

## Our night Sky in May 2015

As sunset grows later by the day, so we have to wait longer to see our night sky. However, both Venus and Jupiter make their appearances in the West after dusk, and Saturn is now rising in the East to be visible during the night at a respectable hour! We are also approaching the season of Noctilucent Clouds which can sometimes be seen at this time of the year until August.

They are low on the northern sky glowing steely blue during the night hours. They are composed of ice crystals probably using meteoric dust as nuclei, and are about 50 miles high, lit by the sun which is just below the northern horizon. Please let me know if you see them, since they are quite rare.

The European Rosetta spacecraft continues to explore Comet 67P/Churyumov-Gerasimenko and, as it gradually gets closer to the sun, it's having to deal with some very inclement orbital weather, triggering some confusion in the spacecraft's automated navigation systems.

As 67P's surface receives more sunlight, Rosetta is seeing an increase in gas and dust blasting into space from the comet's icy nucleus. While the observations may look serene from afar, as the comet chaser dives in for close passes of the cometary surface, the environment surrounding 67P is anything but

During Saturday's flyby — which took Rosetta only 6 kilometers (3.7 miles) from the surface — the star tracker sensors, which automatically keep Rosetta's aerial pointing to Earth, became confused by the bright ice crystals being ejected by the comet, throwing the spacecraft off-kilter.

Attempts were made to regain tracking capabilities, but there was too much background noise owing to activity close to the comet nucleus: hundreds of 'false stars' were registered and it took almost 24 hours before tracking was properly re-established

The strength of the radio signal was dropping, indicating that the spacecraft was repeatedly confusing debris for background stars. Fortunately, the system finally automatically corrected itself and ESA engineers saw the radio signal come back to full strength, signifying that Rosetta's attitude had snapped back to the correct direction. But the star tracker was still confused, intermittently causing glitches in

its pointing so mission control attempted to reconfigure the onboard systems to iron out these inconsistencies in navigation — this triggered a safe mode which prevents a small error or glitch cascading into a larger, potentially mission-threatening situation.

Through Sunday and Monday, mission scientists were able to work through the safe mode and bring the spacecraft back to normal operations, sending it on a trajectory that will take it 200 kilometers (125 miles) from the nucleus and far away from the debris causing all these navigation problems.

But another close pass of 67P is planned, and there are concerns for Rosetta's safety, especially as we are likely to see an increase in cometary activity (and therefore even more debris) as Comet 67P/Churyumov-Gerasimenko approaches perihelion (point of closest approach in its orbit around the sun) in August.

These recent troubles highlight how rough it can be to investigate a comet at such close quarters and these lessons will no doubt affect mission planning — particularly whether or not, during Rosetta's next close approach, the spacecraft should again venture so close. But it also demonstrates what an amazing scientific achievement Rosetta is to our understanding of comet dynamics as these ancient lumps of icy material hurtle through the inner solar system.

Think back to the first cometary flyby of Halley's comet by the spacecraft Giotto, and compare those images with the ones we are receiving from Rosetta; the difference is astonishing!

I will keep you informed of the findings of this incredible mission in later Skys.

## Comet 67P/Churyumov-Gerasimenko

