SPACEWATCH
the newsletter of the Abingdon Astronomical Society

12th March 2007

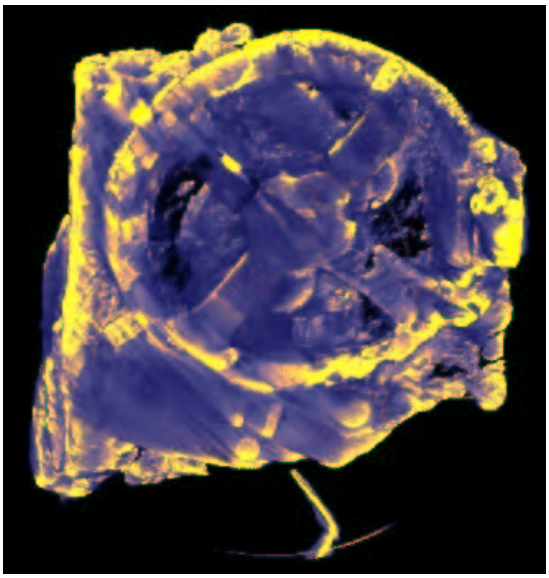
Prof. Mike Edmunds (University of Cardiff) & Andrew Ramsey (X-Tek Systems Ltd & AAS) –

'Antikythera Decoded'

Over 2000 years ago a Roman ship carrying loot from the island of Rhodes sank in a storm off the small Greek island of Antikythera. 100 years ago sponge divers sheltering from another storm found the wreck and over the next two years the cargo was recovered. Among the many bronze and marble statues was a small wooden box containing a geared mechanism. Known as the Antikythera Mechanism, it is probably the world's oldest astronomical calculating machine and has intrigued researchers for over a century.

In September 2005 I was lucky enough to be involved in a new X-ray inspection of this ancient device led by the Universities of Cardiff, Athens and Thessaloniki working with X-Tek Systems of Tring and HP of California.

What we now know about the Antikythera Mechanism has changed forever our view of what ancient astronomers were capable of.



A 3D X-ray CT scan of the largest fragment of the Antikythera Mechanism.

THE NIGHT SKY THIS MONTH

by Bob Dryden

This session has two of the major planets on view in the evening sky plus two more comets coming into view, although they will not be as splendid as Comet McNaught was in January and February.

Sun: On 21st March at 00.07 UT we reach the spring equinox and the days become longer than the nights for the next six months.

Venus: This is one of the two bright planets shining brightly in the evening sky as it gets dark. Now at very respectable 30 degrees above the horizon at sunset, Venus blazes bright at mag. -3.9 in the south west. A telescope will show the phase is still gibbous, but little else because of the complete cloud cover on the planet. How early in the evening can you see Venus with the naked eye? Scan with binoculars at sunset to locate the planet early on, and then you know where to look without them. On the evening of 21st March, the crescent Moon will be about 5 degrees above Venus which will be a very nice vista and a good photo opportunity.

Saturn: The other bright planet in the evening is Saturn. Well past opposition now, Saturn is already above the horizon as it goes dark, shining at mag. +0.2 in Leo towards the east.
The rings are gradually closing, now at an angle of -15 degrees, but are still easy to see in a small telescope. There is a lunar occultation of Saturn on 29th March but it is not visible from Oxfordshire.

Jupiter + Mars + Mercury: All these planets are visible in the morning sky. Jupiter at a bright magnitude of -2.2 in Ophiuchus and Mars at a much dimmer mag. +1.2 in Capricorn. Mercury is undergoing a very poor morning apparition and will be hard to see at all.
For those of you who are out of bed as it gets light, the crescent Moon is about two degrees below Mars on the morning of 16th March. The following morning (17th) the Moon will be about two degrees below Mercury which might help you locate the small planet.

Asteroids: The asteroid 4 Vesta continues to brighten, reaching an easy binocular magnitude of +6.7 by April. It has now crossed into the constellation of Ophiuchus and is best viewed after midnight. If you have a telescope, there is an interesting event on the night of 30/31st March. That night a NEO, or Near Earth Asteroid will pass, not surprisingly, near to the Earth. There is no danger of it hitting us, but during the night you will be able to actually watch it move across the stars in real time. It will be moving at about a degree an hour (bearing in mind that the Moon is half a degree across), crossing Leo Minor and Leo. The asteroid is called 2006 VV2 and will be about 10th magnitude which is why you will need a telescope. You will also need a finder chart that plots the asteroid by the hour as it is moving so fast (the internet is the best place to look for this).

Occultations: There is a rare occultation of a first magnitude star on the morning of 30th March. The brightest star in Leo, Regulus, is occulted by the Moon at 03.29 UT. The Moon will be a bright gibbous phase and about 10 degrees high in the west at the time. The star reappears at 04.19 UT but the Moon will be virtually on the horizon by then and probably lost to view.

Comets: There are two possible good comets this session, both in the evening sky.

First, comet 96P/Machholz moves up from the south crossing Cetus and then Pisces. On March 12th it will be very low and about mag.13. However, it rapidly brightens until by early April it might peak at about mag. 6 which should bring it into binocular range.

The other comet is comet 2P/Encke which will move across Pisces and into Aries. Again, it will start faint at about mag. 11.5 but brighten to about 5th magnitude by early April. This one will actually continue to brighten until the second half of April when, with a bit of luck, it could reach 3rd magnitude. Comets are notoriously unreliable when it comes to predicting how bright they might get. However, these two have been around before and are fairly reliable so spring should have some interest for comet lovers.

Moon: On March 19th there is a chance to look for a very young crescent Moon. Usually, by the time you notice the new crescent Moon it is a couple of days old. However, when conditions are right, you have the chance to see one only a few hours old, and the evening of the 19th is one such chance. At sunset (18.10 UT), the Moon is just 15 hours old. Scan low down with a pair of binoculars and try and find the hair thin crescent before it sets at about 19.00 UT.

MOON PHASES:

New: 17th Mar.; First Qtr: 25th Mar.; Full: 2nd Apr.; Last Qtr: 10th Apr.

LAST MONTH'S TALK

by Andrew Ramsey

Last month, Dr Jochen Weller of UCL gave us an entertaining introduction to Dark Energy, the mysterious energy invented by cosmologists to explain the acceleration of the expansion of the universe, inferred from the study of 'standard candle' supernovae explosions in other galaxies. After inventing dark matter to explain the errant behaviour of galaxies and galactic clusters according to the accepted theory of gravity – Einstein's General Theory of Relativity – they now have dark energy. The two together make up about ninety per cent of the energy in the universe leaving ordinary matter – the only matter we know anything about making up only ten per cent of all that exists. A humbling thought indeed. Dr Weller concluded by saying that after all the research of the last few years we do not really know what dark energy is at all!

[Gwyneth Hueter is on holiday.]

A COSMIC SEARCHLIGHT

by former member Deborah Hambly in New Zealand

Canopus – Alpha Carinae:

Apparent Magnitude -0.72
Distance 1200 LY
Luminosity 200,000 suns

Canopus is directly overhead at sunset at this time of year and my Meade LX90 has reliably been choosing it and Sirius for alignment over the past few months. Facing South, it is the brightest star in our Southern Skies. The only exception to this was in 1843 when Eta Carinae, the most erratic of all variable stars, passed Canopus and almost equalled Sirius in brightness.

Canopus is a beautifully bright star which dwarfs our sun. If it were seen from the standard distance of 32.6 light years (this distance is used to compare stars by their apparent magnitude) it would shine at a magnitude of -8.5 and would cast strong shadows! Not only is Canopus a bright star, but it is also a big star. If Canopus were situated in the place of our sun, it would extend out past the orbit of Venus.

In New Zealand, Canopus' rising was used to time the planting of the Kumara crop. Northland, the northernmost region of the North Island, where I live is the Kumara (or sweet potato) capital of New Zealand. Incidentally, in case you have not seen kumaras (from Delta Produce Dargaville) on sale in your local Sainsbury's, they are shaped like an asteroid, but considerably redder in colour.

The Arabs used the first dawn rising of this star as a sign for weaning Camels! In Germany Canopus is called the Schiff-stern, the ship star. In earlier times the fact that it could be seen from Egypt but not Athens was early proof that the Earth was not a flat plane.

Canopus is officially Alpha Carinae, the leader of the Keel of the Ship, however it was previously Alpha Argus. The Greek philosopher and Mathematician Eratosthenes first used the name Canopus for this individual star, whereas previously the Sumerians had called the entire group of stars making up Argus by this name.

The name Canopus come from the legend of the Trojan War. After the fall of Troy, Canopus piloted a ship which landed in Egypt. Unfortunately Canopus was killed by a snake. A monument was built in his honour and a town, (now occupied by the modern city of Aboukir) blossomed on the site. Interestingly, it was at Canopus that Napoleon's fleet was beaten by Nelson in 1798.

Another interesting legend comes from the Arab astronomer Al-Sufi in the tenth century. Canopus was in the Northern hemisphere with his two sisters Sirius and Procyon. Canopus fell in love with Rigel, but embraced her clumsily and accidentally killed her. To escape from his sisters Canopus fled across the Milky Way. Sirius chased him, which is why they are both now in the Southern Hemisphere of the sky, while Procyon, weaker in strength remains in the North.

I will finish with a poem by Thomas Carlyle celebrating Canopus:

Shining down over the desert, with its blue diamond brightness
Would pierce into the heart of the wild Ishamelite man
When it was guiding through solaritary waste there.
To his wild heart, with all the feelings in it,
With no speech for any feeling, it might seem a little eye,
That Canopus glancing out on him from the great, deep Eternity;
Revealing the inner splendour to him.

NASA Space Place

EVEN SOLAR SAILS NEED A MAST

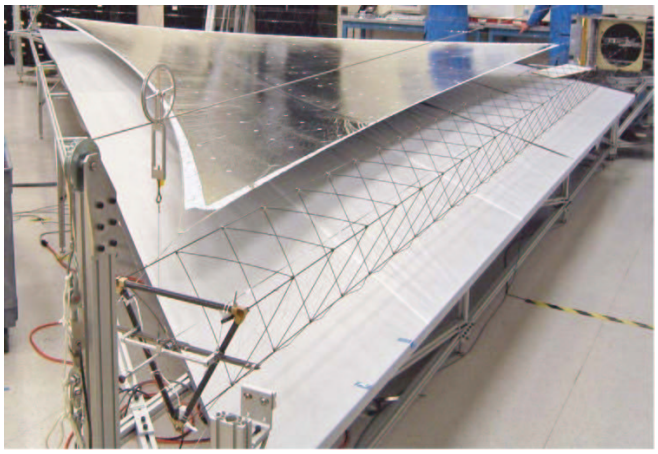
by Patrick L Barry

Like the explorers of centuries past who set sail for new lands, humans may someday sail across deep space to visit other stars. Only it won't be wind pushing their sails, but the slight pressure of sunlight.

Solar sails, as they're called, hold great promise for providing propulsion in space without the need for heavy propellant. But building a solar sail will be hard; to make the most of sunlight's tiny push, the sail must be as large as several football fields, yet weigh next to nothing. Creating a super-lightweight material for the sail itself is tricky enough, but how do you build a "mast" for that sail that's equally light and strong?

Enter SAILMAST, a program to build and test-fly a mast light enough for future solar sails. With support from NASA's In-Space Propulsion Program to mature the technology and perform ground demonstrator tests, SAILMAST's engineers were ready to produce a truss suitable for validation in space that's 40 meters (about 130 feet) long, yet weighs only 1.4 kilograms (about 3 pounds)!

In spite of its light weight, this truss is surprisingly rigid. "It's a revelation when people come in and actually play with one of the demo versions—it's like, whoa, this is really strong!" says Michael McEachen, principal investigator for SAILMAST at ATK Space Systems in Goleta, California.



SAILMAST is the thin triangular truss in front of the picture. It is attached to a section of a silver foil solar sail section shown here in a laboratory test. The mast in the picture is 2m (6 ft) long. The Space Technology 8 mission will test the SAILMAST, which is 20 times longer.

SAILMAST will fly aboard NASA's Space Technology 8 (ST8) mission, scheduled to launch in February 2009. The mission is part of NASA's New Millennium Program, which flight tests cutting-edge technologies so that they can be used reliably for future space exploration. While actually flying to nearby stars is probably decades away, solar sails may come in handy close to home. Engineers are eyeing this technology for "solar sentinels," spacecraft that orbit the Sun to provide early warning of solar flares.

Once in space, ST8 will slowly deploy SAILMAST by uncoiling it. The truss consists of three very thin, 40-meter-long rods connected by short cross-members. The engineers used high-strength graphite for these structural members so that they could make them very thin and light.

The key question is how straight SAILMAST will be after it deploys in space. The smaller the curve of the mast the more load it can support. "That's really why we need to fly it in space, to see how straight it is when it's floating weightlessly," McEachen says.

It's an important step toward building a sail for the space-mariners of the future.

Find out more about SAILMAST at nmp.nasa.gov/st8. Kids can visit spaceplace.nasa.gov/en/kids/st8/sailmast to see how SAILMAST is like a Slinky® toy in space.

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

NOTICE OF ANNUAL GENERAL MEETING

The Annual General Meeting for 2006/07 will take place on Monday 14 May 2007 at All Saints' Methodist Church Hall, Dorchester Crescent, Abingdon at approximately 8 p.m., and will be followed by an astronomical video presentation.

DATES FOR YOUR DIARY

19th Mar 8pm. Beginners' Meeting in the Perry Room.

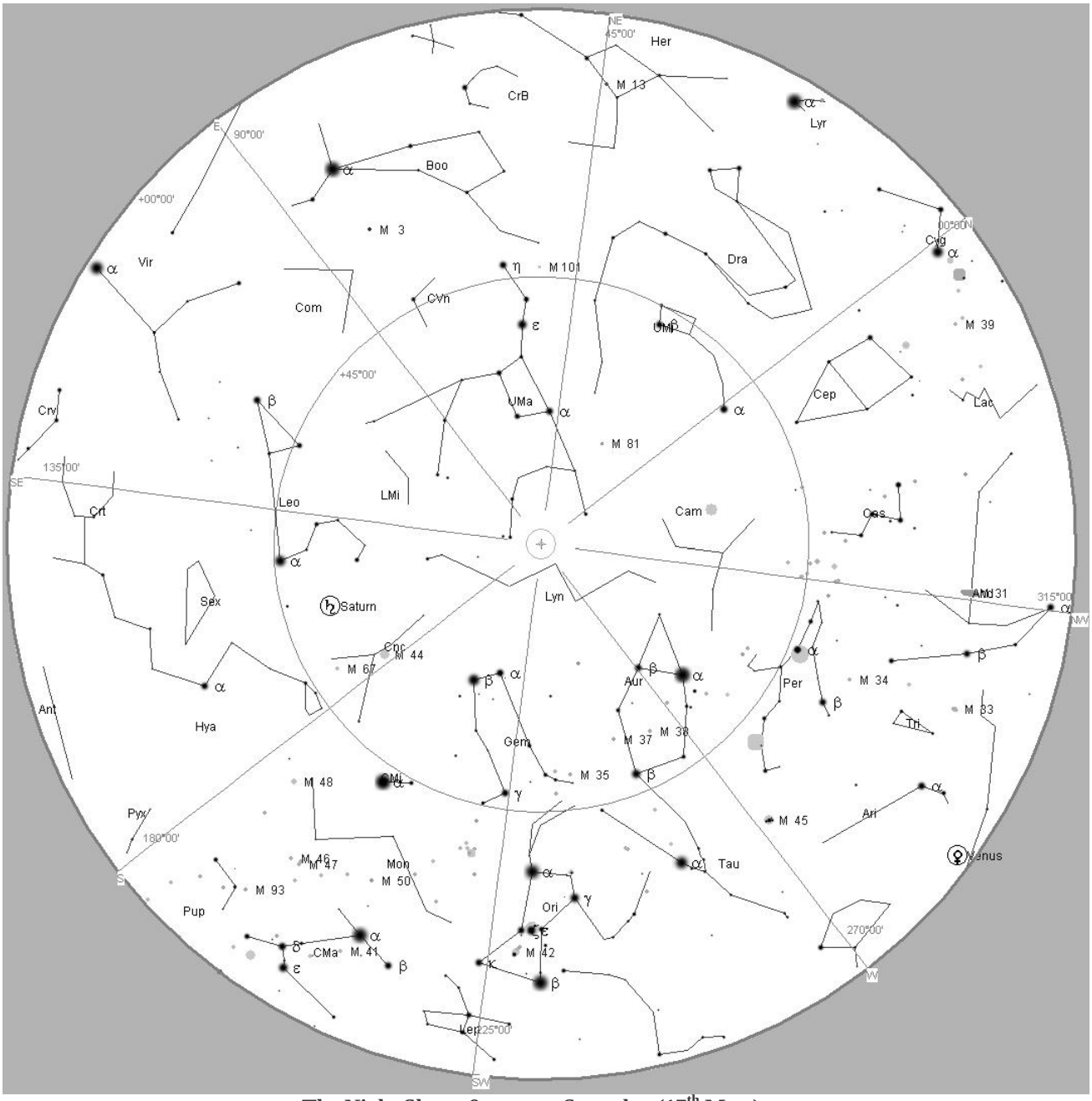
26th – 28th Mar 8pm. Lunar observing evening at Abbey Meadow, Abingdon.

PLEASE NOTE THE DATE OF THE NEXT MAIN MEETING – IT IS THE FIRST MONDAY IN APRIL, NOT THE SECOND!

2nd Apr. 8pm. Speaker Meeting: Dr Darren Baskill (Leicester University): "Cataclysmic Variables".

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:
Mail: A.T.Ramsey, 35 Cope Close, OXFORD, OX2 9AJ.
E-mail: AbAstro@ATRamsey.com Phone: 01865 245339

STAR CHART



The Night Sky at 9pm next Saturday (17th Mar.)