

Wadhurst Astronomical Society Newsletter March 2013

THE SOCIETY'S NEW CONSTITUTION

It has been a long time since the Society's Constitution was written and at a recent Committee Meeting it was felt that a new one should be drawn up. This has been done but must first be agreed by members of the Society. It will be available at the June meeting for members to see and make any comments or suggestions and finally vote on its acceptance if agreed.

MEETINGS

FEBRUARY MEETING

The meeting was opened by Phil Berry who asked if any members had had more luck than him in counting the number of visible stars in the bounds of Orion as part of the Campaign for Rural England's clear sky survey. Most of the nights had cloud cover, but he managed one night and counted 21 stars. Also, no one had been able to observe the Near Earth Flyby of Asteroid 2012 D14, again due to cloud.

A note in the Parish Magazine said that the council were adopting the Dark Sky Survey document that Phil had worked on for so long and future street lighting planning will use it for years to come to improve the skies around Wadhurst. Well done Phil!

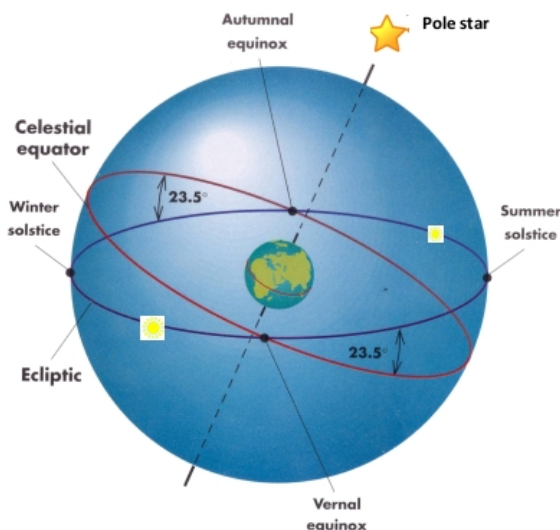
Subscriptions were now due and Phil mentioned that our Treasurer was ready to receive them.

Phil then introduced tonight's talk by our own Jan Drozd who has given us a number of enjoyable and informative talks in the past.

Astronomy, Astrology, Aliens and Pyramids

Jan Drozd

In November, Jan gave a talk called "Early Pioneers of Astronomy" in which he described how beliefs and ideas influenced the development of astronomy. In this talk, he said he would look further into what he called the pseudo-science side of astronomy, also saying that he regarded astrology as absolute baloney and tentatively asked if everyone agreed, to which one member of the audience said he would have to consult his stars...



Briefly Jan looked at the celestial sphere where the Earth is in the centre of an imaginary sphere, and showed the ecliptic, the solstices, the tilt of the Earth and precession. Not all early astronomers were aware of them.

It was Sir Norman Lockyer (1836 – 1920), a British astronomer studying ancient Egyptian astronomy who broke down ancient astronomy into three distinct phases; The Worship Phase, The Practical Stage used for agriculture and navigation, and The Present Stage where the study of astronomy is solely to gain knowledge.

Jan said that in the Worship Stage, alignments of buildings such as Stonehenge suggested that they were used for astronomical and religious purposes and that the priests would have been astronomer/astrologers. A good example of deliberate alignment is Newgrange burial mound in Ireland where a "window" is so aligned that the sun shines through it and down a long passageway only on the winter solstice.

A new discipline called archaeoastronomy is the study of archaeology and its relationship to astronomy such as the Giza pyramids. Jan said this was a new and serious study, but then he looked at some recent theories based on pure fantasy, in particular those of Erich Von Däniken who suggested in a number of books he wrote in the 60s that astronauts visited the earth thousands of years ago and asked is there evidence of a prehistoric airfield in the Andes?

We reflected on these books and their "sloppy" thinking followed by a critical look at these theories in a book by Carl Sagan, "The Space Gods Revealed" Sagan, a renowned American astronomer and astrophysicist, went on to say he hoped Däniken's books would be used in High Schools as examples of sloppy thinking.

It is found that the Giza pyramids line up with the north-south line and this has attracted a great deal of interest. In the 90s, Hancock and Bauval wrote books with a theory correlating the building of the Giza pyramids with the constellation of Orion. They suggested that the pyramids lined up with the three stars in Orion's belt, but for this to hold, the construction of the pyramids would have to be based on a plan for 10,500 BC when the Sphinx was said to have been built. Taking precession into account, at dawn on the spring equinox, the Sphinx would have looked directly at its counterpart in the sky; Leo. Also at the same time, at exactly 45° from the north-south line of the pyramids, a line points accurately to Orion's belt.

Jan said that carbon dating had thrown considerable doubt on timing of the building at Giza, and the two writers had been highly selective in the choice of structures they used.

Hancock and Bauval believe that an ancient advanced civilisation existed but now vanished, had influenced a global network of ancient monuments, mapping the constellations on the ground or being linked to the stars in other ways. In a BBC Horizon programme Graham Hancock presented his theories and refers to the ancient civilisation which may have been destroyed in 10,000 BC and might suggest that he was talking about Atlantis, although he doesn't name it.

After the broadcast, there were many criticisms such as no hard evidence, some of the angles were not a perfect match as claimed, the vernal equinox in 12,500 BC was in Virgo and not in Leo and in any case, the names of the constellations of the zodiac were not known then but originated in Mesopotamia much later.

A later Horizon programme; "Atlantis reborn again", made after complaints by Hancock and Bauval that their ideas were

not presented correctly, although the Broadcast Standards Board said the original programme was correct in all but one claim about the pyramids and Orion line which is still in contention. But Jan did mention one amusing demonstration from the later broadcast. In New York, if points representing Grand Central station, New York Public Library, Macey's, Madison Square Gardens, The Post Office, a theatre, a university, Times Square, The Rockefeller Centre and a police station, all monuments in Manhattan, the pattern would draw out the constellation of Leo!

Andrew Collins wrote another book, the Cygnus Mystery, in which he suggests that the stars in Cygnus are a much better fit with the pyramids. Jan mentioned professor Magli at Cornell University who has done considerable creditable work and is convinced that the Giza pyramids do show that astronomical alignments were important to the builders.

Jan moved on to the formation of the Solar System using useful video clips. He showed why the ancient astronomer/astrologer chose the twelve zodiacal constellations as the Sun on the Ecliptic appeared to move in front of them using the Vernal (Spring) Equinox as the starting point.

To the ancient astrologers, the movement of the planets crossing into another constellation was very important. The astrologers found a number of problems because they hadn't realised that the constellations were slowly moving out of position due to precession where the Earth rotates round a 23.5° axis in a 26,000 year period. Today, the ancient Zodiacal Constellations are no longer in alignment and this has caused all sorts of problems to some modern astrologers said Jan.

We now looked at the ancient astronomers. At the time of Ptolemy, the names of the zodiac were rationalised and remain today, although a thirteenth constellation has been added recently because of precession. Ptolemy wrote books on both astronomy and astrology. Even as late as the seventeenth century astrology and astronomy were linked, astrology often being the main source of income for men like Kepler and Galileo. It was not until the end of the seventeenth century that astronomy became regarded as a separate discipline.

At the beginning of the eighteenth century the Indian's built geometrical devices for measuring time, predicting eclipses tracking stars and ascertaining the positions of the planets in the sky. Jan showed some of the remarkable structures at Jaipur where he recently visited with his wife.



In conclusion Jan said how astrology had separated from astronomy and become a source of modern horoscopes whereas astronomy has separated into a respected science.

Jan showed a video demonstrating precession downloaded from Milan Planetarium from:

www.mag-vice.com

There are a number of very interesting free clips available on this site and is well worth a visit.

John Wayte's Scientific Snippets

A Near Earth Asteroid, 2012 D14 passed the Earth on Friday 15th of February, but was knocked off the headlines by the landing of a meteor in Russia and John came up with a few nuggets not generally known about the meteor:

- It landed in the Chelyabinsk Region
- According to Russians, the size was about 10 tonnes but NASA claims it to be nearer 10,000 tonnes and some 55 ft. wide. So who do you believe?
- It released 500 kilotons of energy (Hiroshima was 12 – 15 kilotons)
- It was travelling at 19 miles per second (58,400 MPH)
- The meteor is an ordinary chondrite, it is a stony meteorite containing some 10% iron
- It is likely to be called the "Chebarkul meteorite"
- It generated a 6 ft. wide crater near a lake and apparently 6 divers have been searching the lake bed for fragments
- Some 1,200 people were injured by flying glass as they looked out of their windows to see the fireball in the sky only for the windows to be shattered by the following sonic boom. Is there a moral here?
- These events are fairly rare but Russia does seem to have its fair share of the big ones with the last one being in Siberia in 1908 when 2,000 square Km were devastated

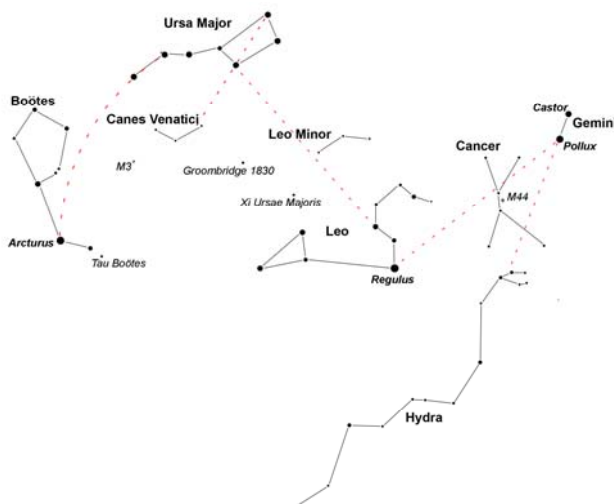
John asked if anyone had seen the recent asteroid 2012 D14 but everyone said the weather was too cloudy. Again John had found a number of facts:

- D14 is very small but if it had hit the Earth then an area of 750 square miles could have been devastated
- Its closest approach was 17,150 miles over Indonesia
- This distance is within the orbit of many communication satellites
- It has a diameter of about 50 metres and would weigh about 130,000 tons

Finally John asked what is the difference between an asteroid and a meteor? An asteroid he said, never hits the Earth but a meteor does. In other words If a chunk of rock is whizzing by in space and never hits the Earth then it is always an asteroid but if subsequently in a few years its course alters and it hits the Earth, then the same rock is a meteor. Simple!

Basic Constellation Recognition

This month, Brian Mills looked further into winter constellation recognition and a few other objects of interest on the way.



From the Plough, continuing along a path from the handle we come to a bright star, Arcturus, part of the constellation of Boötes.

Well over to the right, drawing a line down from Castor and Pollux, the Twins, we come to the constellation of Cancer with M44, a fairly bright open cluster. Also from the Twins and below Cancer is a small group of stars which make up the head of Hydra the water-snake which as Brian says, continues well below the horizon.

Using the front two stars of the square of the Plough, a line down brings us to the constellation of Leo with the bright star Regulus. Half way between the Plough and Leo is a fainter group of stars forming the constellation of Leo Minor, and to the left of this is a small group of faint stars, Canes Venatici.

Between Leo Minor and Canes Venatici is a star called Groombridge 1830, once thought to have the greatest proper motion of any star. This was discovered by Stephen Groombridge who lived at Goudhurst. Brian said there are now known to be two more stars that have been discovered more recently that have even greater proper motion.

Just below Groombridge 1830 is Xi Ursae Majoris which was the first binary star system to be discovered and was found by Herschel. It was a few years later that a French astronomer was able to say what the actual period was.

To the left of Groombridge 1830 is M3 which Brian said is a good binocular object containing something like half a million stars.

Close to Arcturus is Tau Boötes, one of the first systems found to have an exoplanet going round it and was discovered using what is called the radial velocity method where the Fraunhofer lines move and this can be measured. The lines would be shifted towards the red end as the star moves away from us and blue as the star comes towards us.

Brian then gave the Sky Notes for March which can be found later in the Newsletter.

MARCH MEETING

Wednesday 20th March 2013. Dr. David Mannion gives a talk entitled "Cosmology Revealed"

Meetings begin at 1930 although members are invited to arrive anytime after 1900 as this is a good time to exchange ideas and discuss problems and also relax before the meeting.

The venue as always is held in the Upper Room of the Methodist Church at the east end of Wadhurst Lower High Street, opposite the entrance to Uplands College. (For those with SatNav – the post code is TN5 6AT)

Anyone is welcome but non-members are asked if they wouldn't mind contributing £2 towards costs.

FUTURE MEETINGS

Wednesday 17th April 2013 – "The Sky at Night", a talk about the programme given by the BBC producer.

Wednesday 15th May 2013 – Professor Louise Harra will be speaking about the Sun. "Solar Activity – Are we at a Maximum?"

Wednesday 19th June 2013 – Open Evening. An evening to look at and talk about telescopes.

Wednesday 17th July 2013 – John Vale-Taylor gives a useful talk; "Astrophotography on a Shoestring".

OTHER NOTES AND INFORMATION

ANNUAL SUBSCRIPTIONS

We have now entered the Society's new session, and again, the subscriptions remain the same as in previous years.

Membership for the year is still £15.00 and £20 for two members within the same family at the same address. Children and students under 17 are free and always welcome.

Subscriptions can be made at the meetings, preferably by cheque payable to "Wadhurst Astronomical Society" or can be posted to our Treasurer, Michael Wyles at:

31 Rowan Tree Road
Tunbridge Wells
Kent
TN2 5PZ

Visitors to meetings are asked to donate £2 as a contribution towards costs.

SKY NOTES FOR MARCH

Planets

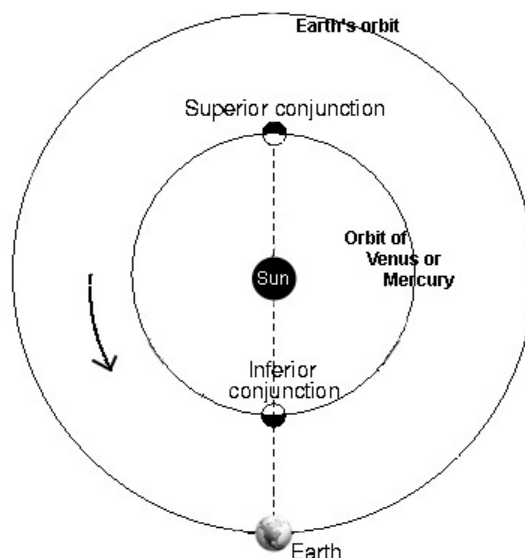
Mercury suffers an inferior conjunction on March 4th after which it moves west of the Sun to become a morning object. However, because of the shallow angle that the ecliptic makes with the horizon on March mornings, even at the time of greatest elongation (March 31st) the planet will only be 5° high at sunrise. This makes it impossible to observe Mercury from the UK during this apparition.

Venus is heading towards a superior conjunction on March 28th and is also not suitable for observation this month.

The diagram shows the positions of either of the inner planets during both types of conjunction. In both instances the three bodies (Earth, Sun and either Mercury or Venus) are all in line. At superior conjunction the planet in question is on the far side of the Sun whilst at inferior conjunction it lies in between the Earth and Sun. It is at this time, if the positional conditions are right, that we would see a transit which as we know occur only very rarely. This is because the Earth, Mercury and Venus do not have *exactly* the same plane of rotation although the variation is only a few degrees. This means that most of the time when Mercury and Venus reach inferior conjunction the line up is not precise and the planet in question appears to pass either above or below the disk of the Sun.

The next transit of Venus is more than one hundred years away and will occur on December 10th/11th 2117. However there are transits of Mercury that occur on May 9th 2016 and November 11th 2019.

Superior/inferior conjunction

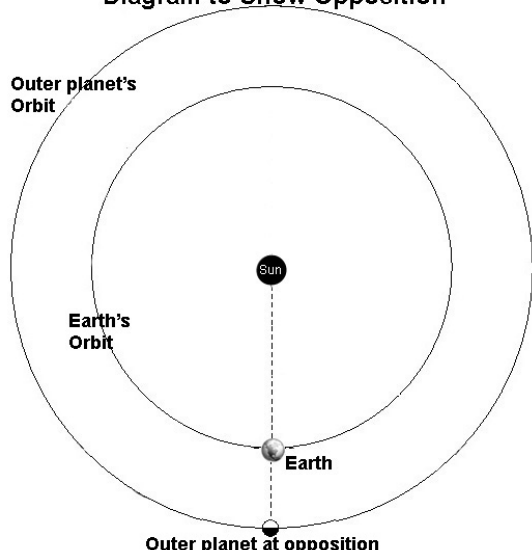


Earth reaches the Vernal (Spring) Equinox on March 20th at 11.02 hrs GMT. At that moment the axis of the Earth points neither towards nor away from the Sun or, in more general terms, we say that day and night are of equal length. On this date the Sun rises exactly in the east and sets exactly in the west.

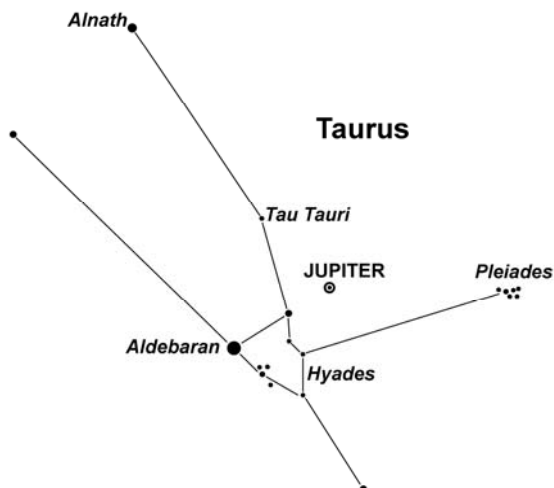
Mars will be in conjunction with the Sun on April 18th and is therefore not visible during March.

Planets whose orbits lie outside that of the Earth can be described as being in conjunction with the Sun when the three bodies (Earth, Sun and the planet in question) are in a straight line with the Sun in the middle. This is effectively the same as the superior conjunction described above for Mercury or Venus. However, it is impossible for the outer planets to reach inferior conjunction because they can never lie between the Earth and Sun. When the three bodies are in a line with the Earth in the middle we say the outer planet (Mars, Jupiter, Saturn, Uranus or Neptune) is at opposition. In other words it is opposite the Sun in the sky. At that time it is visible all night because it rises as the Sun sets and vice versa in the morning.

Diagram to Show Opposition



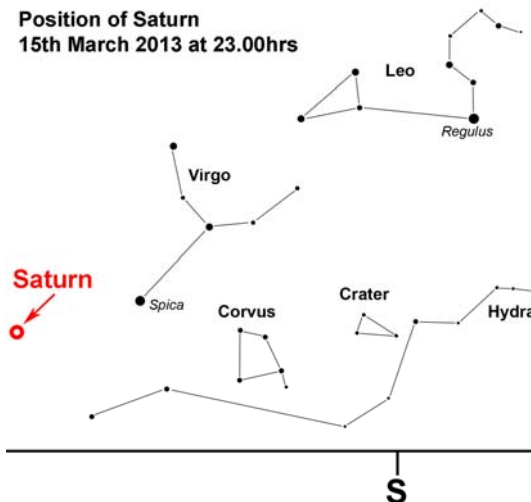
Jupiter is still a brilliant object in Taurus at magnitude -2.2, although its period of visibility is drawing to a close. At the start of the month it sets at 01.30 GMT but at the end of the month it sets at midnight BST. Its position is shown in the map below.



Saturn is now an evening object rising at 23.00 hrs GMT at the beginning of the month. It is currently moving retrograde in Libra

and will continue to do so until it crosses the border into neighbouring Virgo during May.

Position of Saturn
15th March 2013 at 23.00hrs



Lunar Occultations

In the table below I've listed events for stars down to around magnitude 7.0 that occur before midnight although there are others that are either of fainter stars or occur at more unsociable hours. DD = disappearance at the dark limb. There is now a column headed "mm" (millimetres) to show the minimum aperture telescope required for each event. **Times are in GMT.**

Please remember that the Society has telescopes that members can borrow, all of which are suitable for the following events.

Mar	Time	Star	Mag	Ph	Alt °	% illu	mm
16 th	21.15	ZC 510	6.8	DD	20	24	50
17 th	22.53	ZC 654	6.0	DD	13	33	40
18 th	18.53	107 Tauri	6.5	DD	54	41	40
20 th	22.52	ZC 1057	6.8	DD	34	61	70

Phases of the Moon for March

Last ¼	New	First ¼	Full
4 th	11 th	19 th	27 th

ISS

There are no evening passes of the International Space Station that are visible from the UK during March. There are however a large number that occur after midnight and through until dawn. If you wish to see these go to:

www.heavens-above.com

Iridium Flares

The flares that I've listed are magnitude -3 or brighter although there are a lot more that are fainter or occur after midnight. If you wish to see a complete list, or obtain timings for somewhere other than Wadhurst, go to:

www.heavens-above.com

Remember that when one of these events is due it is sometimes possible to see the satellite in advance of the "flare", although of course it will be much fainter at that time. **Times are in GMT.**

Mar	Time	Mag	Alt°	Az°
1 st	18.02	-5.4	51	182 (S)
5 th	19.23	-4.7	53	129 (SE)
10 th	19.02	-8.3	58	144 (SE)
11 th	18.58	-6.3	59	148 (SSE)
15 th	18.41	-4.9	60	157 (SSE)
18 th	20.07	-3.2	52	100 (E)
19 th	20.01	-4.2	52	101 (E)
21 st	18.14	-7.1	61	179 (S)
23 rd	19.46	-8.2	58	109 (ESE)
28 th	19.25	-4.1	64	121 (ESE)

The Night Sky in March (Written for 22.00hrs GMT mid month)

The bright star Arcturus in the constellation of Boötes lies due east at an altitude of close to 30°. For some help to find Arcturus draw a curved line through the stars of the Great Bear's tail and on towards the horizon. The line will pass through Arcturus and then through Spica (in Virgo) if you continue it. Below Boötes lies the crescent of stars that makes up Corona Borealis.

Towards the south Leo and Cancer lie either side of the meridian, whilst below them the long sprawling constellation of Hydra (the Sea Serpent or Water Snake) winds its way to the horizon. Although there are no bright stars in it, the group of stars that make up the "head" are easy to identify if you use the Twins (Castor and Pollux) as a guide. If you follow the line of the serpent towards its tail you will find the two small groups of Crater (the Cup) and Corvus (the Crow) riding on its back.

Within Cancer lies the open cluster M44 (Messier 44) also known as the "Beehive" or Praesepe which contains approximately 1,000 stars. It is an easy object to locate at magnitude 3.7 in a dark sky but averted vision will help in areas of light pollution. It is large, being around three times the size of a full Moon, but don't forget that magnitude measurements of clusters work by aggregating together the brightness of all the stars in that cluster. This gives a false impression of the apparent luminosity of such bodies.

In the west Orion and most of his retinue of winter constellations are on view with Jupiter still brilliant in Taurus. The two dogs are both visible, although Sirius (the brightest star in the night sky) is now just 10° above the south western horizon.

Looking north Ursa Major is not far from the zenith whilst on the opposite side of the celestial pole lies the comparatively faint constellation of Cepheus. Two of the three stars that make up the summer triangle are now visible above the northern horizon indicating that warmer weather is on the way. The double cluster in the sword handle of Perseus is still well positioned for observation, and is best seen with binoculars or a rich field telescope.

Comet C/2011 L4 Pan-STARRS

The latest observations suggest that this comet could reach magnitude 3 when at its brightest during the period of 7th to 12th March. Unfortunately it will not be visible from UK latitudes until possibly March 16th when it will have dimmed slightly to magnitude 3.2. As comets are so unpredictable it would be worth looking a few days earlier in case it is brighter than expected or has developed a considerable tail.



Advance Warning for April

The Lyrid meteor shower reaches maximum on April 22nd. A partial eclipse of the Moon occurs on April 25th. This takes place as the Moon rises, and at maximum only 1.5% of the Moon is eclipsed by the umbral shadow.

Don't forget that clocks go forward one hour at 01.00 hrs on Sunday March 31st.

Brian Mills

NASA SPACE PLACE

Tackling the Really BIG Questions

By Diane K. Fisher

How does NASA get its ideas for new astronomy and astrophysics missions? It starts with a Decadal Survey by the National Research Council, sponsored by NASA, the National Science Foundation, and the Department of Energy. The last one, New Worlds, New Horizons in Astronomy and Astrophysics was completed in 2010. It defines the highest-priority research activities in the next decade for astronomy and astrophysics that will "set the nation firmly on the path to answering profound questions about the cosmos." It defines space- and ground-based research activities in the large, midsize, and small budget categories.

The recommended activities are meant to advance three science objectives:

- Deepening understanding of how the first stars, galaxies, and black holes formed,
- Locating the closest habitable Earth-like planets beyond the solar system for detailed study, and
- Using astronomical measurements to unravel the mysteries of gravity and probe fundamental physics.

For the 2012-2021 period, the highest-priority large mission recommended is the Wide-field Infrared Survey Telescope (WFIRST). It would orbit the second Lagrange point and perform wide-field imaging and slit-less spectroscopic surveys of the near-infrared sky for the community. It would settle essential questions in both exoplanet and dark energy research and would advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system. Naturally, NASA's strategic response to the recommendations in the decadal survey must take budget constraints and uncertainties into account.

The goal is to begin building this mission in 2017, after the launch of the James Webb Space Telescope. But this timeframe is not assured. Alternatively, a different, less ambitious mission that also address the Decadal Survey science objectives for WFIRST would remain a high priority.

The Astrophysics Division is also doing studies of moderate-sized missions, including: gravitational wave mission concepts that would advance some or all of the science objectives of the Laser Interferometer Space Antenna (LISA), but at lower cost; X-ray mission concepts to advance the science objectives of the International X-ray Observatory (IXO), but at lower cost; and mission concept studies of probe-class missions to advance the science of a planet characterization and imaging mission.

For a summary of NASA's plans for seeking answers to the big astrophysics questions and to read the complete Astrophysics Implementation Plan (dated December 2012), see: <http://science.nasa.gov/astrophysics/>
For kids, find lots of astrophysics fun facts and games on The Space Place: <http://spaceplace.nasa.gov/menu/space/>

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Wadhurst Astronomical Society website:
www.wadhurstastro.co.uk
SAGAS web-site www.sagasonline.org.uk

Any material for inclusion in the April 2013 Newsletter should be with the Editor by March 28th 2013



Caption:
Clusters of galaxies collide in this composite image of "Pandora's Cluster." Data (in red) from NASA's Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory's Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe.

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

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