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TO THE STARS

Ken Tapping, 6th January, 2015

Last year, 2014, was an exciting year from the space and astronomy point of view. We got the best view ever of a new star and planetary system forming, we had more revelations from the planet Mars, and one of our spacecraft rendezvoused with a comet and soft landed a probe on it. Then, just before the end of the year, the Orion spacecraft successfully orbited the Earth. The next few years should see a bit of a revival of space exploration, although it is likely to be a while before we see the return of the heady days in space exploration we experienced during the 1960's.

The rapid progress we are making in the exploration of our Solar System, and the discovery of planets orbiting other stars being almost a daily occurrence raise the question as to when we should shift our sights to sending manned or unmanned spacecraft to other stars. However, the warp drive that moves the Starship Enterprise around our galaxy is well beyond any technologies we have or are working on at the moment.

The Rosetta mission to rendezvous with Comet 67P is a good illustration of how far short we are of what we need to head for the stars. We have no launcher with the capability to send a spacecraft directly to the comet. To pick up the speed required it had to use the Earth three times and Mars once to catapult itself to the comet. What could have been a few-month mission, became a ten-year one. Getting there was a triumph in space navigation, but we won't reach the stars that way.

To orbit the Earth a spacecraft has to move at around 30,000 km/hr. That is approximately 8 kilometres a second. Around 42,000 km/h (12 km/s) will get you to the Moon. If we could maintain that speed all the way, we would get there in about 10 hours. Unfortunately we cannot, so it takes a couple of days.

At the moment a speed of 250 kilometres a second is beyond us, but should be achievable at some point. If we could maintain that speed all the way, we would get to Mars in a few days. This technology would open the whole Solar System to manned exploration. However, getting to the stars is another issue entirely.

The light from the Sun takes about eight minutes to cover the 150 million kilometres between the Sun and Earth. That is why we often refer to the Sun as being 8 light minutes from us. After the Sun, the nearest star to us is 4.3 light years away. That is how long its light takes to reach us. If we fire up our 250 km/s spacecraft the voyage to that star would take almost 5,500 years! To reach Sirius, the bright blue-white star in the southern sky this time of year, which lies 8.6 light years away, we're looking at a journey time of around 11,000 years. To cross from one side of our 100,000 light year diameter galaxy to the other would take us almost 130 million years. Obviously, classical space exploration technology will not hack it. Some of the ion drives we are experimenting with could lead us eventually to reaching speeds of around a tenth of the speed of light, so we would be moving at 30,000 km/s. This will make the nearest stars reachable with journey times of 43 years and upwards. Robot spacecraft should be happy with that, but human volunteers might be hard to get. One option is to put everyone into hibernation until arrival at the destination. Another idea has been "generation ships", where huge spacecraft have generations born and dying during the mission. Just going faster still is not much of an option because funny things happen to time. Personally, I think we need to bite the bullet and get working on warp drive.

Venus shines brilliantly in the sunset glow, with Mercury being close by. Jupiter dominates the southern sky during the night and Saturn rises in the dawn twilight. The Moon will reach Last Quarter on the 13th.

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