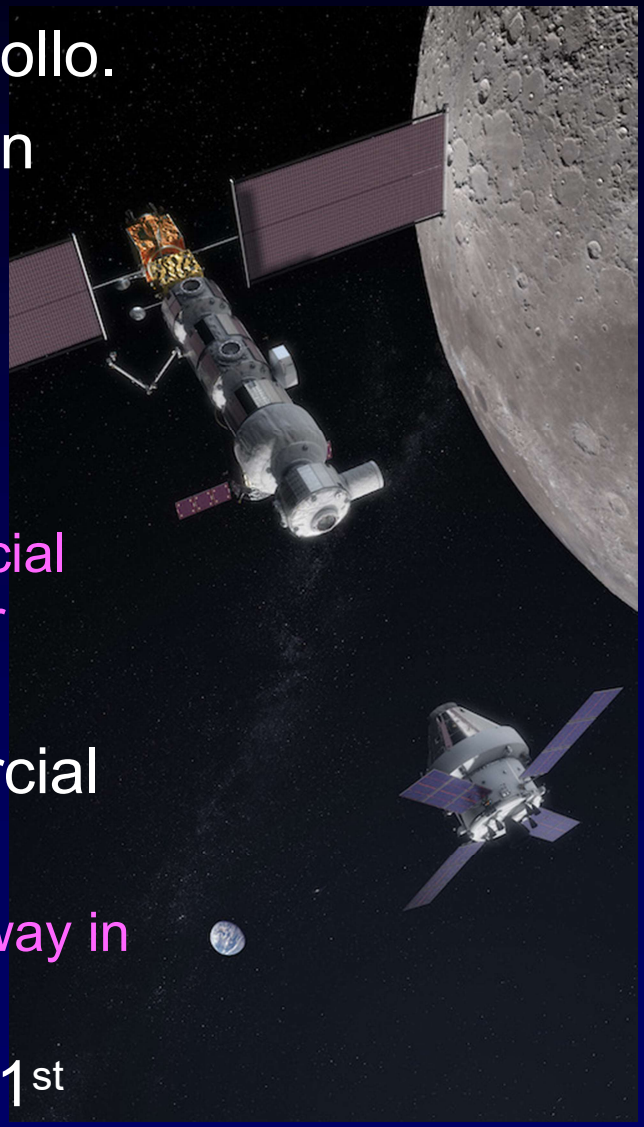
Stars Over Surrey

Astronomy & Spaceflight News

31st May 2019

NASA's Moon Return named "Artemis"

- Fist Moon mission was of course Apollo.
- In Greek mythology Apollo had a twin sister - Artemis
  - she was goddess of the Moon
- Trump adds $1.6B extra to NASA 2020 budget request of $21B
  - likely to be used supporting a commercial company developing the manned lunar lander for 2024
- NASA is currently judging 9 commercial proposals for cargo lunar landers
  - these would ferry materials from Gateway in preparation for manned landings
- NASA awards contract to Maxar for 1st Gateway module.



Blue Origin unveils its Lunar Lander

- Jeff Bezos unveiled a full scale mock up of the Lunar lander called Blue Moon.
- Development began 3 yrs ago
- Cargo variant can land 3.6 metric tons to Lunar surface
- Stretched version can land 6.5 tons inc. astronauts
- Legs fold so lander can be accommodated within New Glenn heavy launcher
  - First flight expected 2021
- Thought likely that this will be chosen for the NASA back-to-the-Moon programme.

Blue Origin "one step closer"

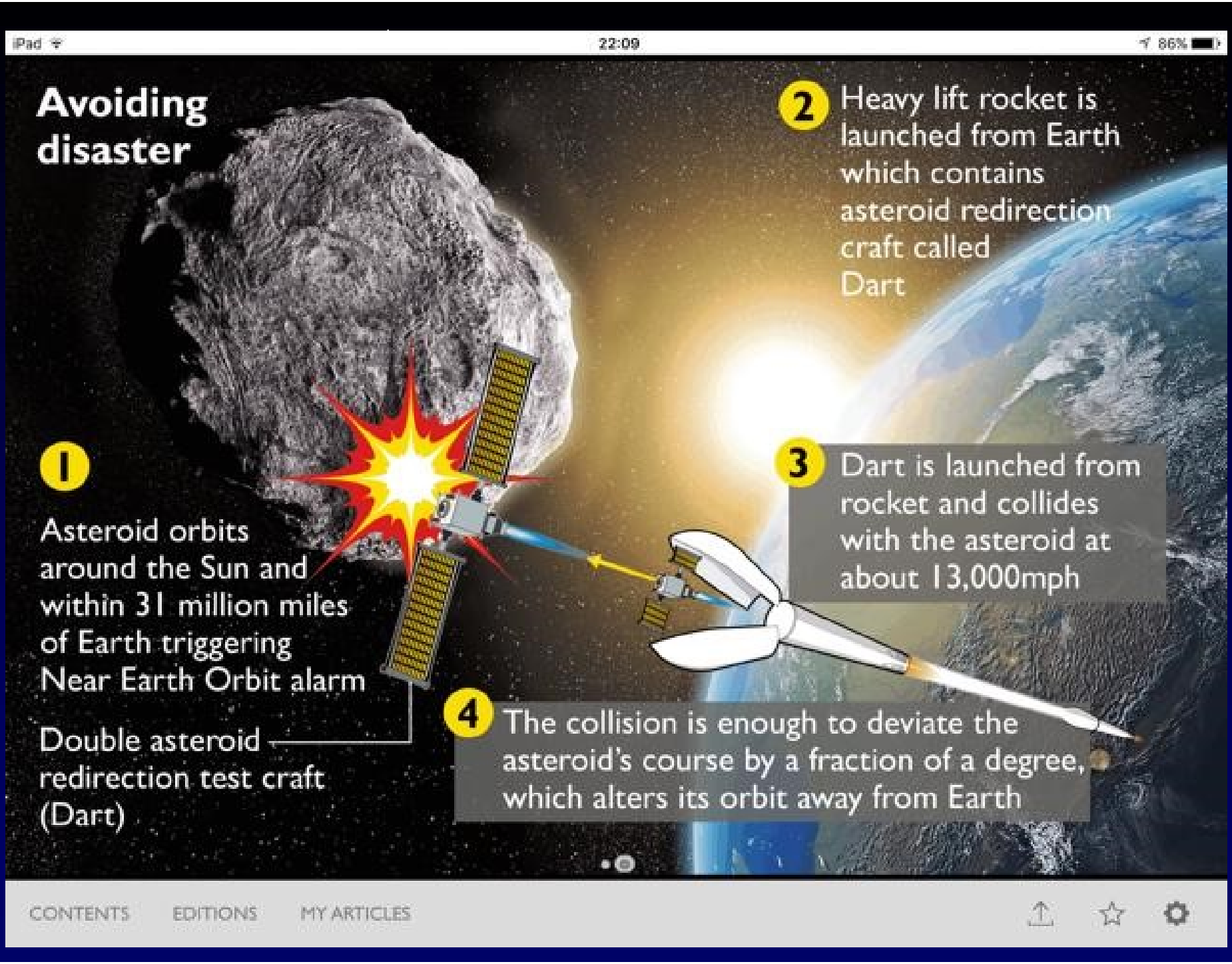
- The New Shephard made its 5th flight above the Karman Line, deployed its capsule with 38 science payloads aboard
  - including 3 from NASA
- This was Blue Origins' 11th flight using a New Shephard
- The 4th New Shephard has just been delivered and is expected to be manned later this year
- Capsule will have 6 seats.

Virgin Galactic at Spaceport America

- Operations are being moved to Spaceport America in New Mexico for the “final stretch” of test flights of SpaceShip 2
- Production will remain at Mojave
- The spacecraft has a crew of 2 and 6 passenger seats.
- 600+ people from 50 countries have paid deposits for the $250,000 trip!

Space X Selected to launch DART

- A Space X Falcon 9 will launch NASA's DART Mission
  - Double Asteroid Redirection Test
  - test the kinetic effect on an asteroid of such a collision
- The target asteroid is a binary object called Didymos
  - approx 800 metres across with 170 metre companion “Didymoon”
  - classified as “potential hazardous asteroid”
  - perihelion 1 AU, aphelion 2.3 AU, orbital period 25 months
- Mission Outline
  - launch June 2021
  - arrive October 2022
  - impact Didymoon at 13,500 mph
  - expected to slow object by only ½ mm per second
- If done early enough this could safely deflect an asteroid


iPad
22:09
86%
Avoiding disaster
2
Heavy lift rocket is launched from Earth which contains asteroid redirection craft called Dart
1
Asteroid orbits around the Sun and within 31 million miles of Earth triggering Near Earth Orbit alarm
Double asteroid redirection test craft (Dart)
3
Dart is launched from rocket and collides with the asteroid at about 13,000mph
4
The collision is enough to deviate the asteroid's course by a fraction of a degree, which alters its orbit away from Earth
CONTENTS
EDITIONS
MY ARTICLES

Moon Impact Analysed

- A meteor impacted the Moon during January's Total Lunar Eclipse
  - several sites recorded the impact
- Images reveal that:
  - object hit the Moon at 61,000 kph
  - massed 45 Kg
  - 30-60 cm across
- New crater formed
  - 10-15 metres diameter
  - ejecta reached 5,400º C

Tutankhamun's Meteor Glass

- The central scarab is carved from Libyan Desert Glass
- This is now thought to have been created about 29 million years ago by the high pressure shock wave and heat resulting from a meteor impact.
  - it had been thought it might have been caused by an air-burst
  - presence of reidite (zircon crystals) proves impact theory as only high pressure can cause this to form.
- The blade of King Tut's burial dagger was made from meteoric iron.

Space X Launches 60 Internet Sats

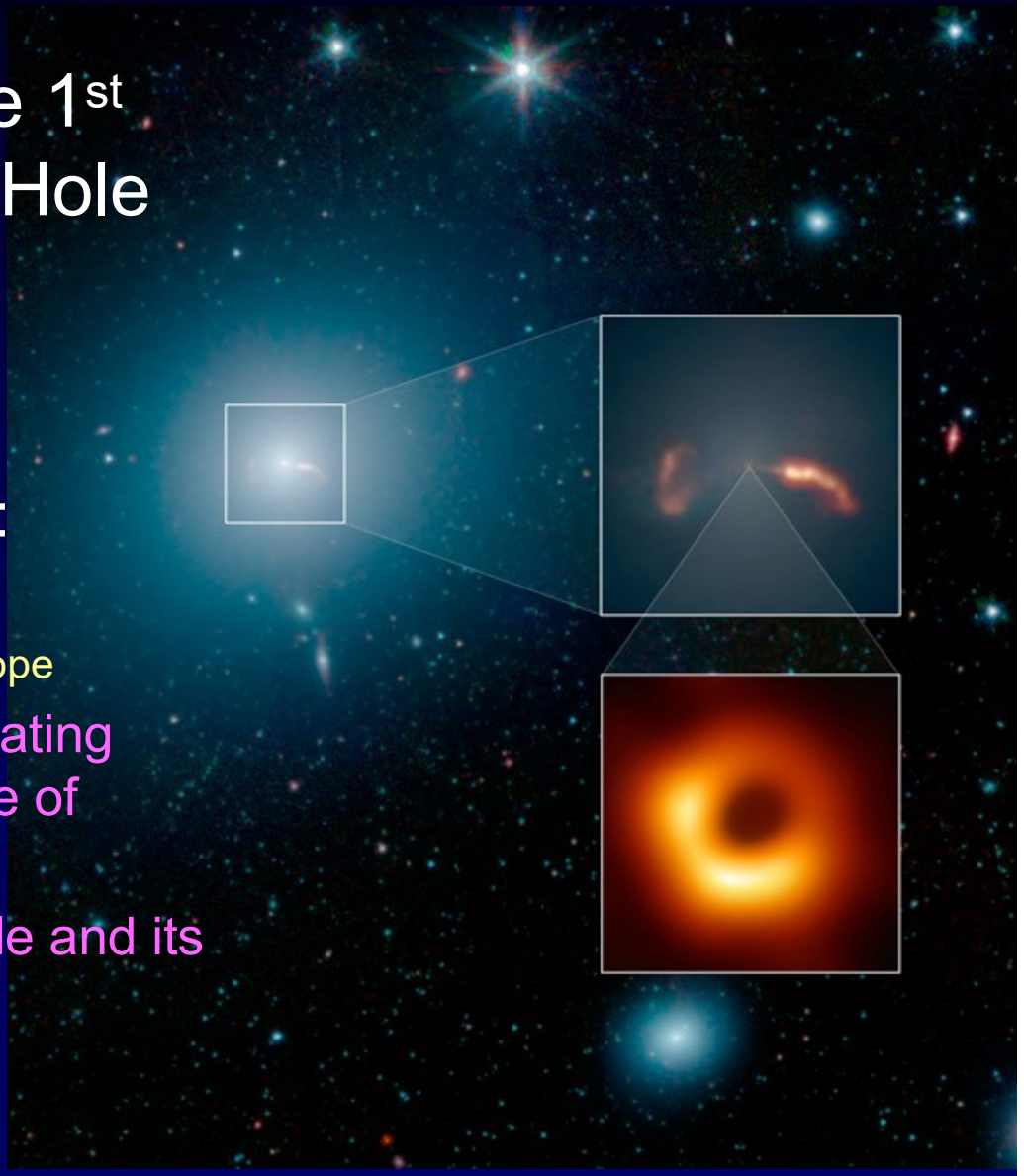
- Falcon 9 launches the first 60 Starlink satellites on 23rd May
  - 440 km orbit inclined at 53°
  - Falcon 9 recovered on drone ship
  - payload fairings (nose cone) also recovered
- Each equipped with large solar sail and krypton-fuelled ion thruster
  - will move into 550 km orbit
  - can manoeuvre to avoid collisions
- Payload totalled 15 tons, heaviest yet launched by Space X
- Several hundred more to be launched this year
- Possible target of 12,000!

Train of Space X Starlink Satellites

- Watch the video at:
  - https://sattrackcam.blogspot.com

Black Hole in Context

- Last month we saw the 1st ever image of a Black Hole
  - Event Horizon Telescope
- NASA have released this composite image of M87, its parent galaxy, showing:
  - the galaxy in infra red
    - taken by Spitzer space telescope
  - a close -up of the jets emanating from the SMBH at the centre of the galaxy
  - the super-massive black hole and its position in the jets.



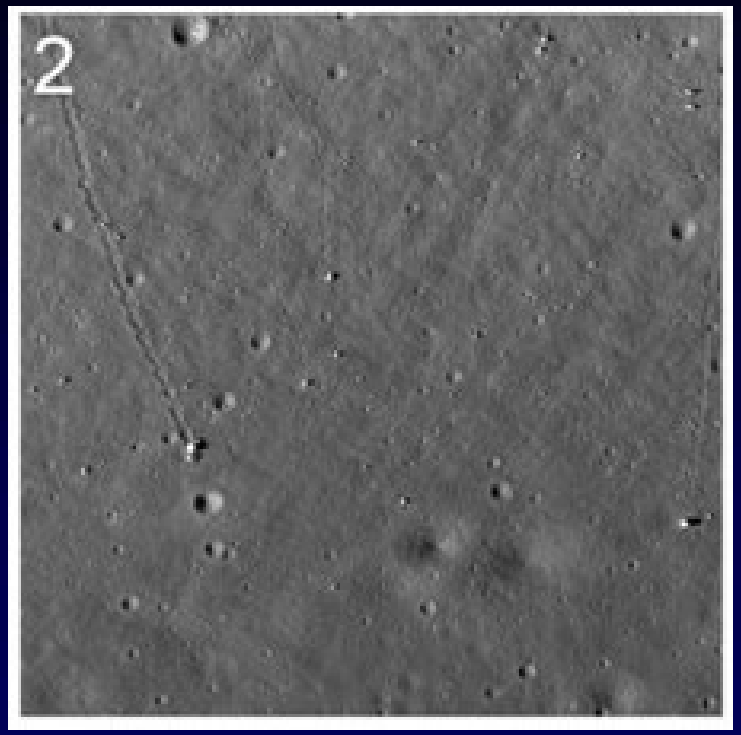
Hubble Legacy Image

- Astronomers have put together the largest and most comprehensive "history book" of galaxies into one single image, using 16 years' worth of observations from NASA's Hubble Space Telescope

https://www.youtube.com/watch?v=99uWHUQ-dC0

Moon still seismically active

- Researchers report that the Moon is still a little seismically
- active
  - Researchers from Smithsonian Centre for Planetary Studies have developed new techniques for analysing the data from seismometers left by Apollo teams.
  - Also images from Lunar Reconnaissance Orbiter show things such as tracks from boulder movement downhill, fresh soil uncovered, landslide debris



- Conclusion is that the Moon is still slowly shrinking as its centre cools, causing thrust faults and surface movement
  - shrunk by about 150 feet in last few hundred million years

Citizen Science for Bennu site

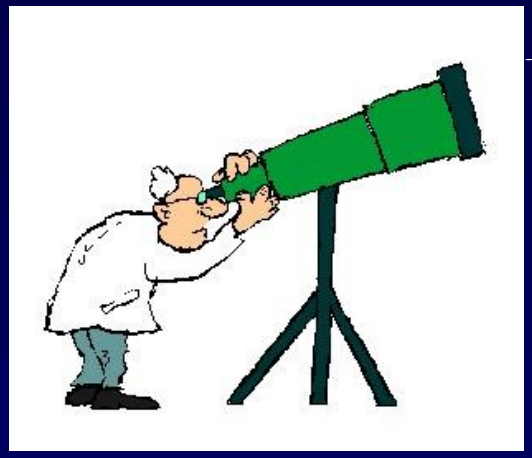
- NASA's OSIRIS-REx spacecraft is currently orbiting asteroid Bennu, prior to landing next summer
- Images show that the surface is rubble-strewn, making landing difficult
- NASA is inviting the public to help catalogue the various boulders at the proposed landing sites
- If interested then go to
- https://bennu.cosmoquest.org

Comets gave Earth its water?

- NASA's SOFIA flying observatory has found a similar ratio of normal water to heavy water in Comet Wirtanen
  - Comet 46P Wirtanen is a “hyper-active comet”
  - passed close to Earth in December 2018
  - 3rd such Comet to show a similar ratio, HDO : H_2O
- Comet 67P Churyamov Gerasimenko had a much higher ratio and so the theory of cometary water took a hit.

What's Up!

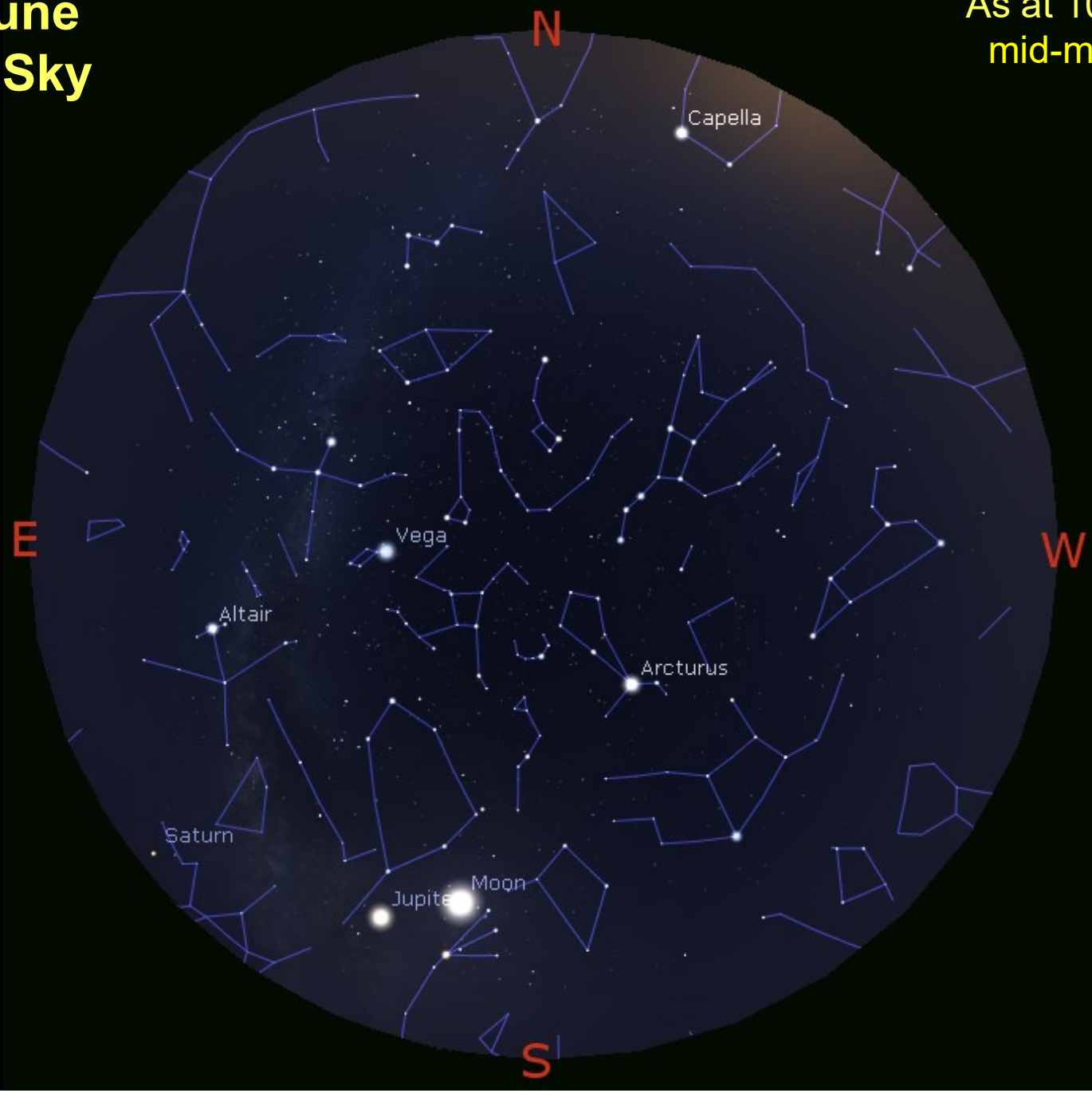
For June 2019



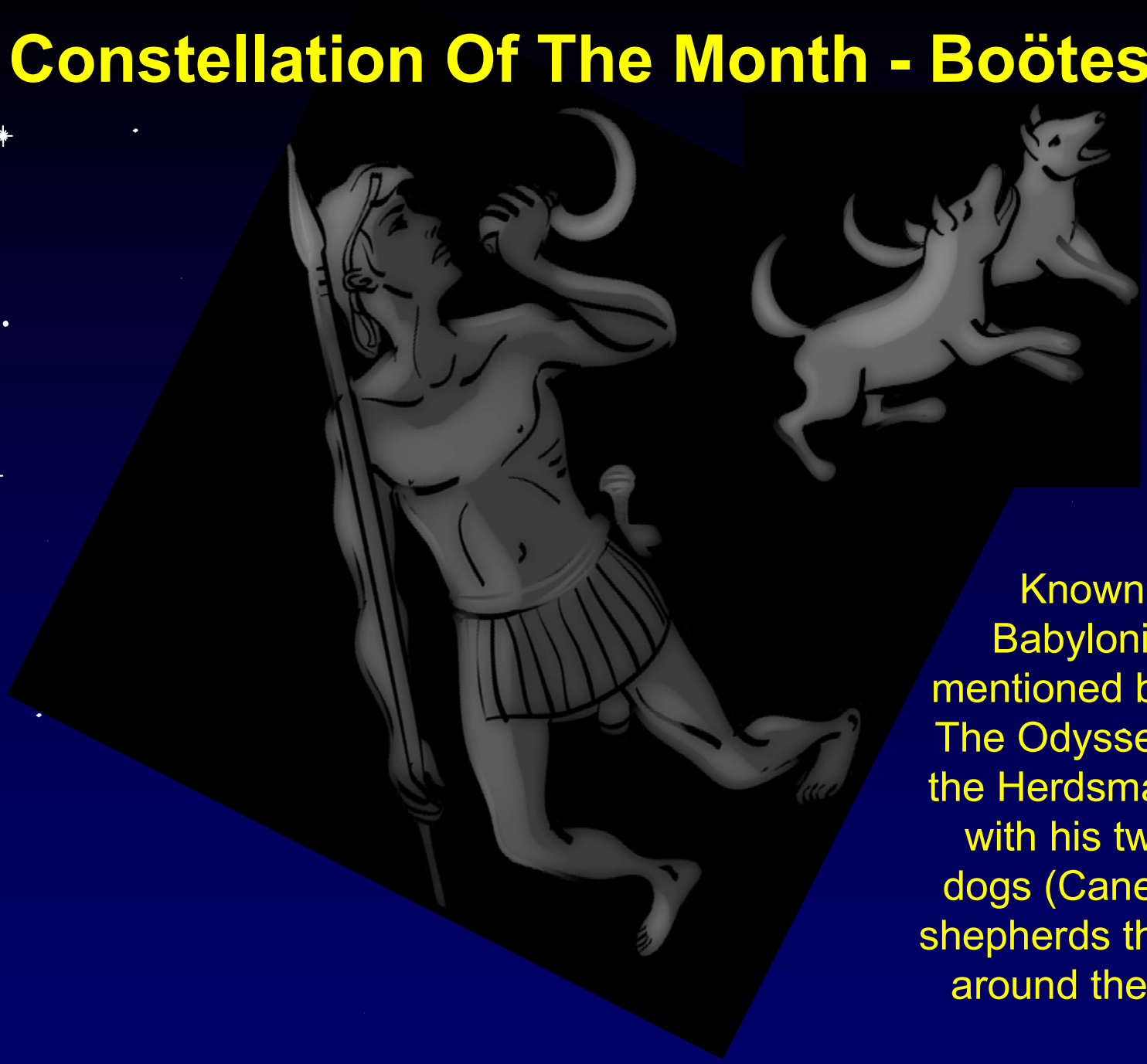
Brooklands Radio
The Sound of Surrey
DAB | Online | Mobile App
Variety | Personality | Companionship

The June Night Sky

As at 10 p.m. mid-month



Constellation Of The Month - Boötes

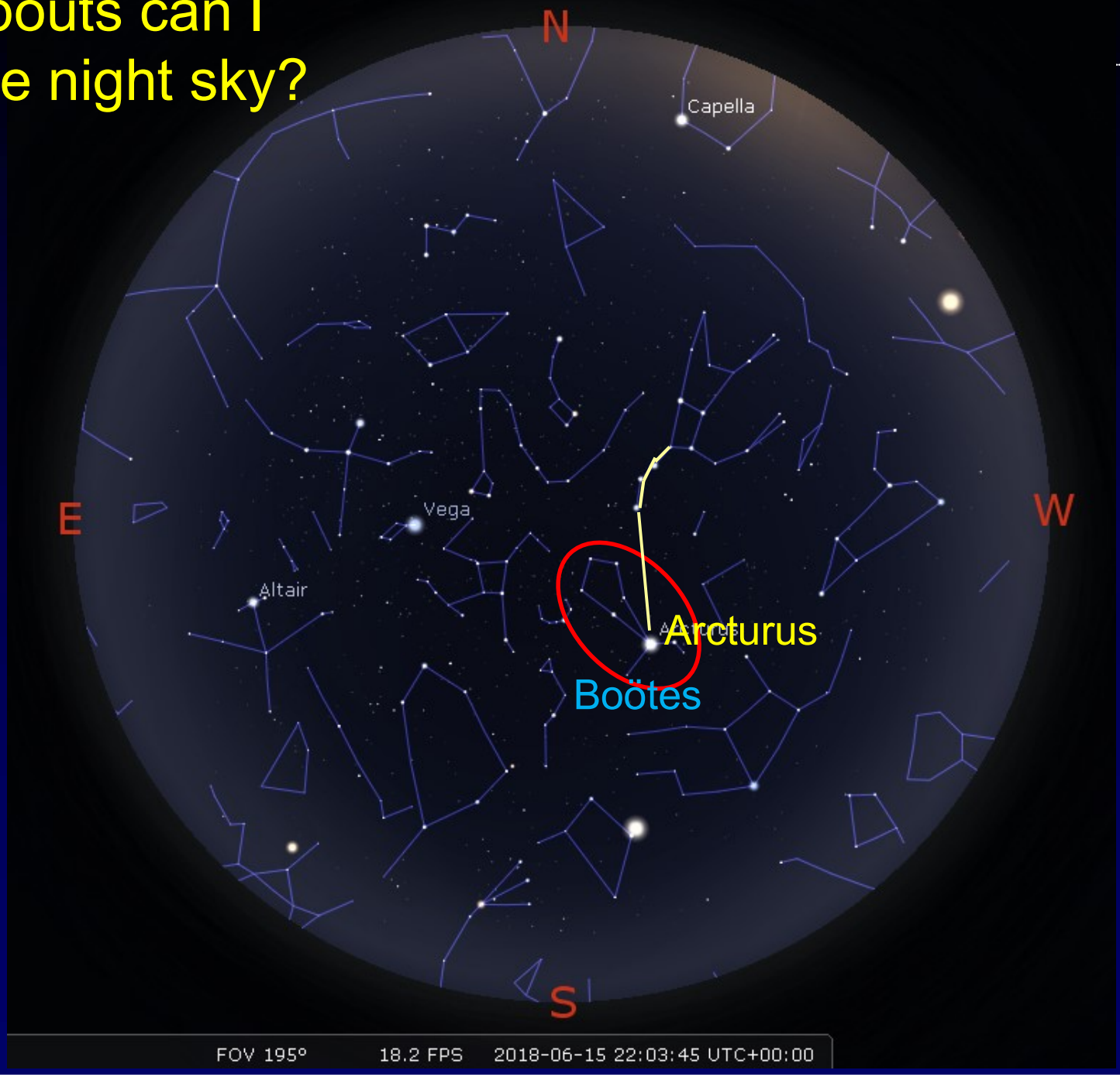


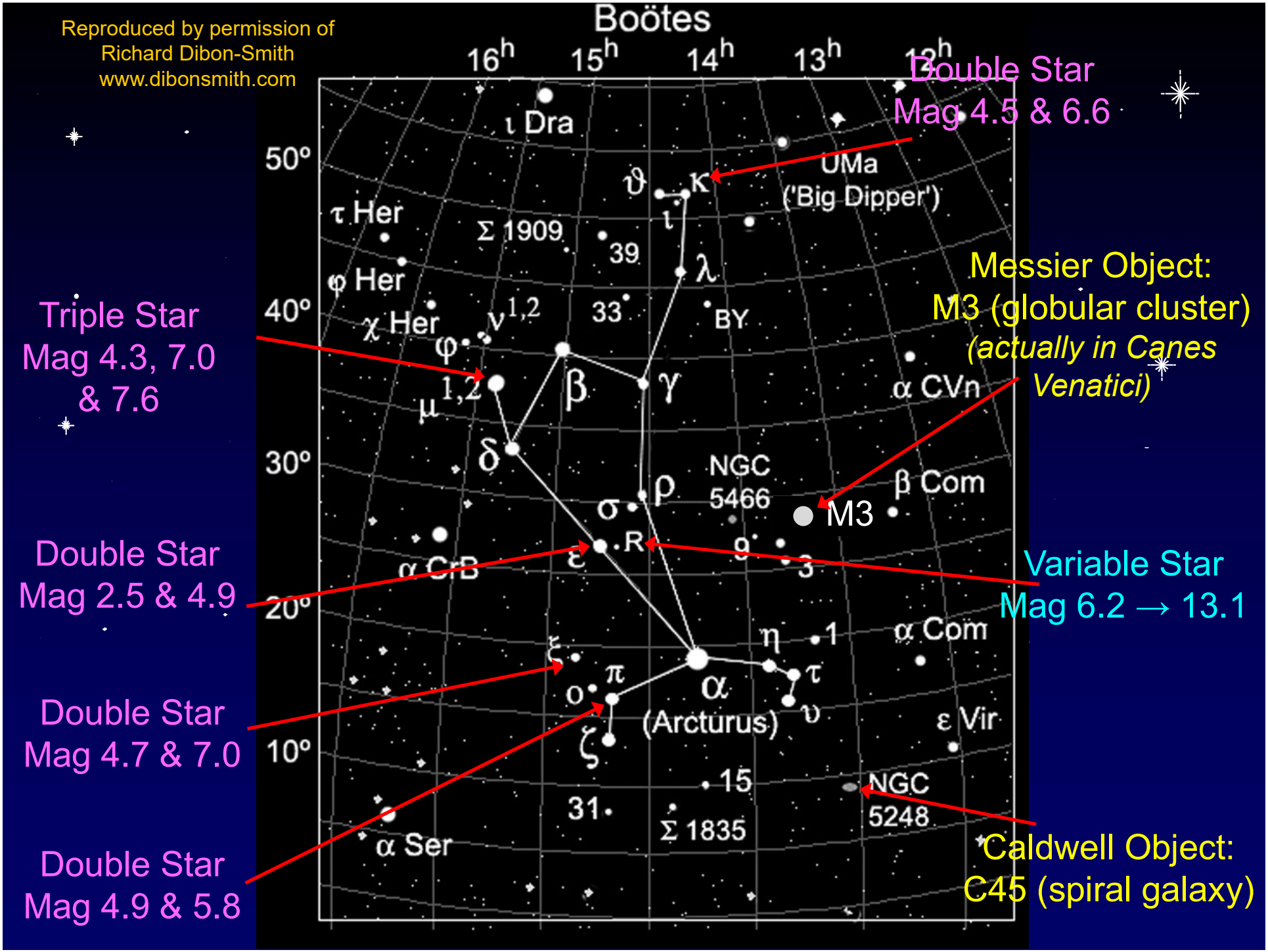
Known by the Babylonians and mentioned by Homer in The Odyssey; Boötes - the Herdsman, together with his two hunting dogs (Canes Venatici) shepherds the two bears around the Pole Star.

Boötes

- Boötes is one of the largest constellations but is perhaps not one of the best known, nor easiest to find.
- Best way to locate it is to make your way to bright orange/red Arcturus (the brightest star in Boötes) by following a curving line down from the tail of the Plough.
- Boötes doesn't contain any Messier objects, however one of the northern hemisphere's best known globular clusters, M3, is close by, easily found half-way between Arcturus and Cor Caroli, the main star in Canes Venatici.
- One of Patrick Moore's Caldwell Objects lives here
  - C45, a spiral galaxy
- The constellation is home to several really attractive double stars.

Whereabouts can I find it in the night sky?

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Boötes
16h
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40°
30°
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('Big Dipper')
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Σ 1835
NGC
5248
α Ser
Double Star
Mag 4.5 & 6.6
Messier Object:
M3 (globular cluster)
(actually in Canes
Venatici)
Triple Star
Mag 4.3, 7.0
& 7.6
Double Star
Mag 2.5 & 4.9
Variable Star
Mag 6.2 → 13.1
Double Star
Mag 4.7 & 7.0
Double Star
Mag 4.9 & 5.8
Caldwell Object:
C45 (spiral galaxy)

M3 (NGC 5272) **Globular Cluster**

Distance 33,900 light years
Visual Brightness Magnitude 6.2

Apparent Dimensions 19 arc minutes
Discovered 1764 Charles Messier

C45 (NGC 5248)

Spiral Galaxy

Distance 74M light years
Visual Brightness Magnitude 10.2

Apparent Dimensions 6 arc minutes
Discovered 1784 William Herschel

Sun & Moon in June

- New Moon 3rd
- First Quarter 10th
- Full Moon 17th
- Last Quarter 25th

(BST)		Sun	Moon
1st	Rise	04.48	04.15
	Set	21.28	18.46
15th	Rise	04.46	19.17
	Set	21.19	04.20*
30th	Rise	04.45	03.07
	Set	21.42	16.51

What's Up - Planets

- **Mercury**
  - Can be seen as an evening object from the middle of the month, just 5^{o} above North Western Horizon, about 45 mins after sunset.
- **Venus**
  - A brilliant morning object at mag -3.8 but very low (2^{o}) in the North East, rising about ¾ hr before sunrise all month, but best seen towards end of month.
- **Mars**
  - Remains visible as a low evening object throughout the month in the West North West, but now showing a very tiny disc telescopically.

What's Up - Planets

- **Jupiter**
  - Will have risen throughout the month before nightfall, the planet is very bright at mag -2.4 and is easily found, low in the South.
- **Saturn**
  - Another morning object, mag +0.8, best seen low in South South East about an hour before sunrise.
- **Uranus**
  - Not visible this month
- **Neptune**
  - A morning object in Aquarius, telescopic at mag +7.9

Phenomena in June

- **4th** Mercury is 5° north of waxing crescent Moon, low in North West, 30 mins after sunset 
- **5th** Mars is 4° from waxing crescent Moon, low in North West, 30 mins after sunset 
- **15th** Near full Moon close to Jupiter, same again following day when Moon is full.
- **17th-19th** Mercury and Mars less than 1° apart 
- **19th** Saturn just 1½° from waning gibbous Moon 
- **19th** Uranus is 4½° North of Moon at 03.00 hrs 
- **28th** Maxima of June bootid meteor shower, but a weak one, theoretical max of only 5 per hour.

Watts Gallery - “Moonscapes”

- Until 23rd June
- 19th Century artistic visions of the Moon
  - William Holman Hunt
  - John Atkinson Grimshaw, Evelyn De Morgan
  - G F Watts,
- Contemporary Moon art
- Talks

Luna - Evelyn du Morgan

Meetings at Local Societies

- **Guildford AS** *Lecture Theatre L, Uni of Surrey*
  - Thursday 6th June, 7.30 p.m.
    - » **How The Universe Will End**
    - » Prof Brad Gibson
    - » Hull University

Meetings at Local Societies

- **Farnham AS** *Aldershot Cricket Club*
  - Tuesday 11th June, 7.45 p.m.
    - **"Extremophiles: Guiding the Search for Extraterrestrial Life"**
      - » Marina Barcenilla
        - » University of Westminster

Meetings at Local Societies

- **Croydon AS** *Royal Russell School, Coombe Lane, Croydon*
  - Friday 7th June, 19.45 hrs
    - **Astronomy research (and more) at UCL Mullard Space Science Laboratory**
      - Prof. Graziella Branduardi-Raymont
        - » MSSL
  - Friday 21st June, 19.45 hrs
    - **ExoMars Rosalind Franklin Rover**
      - Prof. Andrew Coates
        - » MSSL

Meetings at Local Societies

- **Ewell AS** *Nonsuch High School for Girls, Cheam*
  - Friday 14th June, 19.45 hrs
    - **Observatories - A Grand Tour**
      - Ron Johnson
        - » Ewell AS

Astronomy on TV

The Sky at Night

- *"Return to the Moon"*

Fifty years since humans first stepped on the Moon we are on the verge of a new golden age of lunar exploration. With American, European, Chinese, Russian, Indian and Israeli missions all targeting the lunar surface this month, The Sky at Night looks into the technology that will take us back to the Moon, and asks "Why do we want to go there?".

Sunday	9th June	BBC 4, 10.00 pm
Thursday	13th June	BBC 4, 7.30 pm

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

Astronomy on TV

- **The Planets**
- **Five weekly episodes**
  - started Tues 28th May
  - BBC 2, 9 pm
    - rep. Saturday BBC2; 7.30
- **Prof Brian Cox**
- **Episode 1**
  - A Moment In The Sun - The Terrestrial Planets
    - The rocky planets Mercury, Venus, Earth, and Mars were born at the same time from the same material - yet have lived radically different lives. What immense forces are at play?


"That's all Folks!"