Key Organisations

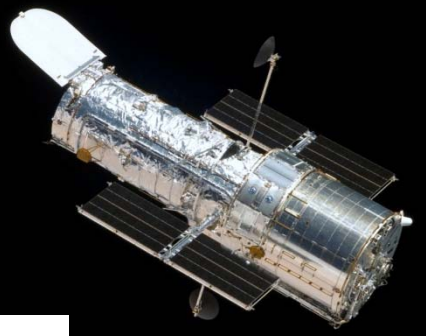
- Founded in 1868, The Royal Astronomical Society of Canada (RASC) is Canada's leading astronomy organization bringing together over 4,800 enthusiastic amateur astronomers, educators, and professionals.
- The Sunshine Coast Astronomy Club was founded in 2004, we joined the RASC in 2007. Our membership in 2007 was 22, today it is 50.
- We meet in the Sunshine Coast Arts Centre on the 2nd Friday at 7:30pm, Sept-June. We hold an “Astro Café” at Pier 17 on the 3rd Friday each month

Observatory at Sechelt Aerodrome

Our 14” Telescope

Telescopes and Binoculars





Selecting Binoculars

- Binoculars are referred to with 2 numbers, such as 7 x 35.
- The first number is the magnification factor, or power; the 7 x 35 lenses will make objects appear 7 times closer
- The second number is the diameter of the objective lenses in millimeters; 7 x 35 lenses are 35 millimeters in diameter.
- The larger the objective lens, the more light it can gather, which is important in low-light activities such as astronomy. However, the larger the lenses are, the more the binoculars will weigh.

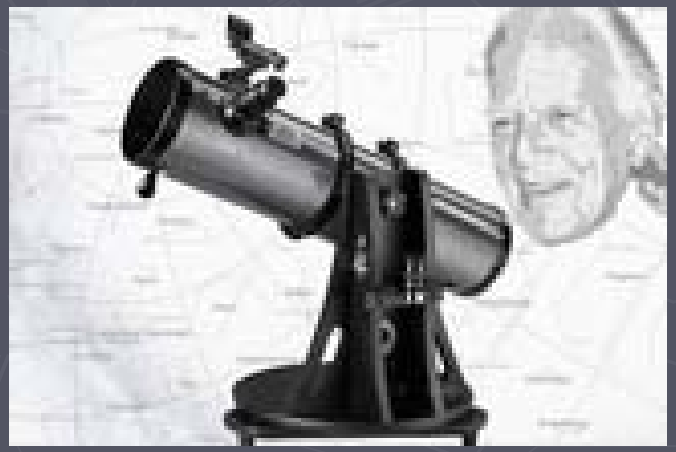
Selecting binoculars

- See p3 of *"Getting started in Astronomy"* for a summary of key points.
- A more comprehensive guide, produced by the RASC, is available for download from the course website.
- You don't want a pair of binoculars that is either too big or too small
- Most people find 7x50 or 10x50s work well.

Types of Telescopes

Refractor

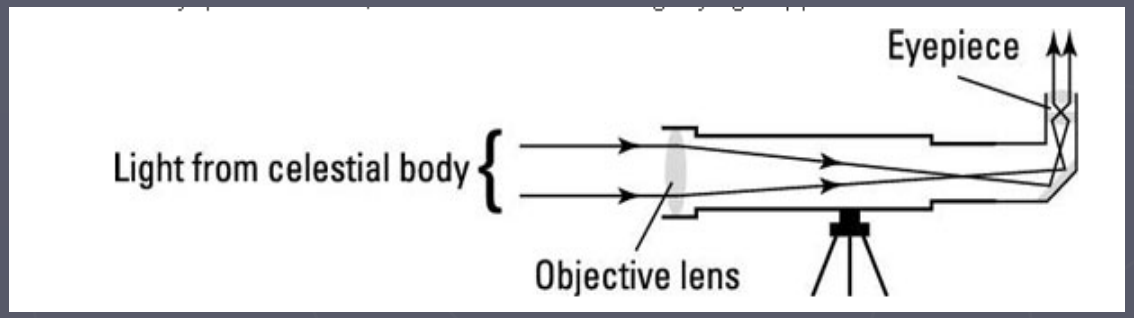
Reflector



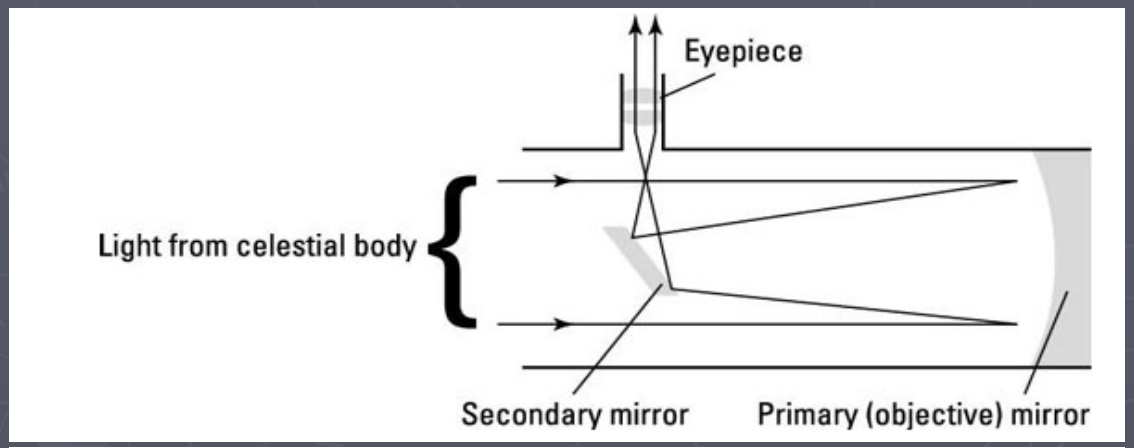
Dobsonian

Hybrid

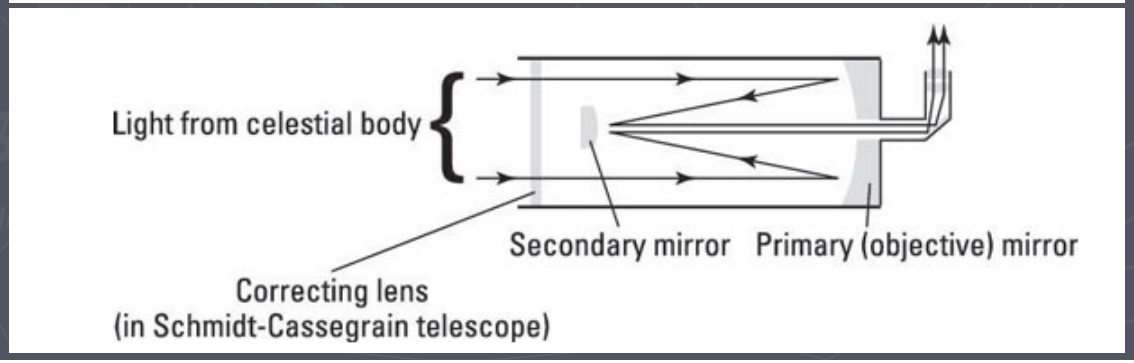
Types of Telescopes



Refractor



Reflector



Hybrid

Selecting a telescope

- Telescopes are described with two numbers, the focal length and the diameter:
  - Diameter determines how much light the telescope will gather, and therefore how dim an object it will be able to resolve
  - Focal length is the length of the optical path between the objective lens and the point of sharp focus.
- Magnification is a function of the focal length of the telescope and its eyepiece:
  - Magnification = FL telescope (mm)/ FL eyepiece(mm)

Selecting a telescope

- See p5 of *"Getting started in Astronomy"* for a summary of key points
- A more comprehensive guide, produced by the RASC, is available for download from the course website.
- A key point to bear in mind is that the best telescope is the one that is actually used!

Telescope mounts – 2 basic designs

AltAz

2 axes: up/down (Altitude)

Side to side (Azimuth)

As the sky rotates the mount must adjust in both axes

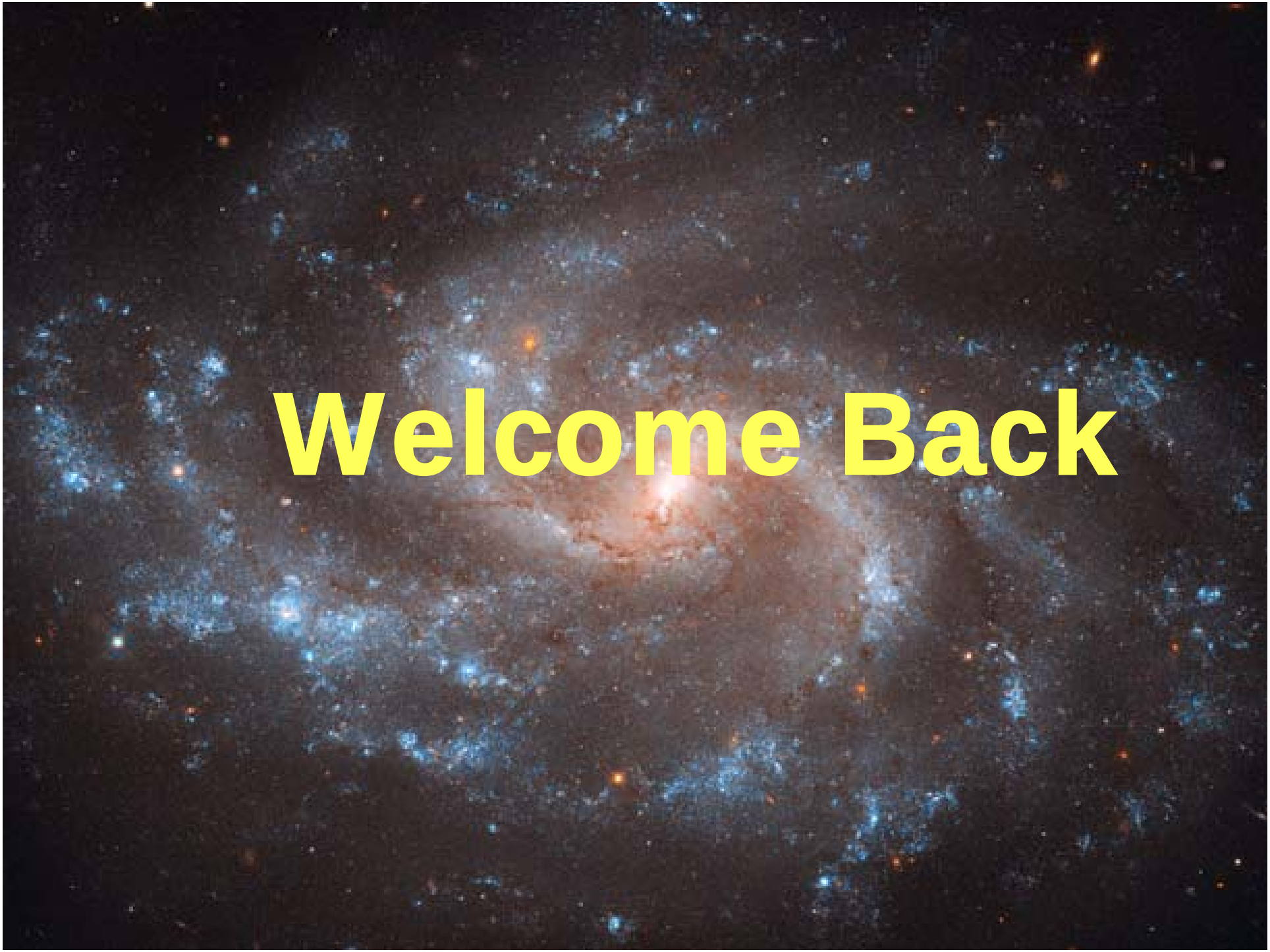
One axis aligned with Polaris.

Once an object is located then only one axis needs to be adjusted making tracking easier

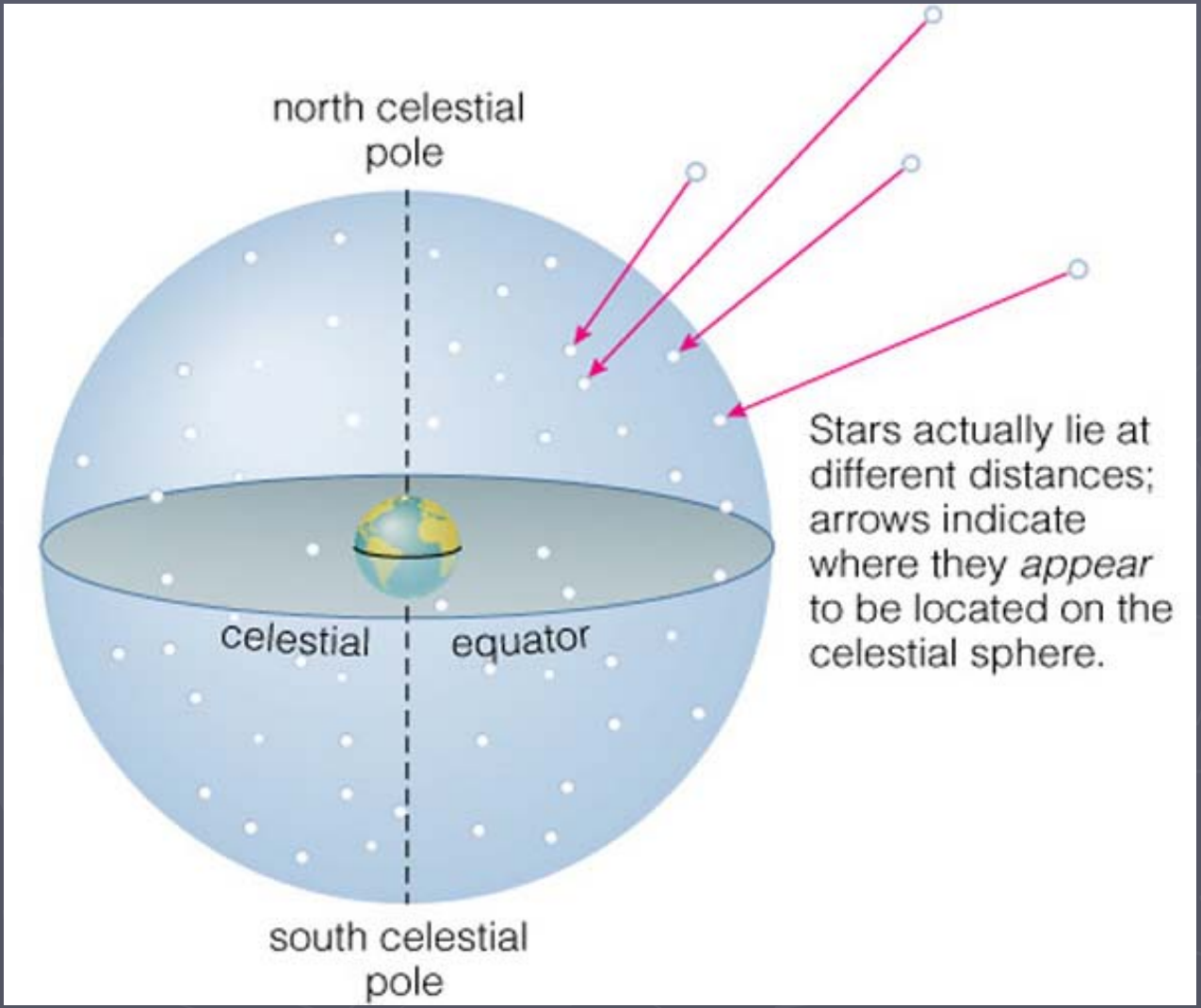
Equatorial

Before you buy

- Come along to some of our club meetings and talk to members
- Attend our observing events and experience different instruments in use.
- Join the club and borrow instruments from our club inventory.
- Lets look at some examples....


Welcome Back

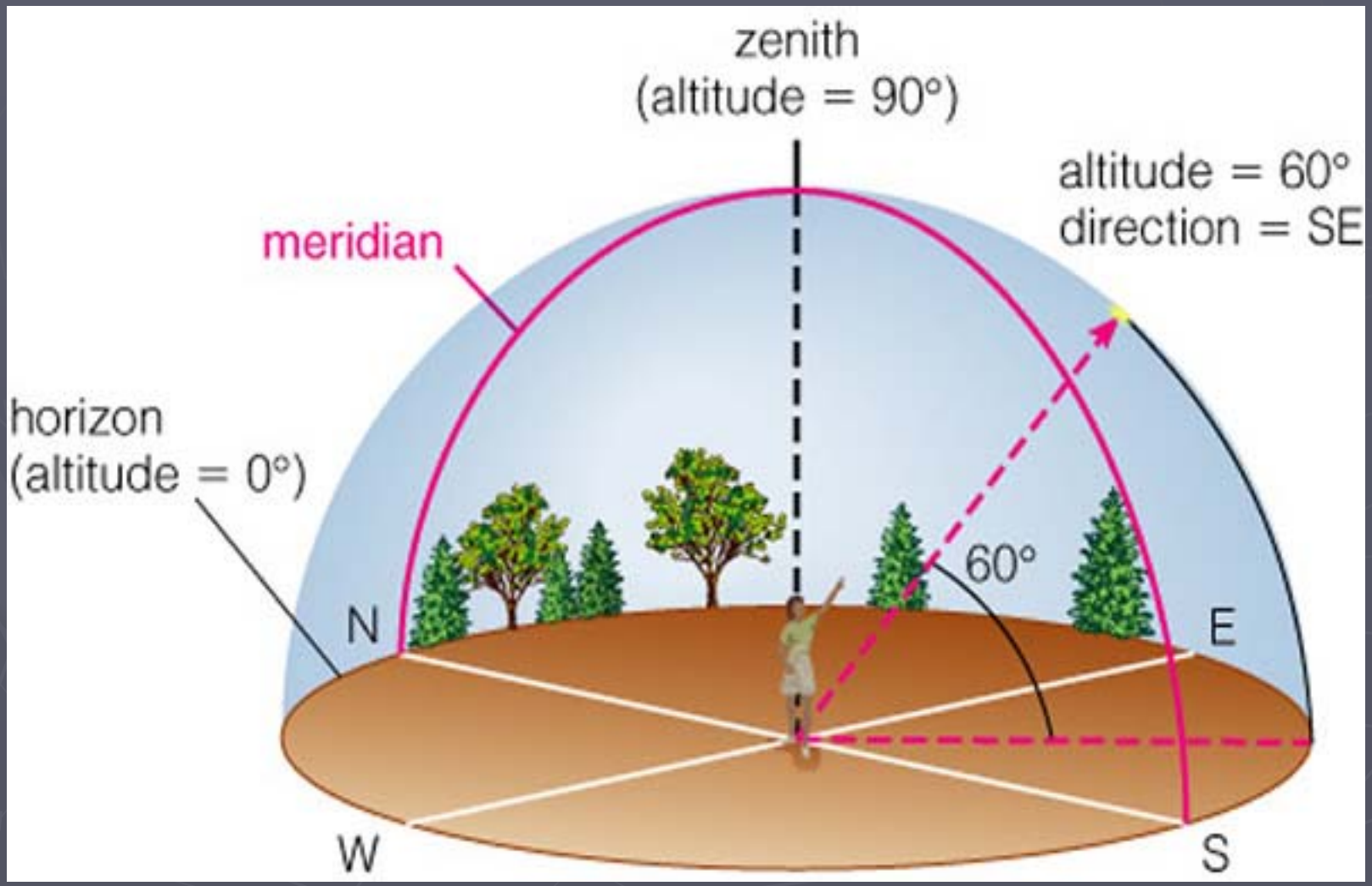
Celestial Sphere



We are on the INSIDE of the sphere, looking out!

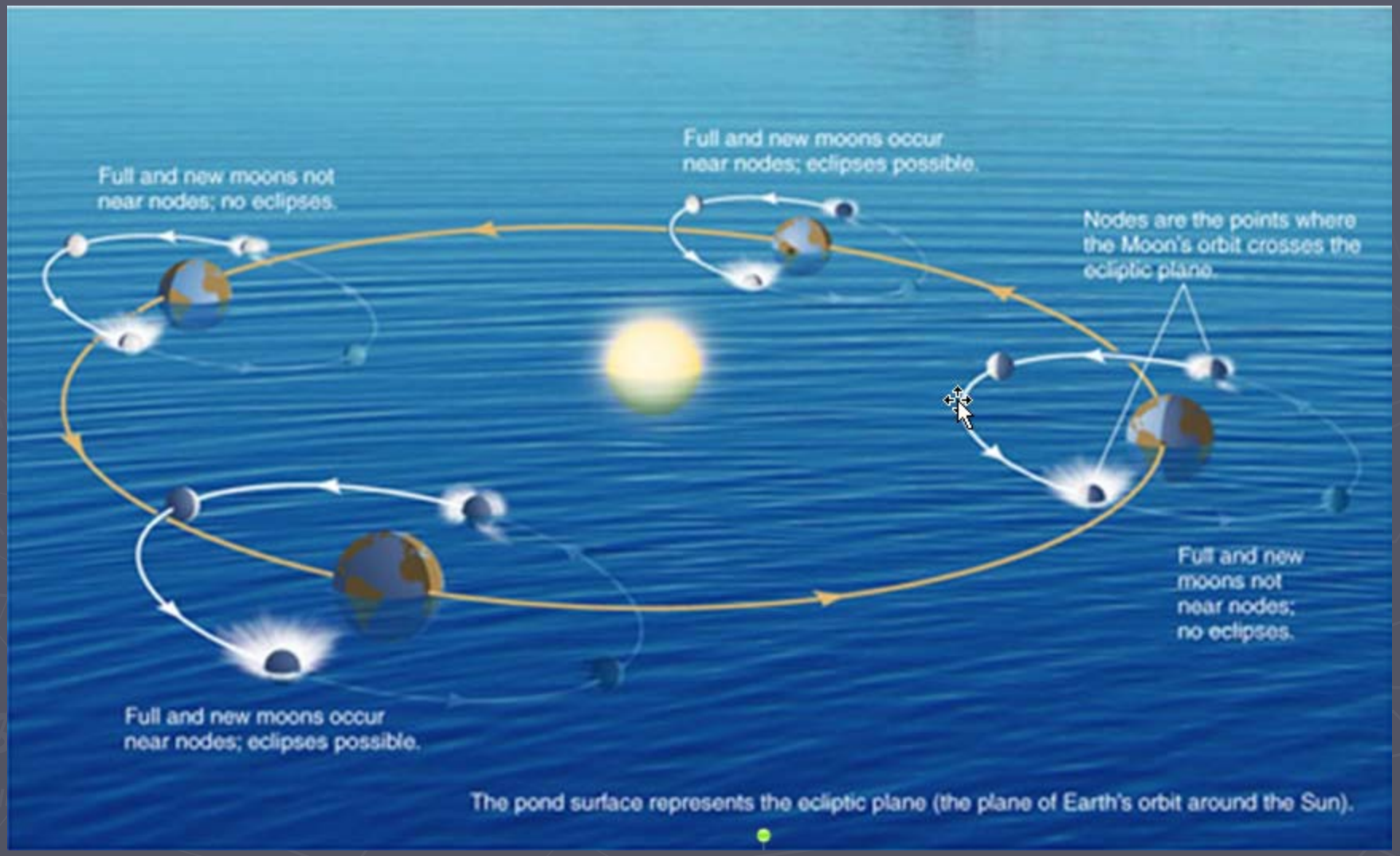
Source: http://astronomy.uconn.edu

The Dome of the Local Sky



Source: http://astronomy.uconn.edu

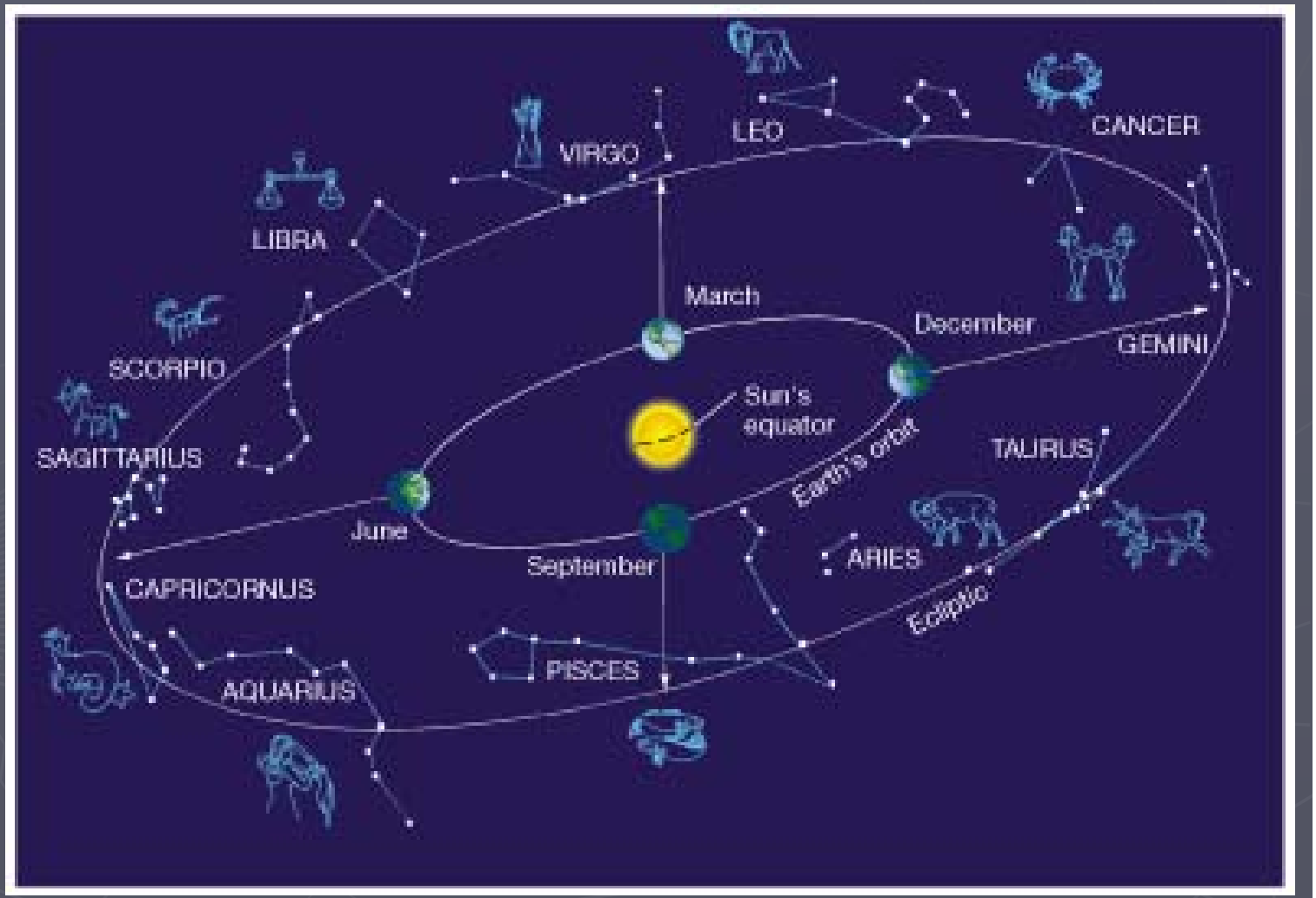
Ecliptic Plane – contains the Sun and planets



Source: http://astronomy.uconn.edu

Zodiac Constellation

The constellations on the celestial sphere through which the ecliptic passes



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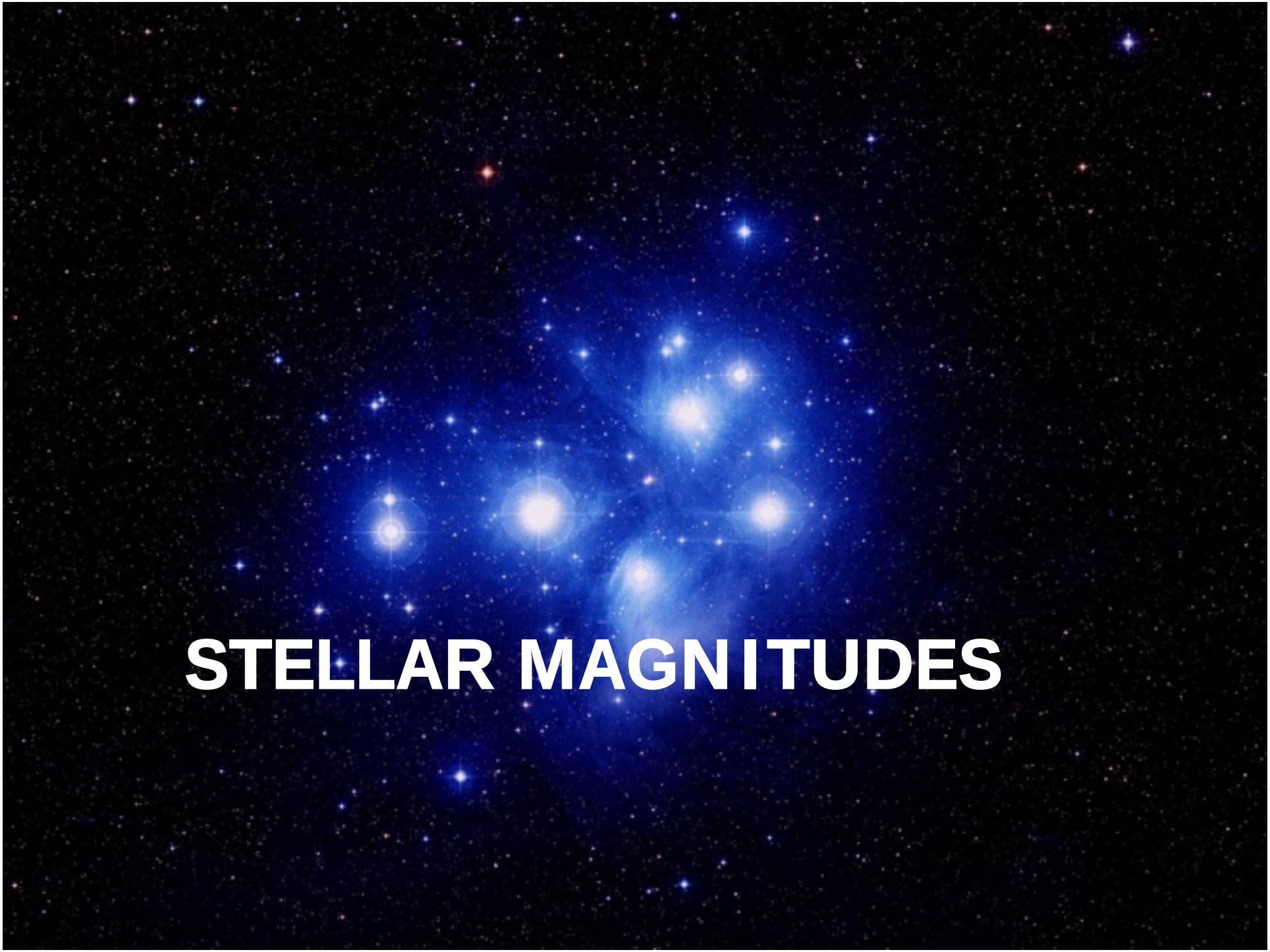

STELLAR MAGNITUDES

Stellar Magnitudes

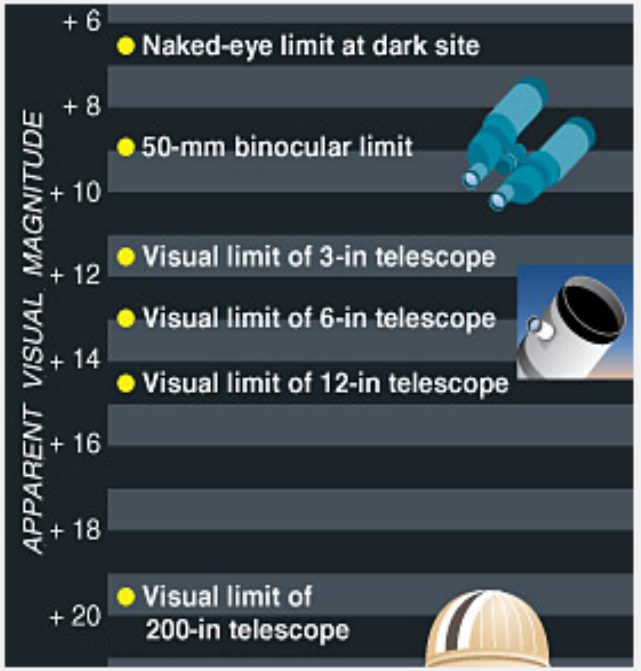
- Stellar magnitude is a measure of the brightness of a star or other celestial body. The brighter the object, the lower the number assigned as a magnitude.
- The scale is logarithmic so a star of magnitude 6.0 is 2.512 times as bright as one of magnitude 7.0
- After the scale was properly calibrated, the brightest class was found to contain too great a range of luminosities, and negative magnitudes had to be introduced to spread the range!

Source: Encyclopedia Britannica

Stellar Magnitudes

Apparent magnitude is the brightness of an object as it appears to an observer on Earth. The Sun's apparent magnitude is -26.7, that of the full Moon is about -11, the bright star Sirius is -1.5.

Absolute magnitude is the brightness an object would exhibit if viewed from a distance of 10 parsecs (32.6 light-years). The Sun's absolute magnitude is 4.8 measured this way.



Fifty-eight magnitudes of apparent brightness encompass the things that astronomers study, from the glaring Sun to the faintest objects detected with the Hubble Space Telescope. This range is equivalent to a brightness ratio of some 200 billion trillion.

Sky & Telescope

Parsec is the distance that an astronomical object would be if It had a parallax of exactly one second of arc (par-sec).

MISCELLANEOUS

Dark Sky charts http://cleardarksky.com

Sponsor this Chart

Sechelt

Clear Sky Chart

legend page

Image Control

1. Explain color and details when you mouse-over: ☐
2. Click on a block to show full forecast map
3. Display color legend: ☐

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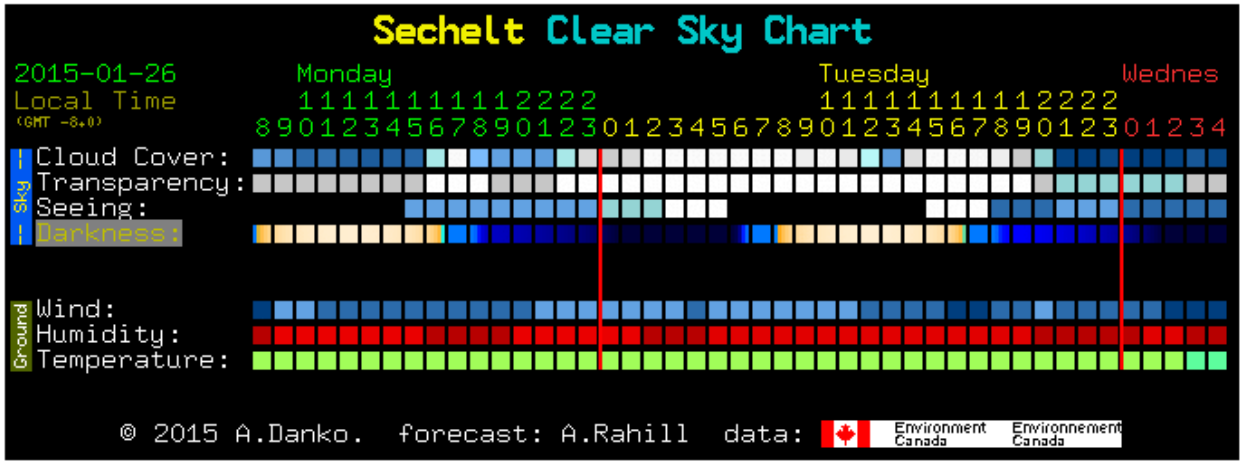


Page Contents

What is it?

Nifty Links: Sun & Moon Data | Road Map | Sat Image | Topo Map | Satellite Predictions | Star Map | CalSky | Light Pollution map

Local Charts

P.River

Sechelt

Airport

R. Creek

Gibsons

Suggested Reading

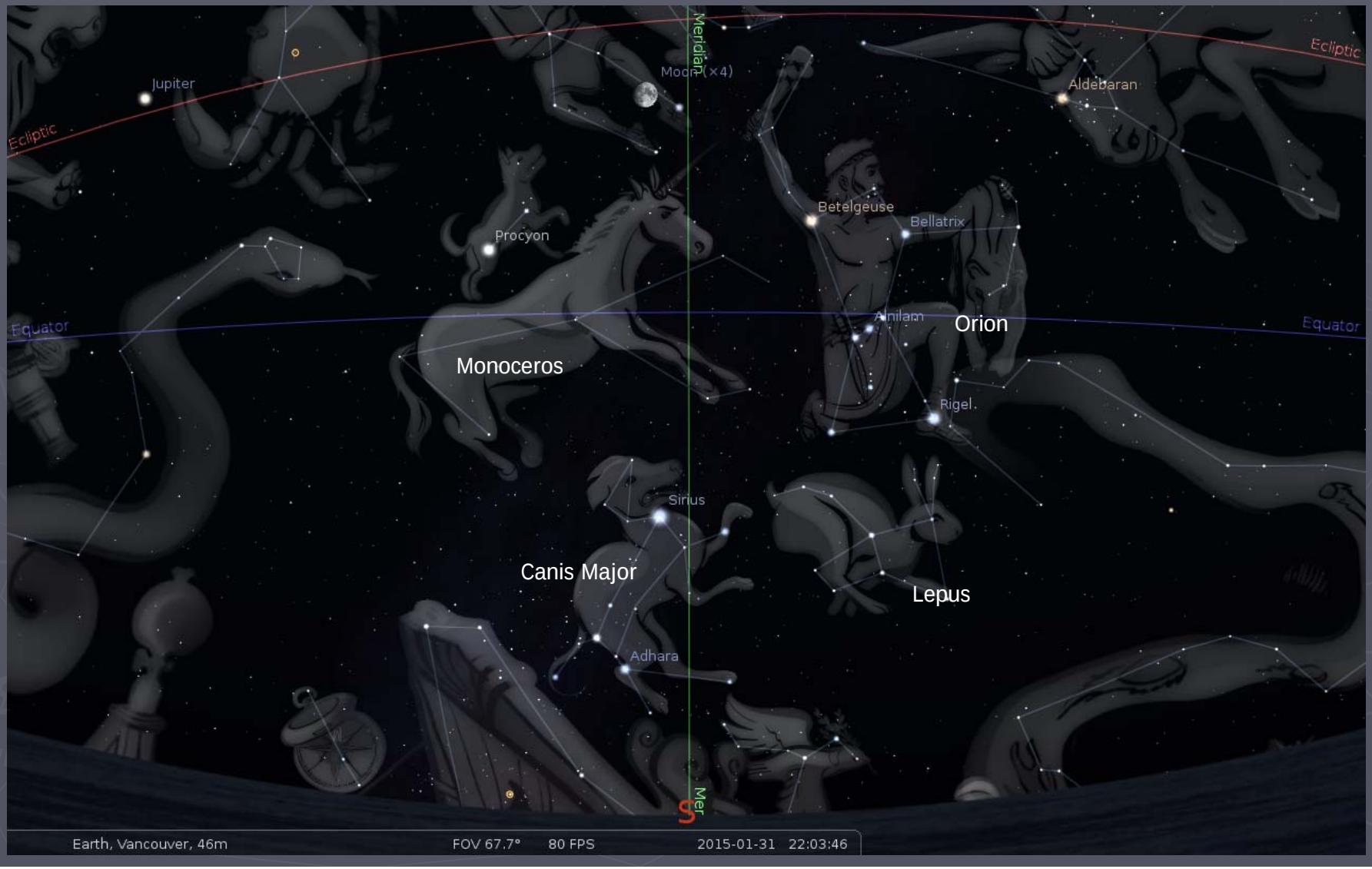
- Nightwatch, T.Dickinson, Firefly Books, 2006
- The Backyard Astronomers Guide, T. Dickinson, A. Dyer, Firefly Books, 2008
- The New Patterns in the Sky: Myths and Legends of the Stars, J. Staal, McDonald and Woodward Publishing, 1988
- Binocular Highlights – 99 Celestial Sights for Binocular Users, G.Seronik, Sky Publishing, 2007

- Local libraries have some of these books, and our astronomy club has them too.

Important terms

- A selection of important astronomical terms is available from download from the course website:
  www.sunmoonstars.ca/elderu/

Homework – Lets look at Orion



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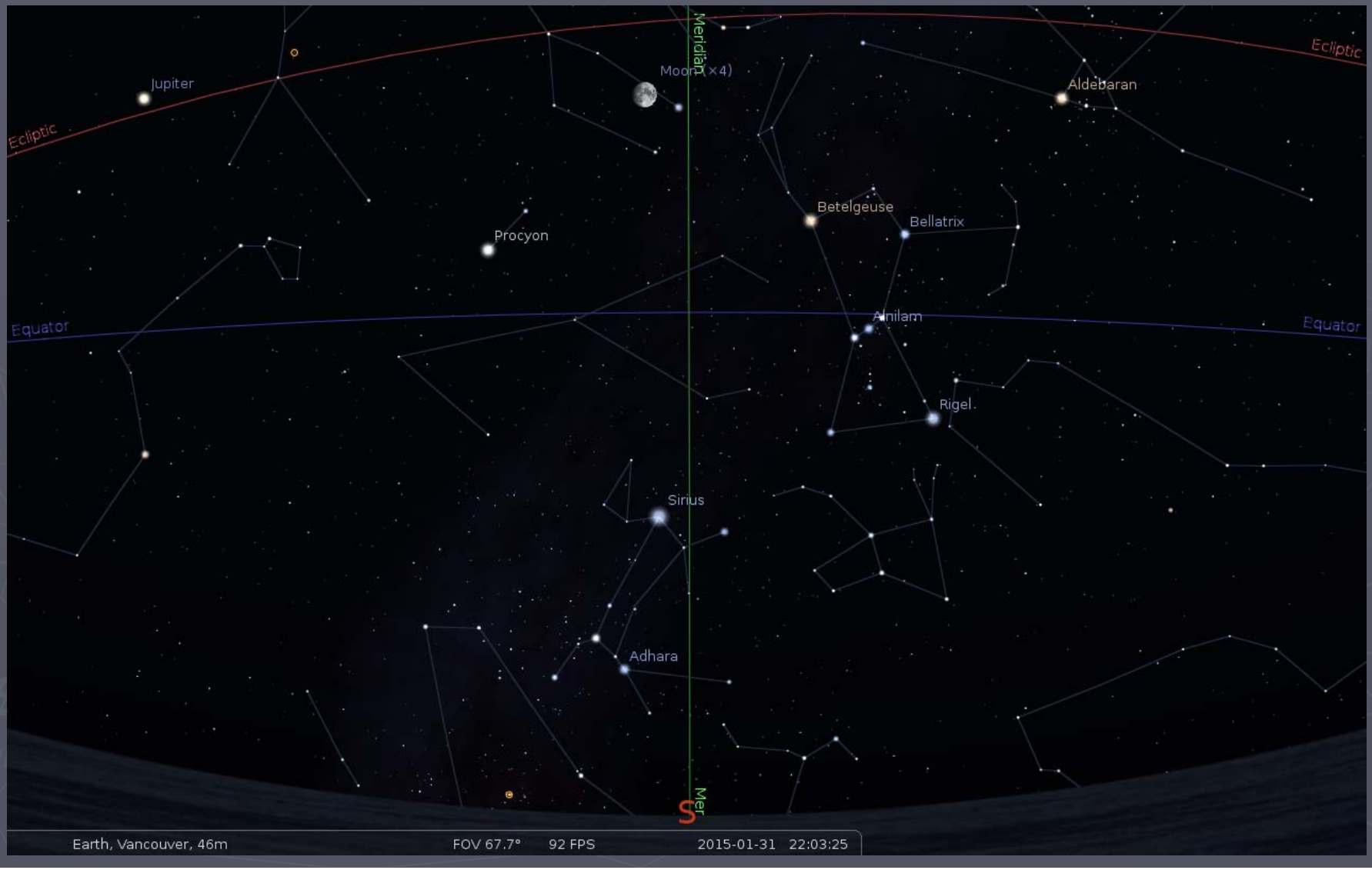
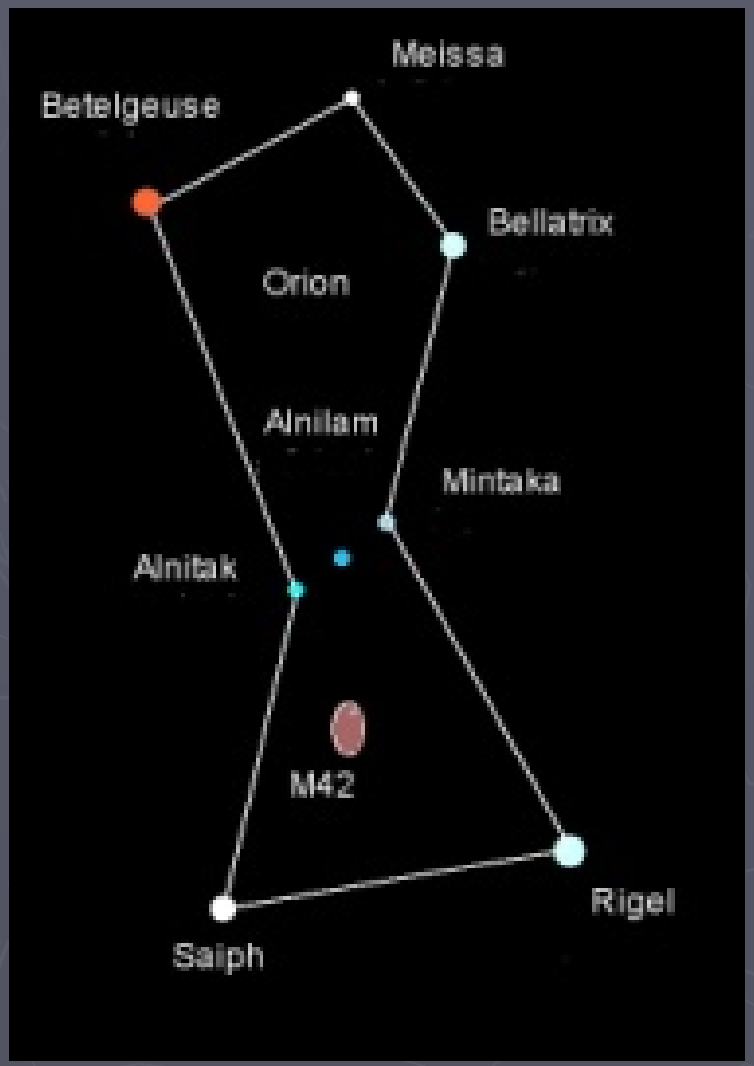


Homework – Lets look at Orion



Which are the two brightest stars?

Holding your fist at arms length, how many fists are there between Betelgeuse and Rigel?

How many fists in the “belt”?

Can you see the nebula (M42) with your naked eye?
.....with binoculars?
.....with a 10-20 second exposure on your camera at high ISO?

QUESTIONS?


Thank You!