

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

9th March 2009

Peter Read (Oxford University)
'Climate Change and Ice Ages on Mars and Earth'

I'm writing this from a snowy Glasgow. The Moon is just about visible through clouds which have thinned considerably from during the day. Not only did they prevent any hill-walking (the objective of the weekend away) but also any astronomy too. Maybe I'll have more luck in the week in Dundee where I hope to visit the Mills Observatory after my work there during the day. This observatory, built of sandstone has a 7m diameter papier maché dome, only one of two known in the world, the other being in Toronto, Canada.

Please note that due to Easter, our next meeting is on the first Monday in April, the 6th.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Sun: At 11.44 UT on 20th March, while in the constellation of Pisces, the Sun reaches the spring equinox. Which means the days will be longer than the nights for the next six months.

Mercury: As superior conjunction occurs on 31st March, Mercury is invisible this session, but we have the best evening apparition of the year coming up.

Venus: The elongation is rapidly decreasing now, going from 26° on 9th March to 0° by the 27th. This means of course that Venus reaches inferior conjunction on the 27th, and then quite rapidly appears in the morning sky. By April 6th it is already 10° high at sunrise. On March 9th Venus sets about 3 hours after the Sun, just 2 hours by the 16th, and just an hour after the Sun by the 23rd. While the planet may be getting close to the Sun, its very bright -4.4 magnitude means it is relatively easy to follow as it approaches the horizon. In fact, on the 27th, at inferior conjunction, Venus can be observed both in the evening sky and the morning sky on the 28th. It will be about 4° high at sunset and some 8° high at sunrise. [*Ed. So you really will be seeing double that Friday night / Saturday morning!*].

Saturn: With opposition just gone (March 8th), Saturn is visible right through the night now, still in southern Leo. The rings open slightly this session, going from 2.6° to 3.6° by early April. Of course, at such a small angle, they will be rather difficult to see in small telescopes. Satellite events are still rather hard to see from the UK but there is a favourable conjunction of Titan and Rhea on April 4th at 23.22 UT if you have use of a telescope.

Jupiter: Jupiter remains close to the south eastern horizon, just 12° high at sunrise by April. Fortunately, it is bright enough to find rather easily as it is -2.0 magnitude. On the morning of 25th March Jupiter passes a mere 48 arc seconds north of the +4.3 mag star, Iota Capricornus. Four days later, on the 29th, a thin crescent Moon will be close to Jupiter but you will need a clear horizon as they will be a measly 6° high, 30 minutes before sunrise.

Uranus + Neptune: Uranus is in conjunction with the Sun on March 13th which means you cannot see it at the moment. Neptune might just be visible by early April very low just before dawn in Capricornus, not too far from Jupiter. It will be a difficult observation though.

Asteroids: There is only one bright asteroid visible this session and that is 1 Ceres. It is past its best for this apparition however, so it fades from +7.0 mag to +7.6 mag by early April but this is still bright enough for binoculars. It creeps into Leo Minor for a week or so before crossing back into Leo.

Comets: Comet 2007 N3 Lulin is still visible but fading fast. It starts at about +7.4 magnitude on March 9th but quickly crosses into Gemini, reaching +10 magnitude by April 6th.

There is a second comet slowly coming into view now. This is comet 22P Kopff which, hopefully, will reach 8th magnitude by June. Through March and April however, it will be around 10th magnitude, slowly crossing northern Sagittarius, so a telescope is needed for this one at the moment.

MOON PHASES:

Full: 11th Mar.; Last Qtr: 18th Mar.; New: 26th Mar.; First Qtr: 2nd Apr.; Full: 9th Apr.



WHERE DID ALL THESE GADGETS COME FROM?

Ion propulsion. Artificial intelligence. Hyper-spectral imagers. It sounds like science fiction, but all these technologies are now flying around the solar system on real-life NASA missions.

How did they get there? Answer: the New Millennium Program (NMP). NMP is a special NASA program that

flight tests wild and far-out technologies. And if they pass the test, they can be used on real space missions.

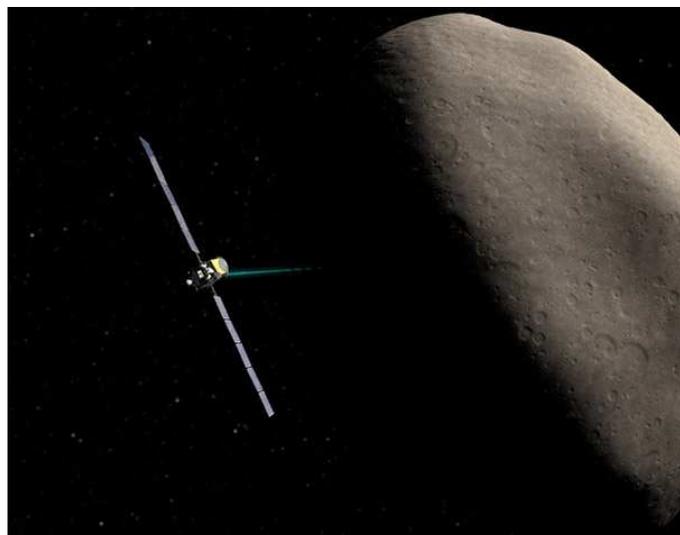
The list of probes that have benefited from technologies incubated by NMP reads like the Who's Who of cutting-edge space exploration: Spirit and Opportunity (the phenomenally successful rovers exploring Mars), the Spitzer Space Telescope, the New Horizons mission to Pluto, the Dawn asteroid-exploration mission, the comet-smashing probe Deep Impact, and others. Some missions were merely enhanced by NMP technologies; others would have been impossible without them.

"In order to assess the impact of NMP technologies, NASA has developed a scorecard to keep track of all the places our technologies are being used," says New Millennium Program manager Christopher Stevens of the Jet Propulsion Laboratory.

For example, ion propulsion technology flight-tested on the NMP mission Deep Space 1, launched in October 1998, is now flying aboard the Dawn mission. Dawn will be the first probe to orbit an asteroid (Vesta) and then travel to and orbit a dwarf planet (Ceres). The highly efficient ion engine is vital to the success of the 3 billion mile, 8 year journey. The mission could not have been flown using conventional chemical propulsion; launching the enormous amount of fuel required would have broken the project's budget. "Ion propulsion was the only practical way," says Stevens.

In total, 10 technologies tested by Deep Space 1 have been adopted by more than 20 robotic probes. One, the Small Deep Space Transponder, has become the standard system for Earth communications for all deep-space missions.

And Deep Space 1 is just one of NMP's missions. About a half-dozen others have flown or will fly, and their advanced technologies are only beginning to be adopted. That's because it takes years to design probes that use these technologies, but Stevens says experience shows that "if you validate experimental technologies in space, and reduce the risk of using them, missions will pick them up."



Dawn will be the first spacecraft to establish orbits around two separate target bodies during its mission—thanks to ion propulsion validated by Deep Space 1.

Stevens knew many of these technologies when they were just a glimmer in an engineer's eye. Now they're "all grown up" and flying around the solar system. It's enough to make a program manager proud!

The results of all NMP's technology validations are online and the list is impressive:

nmp.nasa.gov/TECHNOLOGY/scorecard/scorecard_results.cfm. For kids, the rhyming storybook, "Professor Starr's Dream Trip: Or, How a Little Technology Goes a Long Way" at spaceplace.nasa.gov/en/kids/nmp/starr gives a scientist's perspective on the technology that makes possible the Dawn mission.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

LAST MEETING'S TALK

by Gwyneth Hueter

Last month's talk was given by Dr Patrick Irwin of Oxford University, about the Cassini observations of Saturn and Titan.

The first part of his talk was about looking at an infra-red (IR) spectrum of an atmosphere in order to see what is happening. As IR wavelengths are longer than visual wavelengths they can penetrate deeper into an atmosphere. The longer the wavelength the deeper they penetrate.

IR telescopes have to be as high above the Earth's water vapour levels as possible. The best IR scopes are to be found roughly 30 degrees north and south of the equator because there the air is driest, having circulated up from the tropics and dumping its moisture as it rises.

Dr Irwin then discussed the Cassini-Huyghens mission and its observations of the atmospheres of Jupiter and Saturn. The presence of ammonia and phosphine (an unstable gas) indicates their atmospheres are constantly active. On Saturn, the air at the poles is being drawn down and is warming up as a result.

The methane on Titan acts like a greenhouse gas. There are high levels of nitrogen on Titan and the methane causes it to remain as a gas. Methane is constantly being released, otherwise the nitrogen would freeze. The explanation for the appearance of the methane seems to be that there is some kind of volcanism, but because Titan is so cold these volcanoes are being called cryovolcanoes. (I presume there would then be no atmosphere on Titan without the methane. Are there cows on Titan?)

FURTHER DISCUSSION

If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous messages click on:

<http://groups.yahoo.com/group/abingdonas/> .

To join the abastro list, please go to <http://www.yahogroups.com> . You can also unsubscribe from the list here. To post messages to the list, please send them to abingdonas@yahogroups.com . Please note that you will need to sign up with a YahooID if you do not already have one. You can do this on the above page.

Further information about the mailing list can be found on the abingdonas webpage at :

<http://groups.yahoo.com/group/abingdonas/> .

Further discussion on astronomy and many other topics takes place at the Spread Eagle pub in Northcourt Road after the meeting. You are most welcome to join us.

DATES FOR YOUR DIARY

16th Mar. 8pm. Beginners' Meeting in the Perry Room.

23rd – 25th Mar. (first clear night) 8pm. Observing Evening at Abbey Meadow. Contact Ian Smith for details.

6th Apr. 8pm Speaker meeting: Nick Hewitt (Northampton Natural History Society) 'Planetary Nebulae'.

PLEASE NOTE THAT THIS IS THE FIRST MONDAY IN APRIL DUE TO EASTER!!

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

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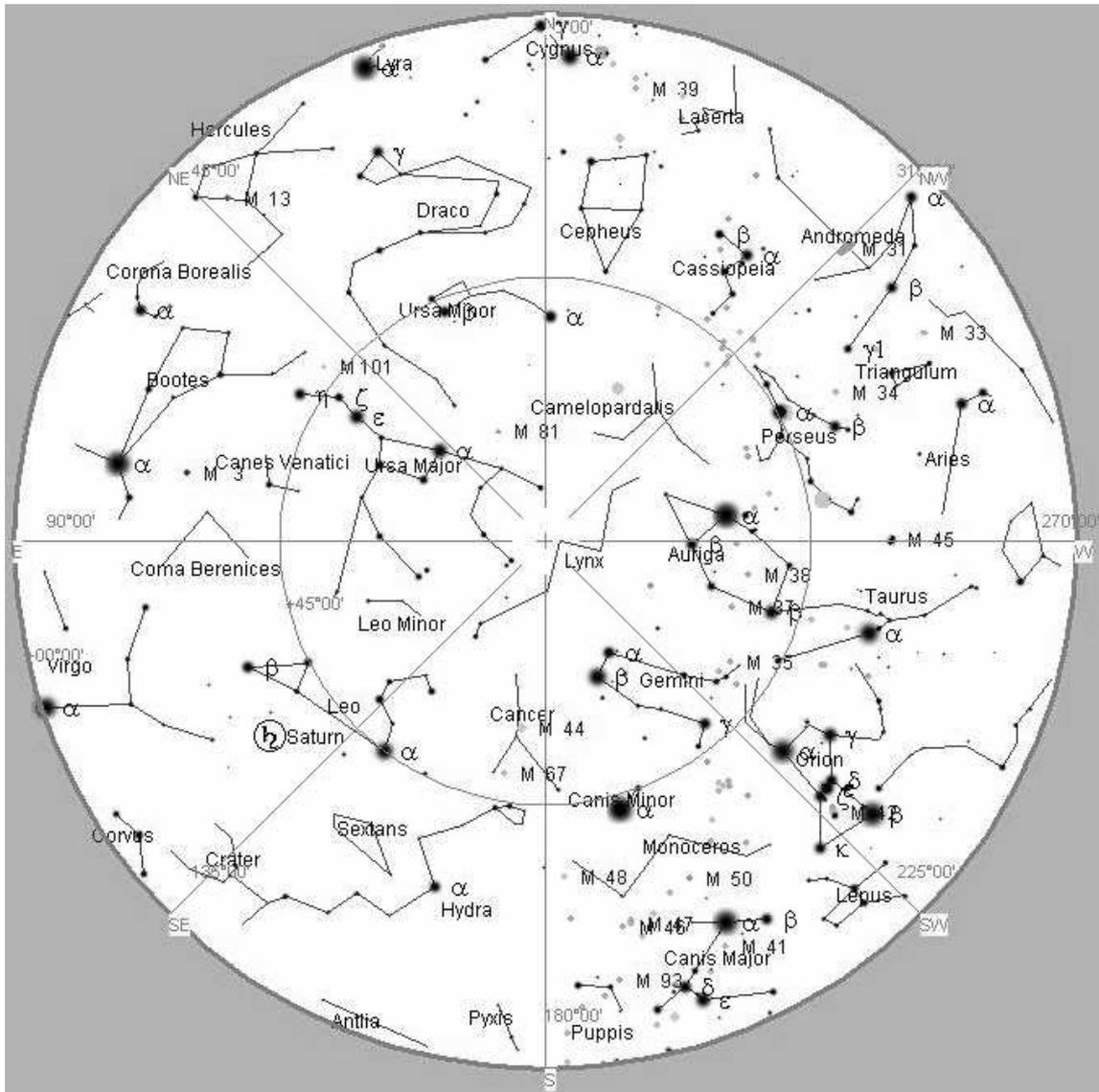
Here is a photograph of Comet Lulin taken by society member Julian Mole, taken on 28th February.



The photo was created from 2x 180s exposures at ISO 1600 using an 80mm refractor, and clearly shows the comet's tail.

The comet, formally known as "C/2007 N3 (Lulin)", was discovered at the Lulin Observatory in Taiwan in July 2007. It has shown a faint gas tail and a brighter dust-spike (anti-tail). They were pointing in almost opposite directions for around two months, but in late February as the comet passed opposition the gas tail swung around (as seen from the Earth) to align with the dust tail. Both are now pointing in the direction away from the Sun.

STAR CHART



The Night Sky at 9pm (GMT) next Saturday (14th March)

Orion is sinking in the west now, and Gemini, the Twins, and Leo, the Lion dominate the southern aspect. Comet Lulin is in Gemini – see the finder chart below:

