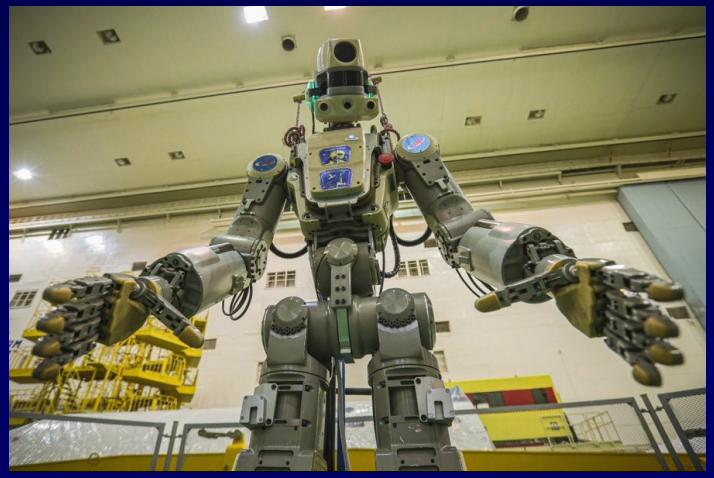
Stars Over Surrey

Astronomy & Spaceflight News

30th August 2019

Russia launches humanoid robot to ISS

- The robot was sole occupant of a Soyuz capsule, to dock last Sat.
  - part of a test of an uprated Soyuz launcher rocket
  - initial docking failed, further attempt
- The robot is 5'11", nicknamed "Fedor", identified as a F-850
  - Arnie's Terminator was an N-850!
- It will learn to operate tools such as screwdrivers, spanners in zero G and eventually later versions might participate in EVAs
  - an American one went up in 2011 and a Japanese one in 2013



ISS - Misc Items

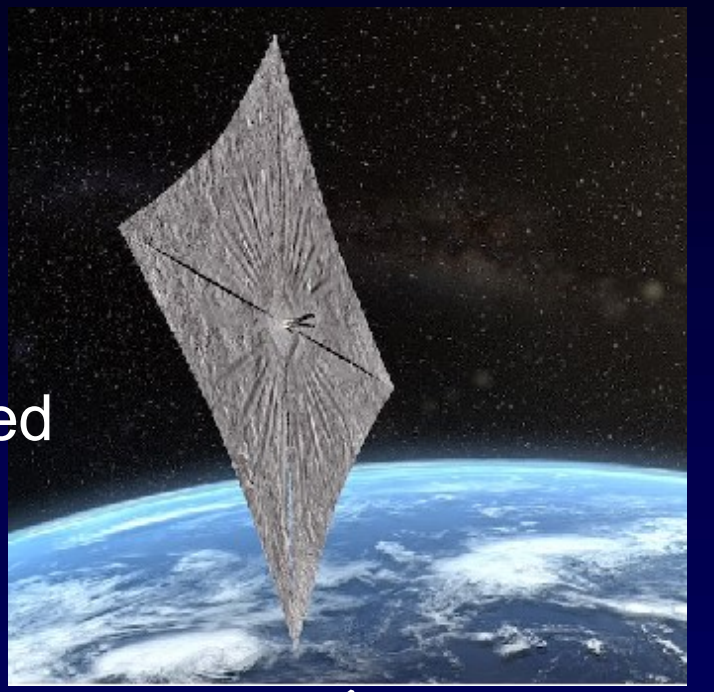
- The Northrop Grumman Cygnus capsule has left the ISS after being docked for 109 days.
  - Now moving into higher orbit as part of a technology demonstration exercise about carrying additional experiments
  - four month mission includes small satellite deployment
- The 8th Japanese HTV resupply vessel will launch mid September to ISS
  - can deliver 5 tons of cargo
- Sierra Nevada's Dreamchaser spaceplane begins resupply missions to ISS in late 2021 using the Vulcan launcher built by United Launch Alliance
  - capable of carrying 5,500 kg to ISS
  - fully reusable, landing on runway and can bring 1,850 kgs back

Space X - Misc Items

- Space X has announced they will be retiring the current Dragon 1 cargo vessels which resupply ISS. They will be replaced by a new larger version derived from the Crew Dragon which of course was derived itself from Dragon 1.
  - Dragon 2 is essentially the Crew Dragon minus the Super Draco launch abort rockets engines.
  - Dragon 2 will be able to automatically dock with the ISS rather than be caught by ISS crew using the stations robotic manipulator arm.
  - Can take 3,300 kg of cargo
- Space X's Tesla Roadster car (with Starman on board) has now completed its first orbit of the Sun. This takes approx 557 days. It launched Feb 2018 on the first Falcon Heavy.
  - now on far side of Sun and doing 24,000 mph!

Planetary Society's LightSail

- LightSail 2 was amongst 24 satellites launched in June by Space X's Falcon Heavy
- Designed by the US-based Planetary Society, the programme has cost just $7M and is crowd-funded
- A cube-sat design, its folded size was about that of a loaf of bread
- Once separated it unfurled its sail and is now the size of a boxing ring (32 square metres)
- The concept is that solar photons exert pressure on the sail and provide thrust.
- With no other means of propulsion it has raised it's apogee by 1.5 kilometres. A forerunner of future cheap missions.



NASA News - Misc Items

- NASA has just selected the Marshall Space Flight Centre, (Huntsville, Alabama) to manage the development and deployment the next manned lunar lander
  - this will be in collaboration with commercial enterprises, with Blue Origins a prime contender
  - initial target is 2 person craft with options to further develop an enlarged 4 person lander.
  - in addition unmanned commercial landers are expected to position supplies, materials, experiments awaiting the manned landing, such as the US variant announced last month of the Israeli Beresheet lander.
- NASA has approved an new exciting mission to Jupiter
  - Europa Clipper will explore the icy moon Europa which has a subsurface ocean and is a prime contender for life within.
  - launch date is 2025 and the craft will take extended elliptical orbits around Jupiter, sweeping close to Europa on its trajectory

India's Chandrayaan in Lunar orbit

- Chandrayaan 2 successfully fired its main motors on a braking burn to slow it down for capture by the Moon's gravity.
  - Initially in a highly elliptical orbit of 70 to 11,229 miles, four subsequent firings intended to place it in a circular 62 mile orbit
- The lander (named Vikram) will separate on 2nd September
  - will test its landing engines over following days
- Landing near Lunar South Pole is scheduled for 6th Sept
- After touchdown the Pragyan rover will deploy onto surface
  - main mission is to study soil, exploring for ice
- Vikram will take panoramic images and deploy a small probe 4” into regolith to test thermal conductivity
- Chandrayaan orbiter will use radar and spectral imaging to hunt for ice.

Tardigrades on the Moon

- Tardigrades are minute creatures at most 1mm long
- They live in soil, moss, pools, etc.
- The hardiest known creature
  - can survive temperatures from 150º C to -200º C, extremes of pressure and radiation
  - they can loose virtually all their water, shrivel up and live in a state of suspended animation for a decade or more, then revive!
  - they have survived over 10 days exposure in outer space (2007)
- They were included in a suspended animation state on the Israeli Beresheet lander, some in artificial amber, some on tape - scientists are sure they will have survived the crash.
- They are also known as “water bears” and “moss piglets”

Mars News - Misc Items

- ESA's ExoMars has passed another milestone. At Airbus Stevenage the PanCam camera has been mated to the mast of the rover (Rosalind Franklin) and fully tested. The rover will now be shipped to Toulouse for further vibration testing. On the down side a parachute test has failed and this might cause the launch date to be delayed.
- Mars Reconnaissance Orbiter has returned a dramatic image of new crater caused by a recent impact
  - impactor perhaps 1.5 metres across, 20 metre crater
- NASA has just named a small rock on the Martian surface. It was disturbed by the downward pointing rockets braking the landing of the Insight lander and rolled about a metre. It's called “Rolling Stone Rock”!

Earth-sized planet for every 1 in 6 stars?

- Now retired, the Kepler spacecraft was responsible for locating thousands of exoplanets
- The ESA's Gaiea spacecraft is currently mapping the nearest part of the Milky Way, studying the motion and properties of stars with incredible accuracy.
- Data from these two has been combined and with new advanced statistical analysis methods researchers propose that it is likely that every 1 in 6 Sun-like stars will have an Earth-sized planet within its planetary system.
  - between 0.75 & 1.5 mass of Earth and with orbital periods between 237 and 500 days
- This data can help inform future missions studying atmospheres of exoplanets, looking for bio-markers indicative of life

Black Hole Swallows Neutron Star?

- The gravity wave detectors LIGO (USA) & Virgo (Italy) continue to discover new events
- The latest shows something not seen before, and scientists believe the gravitational ripples were caused 900 million years ago when a black hole devoured a very dense star known as a neutron star.
- The Australian National University's SkyMapper telescope is searching the relevant part of space to try to find the optical remnants of this event
  - nothing so far found

September's Suggested Constellation

A SERIES OF 50 No. 40

OUT INTO SPACE

Approved by A. Hunter, Ph.D., Sec. Royal Astronomical Society

CYGNUS (The Swan)

A Northern Hemisphere constellation (known also as the Northern Cross) in the Milky Way, directly east of the Lyre, and nearly on the same meridian as the Dolphin. Seen from May to December. Its brightest star, Deneb, is in the tail of the Swan, and always above the horizon in England. One named 61 Cygni (a small variable star in this constellation and almost invisible to the naked eye), was the first to have its distance from the Earth determined—50 billion miles.

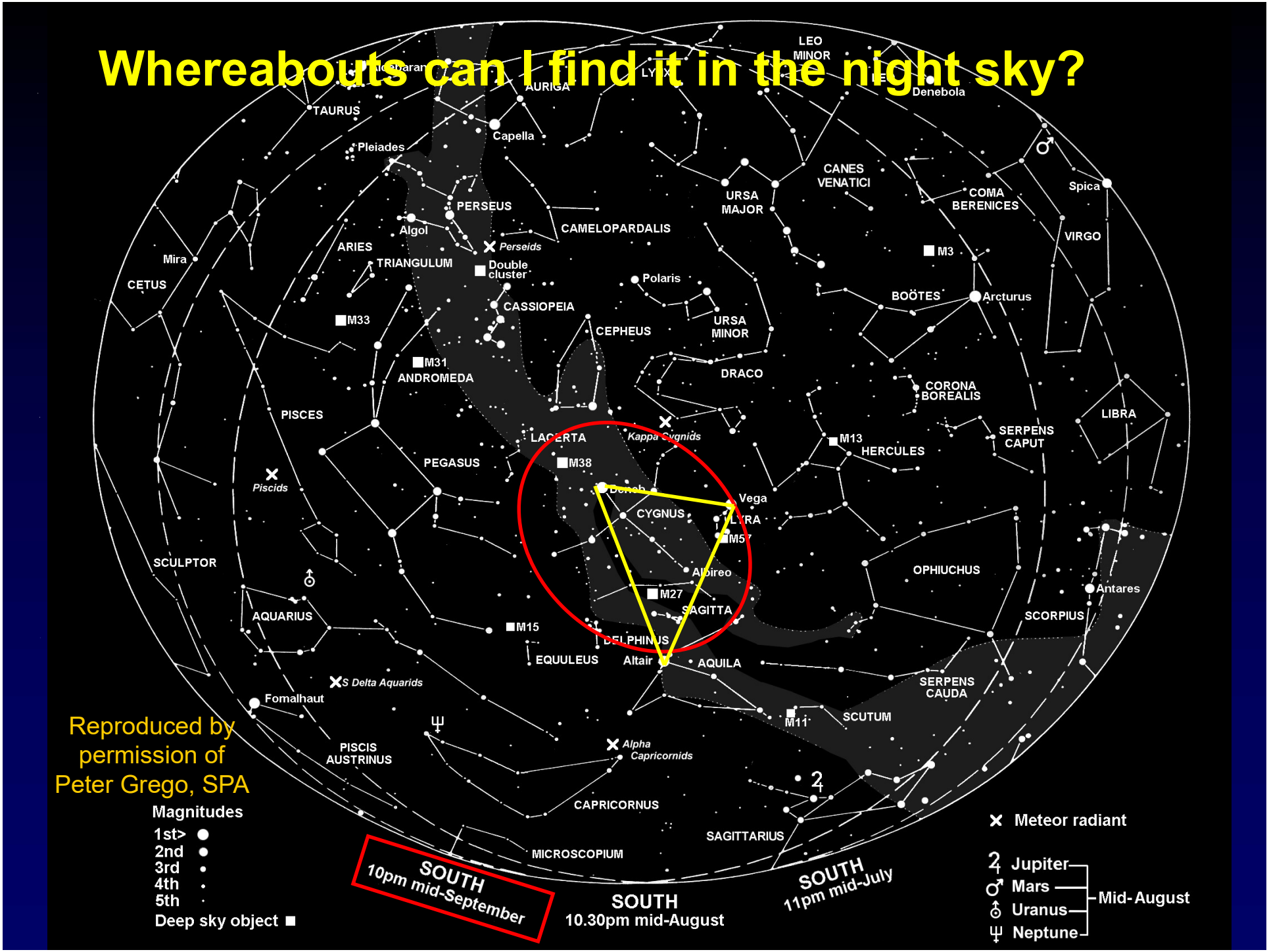
Cygnus - The Mythology

- There are several differing accounts about Cygnus, however here's one popular one
- Zeus, the king of the gods, desired Leda who was the very beautiful wife of the King of Sparta
- He realised she wouldn't love him for what he really was, and so disguised himself as a swan and was successful. (Strange lady!)
- Their offspring included
  - Castor (twin of Pollux who's father was the Spartan King)
  - Helen of Troy
  - Clytemnestra (wife of Agamemnon)

Cygnus - The Constellation

- Its main star is Deneb, a 1st magnitude star and one of the corners of the Summer Triangle
  - the constellation's other main stars are 2nd/3rd magnitude.
- Two Messier objects lie within Cygnus
  - M29 & M39, both open clusters
  - M27, “The Dumbbell” planetary nebula lies close to Cygnus, but is actually just over the border in Vulpecula
- Its 2nd star, β Cygni aka Albireo, is one of the best known double stars
  - and there are several more that can be found with binoculars

Whereabouts can I find it in the night sky?



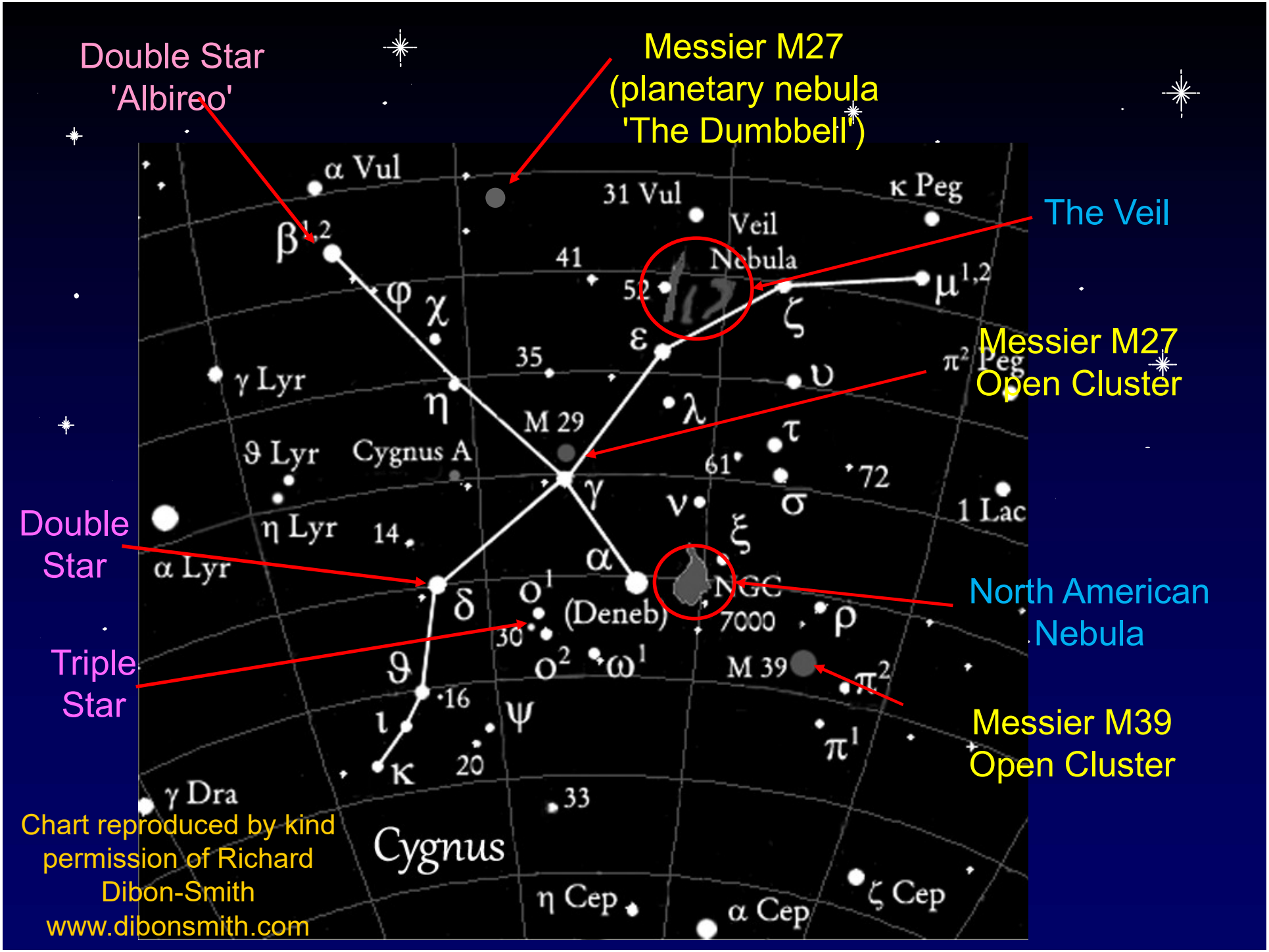
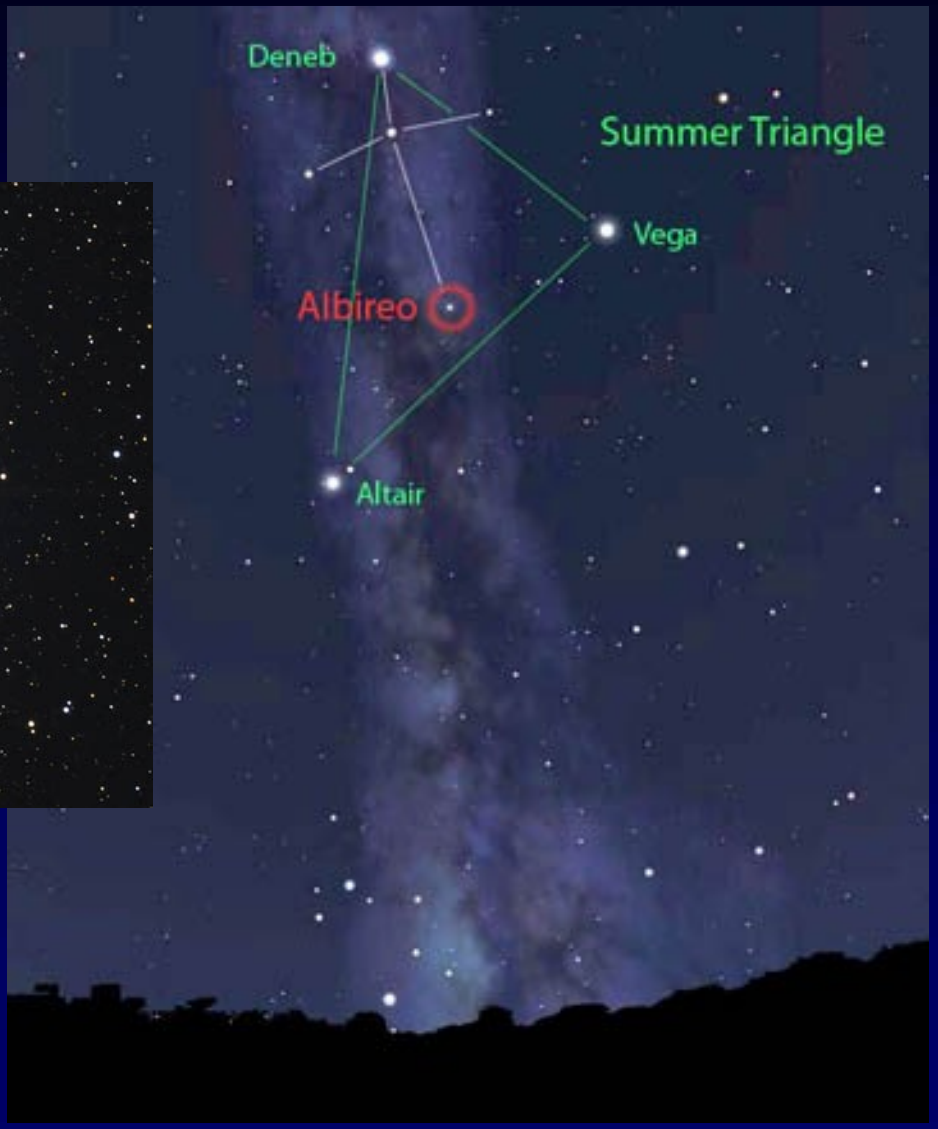


Chart reproduced by kind permission of Richard Dibon-Smith www.dibonsmith.com

Albireo



Beta (β) Cygni

Distance: 400 LY

Magnitude: 3rd & 5th

M29

Distance 4,400 light years
Visual Brightness Magnitude 6.6

Apparent Dimensions 10 arc minutes
Discovered 1764, Charles Messier

M39

Distance 950 light years
Visual Brightness Magnitude 4.6

Apparent Dimensions 30 arc minutes
Discovered 1750, Guillame Le Gentil

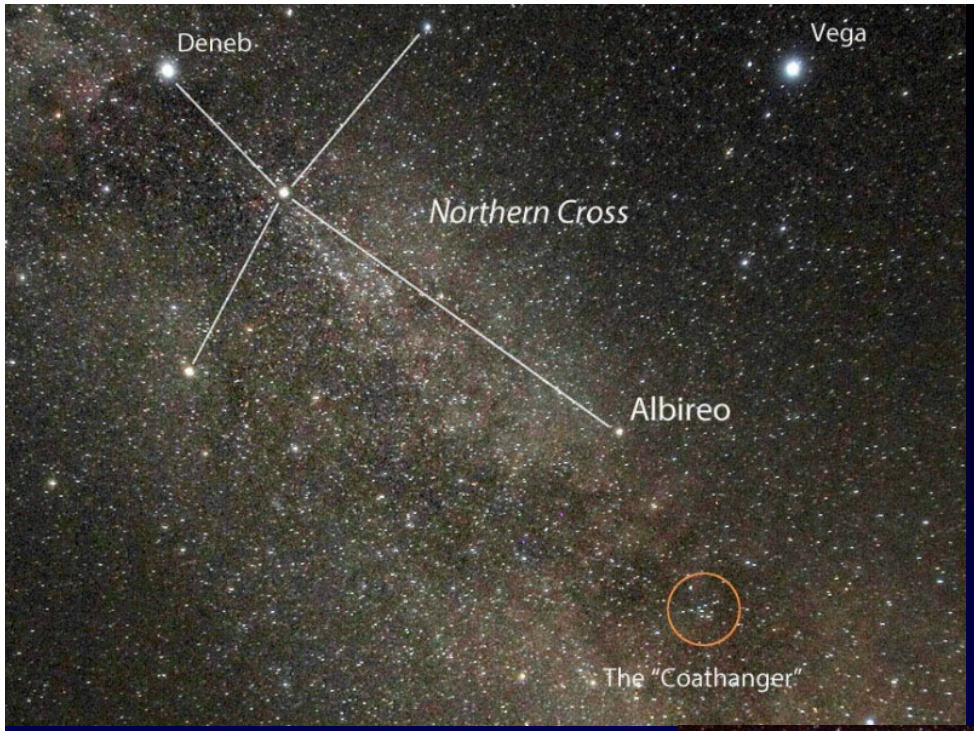
M27 (NGC 6853) **Planetary Nebula**

Distance 815 light years
Visual Brightness Magnitude 7.3

Apparent Dimensions 8 arc minutes
Discovered 1764 Charles Messier

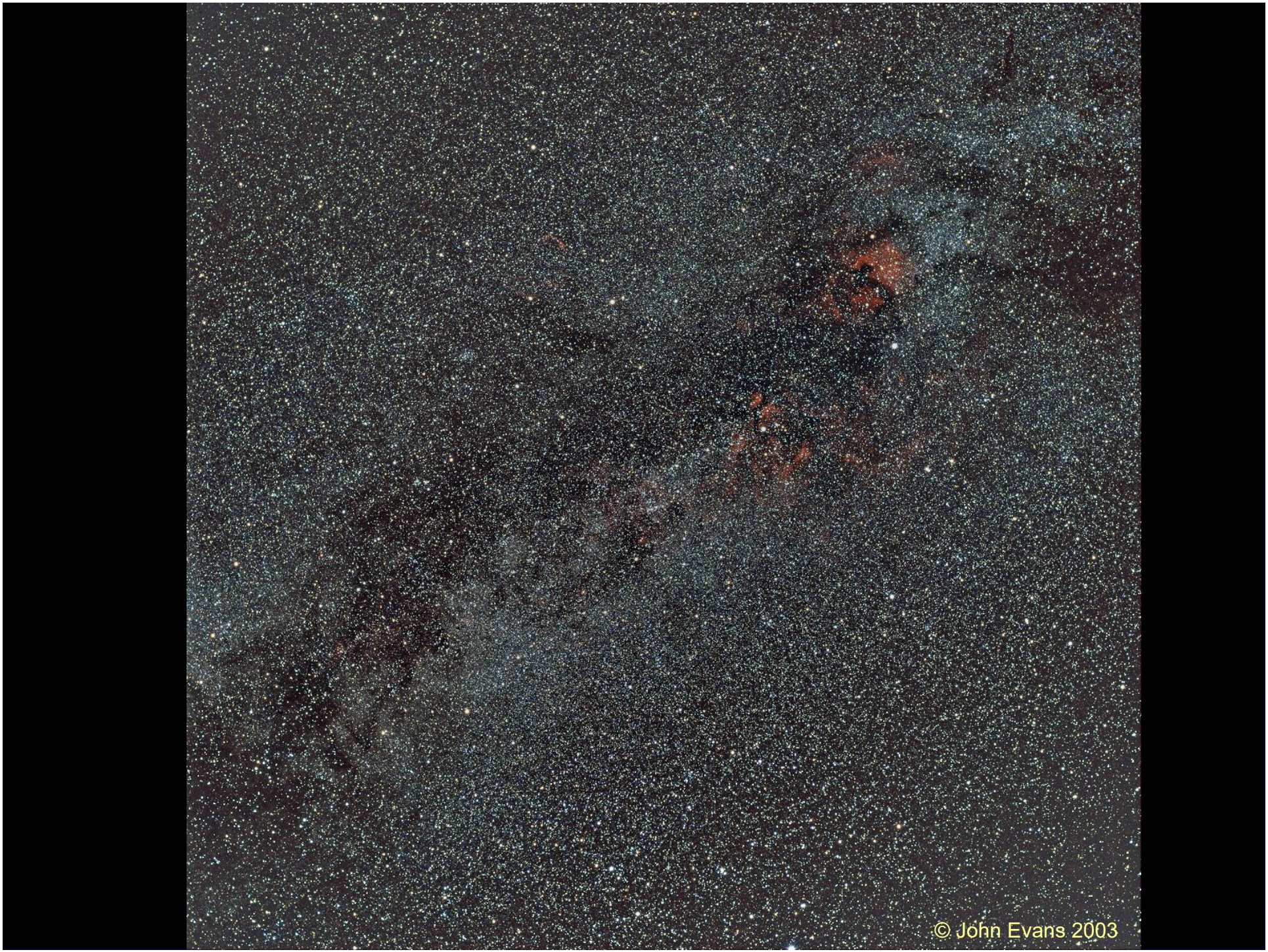
NGC 7000 : North American Nebula plus IC 5070 : Pelican Nebula

The Veil Nebula



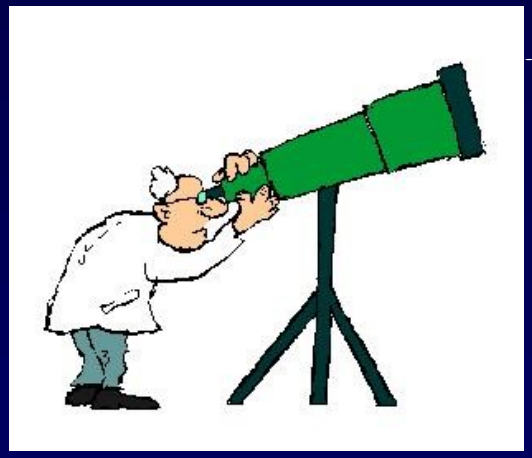
"The Coathanger" asterism

aka
"The Ski Lift"
"Brocchi's Cluster"
Collinder 399


© John Evans 2003

What's Up!

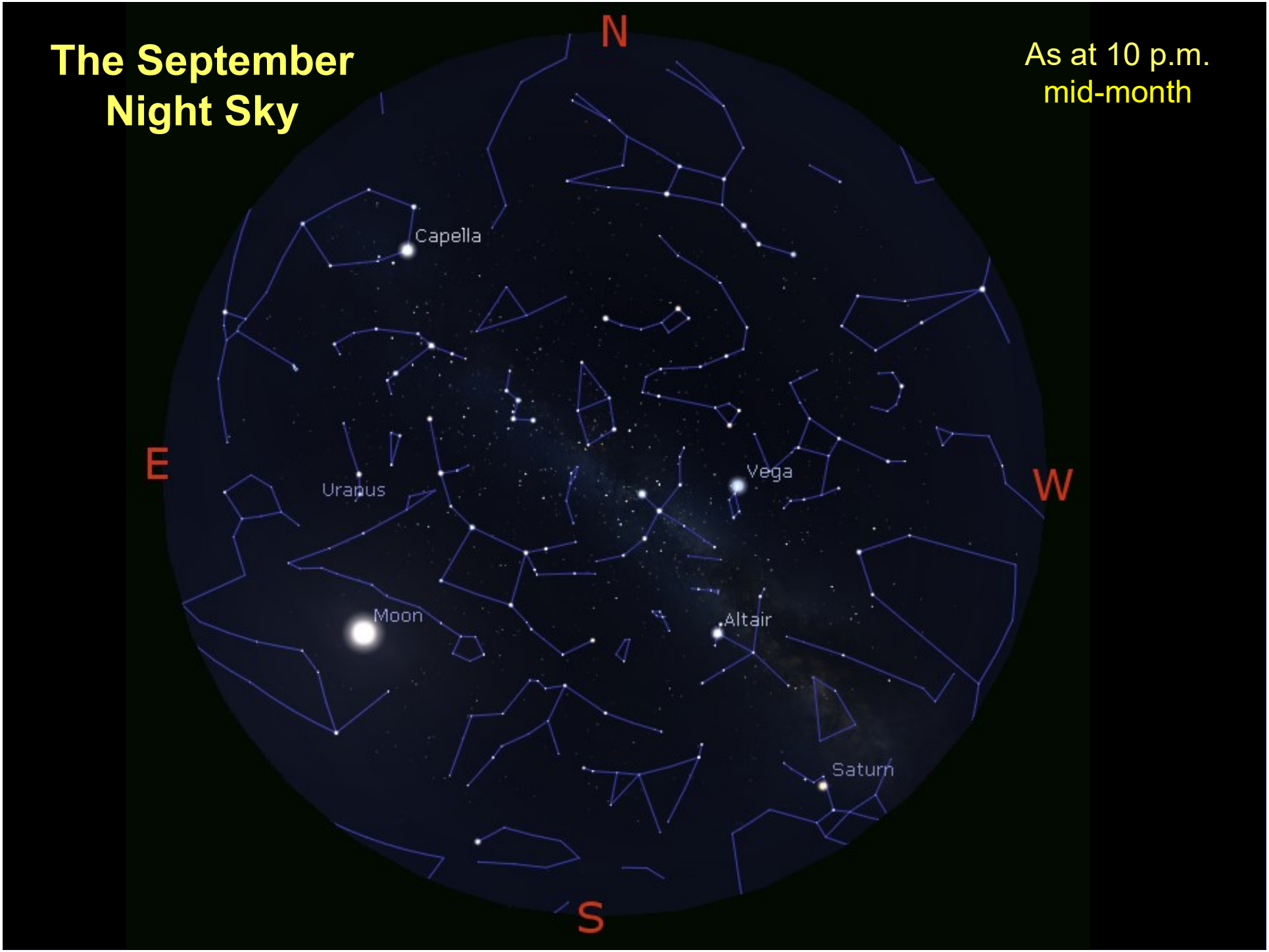
For September 2019



Brooklands Radio
The Sound of Surrey
DAB | Online | Mobile App
Variety | Personality | Companionship

The September Night Sky

As at 10 p.m.
mid-month



Sun & Moon in September

- First Quarter 6th
- Full Moon 14th
- Last Quarter 22nd
- New Moon 29th

(BST)		Sun	Moon
1st	Rise	06.14	08.37
	Set	19.48	21.12
15th	Rise	06.36	20.13
	Set	19.17	08.39
30th	Rise	07.00	08.55
	Set	18.43	19.58

What's Up - Planets

- **Mercury**
  - Not visible this month.
- **Venus**
  - Not visible this month.
- **Mars**
  - Not visible this month.

Sorry - not my fault!

What's Up - Planets

- **Jupiter**
  - Best seen at the start of the month as it is sinking in the SW and nearing extinction in the setting Sun's twilight.
- **Saturn**
  - A good evening object all month, at mag +0.4, in the South above the main stars of Sagittarius.
- **Uranus**
  - Well placed in Aries in the late evening sky, in SSE. Binoculars can find it at mag +5.7
- **Neptune**
  - A late evening/morning object in Aquarius in the South, but telescopic at mag +7.8

Phenomena in September

- 1st Max of Aurigids meteor shower (very low hourly rate)
- 5th Moon just 6.5° north west of Jupiter 
- 8th Moon sits 3° east of Saturn 
- 13th Moon is 4° south of Neptune 
- 17th Moon is 5° south of Uranus 
- 22nd Autumn Equinox

Advance Notice

- World Space Week: October 4-10
- Local event organised by Institute of Physics (South Central Branch) & University of Surrey
  - **“High Street Take-Over”**
    - Guildford: Saturday 5th October
      - » Bridge next to George Abbot Pub
    - Solar Observing - 11 a.m. to 2 p.m.
    - Stargazing - 6 p.m. to 9 p.m.

World Space Week OCTOBER 4-10

Meetings at Local Societies

- **Guildford AS** *Lecture Theatre E, Uni of Surrey*
  - Thursday 5th September, 7.30 p.m.
    - **Latest Developments in Solar Exploration**
      - » Prof Lucie Green
        - » Mullard Space Sciences Laboratory

Meetings at Local Societies

- **Farnham AS** *Aldershot Cricket Club*
  - Tuesday 10th September, 7.45 p.m.
    - **"Solar Megastorm: The Carrington Event"**
      - » Eric Grieve
        - » Farnham AS
    - **"The History of the Telescope"**
      - » John Vines
        - » Farnham AS

Meetings at Local Societies

- **Croydon AS** *Royal Russell School, Coombe Lane, Croydon*
  - Friday 6th September, 19.45 hrs
    - **Topic & speaker to be confirmed**
  - Friday 20th September, 19.45 hrs
    - **Topic & speaker to be confirmed**

Meetings at Local Societies

- **Ewell AS** *Nonsuch High School for Girls, Cheam*
  - Friday 13th September, 19.45 hrs
    - **How We'll Live On Mars**
      - Colin Stuart
        - » Ewell AS

Meetings at Local Societies

- **Walton Astronomy Group**
  - Friday 20th or Saturday 21st September, 8pm till late
    - **Dark Sky Trip** (Stargazing session)
      - Venue & night to be decided nearer to date
        - » check website for details
          - » http://www.waltonastrogroup.co.uk

Astronomy on TV

The Sky at Night

- *"Exoplanets"*

- Alien worlds circling the stars

Sunday 8th September BBC 4, 10.00 pm

Thursday 12th September BBC 4, 7.30 pm

for exact times please check www.radiotimes.com
or www.bbc.co.uk/skyatnight


"That's all Folks!"