

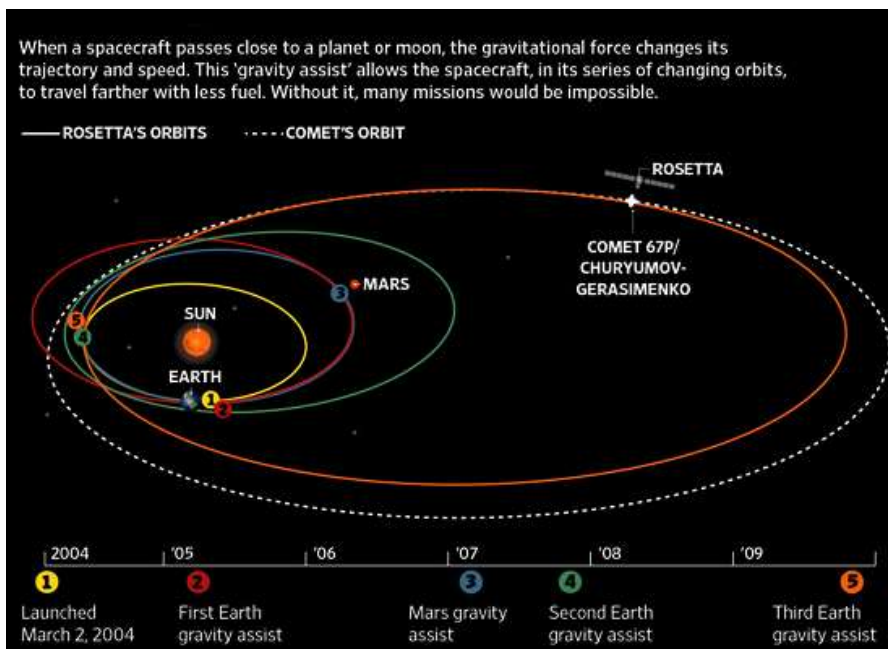
Radlett U3A Astronomy Group Talk of 2nd March 2016

The Rosetta Mission

Our speaker for this event was Mr John O’Keeffe who was one of the Lead Engineers on the Rosetta mission which sent a space probe to land on comet 67P in the summer of 2014. This was a remarkable mission from various standpoints since it required a complex 10 year 4 billion mile journey including a 31 month period when the space craft was in hibernation mode to save power; its main claim to fame however is that it was the first probe ever to land on a comet.

John explained how the two craft – the Rosetta mother ship and the Philae lander – were designed and tested, and how the comet rendezvous was organised. He illustrated his talk with diagrams and photographs, even including a ‘selfie’ taken by the Rosetta mother ship.

The complexity of such a mission becomes a little more apparent when one looks at the journey that had to be undertaken. This involved circling Earth 3 times and Mars once in order to gain the extra momentum required to achieve the necessary speed to reach the comet. These manoeuvres are known as *gravity assists* and are necessary because long-distance missions are unable to carry sufficient fuel to achieve the required speeds.



Rosetta's trajectory showing the gravity assists

The comet itself has an unusual appearance possibly because it consists of two objects that collided and fused together in the distant past. This became apparent after Rosetta was close enough for its cameras to resolve the shape.

Unfortunately, although everything went according to plan up to the moment when the lander was deployed, its harpoons did not attach to the comet surface with the result that it bounced three times before coming to rest in a shady area where its batteries could not get sufficient sunlight to properly recharge. It was able however to gather and transmit data before it ran out of power. Nevertheless, much information was, and still is, being obtained from both the lander, which did eventually receive more sunlight as the comet's orbit took it closer to the Sun, and the mother ship.



Comet 67P photographed by Rosetta

The European Space Agency, who are responsible for the mission, have produced an excellent fully illustrated brochure which is well worth reading. It can be seen at <http://esamultimedia.esa.int/multimedia/publications/BR-321/>

We had a good audience of about 30 people. There were many questions which eventually had to be curtailed as we had already overrun by a considerable time!

Peter Altman