SPACEWATCH

the newsletter of the Abingdon Astronomical Society

12th May 2008

AGM – followed by
Trevor Pitt –
'Weather Forecasting for Astronomers'

Summer is upon us already – if not officially then at least weather-wise. Is it going to last? Well, hopefully Trevor will tell us later tonight. Also the long light evenings mean that if you want to do any observing you have to stay up late.

Tonight is our AGM – your turn to have your say in the running of the society. There is a vacancy on the committee, so why not give it a go – it's only four extra meetings a year.

THE NIGHT SKY THIS MONTH

by Bob Dryden

We have a rather quiet time ahead this session as there are no active meteor showers, no bright comets, and no bright occultations ahead. However, the planets can always be counted on to provide something different to see.

Mercury: With greatest eastern elongation on 14th May, Mercury is in the middle of its best evening apparition of the year. On 14th May, the planet will be about 20 degrees high at sunset so should be easily visible low in the west as it crosses Taurus. At the moment, the planet is showing a half phase, which will narrow to a nice crescent as the apparition progresses. You will need a telescope to see these phases however, as binoculars are not powerful enough. Inferior conjunction is on June 7th so Mercury should be on show in the evening sky until the end of the third week of May.

Mars: In Cancer, Mars is still gradually fading, reaching +1.5 magnitude by June. It is still easily visible to the naked eye though, but the telescopic view is poor as the apparent disc is so small at about 5" across. An interesting encounter occurs between the 22nd and 25th May when Mars crosses the northern part of the Beehive open cluster, M44. To see this you will just need a pair of binoculars (and a clear sky of course). Another meeting happens on the evening of 7th June when a crescent Moon passes about 2 degrees south west of Mars.

Saturn: Saturn remains close to Regulus in Leo. They make a bright pairing in the evening sky and there is the addition of a first quarter Moon on 13th May when they form a nice triangle. On 8th June the crescent Moon returns and the three form a straight line in the sky. The rings are at an angle of about 9 degrees which means they are narrow, but still visible in a small telescope.

Jupiter: While only really visible after midnight, Jupiter is a very bright -2.5 magnitude, low in Sagittarius. In mid May it rises about 1.30BST but by mid June that time decreases to 11.30BST. On May 22nd around 04.00UT there is the unusual situation of Jupiter appearing to have no bright moons. Ganymede will be behind the planet, Io and Callisto are in Jupiters shadow, and Europa is crossing the disc and so will effectively be invisible to most observers. If you are up early on the morning of 24th May, there will be a gibbous Moon just south of Jupiter.

Uranus + Neptune: These two planets are slowly moving out from behind the Sun. In Capricornus, Neptune is the furthest from the rising Sun, observable at about 20 degrees high in the south at sunrise by June. Uranus is about 25 degrees at sunrise by June but it is in Aquarius so a bit closer to the Sun. At magnitude +5.8 (Uranus) and +7.8 (Neptune), both should be visible in binoculars. On the morning of 27th May, there is a ½ Moon very close to Neptune if you need a pointer to its location.

Venus: As superior conjunction occurs on 9th June, Venus is not visible this session. In fact, it will not be visible for several months now, before reappearing in the evening sky in autumn.

MOON PHASES:

New: 5th May; 1st Qtr: 12th May; Full: 20th May; Last Qtr: 28th May; New: 5th June.

LAST MEETING'S TALK

by Gwyneth Hueter

Last month's talk was all about the astronomical equipment that was state of the art amongst the Neolithic astronomers in Oxfordshire. (i.e. around 1200-400BC)

According to Robin Brunner-Ellis, director of the Lower Windrush Survey, the in thing was pairs of ditches running parallel and ending in a water source (if you couldn't find one you dug one). Then you needed to make sure the ditches were lined up on some prominent point on a background hill, like a dip or a peak. Then you stood back from the ditches otherwise the hill was obscured.

Dr Brunner-Ellis is hoping that we can help him work out which astronomical objects are the targets of these ditches, which have differing southwest-northeast alignments. The pairs of ditches do not have the same distances between them either. Are they aligned to

positions of the Sun and Moon at different times in their cycles? And why do they have water at the end? Is it to help the earth's spirits to get up into the sky?

The ditches are mainly in the floodplain around the Windrush near to Stanton Harcourt, Northmoor and Standlake.

If you are intrigued then do contact Dr Brunner-Ellis.

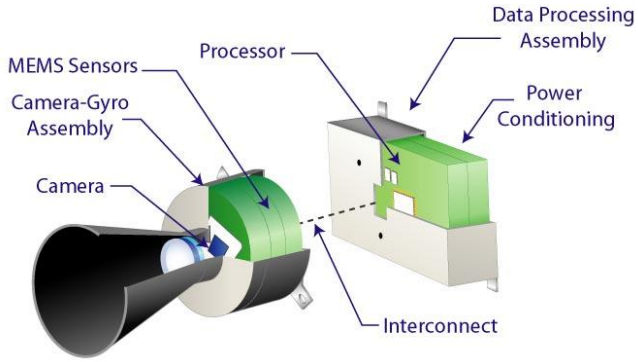
STELLAR COMPASS FOR SPACE EXPLORERS

by Patrick L. Barry

In space, there's no up or down, north or south, east or west. So how can robotic spacecraft know which way they're facing when they fire their thrusters, or when they try to beam scientific data back to Earth?

Without the familiar compass points of Earth's magnetic poles, spacecraft use stars and gyros to know their orientation. Thanks to a recently completed test flight, future spacecraft will be able to do so using only an ultra-low-power camera and three silicon wafers as small as your pinky fingernail.

"The wafers are actually very tiny gyros," explains Artur Chmielewski, project manager at JPL for Space Technology 6 (ST6), a part of NASA's New Millennium Program.



Compass is built as two separate assemblies, the camera-gyro assembly and the data processor assembly, connected by a wiring harness. The technology uses an active pixel sensor in a wide-field-of-view miniature star camera and micro-electromechanical system (MEMS) gyros. Together, they provide extremely accurate information for navigation and control.

Traditional gyros use spinning wheels to detect changes in pitch, yaw, and roll—the three axes of rotation. For ST6's Inertial Stellar Compass, the three gyros instead consist of silicon wafers that resemble microchips. Rotating the wafers distorts microscopic structures on the surfaces of these wafers in a way that generates electric signals. The compass uses these signals—along with images of star positions taken by the camera—to measure rotation.

Because the Inertial Stellar Compass (ISC) is based on this new, radically different technology, NASA needed to flight-test it before using it in important missions. That test flight reached completion in December 2007 after about a year in orbit aboard the Air Force's TacSat-2 satellite.

"It just performed beautifully," Chmielewski says. "The data checked out really well." The engineers had hoped that ISC would measure the spacecraft's rotation with an accuracy of 0.1 degrees. In the flight tests, ISC surpassed this goal, measuring rotation to within about 0.05 degrees.

That success paves the way for using ISC to reduce the cost of future science missions. When launching probes into space, weight equals money. "If you're paying a million dollars per kilogram to send your spacecraft to Mars, you care a lot about weight," Chmielewski says. At less than 3 kilograms, ISC weighs about one-fifth as much as traditional stellar compasses. It also uses about one-tenth as much power, so a spacecraft would be able to use smaller, lighter solar panels.

Engineers at Draper Laboratory, the Cambridge, Massachusetts, company that built the ISC, are already at work on a next-generation design that will improve the compass's accuracy ten-fold, Chmielewski says. So ISC and its successors could soon help costs—and spacecraft—stay on target.

Find out more about the ISC at nmp.nasa.gov/st6. Kids can do a fun project and get an introduction to navigating by the stars at:
spaceplace.nasa.gov/en/kids/st6starfinder/st6starfinder.shtml .

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

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.yahoogroups.com . You can also unsubscribe from the list here. To post messages to the list, please send them to abingdonas@yahoogroups.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

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

9th June 8pm Speaker meetings: Samuel George FRAS (University of Birmingham): Title TBA.

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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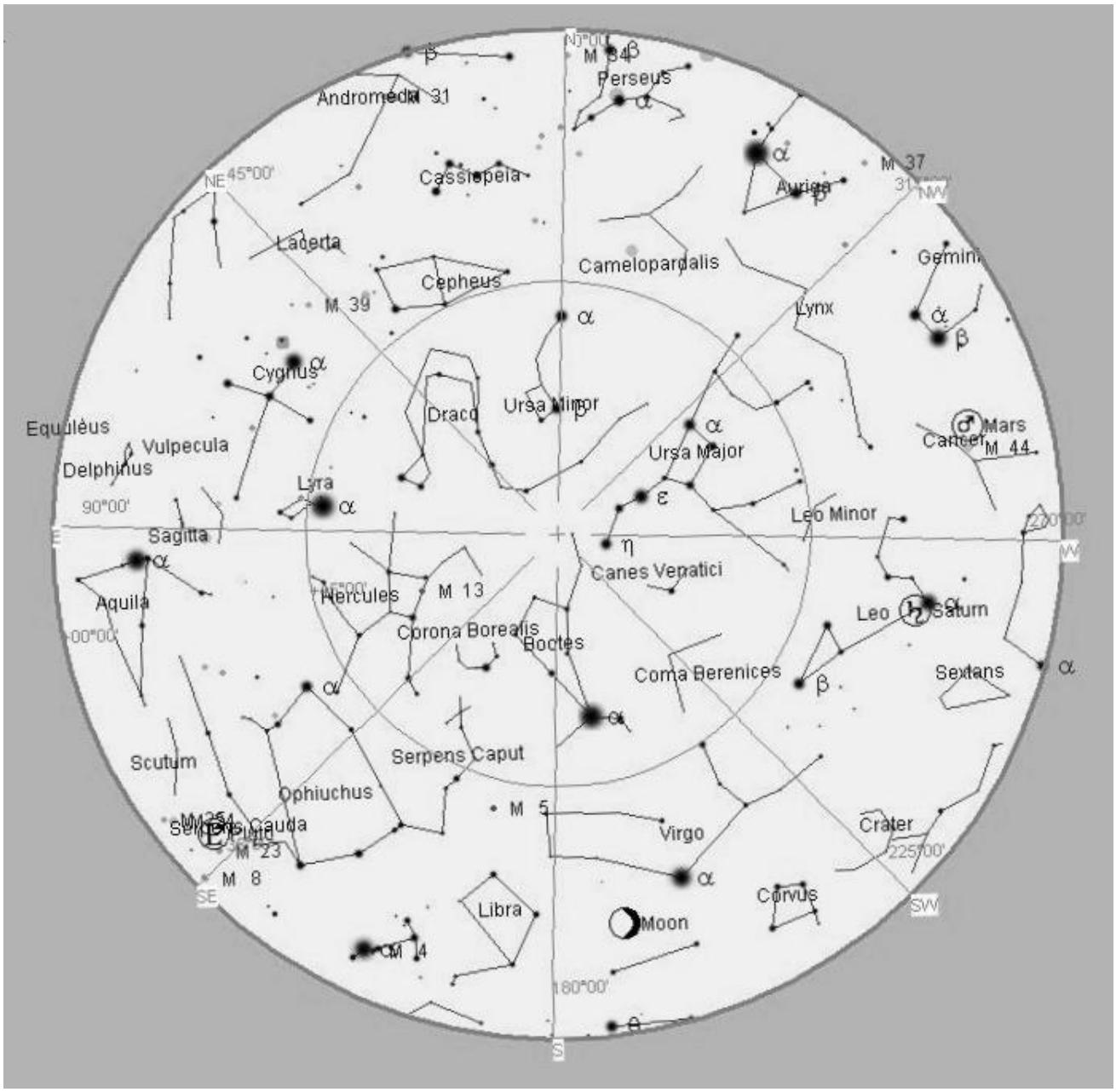
STAR CHART



The Night Sky at 11pm (BST) next Saturday (17th May)

Ursa Major is still overhead this month, its tail arching over to Arcturus, high in the south-east. East of Arcturus, look out for Saturn near the bright star Regulus in Leo.