

The November meeting was held on the first properly cold evening of the autumn. It was still cloudy, though, which came as no surprise. To brighten up the evening, the talk was given by Brian Fraser of Somerset Levels Stargazers on the subject of Unmanned Moon Landings. Most of us are aware of – either by living through it or from history – the manned Apollo moon landings but far less is known about the unmanned landings that preceded them and have again started up before, maybe, some more manned landings in the next few years.

Brian took us through the early Soviet Union probes which were way in advance of the USA's efforts in the late 50's and early 60's. The USSR was first to hit the moon, photograph the far side, soft land and have a rover on the moon. They even managed to do an unmanned sample-return mission soon after Apollo 11. Ultimately, their achievements were eclipsed – to western eyes anyway - by the NASA programme culminating in Apollo.

Brian then took us through the US programme which consisted of the Ranger impactors (with a very nice time-lapse movie), the Surveyor soft landers and the Lunar Orbiter mapping probes. Brian described how the Surveyor craft – without any on-board computers - used fairly simple Doppler RADAR and analogue comparators to determine when to fire the approach and landing thrusters to achieve the soft landing.

The mapping photographs returned by the Lunar Orbiter probes allowed much improved mapping of the moon ready for the manned landings, though the smaller boulder fields and craters still posed a hazard to the Apollo LEMs.

After Apollo, the US lost a lot of interest in space (mainly distracted by the Vietnam war (and its cost in both money and lives) and didn't really get back into the game until the Lunar Reconnaissance Orbiter launched in 2009 and still in operation. It has mapped the moon in detail to the point that the Apollo landing sites have been imaged showing the LEM landing stage and the tracks of the astronauts around the sites. Brian showed an amazing video at the end (see <https://www.youtube.com/watch?v=cFC71rFejvo> ) of stitched together images from LRO.

The lack of interest from both Russia and the USA has opened up moon exploration to a number of other countries. Foremost have been India and China, along with a host of others and even some commercially launched probes. At the end, Brian speculated who would launch the next feet to land on the moon – with his money on a commercial landing, probably by SpaceX.

Many thanks to Brian for an interesting talk with lots of new information for all of us.

After the break, Terry showed some images of Comet 2023 A3, some deep-sky object from Australia and a few planetary images (including Venus which is at last in our western sky again in evening twilight). As usual, he did his Upcoming Events presentation (see below)

and noted that there was a shadow transit of Saturn going on at that very moment behind the clouds. Others to come, though, again see below.

He also reminded everyone that the next meeting will be the Christmas Social event. Just bring something to eat and share and we'll have a more informal meeting than the usual. There will be a quiz (with prizes!) as well as some short talks by members (let Terry know if you have something you would want to talk about).

As a side-note, we were able to put a new visitor in contact with one of our more experienced engineers (thanks Pete!) to see if her long neglected telescope could be fixed. At the end of the day, getting people together like this is one of the main reasons that astronomical societies exist and it's great to be able to help.

# Upcoming Events

## Planets

Venus is now very bright but low down at twilight (17:00 – 18:00) in the SSW. It's rapidly moving Northwards and will be visible in full darkness by the start of December. Nice thin moon below on December 4<sup>th</sup>.

Mercury still very low at end of civil twilight but will disappear soon

Saturn's rings are now nearly edge on. It means that its moons are in line as well. This allows transits of the moons including Titan. Shadow transits on November 20<sup>th</sup> and December 6<sup>th</sup> & 22<sup>nd</sup>. See <https://www.skyatnightmagazine.com/advice/saturn-titan-transits>.

Mars is now up by 11pm and in Cancer and will be closest to M44 around December 4-5<sup>th</sup>. It will stop moving eastwards and start moving back towards Castor & Pollux. Opposition is on 2025 January 16<sup>th</sup>.

Jupiter is approaching opposition (December 4<sup>th</sup>) and is visible pretty much all night. It continues to be between the horns of Taurus but moving back towards Aldebaran.

Uranus near the Pleiades

Neptune west of Saturn in Pisces

## Comets

Comet 2023 A3 (Tsuchinshan-ATLAS) had a good run but is now receding quickly and becoming quite faint

## Upcoming Meetings

Dec 18 Christmas Social and members' short talks

## Outreach

Redstart School Thursday 2025 January 30th.

Manor Court School Friday 2025 January 24th