New Zenith

The Monthly Magazine of the Vectis Astronomical Society

Vol 20 Issue 10 — November 2012

When Printed, this Newsletter costs VAS at least £1

Society News

VAS Equipment

We need to conduct an audit of VAS equipment over the next couple of weeks and this entails accounting for all equipment out on loan to members.

If you have anything belonging to the Society could you please arrange to return it to the observatory as soon as possible - extra loan periods may be possible after the audit has taken place.

I am particularly keen to recover the Sky Quality Meter as this is needed by the sub-committee working on the dark sky survey as part of the ongoing project into VAS plans for the future.

The Letters Page

My plea for letter to VAS last month has brought exactly no response which means there is no letters' page this month.

Brian Curd
Observatory Director

Hampshire Astronomy

Mike Wilson and Dave Woods from HantsAstro have just released another 2020 Astro Extra Time Podcast for September (Part 2), which covers the second part of the month.

2020 Astro podcast is getting great reviews and over 75% of the Extra Time downloads are in the UK. This tiny podcast is packed full of astronomy news for the South and your Groups events can also feature as part of the show. Just email the details to us and we'll see what we can do : ***mailto:podcast@2020astro.com***

We also run a nunber of 'Specials' in between - such as: the passing of Neil Armstrong and the Mars Curiosity Rover. These shows are getting thousands of downloads every month and we would like to thank all those that have contributed so far.

Extra Time is only about 5 minutes long and you can subscribe through iTunes via: ***http://itunes.apple.com/gb/podcast/2020-astro-extra-time/id549246613*** or you can download the mp3's direct from the 2020 astro website: ***http://www.2020astro.com***.

VAS Website: www.wightastronomy.org

Submissions or letters to New Zenith are always welcome and should be sent to:

The Editor New Zenith
35 Forest Road
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Sandown PO36 0JY

Tel: **01983 864303** or email: **editor@wightastronomy.org**

Material for the next issue by the 6th of the month please.

VAS Registered Office

35 Forest Road, Winford, Isle of Wight, PO36 0JY

Registered Charity No 1046091

Observatory Diary

Monday, 19.30hrs	**Members Only**. Telescope and night sky training. ***Contact Barry Bates 01983 872979***
Thursday, 19.30hrs	**Members and Public**. Informal meeting and observing.

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Monthly Meeting Calendar 2012

Friday meeting are held at the Parish Centre, Town Lane, Newport, IW, PO30 1JU. All mettings start at 19.30 hrs apart from August which is at 1900 to allow time for the business of the AGM.,

Travel for our monthly speakers is sponsored by:

Date	Subject	Speaker
26 Oct	Observing Galaxy Clusters	Owen Brazell
23 Nov	The Search for Intermediate Mass Black Holes	Dr Tom Maccarone

Monthly Meeting Calendar 2013

Date	Subject	Speaker
25 Jan	Mapping the Universe	Dr Rita Tojeiro
22 Feb	Galaxy and Mass Assembly	Dr Jon Loveday
22 Mar	Active Galaxies	Nick Hewitt
Apr		
May		
Jun		
Jul		
Aug		
27Sep	History of the Dark Sky	Alan Dowdell
Oct		
Nov		

All details correct at time of publication.

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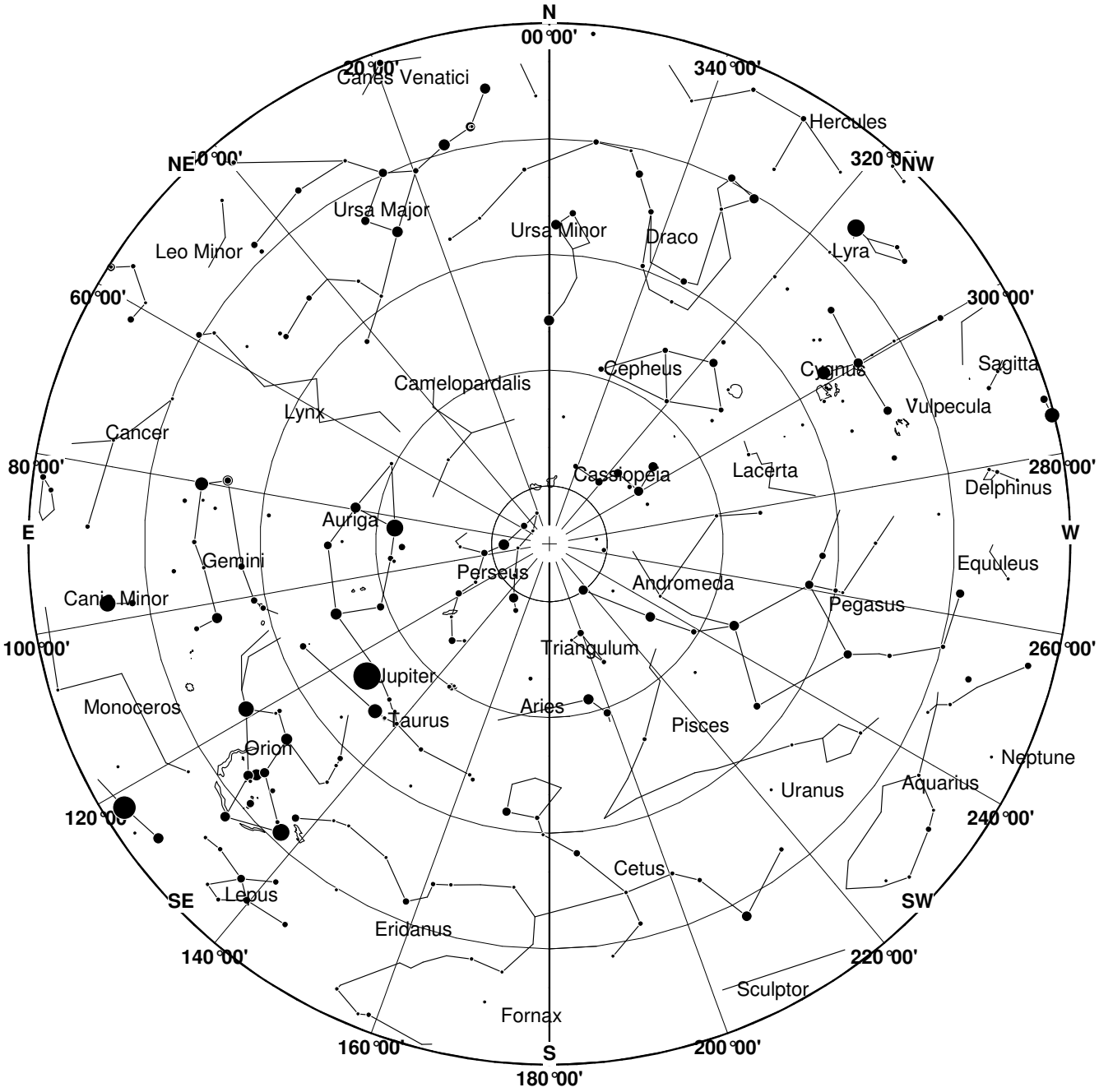
Others	**Barry Bates** **Mark Williams**

Nov-Dec Weather - Deep Joy!

As **November** develops it is set to offer the most extended dry period many of us in the UK will have witnessed since March 2012. The prominent theme to emerge will be one of anticyclonic calm, especially affecting northern and western regions. This type of configuration however will leave some areas open to attack from low pressure cells that will develop across Benelux and France; these have the potential to export wet and windy weather to eastern, central and southern regions – over upland areas this may turn to sleet and wet snow. November will end rather chilly, as temperatures overall approach the seasonal norm. It will be drier than usual for this month.

December will start with a cold feel as high pressure temporarily anchors down. Where it stays dry overnight frosts will become commonplace, accompanied by localised fog that may persist during the short daylight hours. There will be a continued risk of some sleet or snow across northern and upland areas, with perhaps a few southern incursions. With a change to perhaps milder conditions just before the festive period, Christmas itself may well see a colder phase of weather with a White Christmas a distinct possibility, perhaps even across southern quarters. The month looks likely to be wetter than average. Temperatures for December will reflect on or around the average.

November 2012 Sky Map



View from Newchurch Isle of Wight UK - 2300hrs - 15 November 2012

Messier 74 (also known as NGC 628) is a face-on spiral galaxy in the constellation Pisces. It is at a distance of about 32 million light-years away from Earth. The galaxy contains two clearly defined spiral arms and is therefore used as an archetypal example of a Grand Design Spiral Galaxy. The galaxy's low surface brightness makes it the most difficult Messier object for amateur astronomers to observe. However, the relatively large angular size of the galaxy and the galaxy's face-on orientation make it an ideal object for professional astronomers who want to study spiral arm structure and spiral density waves. It is estimated that M74 is home to about 100 billion stars.

November 2012 Night Sky

Moon Phases

New	1st Qtr	Full	Last Qtr
13th	20th	28th	7th

Planets

Mercury

Mercury is at inferior conjunction; between us and the Sun on the 18th. At the end of the month it starts to make an appearance in the morning sky.

Venus

Look to the east south east in the pre dawn sky and you will not fail to find Venus. If the sky is clear enough try following it until sunrise and see how long you can keep track of it while the Sun is in the sky.
On the 27th Venus and Saturn are in close conjunction, just over 0.5° apart. Viewing this will be something of a challenge with the sky brightening rapidly after the pair rise making it difficult to spot the much dimmer Saturn as it climbs away from the horizon.

Mars

Although Mars technically remains in the evening, it will be almost impossible to spot from our latitude being barely 10° above the horizon at sunset.

Jupiter

Almost as soon as the sky darkens Jupiter will be rising in the East making it the best placed of the bright planets for observation this month. On the night of the 1st and 2nd the Moon drifts by with the closest approach at about 01:00 with a separation of about 1.5°, closer stillon the 28th/29th also about 01:00 where the separation is about 1°.

Saturn

Saturn is now just starting to leave the glare of the Sun but is still too low down before the key becomes too bright for any serious observation.

Uranus

Uranus is well placed for viewing in the south at about 20:00. It lies below the left hand edge of the square of Pegasus. Follow the line from Alpheraz through Algenib into Pisces. Uranus is about 2° west of the magnitude 5.7 star 44 Piscium. At magnitude 5.8 Uranus is just on the limit of naked eye visibility for someone with good eyesight under dark skies. It is easily within reach for any binoculars or telescope.

Neptune

Neptune is less than 0.5° from magnitude 5.4 star 38 Aquarii on a line toward Iota Aquarii. There are no stars as bright as Neptune this close to the star so it should be relatively easy to spot. Neptune is magnitude 7.8. It is well placed in the south in the mid evening sky.

Meteors

- The Taurids is a shower having two rather broad peaks both lasting a few days. The first peak is on the 3rd and the second more favourable one is at new moon on the 13th.

- The The Leonid shower peaks on the night of the 17th /18th. This shower can give suprises with the occaisional short bursts of storm activity, though none is predicted for this year.

Deep Sky objects

M74 The Phantom Galaxy RA 1h 37m Dec 15° 50' mag 9.1

This low surface brightness face on spiral galaxy is probably the most challenging of all the Messier objects. With a large aperture telescope and dark skies detail can be glimpsed in the spiral arms.

M31 Galaxy RA 0h 43m Dec 41° 54' mag 4.5

Easily visible to the naked eye this galaxy is at least twice the width of the full moon and the largest member of the local group. It is seen as an oval smudge in the central northern part of Andromeda. Viewed from this galaxy our own Milky Way would look very similar if somewhat smaller.

In dark skies binoculars just show Andromeda's two companion galaxies, but a telescope is really needed to appreciate them. Through a small telescope the view of Andromeda is not that much better than binoculars, it is such a large object that it completely fills the field of view with anything other than very low magnification. A larger telescope will show the dust lanes and allow tracing out of the spiral arms.

M33 Galaxy RA 1h 34m Dec 45° 8' mag 7

M33 in Triangulum is one of a number of galaxies that shares the common name Pin Wheel. It is another member of our local group of galaxies, but somewhat smaller than the Milky Way being only 1/7 its size. This galaxy despite its relatively bright apparent magnitude its large size, about that of the full moon makes it very difficult to see. It can be glimpsed in our skies with a pair of 10x50 binoculars as a slight brightening of the background sky. A telescope of at least 8 inches diameter is needed to see any structure in the spiral arms, and then it can be difficult. Don't be put off by the difficulties it is a worthwhile object for observation.

Peter Burgess

Essays from a beginner: On seeing in colour

Normally this would be a good thing, but not in the middle of the night. Oh no. Not if you are an astronomer. Because if you can see green grass and red bricks and not fall over that sneaky little step in your front path, it means that the full Moon is wrecking your chance to observe on the ONE clear night of the month so far.

However, in this abomination of a summer I've been so starved of observing that I took the 10 inch dobsonian out anyway, and aimed it at the Moon. I should have known better. I was almost knocked over by the jet of photons which shot out of the eyepiece. The next few minutes were spent blinking alternate eyes to reassure myself that the assaulted eyeball was still working.

I screwed a neutral density filter into the barrel of the eyepiece, and tried again, wandering round the Moon and attempting to match features with names from a badly-organised memory. I missed the drama of the terminator; no razor-sharp shadows to throw mountains and craters up into three dimensions. And even with a filter, the image was so bright that I had after-images in my observing eye.

In this grumpy state I took out my cheap set of coloured filters. Would they make life easier? I started with the dark blue, which gave a rich and restful colour to the moonlight. Next the red. Yikes! - a baleful crimson Moon glared back. The pale blue filter didn't really look blue at all, but the green offered an illustration for a science fiction story, in which the Moon has myteriously sprouted lavish verdure. By now I was beginning to enjoy myself, so (serious astronomers look away now) I went for the nebula filter, and a beautiful turquoise beamed from the eyepiece.

I footled about for a while, swapping filters in and out and amusing myself with the optical consequences - for example, after using the green filter, my telescope eye saw the world in red (the complementary colour to green) while the other eye perceived 'normal' moonlit colours.

Gradually the relative value of the filters emerged. Dark blue was restful, mostly because I couldn't see much with it. Red was effective in revealing dark features, but overall lost out to the lighter colours. Green seemed to lose contrast between light and dark. I rejected the nebula filter with some reluctance, because it is such a lovely colour and did seem to make small dark features stand out well. The winner? Pale blue. It gave a slightly more contrasty view than the plain ND, I thought.

I did get a decent observation of Jupiter when it rose. And I definitely saw the Moon in a whole new light...

Rebecca Mitchelmore

For Sale

Baader Hyperion 8mm eyepiece 1.25inch.
Unscrew the bottom lens(effectively a x2 Barlow) and you have a 16mm 2inch eyepiece.
Multicoated, with adapter threads for afocal and projection photography built in.
In original box with leatherette case
Two for the price of one.
£45

Tony Williams 613428
tonykwilliams@btinternet.com

NEW YEAR'S DINNER

19th January 2013 is the provisional date for the VAS New Year's Dinner. Arrangements are being made as I type this.

If you are interested in attending, please contact Bryn Davis for up-to-date information

chairman@wightastronomy.org

CHRISTMAS TREE FESTIVAL

Following last year's VAS entry, Elaine Spear is organising a repeat. If you are interested in decorating our tree this year on Tues 3rd & 4th December, please contact Elaine directly.

progorg@wightastronomy.org

Split-Personality Elliptical Galaxy Holds a Hidden Spiral

Cambridge, MA *- Most big galaxies fit into one of two camps: pinwheel-shaped spiral galaxies and blobby elliptical galaxies. Spirals like the Milky Way are hip and happening places, with plenty of gas and dust to birth new stars. Ellipticals are like cosmic retirement villages, full of aging residents in the form of red giant stars. Now, astronomers have discovered that one well-known elliptical has a split personality. Centaurus A is hiding a gassy spiral in its center.*

"No other elliptical galaxy is known to have spiral arms," said lead author Daniel Espada (National Astronomical Observatory of Japan & Harvard-Smithsonian Center for Astrophysics). "Centaurus A may be an old galaxy, but it's still very young at heart."

Centaurus A isn't your typical elliptical to begin with. Its most striking feature is a dark dust lane across its middle - a sign that it swallowed a spiral galaxy about 300 million years ago.

Centaurus A slurped that galaxy's gases down, forming a disk that we see nearly edge on. From our point of view, any features in that disk have been hidden by the intervening dust.

To tease out the disk's structure, Espada and his colleagues used the sharp vision of the Smithsonian's Submillimeter Array. This radio telescope can see through dust to pick up signals from naturally occurring carbon monoxide gas. By mapping the gas, the team unveiled two distinct spiral arms within the galaxy's core.

These gaseous tendrils have sizes and shapes similar to spiral arms in galaxies like the Milky Way. Also like the Milky Way's spiral arms, they are forming new generations of stars.

"Centaurus A has been given a new lease on life by that past merger," said Espada.

Computer simulations suggest that the spiral features might endure for hundreds of millions of years to come.

Although Centaurus A is the first elliptical galaxy found to have spiral arms, it may not be the last. Since it's only 12 million light-years away, it's relatively nearby and easy to study. The Atacama Large Millimeter/submillimeter Array (ALMA) potentially can find more split-personality galaxies with its improved radio "vision."

"We definitely will use ALMA to search for other objects that are similar to Centaurus A," added Espada.

These findings were published in The Astrophysical Journal Letters and are available online.

Headquartered in Cambridge, Mass., the Harvard-Smithsonian Center for Astrophysics (CfA) is a joint collaboration between the Smithsonian Astrophysical Observatory and the Harvard College Observatory. CfA scientists, organized into six research divisions, study the origin, evolution and ultimate fate of the universe.

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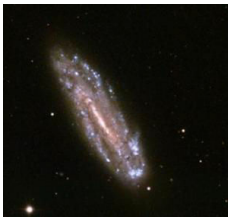
Revealing a Mini-Supermassive Black Hole



ScienceDaily (Oct. 24, 2012) — One of the lowest mass supermassive black holes ever observed in the middle of a galaxy has been identified, thanks to NASA's Chandra X-ray Observatory and several other observatories. The host galaxy is of a type not expected to harbor supermassive black holes, suggesting that this black hole, while related to its supermassive cousins, may have a different origin.

The black hole is located in the middle of the spiral galaxy NGC 4178, shown in this image from the Sloan Digital Sky Survey. The inset shows an X-ray source at the position of the black hole, in the center of a Chandra image. An analysis of the Chandra data, along with infrared data from NASA's Spitzer Space Telescope and radio data from the NSF's Very Large Array suggests that the black hole is near the extreme low-mass end of the supermassive black hole range.

These results were published in the July 1, 2012 issue of The Astrophysical Journal by Nathan Secrest, from George Mason University in Fairfax, Virginia, and collaborators.

More at: ***Science Daily***

The Future is out of this world

Lecture Report 28 September 2012

Dr. Stuart Eves

SSTL (Surrey Satellite Technology Ltd)

Making predictions can be erratic - like pouring tea from a pot before teabags came into fashion - if a floating leaf called a 'stranger' appeared, it was placed on one hand and banged with the other until it stuck to the upper hand: the number of bangs predicted the number of days for a stranger to visit. Ken Gatland, in 1971, designed PG Tips tea-cards, illustrating 'Man's first 50 steps into the Universe' predicting the future with the last ten cards. Looking back to these times, in this well attended, clearly illustrated and very informative presentation, the lecturer outlined the four sections of his talk, beginning with the fun of discussing and awarding marks for the accuracy, or otherwise, of these tea-card predictions.

Brooke Bond tea-cards "The Race into Space"

Last ten cards (numbered 41 to 50) with marks awarded :-

41. A future European Launch Vehicle, 10/10.

42. A Lunar Rover but without an upside-down umbrella aerial, 8/10.

43. Skylab, 8/10.

44. Viking as described 4 years before launch, 10/10. 45. Manned Space Station, 12-man came much later, but would be International, 3/10.

46. Winged vehicle, 5/10.

47. Grand Tour of the planets trajectory, different planet combination, 8/10.

48. Lunar Shuttle, 0/10.

49. Moon Base, 0/10 (1976 was the last soft landing, Russian Lunar 24).

50. Manned flight to Mars, 0/10.

Overall score, with no mention of the Hubble Space Telescope, 52%.

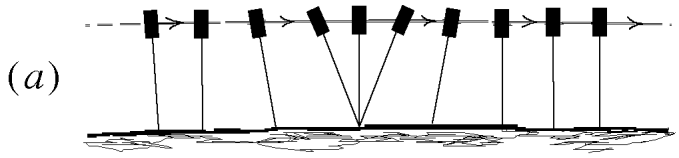
The caveat - "it is difficult to predict the future".

Terrestrial Applications of the Tactical Optical Satellite, TopSat.

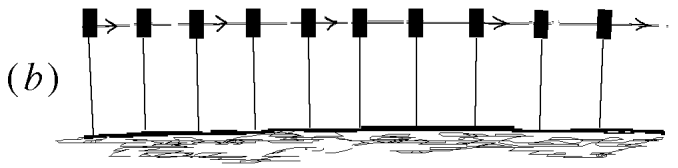
Built at SSTL, Guildford, it holds the world record in resolution per kg. Quite a few facts came together, indicating the distinct advantages of low orbit satellites, placing them really into a class of their own, these are:-

- Low altitude satellites are closer to their visual targets, improving the resolution and gathering more photons. With shorter orbital periods they have faster global coverage.

- Being small and manoeuvrable, travelling at 7.5 km/sec, they can pitch forward and back, getting 8 seconds to view a given terrestrial point, see *Sketch 1*(*a*) - better than a standard image acquisition of 2 seconds, see *Sketch 1*(*b*).



Sketch 1



- They need less launch energy than higher altitude satellites.

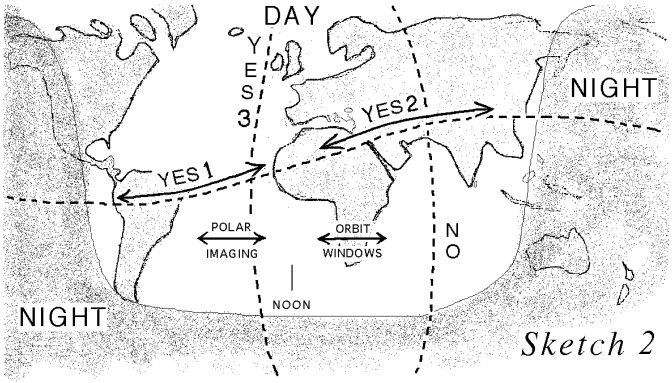
- They are cheaper.

- They provide a unique data set over large footprints.

- No deorbit manoeuvres are needed - they burn up after several years, leaving no space debris.

- Being lower over land targets, they are less affected by reflected light from the sea, and they cope far better with changing light than 'normal' satellites. This means they have enhanced time windows for obtaining images of a chosen region. For an approximate interpretation of the diagrams seen, see Sketch 2, where noon is the Greenwich meridian: 'YES 1' and 'YES 2' represent the parts of the orbit where imaging is done. 'YES 3' indicates a normal (high altitude) polar orbit satellite taking images down a north-south direction. The pairs of double arrows labelled "POLAR ORBIT IMAGING WINDOWS" indicate the 1.5 hr longitude ranges for optimal imaging by

normal polar orbit satellites, relative to noon. 'NO' indicates a polar orbit for a normal satellite where the Sun is too low for imaging (so it's doing something else). As the Earth rotates and it is oblate, this enables polar orbit satellites to precess retrogradely (this works for Mars too, but not for spherical Venus) and keep pace with the Sun. It appears that these 'sun-synchronous' imaging satellites must be clustered each side of local noon, so optical imaging of regions near the equator by satellites that spread out most in this region is sparse - they give far better coverage of polar regions. But TopSat can be launched on low inclination orbits, selected to give many more passes per day of a low latitude region, and with advancing CMOS technology, opportunities for observing into the night become possible.



- Their manoeuvrability provides novel methods of image collection. These include:

  + target to target
  + point imaging
  + strip imaging
  + stereoimaging with a second image
  + tracking with more images
  + low elevation imaging, suitable for the ocean, giving bigger image footprints but not for land due to obscuration.

- Small satellite constellations, like five in a common plane, can give continuous imaging opportunity anywhere on the globe.

Radar

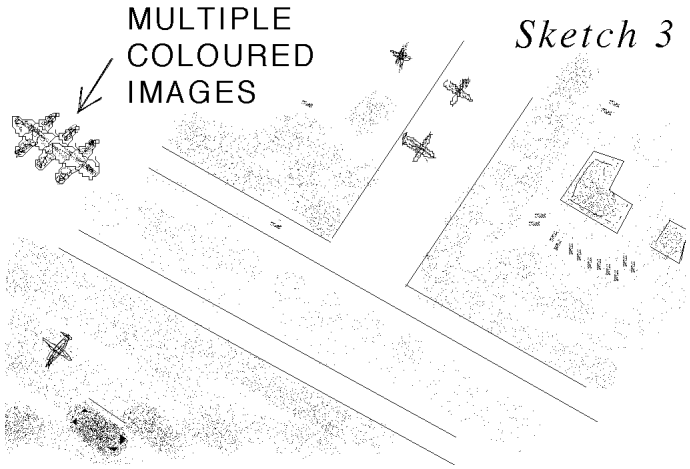
One third of the time, on average, cloud gets in the way, so Synthetic Aperture Radar SAR and multi-polarimetric (giving colour) imaging is being developed and demonstrated on aircraft. SAR works by a radar pulse being sent by the craft, then receiving echoes in various positions as the craft moves. By summing the individual echoes, the moving craft effectively synthesizes a bigger aerial giving superior resolution.

Images seen included:

i. A clear image of central London made in the poor light of December 2005, despite some cloud cover.

ii. Ship detection and identification in the Solent using SAR superimposed on AIS (Automatic Identification System, try Googling "AIS Wight" to see data on nearby ships). The large forts showed up with radar but they have no AIS.

iii. Salt Lake City airport, featuring an aircraft and its shadow, *Sketch 3*. The coloured images being 0.2 sec apart, enabled calculation of the plane's velocity, this one was 145 mph. This matched the sort of aircraft it turned out to be - a military type landing at 150 mph.



The next generation satellites, will advance from being able to image the land surface area, covering one third of the globe, once per day, to imaging the entire ocean as well, down to a resolution of 2.5 metres (vehicles on roads can be seen). This depends on Moore's law - IBM are developing a processor ten times faster and consuming ten times less power, "for the next generation of games". Intersatellite links will enable images to be returned fast, with joystick camera control. More data is available on ***www.sstl.co.uk*** - see their recent SSTL 300 S1 imaging system.

Enhanced platform capabilities and the super resolution mode use a long linear CCD, covering one axis at 90° to the travel direction, the motion of the spacecraft builds the other axis. A yaw places the long CCD at an angle to the direction of travel, seeing points more than once, enabling image nesting with a 40% improvement in resolution. Ultra-high resolution systems with 5 RGB detectors at the back of the craft, giving 15 images, has application as an image service with high commercial potential, for agriculture, forests, farming, land surveying and so on, raw imagery costs 0.2$/km^2.

STRaND is a small satellite 10x10x30cm, using a smartphone as an onboard computer, designed with the Surrey Space Centre SSC, of Surrey University, for launch before Xmas. It exemplifies the fast moving modern world "from idea to reality in one year" using off-the-shelf items.

The Langton Ultimate Cosmic ray Intensity Detector, LUCID has been developed at Langton Grammar School, near Canterbury, using Medipix detectors obtained from CERN. Dr. Becky Parker at the Langton Star Centre at the school is the teacher behind this project and SSTL will fly it on their TechDemoSat. It will yield directional information on cosmic rays. World-leading science is done at this school, and it supplies 1% of UK's physicists and engineers (see "LUCID" on Wikipedia and ***www.thelangtonstarcentre.org***).

Exploration by humans or robots?

Robots can visit a lot more places than humans, like Venus - impossible for humans with its red-hot sulphuric fumes. For the same cost as going to Mars, fleets of robots can be sent. The lecturer does not expect humans to arrive there in his lifetime. Robots don't die on the way. The Apollo astronauts were lucky, one peak of solar radiation near that time was strong enough to kill. Robots don't have to live in a hole, and they don't get through several kg of food, water and air per day. Cosmonauts on Mir spent all their time keeping it running, rather than doing science. Space is not a great environment for humans. Robots are not limited by human senses. Planets explored by robots can be protected from biological contamination more easily. Already the non-contamination protocol (the UN Outer Space Treaty) has failed for the Moon - the Surveyor landed there before man, and its camera was found to contain viable bacteria. Robots can stay much longer than expected, humans can't. Robots don't need to come home... and they're cute!

The Future

Space debris is becoming a problem, an Iridium satellite and Russian Cosmos have already collided, and a boom got chopped from another spacecraft. To avoid a cascade of collisions, a clean-up operation will be needed. In the meantime, launching to higher than 500km where the drag is too low to sort the problem out naturally, needs to be avoided. This is possible using lower orbit satellites with less lifetime.

Forecasting earthquakes: there is evidence that the Earth's mantle when under increasing pressure deposits positive charge on Earth's surface prior to an earthquake, affecting the ionosphere, which can be studied with low orbit satellites.

Meteorology: There is much interest in 'sprites' and 'elves' - these very puzzling luminous phenomena occur high above thunderstorms, releasing gamma rays and possibly em radiation.

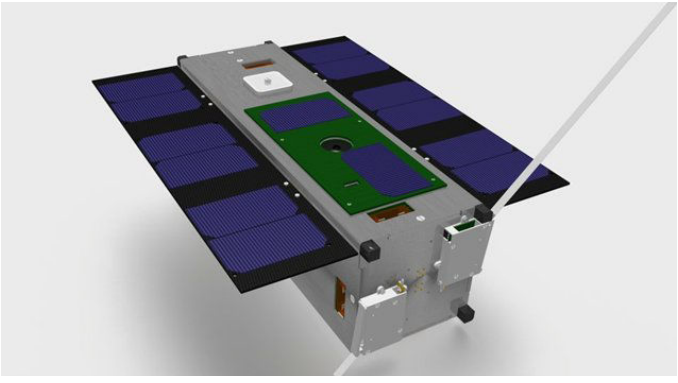
Reconfigurable spacecraft may be constructed to find out more about the planets and their moons, like why does Europa remain white with a dark substance appearing in the fractures in its water-ice. A hydrobot could investigate, or the answers obtained using low frequency sound probing. Did Mars obtain water before Earth did, and did bacterial life evolve there and then travel to Earth? – and so on, robots are suitable for studying *many* such questions.

Brief mention was made of inflatable space hotels and spacecraft protected by magnetic plasma bubbles. But as the tea-cards illustrated, the future is hard to predict...

Discussion covered ship identification and the 'good guys who use the system'. TopSats can be seen in the sky, but near magnitude 10, optics are needed; you need to know where to look using websites like 'heavens-above' or 'see-sat,' but the timing can't be predicted due to drag. One VAS member asked - "why do these spacecraft have solar panels fixed to the body and aren't deployed on wings?" – reason – solar panel wings vibrate and don't allow rapid manoeuvres, needing more torque to turn the craft. These satellites "have the dynamics of a brick". Attitude control uses orthogonal wheels, accelerated up or down giving fast reaction torques without using propellant. Small torques are obtainable with current in a wire loop reacting with the Earth's magnetic field. An aluminium box of 1.5mm wall thickness, screens the electronics from solar protons and electrons, but cosmic rays need a yard of lead - so error detection and correction is used. Operating licences are needed for satellites. 30-metre resolution earlier satellites gave views of craters caused by nuclear tests in a valley in southwest USA. Another VAS member wanted to know more about how SSTL developed in relation to Astrium, involving history going back to its origins in Surrey University in the 1980s. Astrium has platforms in Portsmouth for transmitting and receiving for the huge Geostat - big enough to contain all the 30 satellites, built by SSTL with its staff of 500 people. The relationship with Astrium enabled SSTL to grow.

TopSat is exhibited in the **Science Museum**.

Dr.Guy Moore



THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

VISTA creates largest-ever catalog of center of the Milky Way

This gigantic data set is a major step forward for understanding our home galaxy.

By ESO, Garching, Germany — Published: October 24, 2012

Using a whopping nine-gigapixel image from the VISTA infrared survey telescope at the European Southern Observatory's (ESO) Paranal Observatory, an international team of astronomers has created a catalog of more than 84 million stars in the central parts of the Milky Way. This gigantic data set contains more than 10 times more stars than previous studies and is a major step forward for the understanding of our home galaxy. The image gives viewers an incredible, zoomable view of the central part of our galaxy. It is so large that, if printed with the resolution of a typical book, it would be 30 feet (9 meters) long and 23 feet (7m) tall.

"By observing in detail the myriad stars surrounding the center of the Milky Way, we can learn a lot more about the formation and evolution of not only our galaxy, but also spiral galaxies in general," said Roberto Saito from the Pontifical Catholic University of Chile and the University of Valparaiso.

Most spiral galaxies, including the Milky Way, have a large concentration of ancient stars surrounding the center that astronomers call the bulge. Understanding the formation and evolution of the Milky Way's bulge is vital for understanding the galaxy as a whole. However, obtaining detailed observations of this region is not an easy task.

*More at: **Astronomy.com***

NuSTAR reveals flare from Milky Way's black hole

These data will help scientists better understand why our black hole sometimes flares up for a period of time.

By Jet Propulsion Laboratory, Pasadena, California, NASA Headquarters, Washington, D.C. — Published: October 24, 2012

NASA's newest set of X-ray eyes in the sky, the Nuclear Spectroscopic Telescope Array (NuSTAR), has caught its first look at the giant black hole parked at the center of our galaxy. The observations show the typically mild-mannered black hole during the middle of a flare-up.

"We got lucky to have captured an outburst from the black hole during our observing campaign," said Fiona Harrison from the California Institute of Technology in Pasadena. "These data will help us better understand the gentle giant at the heart of our galaxy and why it sometimes flares up for a few hours and then returns to slumber."

NuSTAR, launched June 13, is the only telescope capable of producing focused images of the highest-energy X-rays. For two days in July, the telescope teamed up with other observatories to observe Sagittarius A* (Sgr A*), the black hole at the center of the Milky Way. Participating telescopes included NASA's Chandra X-ray Observatory, which sees lower-energy X-ray light, and the W. M. Keck Observatory atop Mauna Kea in Hawaii, which took infrared images.

*More at: **Astronomy.com***

Observatory

For your own safety, when visiting the VAS observatory, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

Articles Needed

New Zenith welcomes letters, articles or pictures related to all aspects of astronomy. Contributions to the Editor at the email or postal address on the front page.

"It is the mark of an educated mind to be able to entertain a thought without accepting it"
Aristotle

Quotations

"If you're not confused, you're not paying attention"
Tom Peters

"Before I came here, I was confused about this subject. Having listened to your lecture, I am still confused -- but on a higher level"
Enrico Fermi

"The funny thing is, that everything in life is figured out, except how to live it"
Anonymous