Stars Over Surrey
Astronomy & Spaceflight News

3rd December 2021

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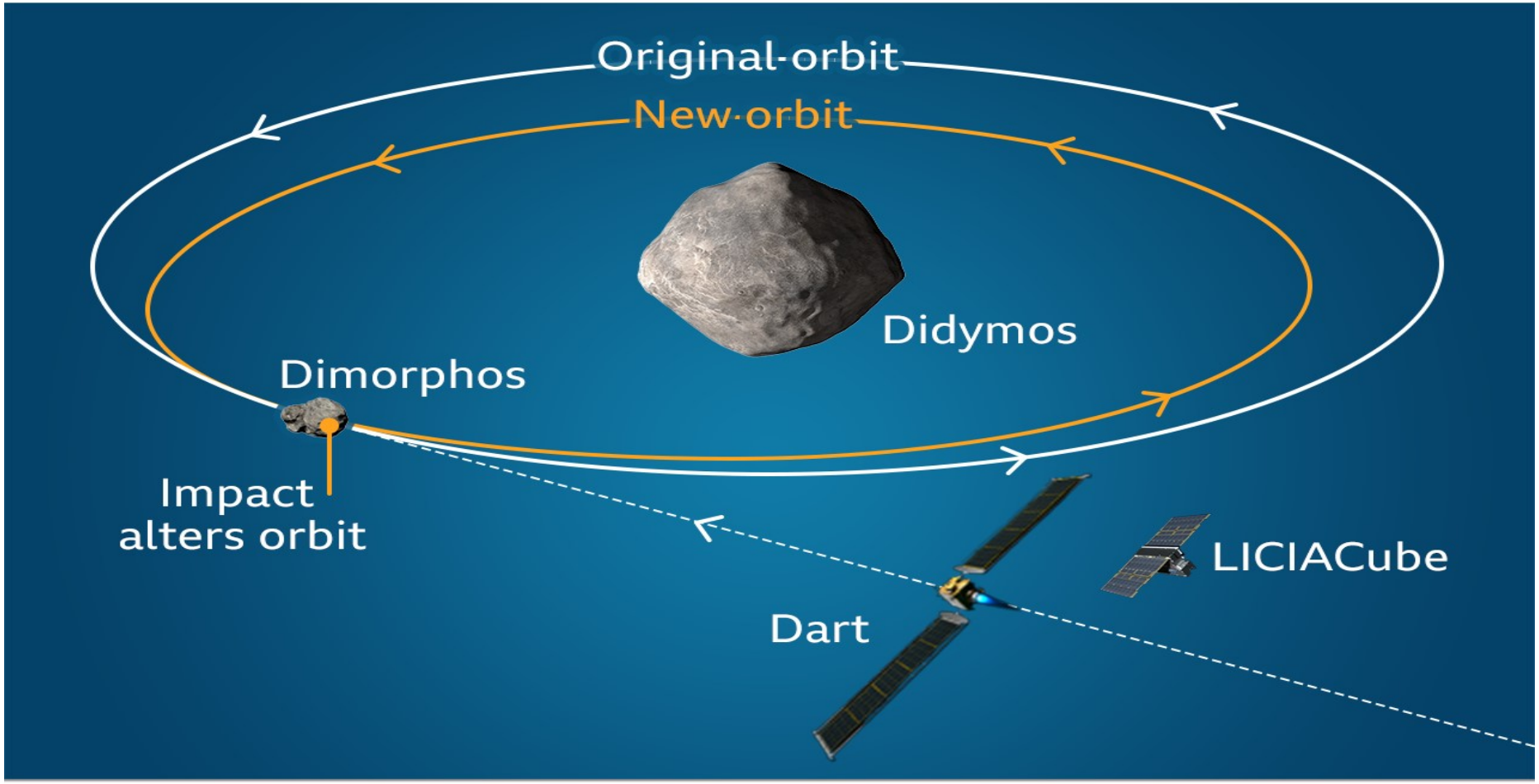
Asteroid Mission Under Way

- **Nov 24th: SpaceX Falcon 9 launches DART from Vandenburg Air Force base**
  - DART (Double Asteroid Redirection Test) is a technology demonstrator to test one possible approach to remove the threat of a future asteroid impact
- **The target is a binary asteroid Didymos (0.5 mile) and Dimorphos (football stadium sized)**
  - Didymos/Dimorphos are classed as “near Earth” but are not Earth imperilling, but come close enough for this experiment’s results to be observed from observatories.
  - DART will travel 170 M miles to hit a target 0.1 miles across!
- **The 600+ kg spacecraft will impact Dimorphos at 15,000 mph and the transfer of kinetic energy will change its current orbit of 11hr 55 mins by 10 mins.**

Nasa spacecraft will crash into asteroid's moon



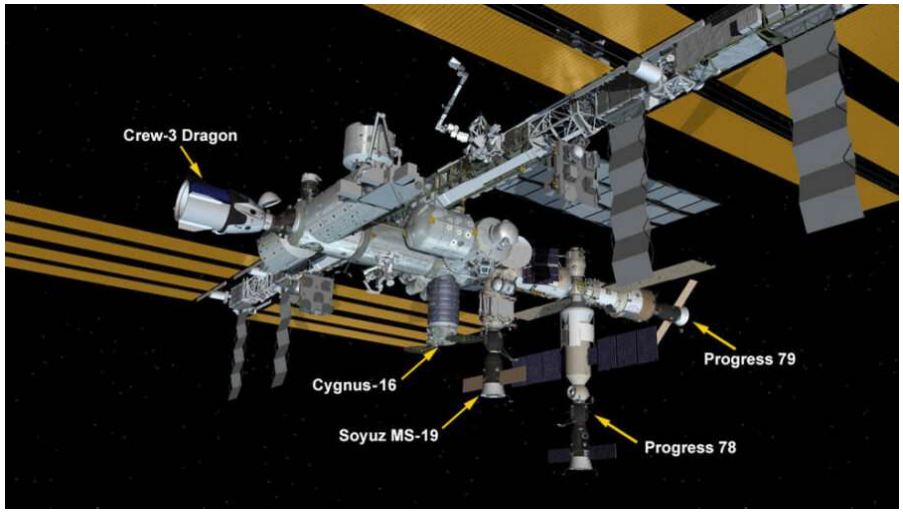
Source: Nasa, Johns Hopkins Applied Physics Laboratory

BBC

- **Graphic shows DART's collision with Dimorphos which orbits Didymos, with Italian LICIACube satellite recording the impact and resulting plume of material**

Russian ASAT Test

- On 15th Nov Russia launched an anti-satellite missile against one of its own old orbiting satellites
  - Cosmos 1408 was a defunct electronic signals intelligence satellite from Soviet era



Credit:NASA

- The test resulted in 1,500 bits of debris (plus more too small to be detected) which, because the field has expanded, posed a danger to the ISS.
  - the seven crew on board had to close down experiments, isolate sections by closing bulkheads and then take shelter in their "lifeboats" , four in Crew Dragon and three in Soyuz, in case they had to depart the station
  - this was for the 2nd & 3rd passes of the debris, which passes the station every 90 minutes, but tens of miles below
- NASA expressed outrage at the test
  - "outraged by this irresponsible and destabilizing action"
  - but they, China and India have also done it.

Other ISS News

- **Nov 8th : Crew-2 depart in SpaceX Crew Dragon *Endeavour* after nearly 200 days on ISS and splash down off Pensicola, Florida.**

- **Nov 12th : First flight for Crew Dragon *Endurance* brings four Crew-3 astronauts for six month stint**

- **Nov 27th : Russian docking module *Prichal* docked at the new *Nauka* laboratory module on the ISS, completing the Russian section.**
  - the spherical module was ferried up to the ISS using a modified Progress tug, and is equipped with five docking ports

Hubble News

- **At the end of October the Hubble Space Telescope's main flight computer put the scope into "Safe Mode" following several data synchronisation errors. NASA has now recovered the main Survey camera into operational mode and engineers continue to troubleshoot the remaining instrument problems.**

- **NASA has just placed a contract with an association of universities to oversee the science programme for the HST up until end June 2026**

Delayed Launches

- **The JWST launch has been deferred to 22nd December, following an "incident" at ESA's Kourou launch base in French Guiana**
- **SpaceX might launch the first orbital velocity test of its complete Starship in January, depending upon completion of launch tower construction work at its launch facilities and also receiving FAA license approval**
  - Ship No.10 (6 Raptor engines) and Booster No.4 (29 Raptors) will comprise the worlds biggest ever rocket
- **NASA says the launch of SLS and the Artemis 1 mission will now take place on February 12th**
  - unmanned Orion capsule will fly round the Moon and return

Miscellaneous News

- **Sadly, Glen de Vries, one of the passengers who flew into space last month with William Shatner and Blue Origin, has died in an air-crash.**

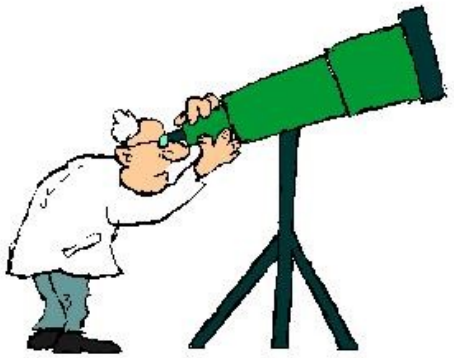
- **The next set of passengers on the Blue Origin New Shepard sub-orbital mission includes the eldest daughter of Alan B Shepard, the first US astronaut**
  - Scheduled for Dec 9th the flight will be the first carrying the full complement of six passengers (2 guests, 4 paying customers)

- **20 Nov: Private US launch company Astra achieved orbit for the 1st time when their kerosene-fuelled Rocket 3.3 carried US Space Force payload into polar orbit, launching from Kodiak Island, Alaska**
  - company plans potential eventual daily launches!

Stars Over Surrey

What's Up!

For December 2021



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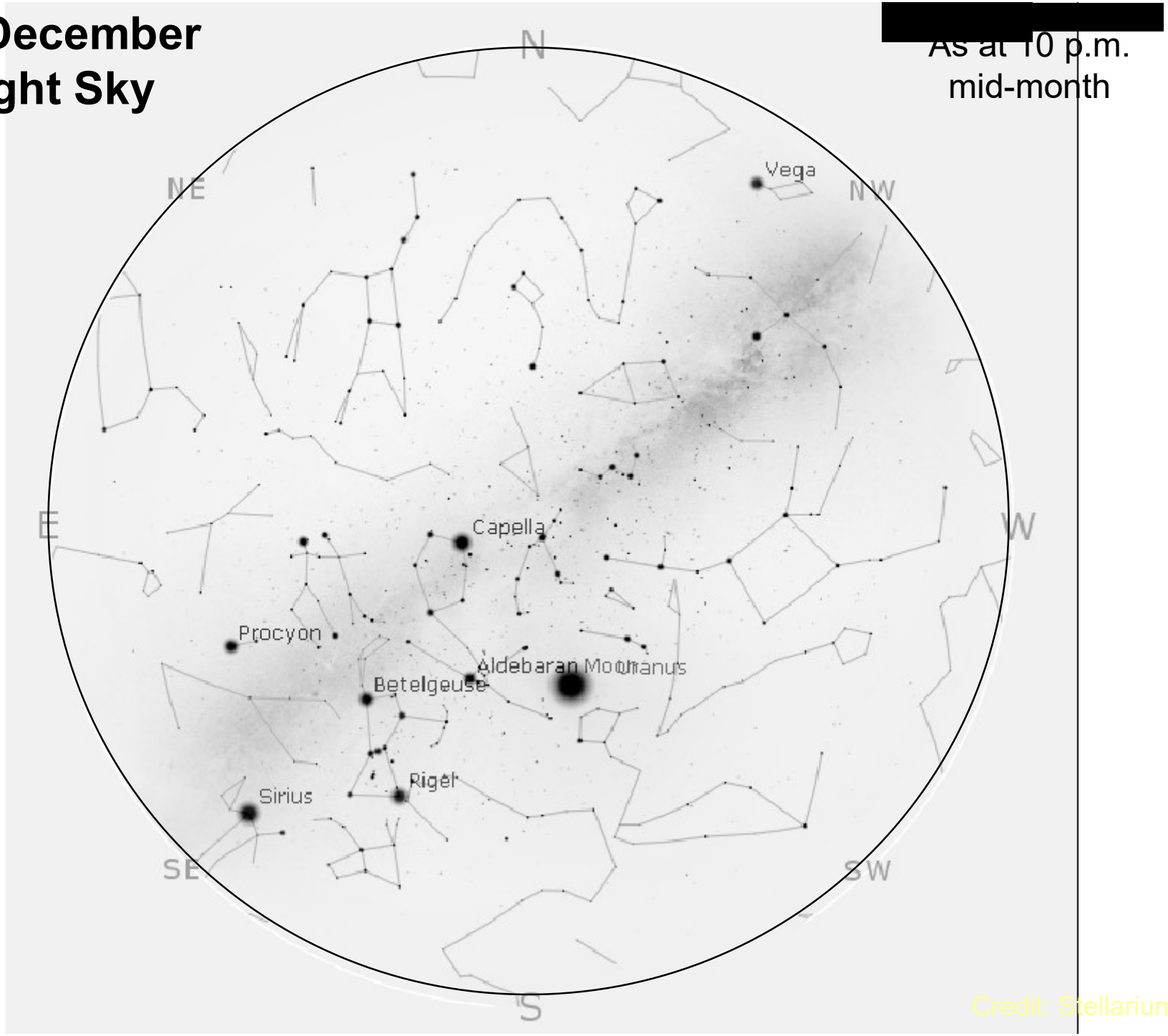
The December Night Sky

As at 10 p.m.
mid-month



Credit: Stellarium

Sun & Moon in December

- **New Moon 4th**
- **First Quarter 11th**
- **Full Moon 19th**
- **Third Quarter 27th**

		Sun	Moon
1st	Rise	07.44	03.33
	Set	17.57	14.31
15th	Rise	08.00	04.04
	Set	15.54	13.59
31st	Rise	08.06	05.26
	Set	16.04	13.44

All times are GMT

The Planets in December

Mercury

Mercury is now an evening object again, but not easily seen as it's very low and only sets 30 mins after the Sun. Things improve as month progresses and it's more easily found, albeit still low in SW towards the end of the month, setting more than an hour after sunset.

Venus

Venus is still a brilliant but low evening object, shining at mag -4.7 in SSW all month, setting about 2.5 hrs after sunset at start, 1.25 hrs by month end

Mars

Visible in SE shortly before sunrise, improving as the month draws to a close, when it rises two hours before the Sun.

The Planets in December

Jupiter

Despite shining at mag -2.3, it gets harder to find Jupiter in WSW as month progresses as it moves further into the twilight

Saturn

Saturn is now only visible in WSW as twilight falls rather than in true darkness

Uranus

Still well placed throughout the night, but binoculars must be used to find this mag +5.7 evening object, nicely placed around 50^{o} high in the South

Neptune

Visible all month in the South, but at mag +7.9 a telescope is needed

Astronomical Phenomena in December

6th	The waxing crescent Moon will make a fine sight with the brilliant Venus, just 6° apart, shortly after sunset
8th	The Moon forms a shallow triangle, with Jupiter above and to left, Saturn slightly above and to right. Jupiter and Saturn point down to Venus, so 4 Solar System objects in a group
13th	The peak of the annual Geminids meteor shower occurs at 7a.m. on 14th, so start looking late tonight. The bright waxing gibbous Moon will unfortunately wash out the fainter trails.
24th	The Moon occults Eta Leonis from 4.16 a.m. The star reappears from the Moon's dark limb at 5.09 a.m.
27th	If you have a flat SE horizon look about 7a.m. for Mars (Mag +1.5) and its rival Antares (Mag +1), approx 5° apart
28th	About 30-40 mins after sunset Mercury might be glimpsed about 5 below Venus. This will make all planets bar Mars visible in one evening.

Meetings at Local Societies

- Given the current Covid-19 situation, most physical meetings at our local astronomical societies have been cancelled until further notice, some continue via Zoom for paid-up members, but some are now returning to physical meetings.
- You might like however to see their websites for items of interest:
  - **Guildford AS** http://www.guildfordas.org/
  - **Farnham AS** https://www.farnham-as.co.uk/
  - **Croydon AS** http://www.croydonastro.org.uk/
  - **Ewell AS** https://ewellastronomy.org/
  - **Walton AG** http://www.waltonastrogroup.co.uk/

Meetings at Local Societies

- **Ewell AS** *Nonsuch High School for Girls, Cheam*
  - Friday 10th December, 20.00 hrs
    - *–AGM and Christmas fun*

Meetings at Local Societies

- **Croydon AS** *Sandison Room, Trinity School*
  - Friday 3rd December, 19.30 hrs
    - *"What Is Time?"*
      - » Martin Hogbin
  - Friday 17th December, 19.30 hrs
    - *"Christmas Meeting: Festivities"*

Free Meetings & Talks On-line

- **British Astronomical Association**: Zoom webinars
  - "*Christmas Meeting*"
    - Saturday 4th December, 2.00 - 6.00 p.m.
      - live-streamed from physical meeting
  - "*Exoplanets - Present and Future*"
    - Thursday 16th December, 7.00 - 8.15 p.m.
      - Roger Dymock, BAA Exoplanets Section

https://www.britastro.org/meetings

(will also be viewable via BAA's YouTube Channel)

Free Meetings & Talks On-line

- **British Interplanetary Society**:
  - *"Future Concepts For Space Travel:*
    - Life Jim, but not as we know it!"
    - Dr Martin Braddock, Sherwood Observatory
    - Wednesday 1st December via CrowdCast
      - 19.00 to 20.30:

https://www.bis-space.com/events//

Meetings & talks on-line

- You can also pay £3.00 to watch these on-line talks run by **GoSpaceWatch**: (book via Eventbrite)
  - *"The Size and Scale Of the Universe"*
    - Wednesday 15th December, 7.30 - 9.30 pm
      - Kevin Manning

www.gospacewatch.co.uk

Astronomy on TV

The Sky at Night

"Review Of The Year"

It's been quite a year for astronomy and spaceflight, and once again Maggie, Chris and the rest of the Sky At Night team have been at the forefront, bringing the latest space news and stargazing advice to viewers over the past 12 months. This episode the team look back at the year that was, and pick some of their highlights from *The Sky At Night* in 2021

Sunday	12th	Dec	BBC 4, 10.00 pm
Thursday	16th	Dec	BBC 4, 7.30 pm

Astronomy on TV

"Universe - Series 1: 5 episodes"

Professor Brian Cox journeys across the vastness of time and space revealing epic moments of sheer drama that changed the universe forever.

Episodes

1. *The Sun: God Star*
2. *Alien Worlds: The Search For Second Earth*
3. *The Milky Way: Island of Light*
4. ~~*Black Holes: Heart of Darkness*~~
5. ***Big Bang: Before The Dawn***

Wednesday 1st Dec, BBC2 9pm

repeated Saturday 4th Dec at 6.55pm BBC2


That's all Folks!