

Wadhurst Astronomical Society Newsletter July 2012

MEETINGS

COMMITTEE MEETING

Members of the Committee are respectfully reminded that there is a meeting at Phil's starting at 1930 on Tuesday the 10th of July.

Any member of the Society is very welcome to come along but please let Phil know first.

OUTREACH EVENTS

The Society continues to provide talks to both astronomical and non-astronomical bodies and also gives assistance to individuals who have a telescope but are experiencing difficulties.

On Monday June 11th Brian Mills gave a talk to the West Kent Amateur Radio Society entitled "An Introduction to Astronomy". He then spoke briefly about the occultation work that he has been involved in for many years.

On **Monday June 25th** Brian will speak to a new Astronomical Society that has recently been formed at Tonbridge School. The subject will be "Occultations and Transits - Their Meaning and Value". Members of WAS are welcome to attend - please contact Brian for details.

JUNE MEETING

The meeting was opened by Phil Berry by welcoming members and saying how good it was to see so many visitors to the Society's Open Evening.

He reported that he and Brian Mills had tried to observe the Transit of Venus at Seasalter on the north Kent coast where the horizon was low. Sadly, cloud ruined their chance to see the event, but Phil went on to say the transit of Venus had been important in the past when Captain Cooke witnessed the transit of Venus in 1796 from Tahiti and from his observations and other observations, he was able to estimate the size of the Earth using parallax.

Phil also announced that there is a Summer Meeting of the British Astronomical Society on Saturday 7th of July at Hurst Community Centre, Hurst Place, Hurst Road, Bexley Kent DA5 3LH, starting at 1000 and closing at 1730. The theme is "Exploring the Solar System". More details can be found on the SAGAS website, shown at the end of this Newsletter.

The telescopes on display

Phil then took us on a guided tour of the telescopes that had been brought to the meeting and on display.

He started with an impressive combination of his Nextstar 5 with a Personal Solar Telescope, PST Coronado, on the same mount and all carefully balanced. He talked particularly of the success he had had with a small Lumix camera, mounted on an eyepiece jig so that he could take photographs of the sun through the hydrogen-alpha PST. This is what he had achieved.



Not only was he able to resolve the sun spot but also there are several prominences and spicules around the edge of the sun's disk.

The Nextstar 5 had a solar filter on the front which took images using a Waytec camera through a flip-mirror to facilitate focussing. The output from the camera is used with a GPS video overlay which displays the time in the image; particularly useful when observing occultations and other events where accurate time recording is necessary.

One warning Phil gave was to never use a solar filter that fits on the inside of the eyepiece because the energy from the sun can heat it up to the point where it shatters and if it is being used with the human eye, it may well cause permanent blindness!

We were shown Phil's new equatorial mount using belt drives as opposed to gears and he claims it is very stable and extremely accurate.

Next, Phil showed us a very odd looking mount, full of counterweights and a Go-to drive. He said he had bought it for himself as a birthday present, but all was explained when he reached inside a case to reveal the other part of his present to himself. It was a pair of large binoculars with 90° eyepieces which he said made viewing very comfortable, especially when looking any where near vertical. The binoculars had 100 mm object lenses and came with a selection of eyepieces.

Also present was a very useful Starlight 80 refractor telescope on a solid tripod mount.

Setting up the Society's refracting telescope

Following this introduction, Phil demonstrated how to set up an equatorial refractor, using the Society's own Kunos 4-inch telescope which is available to any member to borrow.

Taking just the tripod and equatorial mount without the telescope tube attached, make sure it is on solid ground. The first job is to set the tripod so that the "N" on one side faces north using a magnetic compass. The flat at the top of the tripod needs to be level.

Then the Right Ascension axis has to be adjusted so that it is in line with the Earth's polar axis using the Pole Star. The axis needs to be at 51°; our latitude. (This should already be set). There is also a slight adjustment from side to side for final setting when dark. In this way, as Phil said, the mount will manually track the stars by cancelling out the effect of the

Earth's rotation. Other telescope mounts may however be motor-driven.

Once this is done, the counter weight is attached and the telescope tube can be fixed on the mount and balanced by moving the tube before tightening the clamps. The final balance adjustment is made with the weights so that the whole telescope assembly balances on the mount.

Phil stressed that if the alignment is not all that accurate; the result is that stars will be difficult to track with just the Right Ascension control alone particularly if a high magnification eyepiece is being used. A method called "Drift Alignment is where a star is tracked for a period of time and any Declination drift can be seen and remedied.

To make it easier to find objects in the night sky, the telescope is provided with a finder scope; a small low magnification telescope mounted on the tube, but this must be aligned with the main telescope. Phil showed how this can be done, beginning in daylight by pointing the main scope at an easily recognised object as far away as possible such as a television aerial and adjusting the finder to the same object. This will make it easier to find a bright star with the main telescope when it is dark and then make slight adjustments to the finder scope to remove any remaining parallax. A higher magnitude eyepiece will help to make finer adjustments.

The only thing that remains now is to hope for a clear night!

Stellarium software

A very useful tool when preparing to spend a night observing is to have a good night-sky computer programme, and Geoff Rathbone demonstrated the latest version of Stellarium which is free and can be downloaded from:

www.stellarium.org/

There are versions for Microsoft Windows, Mac and Linux and it works accurately and as effectively as many bought programmes. The programme has been developed over a number of years by different programmers under project coordinator & lead developer: Fabien Chéreau in Boston MA.

The main features of the programme were first explained by Geoff and developed to show some of the newer facilities could be shown such as where to find and setup and store controls for different telescopes.

Other features of the programme were the ability to add Plug-ins such as angle measurement, satellite positions (updated whenever the computer is connected to the internet), display compass angles or cardinal points (N S E & W) and display an indication of the ocular view, i.e. showing what could be seen through any particular telescope and eyepiece.

For those who missed the transit of Venus, we were shown the next transit in December of the year 2117.

A practical demonstration of Precession showed the movement of the background stars past the Earth's northern axis over many centuries. At present, Polaris is only 40 minutes of arc from the celestial axis but by selecting the year 14,000 Vega is merely 4 minutes from the axis! Entering the year 28,000, Polaris is back close to the celestial pole.

It is also possible to go forwards or backwards in time to the limit of + or - 99,999 years!

Finally we saw that it was not only possible to change the landscape to that of Mars (and see the Lander) but also to change our location to that planet. Then looking back to Earth it was possible to see the rotation of the Earth as it would be seen in true time.

The programme is excellent at searching the night sky and is also very good as an educational tool.

John Waytes Scientific titbits

On the 22 April this year a meteor was sighted and landed in northern California. It was found to be formed from a very rare rock called CM Chondrite and this type of rock contains a lot of carbon and organic minerals such as amino acids. Some

people believe this may have brought the first life building blocks to Earth.

If this follows the Australian Muchison meteorite found in 1969 then it will become one of the most studied rocks on Earth.

Ironically, the location where this new meteorite landed is in the same area as the Gold Rush during the mid-1850s, but as John says, it is much more valuable than gold and is valued at present at about \$6,000 an ounce!

John's second titbit was a suggestion that if you commit a murder in a room full of Koala bears, you may well get away with it because it has been established that Koala fingerprints are similar to human fingerprints; even with an electron microscope it can be quite difficult to distinguish between the two.

He finished by saying "Don't be surprised if you see a strange hairy face with a big nose on a wanted poster"



Coffee break at the June meeting

SKY NOTES

Unfortunately our Director of Observations, Brian Mills had what Phil described as particularly nasty form of "Man Flu" and couldn't be here. But Brian still managed to prepare the Sky Notes and Phil bravely stepped in to give them.

The main part of the Sky Notes follows later in the Newsletter.

JULY MEETING

Wednesday 18th July 2012 – John Strachan talks about "Amateur Astronomical Spectroscopy". This is fast growing area of astronomy that amateurs are becoming interested in. This talk should be well worth attending.

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

There is no meeting in August, but we are holding an Astro-barbecue on Saturday the 25th of August. This year it is to be held at Brian Mill's house in Hildenborough. More details will follow in the next Newsletter

Wednesday 19th September 2012 – Ian King is giving a talk called "The Evolution of the IKHAROS Telescope".

Wednesday 17th October 2012 – Bob Seaney is giving a talk on “The Lick Observatory”

Wednesday 21st November 2012 – Jan Drozd talks about “Early Pioneers in Astronomy”

Wednesday 14th of December – Member Paul Treadaway continues his story of building his own telescope. His talk is called “The T200 Telescope First Light”

OTHER NOTES AND INFORMATION

SKY NOTES FOR JULY

Planets

Mercury reaches greatest eastern elongation on the first of the month but its altitude (10°) at the time of sunset will make it a very difficult object in the west-north-west. It sets an hour after the Sun. **Do not sweep for Mercury with optical aid until after the Sun has set.**

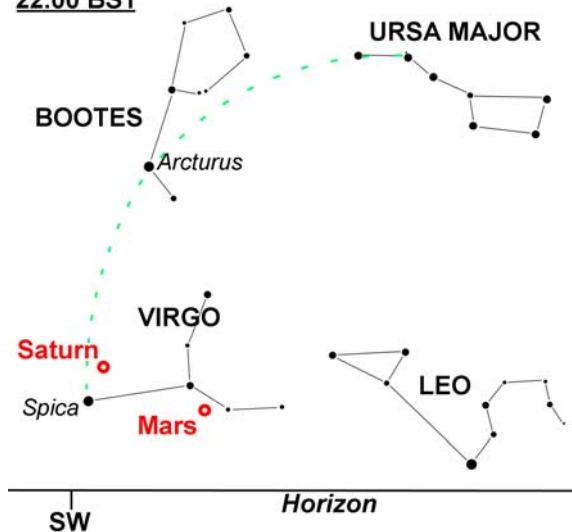
Venus, fresh from its transit last month, it now moves west of the Sun to become a morning object. By the middle of the month it rises three hours ahead of the Sun, and at magnitude -4.4 it makes an interesting sight, for early risers, close to both Jupiter and the Hyades star cluster. The phase of the planet changes from crescent to a little under half.

Earth reaches aphelion (furthest from the Sun) on the 5th when we will be 94.5 million miles away. It may seem strange that summer occurs when we are at our most distant from our parent star. See later in these Sky Notes for an explanation.

Mars is visible in the south-west as soon as the Sun sets and will itself have set by 23.30. Its magnitude continues to fade during July, reaching +1 by month's end. At the end of last month its easterly motion carried it across the border from Leo into Virgo where it will stay until the beginning of September. Directions from Ursa Major via Arcturus are shown in the diagram.

Positions of Saturn and Mars - mid July 2012.

22.00 BST



Jupiter is, like Venus, a conspicuous morning object in Taurus rising three hours ahead of the Sun by mid-month. In the early hours of the 15th, Jupiter will undergo an occultation by the

Moon - something that although not of great scientific importance should provide an ideal subject for astro-imagers. The event begins at 02.53 BST with Europa being the first of the Gallilean satellites to be occulted. It is followed by Io, Jupiter (at 02.56), Ganymede and finally Callisto.



By 03.06 as Callisto is about to disappear on the bright limb, Europa will be reappearing on the dark limb, followed by Jupiter at 03.08. The event ends at 03.24 with the reappearance of Callisto at the dark limb.



These are the times as seen from Hildenborough. If you are further south the event will take slightly longer, whereas if you are further north then you will see a “graze occultation” where only part of the planet will be obscured. If you go too far north then Jupiter will skim past the Moon without being occulted at all.

Saturn is visible towards the south west in Virgo at magnitude +0.7, setting at midnight by the middle of the month. It can be found by using the map shown above under the “Mars” heading. If you follow the curved line from the tail of Ursa Major, through Arcturus in Boötes and on towards the horizon you will reach two moderately bright “stars” one above the other. The upper one is Saturn. If you get a chance to view this beautiful planet, even in a small telescope, do take the opportunity as it will not be an evening object much longer. It will be lost to the Sun's glare during September and will not become an evening object again until late February 2013.

Lunar Occultations

Unfortunately there are only three reasonably bright occultations that occur before midnight this month although there are many others that are either of fainter stars or take place at more unsociable hours. I have added an extra column headed "mm" (millimetres) to show the minimum aperture telescope required for each event. DD = disappearance at the dark limb. **Times are in BST.**

Jul	Time	Star	Mag	Ph	Alt °	% illu	mm
27	22.43	SAO 183533	6.2	DD	10	67	70
30	23.50	SAO 187086	5.8	DD	17	94	70
31	22.42	SAO 162809	6.1	DD	18	98	90

Phases of the Moon for July

Full	Last ¼	New	First ¼
3 rd	11 th	19 th	26 th

ISS

There are no evening passes of the International Space Station this month that are visible from Wadhurst. If you would like to check for passes in an area other than Wadhurst you can go to:

www.heavens-above.com

and put in your coordinates to get more localised predictions.

Iridium Flares

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

www.heavens-above.com

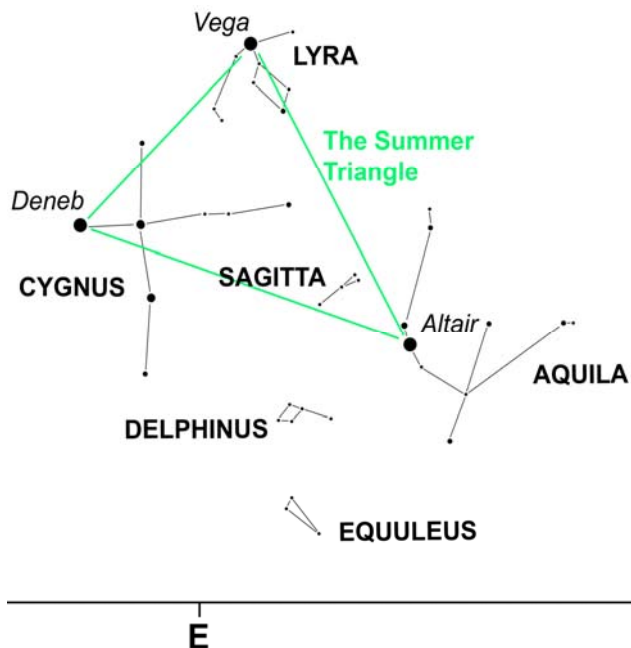
Remember that when one of these events is due it is sometimes possible to see the satellite in advance of the "flare", although of course it will be much fainter at that time. **Times are in BST.**

July	Time	Mag	Alt°	Az.
8 th	23.50	-4	43	WSW
13 th	23.30	-3	39	WSW
16 th	23.21	-7	35	WSW
19 th	23.11	-4	32	W
21 st	23.08	-5	28	W
22 nd	23.03	-4	27	W
25 th	22.52	-5	23	W
26 th	22.58	-3	21	W
27 th	22.59	-6	19	W
29 th	23.06	-3	14	WNW
30 th	23.09	-4	12	WNW
31 st	23.12	-5	11	WNW
31 st	23.52	-8	37	WSW

The Night Sky in July (Written for 22.00hrs BST mid month)

If you look north Ursa Minor is standing on its tail whilst above it the head of Draco is close to the zenith. Ursa Major lies to the west of the pole with Cassiopeia is to the east of it. On the meridian just above the horizon lies the bright star Capella in Auriga.

In the east Pegasus and Andromeda are just rising whilst above them lie the three bright stars of the Summer Triangle - Deneb, Altair and Vega. Also there is their retinue of small constellations - Sagitta (the arrow), Delphinus (the Dolphin) and Equuleus (the little horse).

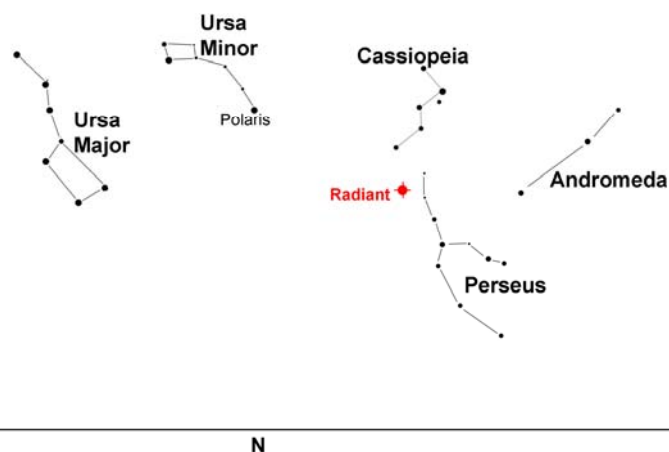


Turning our attention to the south we find Hercules and Corona Borealis high in the sky straddling the meridian whilst low down and due south, some 12° above the horizon, lies the giant orange star Antares in Scorpio. Between the two is the very uninspiring area of the sky that contains the constellations Ophiuchus and Serpens.

In the west Leo is about to set and just behind is Virgo within whose boundaries lie the planets Mars and Saturn. Above them is Boötes with the bright star Arcturus dominating that part of the sky.

Meteors

This month sees the start of one of the years most prolific showers - the Perseids, so called because the meteors appear to radiate from the constellation Perseus. The shower begins on July 23rd and runs until August 20th. The position of the radiant is shown in the map.



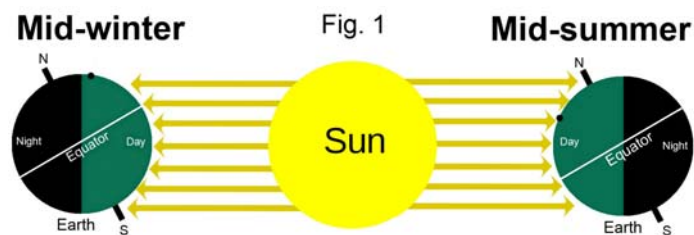
Advance Warning for August

August 12th - Perseid maximum.

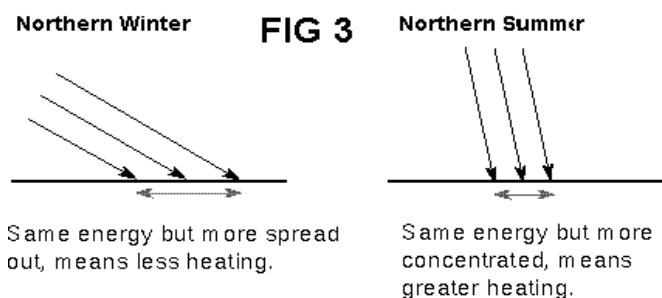
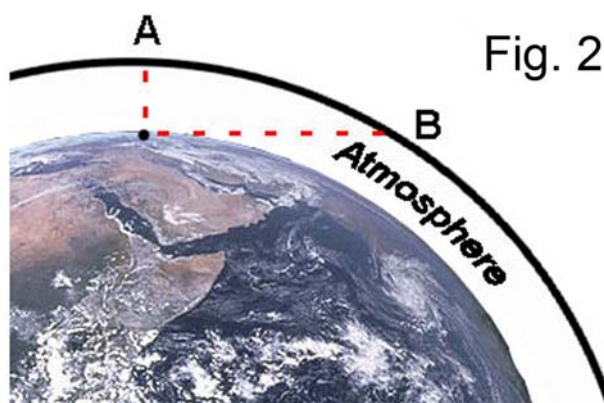
Why does summer occur when Earth is furthest from the Sun?

Earlier in this newsletter I said that, possibly rather surprisingly, when we are in the middle of summer, the Earth is at its furthest from the Sun. It seems reasonable to expect that at this time, when we hope to be warmest, we would be at our closest to the star that provides us with light and heat.

At a time when the Earth was still molten, we believe it was struck a glancing blow by a Mars sized body which continued on into space whilst the debris from the collision was sent into orbit around the Earth. Gradually over time this material accreted and formed the Moon. The impact was also responsible for the Earth's axis being tilted at approximately 23½° which in turn gives rise to our seasons.



If you look at figure 1, you will see a black dot on both of the globes to indicate roughly the position of the UK at latitude +52°. You can see that in mid-winter the solar rays strike our part of the Earth's surface at quite an acute angle, and the Sun is therefore low in the sky and additionally shining through a much thicker layer of the atmosphere (fig 2). In mid-summer from the UK the angle that the sun's rays make with us are more oblique because it is higher in the sky. Consequently a given unit of heat is more concentrated in summer than in winter (fig 3).



Transit Of Venus (6th June 2012)

Despite the very unfavourable weather forecast, Phil Berry and I met near the M2/A299 junction at 03.45 on the morning of the transit, and drove to a spot by the sea wall at Seasalter on the north Kent coast to set up our telescopes. Below is a photograph, taken by Phil, of both of us with our equipment.



Phil used a 5" Nexstar fitted with a video camera and a Coronado PST. I used 5" and 4" refractors - one with a DSLR and the other for visual use only. Sadly, although we could see clearer skies approaching we didn't see the Sun until 25 minutes after the event was over. It would appear it was very hit and miss who saw it and who didn't. Certainly of the people I know one was lucky at Crawley and another at Carshalton.

However, in the coming years there are two transits of Mercury to look forward to. They are:-

May 9th 2016

1st contact at 12.12 BST and last contact at 19.42 BST. The whole thing is visible from the UK but for the last 2 contacts the Sun is only 7 degrees high.

November 11th 2019

1st contact at 12.35 UT but Sun sets at 16.06 which is 46 minutes after mid transit. For 3rd and 4th contact the Sun is 17 degrees below the horizon.

Forthcoming Occultations

If possible I would like to arrange some more opportunities for members to observe occultations together. There are a few that are of reasonably bright stars, and so I have listed them below. If you are interested in joining us please let me know. The Society has some telescopes and digital stopwatches available for members to use.

27 th July 2012	22.43 hrs	mag 6.2	moon is 67% and 10° high.
23 rd Aug 2012	20.39 hrs	mag 4.5	moon is 41% and 11° high.
23 rd Aug 2012	21.08 hrs	mag 6.1	moon is 41% and 8° high.
26 th Aug 2012	20.28 hrs	mag 5.5	moon is 75% and 17° high.
26 th Sept. 2012	22.30 hrs	mag 5.1	moon is 89% and 30° high.
18 th Oct. 2012	18.09 hrs	mag 4.4	moon is 14% and 10° high.
19 th Oct 2012	18.57 hrs	mag 6.3	moon is 24% and 11° high.
21 st Oct. 2012	17.54 hrs	mag 5.7	moon is 45% and 20° high.

Brian Mills

NASA'S SPACE PLACE

How Many Discoveries Can You Make in a Month?

By Dr. Tony Phillips

This year NASA has announced the discovery of 11 planetary systems hosting 26 planets; a gigantic cluster of galaxies known as "El Gordo;" a star exploding 9 billion light

years away; alien matter stealing into the solar system; massive bullets of plasma racing out of the galactic center; and hundreds of unknown objects emitting high-energy photons at the edge of the electromagnetic spectrum.

That was just January.

Within NASA's Science Mission Directorate, the Astrophysics Division produces such a list nearly every month. Indeed, at this very moment, data is pouring in from dozens of spacecraft and orbiting observatories.

"The Hubble, Spitzer, Chandra, and Fermi space telescopes continue to make groundbreaking discoveries on an almost daily basis," says NASA Administrator Charlie Bolden¹.

NASA astrophysicists and their colleagues conduct an ambitious research program stretching from the edge of the solar system to the edge of the observable Universe. Their work is guided in large part by the National Research Council's Decadal Survey of Astronomy and Astrophysics, which identified the following priorities:

Finding new planets—and possibly new life—around other stars.

Discovering the nature of dark energy and dark matter.

Understanding how stars and galaxies have evolved since the Big Bang.

Studying exotic physics in extreme places like black holes.

Observing time on Hubble and the other "Great Observatories" is allocated accordingly.

Smaller missions are important, too: The Kepler spacecraft, which is only "medium-sized" by NASA standards, has single-handedly identified more than 2300 planet candidates. Recent finds include planets with double suns, massive "super-Earths" and "hot Jupiters," and a miniature solar system. It seems to be only a matter of time before Kepler locates an Earth-sized world in the Goldilocks zone of its parent star, just right for life.

A future astrophysics mission, the James Webb Space Telescope, will be able to study the atmospheres of many of the worlds Kepler is discovering now. The telescope's spectrometers can reveal the chemistry of distant exoplanets, offering clues to their climate, cloud cover, and possibilities for life.

That's not the telescope's prime mission, though. With a primary mirror almost 3 times as wide as Hubble's, and a special sensitivity to penetrating infrared radiation, Webb is designed to look into the most distant recesses of the universe to see how the first stars and galaxies formed after the Big Bang. It is, in short, a Genesis Machine.

Says Bolden, "We're on track in the construction of the James Webb Space Telescope, the most sophisticated science telescope ever constructed to help us reveal the mysteries of the cosmos in ways never before possible." Liftoff is currently scheduled for 2018.

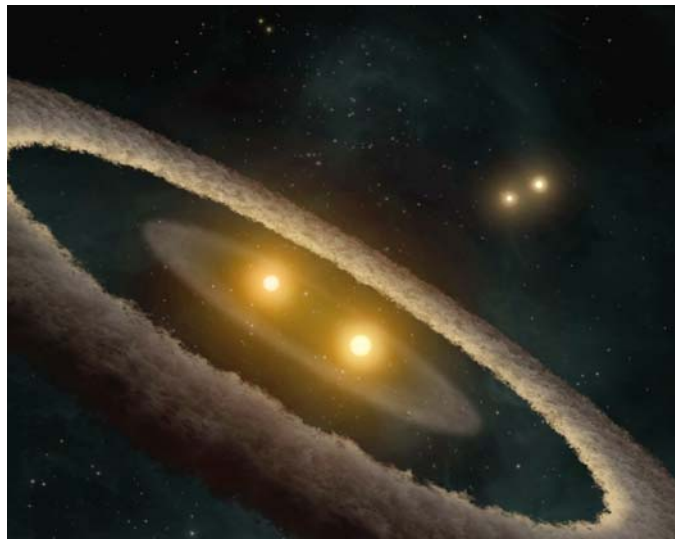
How long will the list of discoveries be in January of that year? Stay tuned for Astrophysics.

For more on NASA's astrophysics missions, check out:

<http://science.nasa.gov/astrophysics/>

Kids can get some of their mind-boggling astrophysics questions answered by resident Space Place astrophysicist "Dr. Marc" at:

<http://spaceplace.nasa.gov/dr-marc-space>



Artist's concepts such as this one are based on infrared spectrometer data from NASA's Spitzer Space Telescope. This rendering depicts a quadruple-star system called HD 98800. The system is approximately 10 million years old and is located 150 light-years away in the constellation Crater. Credit: NASA/JPL-Caltech/T. Pyle (SSC)

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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www.wadhurst.info/was/

SAGAS web-site www.sagasonline.org.uk

Any material for inclusion in the August 2012 Newsletter should be with the Editor by July 28th 2012

¹ Bolden made these statements in an April 20th editorial he co-authored with John Holdren, Director of the Office of Science and Technology Policy:
http://blogs.nasa.gov/cm/blog/bolden/posts/post_1334967201693.html