



WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society
www.was.org.uk



Number 180

November 2004

ALMANAC

All times U.T. for B.S.T. add one hour

October / November

		LUNAR		
November	Date	Time	Rise	Set
Last Quarter	5 th	05.53	22.58	14.19
New moon	12 th	14.27	07.05	15.55
First Quarter	19 th	05.50	13.48	23.37
Full Moon	26 th	20.07	15.23	07.25
December				
Last Quarter	5 th	00.53	**.**	13.05
New moon	12 th	01.29	09.01	15.39
First Quarter	18 th	16.40	12.21	**.**
Full Moon	26 th	15.06	15.12	08.38

		December	
1 st	04	Saturn	5° S. of moon
5 th	22	Mars	1° S. of Venus
7 th	11	Jupiter	0.3° S. of moon
9 th	23	Mars	2° N. of moon
10 th	04	Venus	3° N. of moon
10 th	08	Mercury in inferior conjunction	
11 th	20	Mercury 6° N. of moon	
13 th	17	Pluto in conjunction	

Minima of Algol

November	22 nd	03.42	25 th	00.36	27 th	21.24	30 th	18.12
December	12 th	05.30	15 th	02.18	17 th	23.06	20 th	19.54

EARTH

		Sunrise	Sunset
November			
	5 th	07.01	16.26
	12 th	07.14	16.15
	19 th	07.26	16.06
	26 th	07.37	15.58
December			
	5 th	07.49	15.53
	12 th	07.57	15.51
	18 th	08.02	15.52
	26 th	08.06	15.57

PLANETS

(As at November 26th.)

	Constellation	Rises	Sets	Mag.
Mercury	Ophiuchus	09.37	17.01	0.04
Unfavourable				
Venus	Virgo	04.45	14.57	-4.0
Brilliant morning object in the South East				
Mars	Libra	05.20	15.05	+1.7
Morning object in the South east				
Jupiter	Virgo	02.44	14.11	-1.8
Morning object in the South East				
Saturn	Gemini	19.39	11.30	+0.2
Well placed				
Uranus	Aquarius	12.51	23.06	+5.8
Evening object				
Neptune	Capricornus	13.58	23.07	+7.9
Evening object				
Pluto	Serpens cauda	08.17	17.49	+14.0
Unfavourable				

PHENOMENA

Day	Hour	November
10 th	02	Venus 0.2° N of moon
11 th	04	Mars 0.4° N of moon
11 th	19	Uranus at stationary point
14 th	03	Mercury 0.9° N of moon
21 st	01	Mercury at greatest elongation E.22°
30 th	12	Mercury at stationary point

Lunar Occultation's

Times as at W.A.S. Observatory

Date	U.T.	S.A.O.No	Mag	Phase
Nov	h. m. s.			
18 th	20.00.11	190556	7.0	Diss
18 th	20.49.09	164601	6.1	Diss
19 th	18.10.34	165154	8.9	Diss
19 th	20.56.18	165182	8.6	Diss
20 th	17.27.22	146650	8.4	Diss
20 th	18.45.21	146681	8.9	Diss
20 th	19.24.21	146683	7.2	Diss
21 st	18.18.42	128618	7.2	Diss
21 st	19.02.09	128629	9.1	Diss
21 st	22.54.15	128673	8.2	Diss
22 nd	20.34.12	109568	7.6	Diss
22 nd	22.48.22	109622	8.7	Diss
23 rd	19.10.35	110100	8.3	Diss
28 th	21.53.02	77819	6.8	Reapp
28 th	22.15.19	77837	6.0	Reapp
29 th	22.50.52	78873	8.1	Reapp
29 th	22.55.32	78876	6.9	Reapp
30 th	20.33.53	79650	5.4	Reapp
Dec				
1 st	06.14.16	79861	5.8	Reapp
5 th	07.01.41	118735	5.9	Reapp
7 th	06.08.02	138952	6.8	Reapp
7 th	06.08.44	138951	8.2	Reapp
15 th	17.07.18	190198	8.3	Diss
16 th	18.29.16	164975	8.7	Diss
16 th	18.51.27	164982	8.6	Diss
16 th	18.57.48	164984	7.1	Diss
17 th	16.59.19	1654890	7.7	Diss
17 th	20.58.10	146563	7.0	Diss

This is only about 18% of the predictions for the W.A.S. Observatory.

Dave Wells

Editors Note

Greetings from the desk of WAS News....As the sound of Mrs WAS News editor painting the bedroom settle into a comfortable rhythm I feel that the time is right to issue a clarion call to all budding WAS News contributors.....CONTRIBUTE!

Don't be shy, anonymity offered if required, but your articles would be greatly welcomed.

In this 'Copy and Paste' culture in which we now live it would be a crying shame if this newsletter became bereft of original contribution and comment.

As much as the WAS News News section is enjoyable and informative, it is lifted directly from far more august publications than this. It's not *your* input, and it's your input which makes this Newsletter.

WAS News needs you!

So don't delay, put pen to paper today! (Boom, Boom)

Rob

Reports

Solar Section Report - October 2004

Section Director, Brian Halls

October began with low activity – indeed, by the middle period of the month, the Sun had a number of spotless days (10th, 11th and 12th).

After this period of quiet activity, sunspot activity (just too prove it was still active) increased quite considerably for much of the third week during which a large group, 0687 appeared at N10^o L=177^o (size/type 0280/Eki on 22nd). This group was magnetically complex and ten times the diameter of the Earth.

This situation lasted until the end of the month – very active sunspot groups – some sufficiently large enough to be magnetically quite complex to produce violent activity which in turn created events that required solar alerts to be issued in possible anticipation of aurora activity.

Despite the increase in sunspot activity in the latter half of October, the few spotless days that were seen shall become more and more frequent. What does a spot free Sun mean? It certainly means that it is a sign of the reduction in sunspot activity but, the noting of spotless days might have another use.

Researchers at the Marshall Space Flight Centre believe they can use the spotless Sun to predict solar minimum. David Hathaway and Bob Wilson have examined the last 8 sunspot cycles and discovered that the period between the first spotless Sun after solar maximum and solar minimum is 34 months. The first spotless Sun was at the end of January this year – therefore using Hathaway and Wilson's simple rule, solar minimum shall occur late in 2006. That is at least a year before the generally accepted time of sunspot minimum using orthodox calculation methods.

The next solar maximum might come early, too, says Hathaway. "Solar activity intensifies rapidly after solar minimum. In recent cycles, solar maximum has followed solar minimum by just 4 years." That would make the next maximum around 2010.

Why the interest in solar activity by the Marshall Space Flight Centre? Space craft on long space flights may be affected by solar activity and thus have to have shielding to protect the more and more sophisticated and delicate electronics that are within them. By correctly predicting sunspot maximum, protective measures can be built in to the spacecraft as and when they are required.

We shall have to wait and see if they are correct.

Reports were received from Graham Boots (18 days) and the Director (2 days).

MDF= 4.69; R= 69.6

solar_section@was.org.uk

Notices

End of an Era

Brian Halls



Graham and Eileen taken the evening of the closure of the observatory – Photo Brian Halls

New Year Social

Graham Boots

Our 12th January monthly meeting will be our social evening which comprises of quizzes, games and light refreshments. Please make it a successful evening by thinking up and organising ideas for games and quizzes and providing refreshments. We did fairly well last year and I would like us to build on that success. I hope we can also have a worth while raffle.

WAS Ad

Sussex Astronomy Centre

Now open: Meade main dealer for Sussex Stockist of Astro engineering range
And all products from
Meade Telescopes.
Bresser Telescopes.
Discounts for club members
Part Exchange considered.

Sussex Astronomy Centre
16 Mulberry Lane
Goring by sea
Worthing, West Sussex.
Tel 01903 247317
Email worthingastronomy@tiscali.co.uk

Ask for Paul Farmer.
(Club member)

What's on the Box

Friday 12th November 2004



02:00 to 02:50: **Odyssey: The Robot Pioneers**

To accompany Space Odyssey: Voyage to the Planets, a documentary that looks at the history of space exploration and which reveals the science behind the series. It tells the story of the human ingenuity that has dispatched robotic missions to all the planets except Pluto. Thanks to the engineers and the metal limbs of these mechanical explorers, the series was able to portray the gruelling reality of a human expedition to the planets.

Saturday 13th November 2004



12.45 to 13.05: **The Sky at Night**

Star Death. Patrick Moore looks at the constellation of Orion and picks out some objects to look at, whether

through a telescope or with binoculars. Chris Lintott talks about the SWIFT mission and the search for elusive gamma ray bursts, with the main programme discussing star death and creation of planetary nebulae.

Tuesday 16th November 2004



21.00 to 22.00: **Space Odyssey: Voyage to the Planets**
Drama-documentary about the possibility of a manned mission around the solar system. It combines stunning special effects and drama, and follows the lives of five astronauts on a six-year odyssey on board the spacecraft Pegasus. A daring descent to the unstable surface of Jupiter's volcanic moon is followed by a spacewalk in the ice- and-rock filled rings around Saturn. They then return to Earth after a three- year space trek to Pluto. Second of two programmes

WAS News News

Radar image shows Titan's surface live and in colour

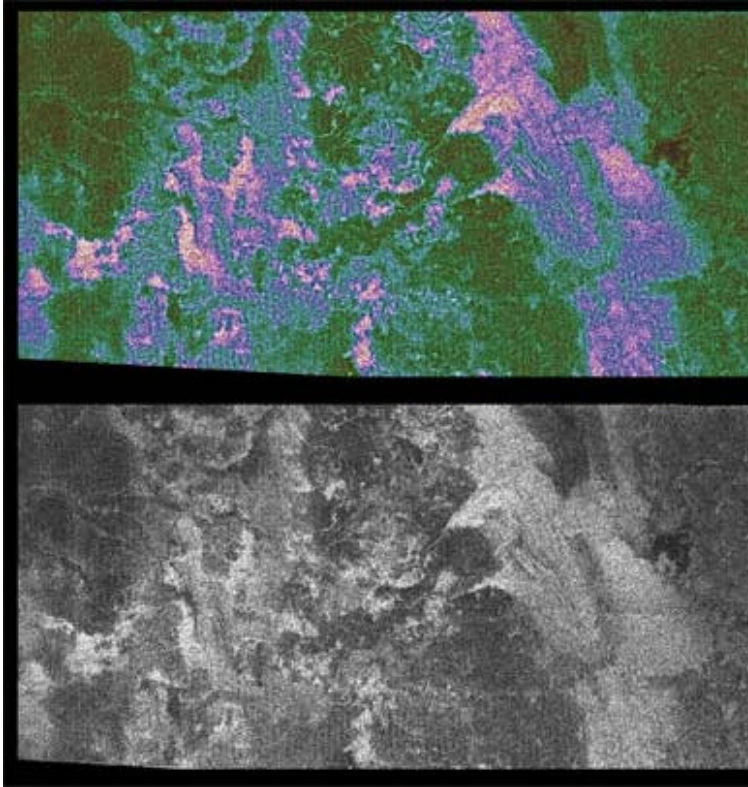
Cassini photo release

Saturn's moon Titan shows a sharp contrast between its smooth and rough edges in a new false-colour radar image.

Titan's surface lies beneath a thick coat of hazy clouds, but Cassini's radar instrument can peer through to show finer surface features. Scientists have added colour to emphasize finer details on Titan, as shown in the image. To provide a better perspective of the surface features, the colour image is shown next to a black-and-white image that was previously released.

Brighter areas may correspond to rougher terrains, slopes facing the radar, or different materials. The pink colours enhance smaller details on the surface, while the green colour represents smoother areas. Winding linear features that cut across dark areas may be ridges or channels, although their nature is not yet understood. A large dark circular feature is seen at the western (top left) end of the image, but very few features on Titan resembling fresh impact craters are seen.

The area shown is in the northern hemisphere of Titan and is about 150 kilometres (93 miles) wide by 300 kilometres (186 miles) long. The image is a part of a larger strip created from data taken on Oct. 26, 2004, when the Cassini spacecraft flew approximately 1,200 kilometres (745 miles) above Titan's surface.



Credit: NASA/JPL [Download larger image version here](#)

The radar instrument works by bouncing radio signals off Titan's surface and timing their return. This is similar to timing the returning echo of your voice across a canyon to tell how wide the canyon is. Approximately 1 percent of Titan's surface was mapped during the Oct. 26 flyby.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C. The radar instrument team is based at JPL.

Crunch, squelch or splash on Saturn's moon Titan?

Particle Physics and Astronomy Research Council
release

The prospect of the Huygens probe landing on a hard, soft or liquid surface when it lands on Titan next January still remain following further analysis of data taken during the Cassini mother ship's closest encounter with Saturn's largest moon during its fly-by on October 26.

Commenting on the latest data results and implications for the Huygens probe Mark Leese of the Open University, Programme Manager for Science Surface Package [SSP]

instruments that will unravel the mysteries of Titan said: "It's interesting that all of the possible landing scenarios that we envisaged - a hard crunch onto ice, a softer squelch into solid organics or a splash-down on a liquid hydrocarbon lake - still seem to exist on Titan." Leese added, "A first look at the measurements of Titan's atmosphere during the fly-by suggest that the "Atmosphere Model" we developed and used to design the Huygens probe is valid and all looks good for the probe release on Christmas day and descent to the surface on 14th January 2005."

Further analysis of Titan's upper atmosphere, the thermosphere, has revealed a strange brew as Dr Ingo Mueller-Wodarg of Imperial College London explained, "Our instrument, the Ion Neutral Mass Spectrometer (INMS), made in-situ measurements of atmospheric gases in Titan's upper atmosphere and found a potent cocktail of nitrogen and methane, stirred up with signatures of hydrogen and other hydrocarbons. We are now working on a 'Weather Report' for the Huygens landing in January".

Commenting on the surface characteristics of Titan Professor John Zarnecki of the Open University, lead scientist for the Huygens SSP said: "The recent results from the fly-by have started to show us a very diverse and complicated surface. Titan is geologically active but hasn't yet given up all of its secrets. Combining the visible images with infrared and RADAR data from this and future fly-bys should help to clarify the picture - but the arrival of the Huygens probe in January will perhaps be the key to unlock these mysteries."

Professor Carl Murray, of the Imaging Science System [ISS] team from Queen Mary, University of London also commented on the surface features: "The images of the Huygens' landing site returned by the cameras show a diverse range of features. We see bright and dark areas roughly aligned in an east-west direction. These are similar to wind streaks seen on Mars and may indicate that material on Titan has been deposited by the effects of wind blowing across the landscape. All indications suggest that we are in for a real treat in January when the Huygens probe reaches Titan's surface and returns the first in situ data from this alien world."

UK scientists and technologists are amongst an international team continuing to analyse the latest data received from the NASA/ESA/ASI Cassini Huygens mission after the spacecraft made its close fly-by of Titan last week. The data has provided a wealth of information about Saturn's largest moon, which will not only assist the European Space Agency's Huygens team in advance of the probe landing on Titan in January 2005 but will also

increase our understanding of the relationship between Titan and its parent planet Saturn.

Professor Michele Dougherty from Imperial College is lead scientist on the Cassini Magnetometer, which is studying the interaction between the plasma in Saturn's magnetosphere and the atmosphere and ionosphere of Titan. "We have been able to model the Magnetometer data very well from the Titan flyby. There does not seem to be an internal magnetic field at Titan from the observations we obtained during this flyby, but we will have a much better idea about this when we have a further flyby in December which is on a very similar trajectory. All we can say at this point is that if there is a magnetic field generated in the interior of Titan, then it is very small."

Dr Andrew Coates from University College London's Mullard Space Science Laboratory, a Co-Investigator on the Cassini Electron Spectrometer team, said: "We received some remarkable new information about Titan's plasma environment within the context of Saturn's fascinating magnetosphere. Unexpectedly, it looks like we can directly use features of the electron results to understand what Titan's upper atmosphere is made of, supplementing the ion measurements from companion sensors on other instruments. Our electron results contain tell-tale fingerprints of photoelectrons and Auger electrons which we will use for this. Also, the total picture shows how important electrons, raining down on Titan's upper atmosphere, are in helping the feeble sunlight drive the complex chemistry in Titan's upper atmosphere."

Nick Shave, Space Business Manager at UK IT company LogicaCMG said "The amazing imagery and radar results recently received from Cassini of Titan's surface is providing important early information and creating real excitement in the industrial community. UK industry's critical contributions to Cassini-Huygens via the LogicaCMG Huygens flight software and other systems, such as the parachutes by Martin Baker, will enable even more spectacular science that could help unlock some of the secrets of life on Earth."

UK scientists are playing significant roles in the Cassini Huygens mission with involvement in 6 of the 12 instruments onboard the Cassini orbiter and 2 of the 6 instruments on the Huygens probe. The UK has the lead role in the magnetometer instrument on Cassini (Imperial College) and the Surface Science Package on Huygens (Open University). UK industry had developed many of the key systems for the Huygens probe, including the flight software (LogicaCMG) and parachutes (Martin Baker). These mission critical systems need to perform reliably in some of the most challenging and remote environments ever attempted by a man made object.

Titan Background

Titan is a highly complex world and is closer to a terrestrial planet than a moon typical of the outer planetary systems. Titan was first seen by Dutch astronomer Christiaan Huygens (after which the ESA probe is named) in 1655.

Not only is Titan the largest of Saturn's satellites, it is also larger than the planets Mercury and Pluto, and is the second largest satellite in the solar system (Jupiter's Ganymede being larger). It is the only satellite in the solar system with appreciable atmosphere, composed mostly of Nitrogen, but also contains aerosols and hydrocarbons, including methane and ethane. Titan's atmosphere was first confirmed in 1944 when Gerard Kuiper confirmed the presence of gaseous methane with spectroscopy.

Titan's peak surface temperature is about 95 K (-178 degrees C) and surface pressure is 1.6 Earth atmospheres. At this temperature and pressure, many simple chemicals that are present in abundance (methane, ethane, water, ammonia) provide materials in solid, liquid and gaseous form which may interact to create exotic features on the surface. Precipitation, flowing liquids, lakes and eruptions are all possible.

Titan orbits Saturn at a distance of just over 20 Saturn radii (1,222,000 km/759,000 miles) which is far enough to carry the moon in and out of Saturn's magnetosphere. Very little is known about Titan's interior structure, including whether it has its own magnetic field. Titan's surface has been difficult to study, as it is veiled by a dense hydrocarbon haze that forms in the dense stratosphere as methane is destroyed by sunlight. From the data collected so far, dark features can be seen crossing the equatorial region of Titan, with a large bright region near longitude 90 degrees now named Xanadu, and possibly a large crater in the northern hemisphere. The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL.

The Particle Physics and Astronomy Research Council (PPARC) is the UK's strategic science investment agency. It funds research, education and public understanding in four broad areas of science - particle physics, astronomy, cosmology and space science.

PPARC is government funded and provides research grants and studentships to scientists in British universities, gives researchers access to world-class facilities and funds the UK membership of international bodies such as the European Organisation for Nuclear Research, CERN, the European Space Agency and the European Southern Observatory. It also contributes money for the UK telescopes overseas on La Palma, Hawaii, Australia and in Chile, the UK Astronomy Technology Centre at the Royal Observatory, Edinburgh and the MERLIN/VLBI National Facility.

Diary

10th November 2004 Central Questions on Cosmology - Dr Alan Longstaff B Sc., PhD., F.R.A.S., Science Writer & Tutor in Astronomy Royal Observatory Greenwich

8th December 2004 Observing the Sun - Lee Macdonald

12th January 2005 New Year Social, see other entry in this edition

9th February 2005 Deep Sky Observing Dr. Stewart Moore Director of the British Astronomical Association Deep Sky Section and Committee Member of the Webb Society

9th March 2005 Astrophotography Impact since 1795 Mike Maunder Astrophotographer & Eclipse Chaser

13th April 2005 Member's Evening Short Talks and Imaging Displays by members

11th May 2005 Southern Africa Large Telescope (SALT) 11 meter Dr Malcolm Coe Southampton University

All Meetings (**bold**) are held on the second Wednesday of every month unless otherwise stated, at Heene Church Rooms, Worthing at 7.30 p.m. Meetings include the latest astronomical work, reports and, photographs by members. For further information please call 01903 521205, on the Internet at www.was.org.uk or email: chairman@was.org.uk

Executive Committee

Chairman: Glen Thomas

20 Wayside Avenue
Durrington
BN13 3JU
Tel: 01903 261723
Email: chairman@was.org.uk

Vice-Chairman: Bob Turner

21 Beechwood Ave
Worthing
West Sussex
BN13 2HR
Tel: 01903 692522
Email: vice_chairman@was.org.uk

Business Secretary: Christa Sutton

8 Tower Road
Lancing
BN15 9HT
Tel: 01903 523764
Email: secretary@was.org.uk

Meeting Secretary: Graham Boots

101 Ardingly Drive,
Worthing,
West Sussex
BN12 4TW.
Tel / Fax: 01903 505346
Email: meeting_secretary@was.org.uk

Membership Secretary: Colin Knappitt

41 Cleveland Road
Worthing,
West Sussex
BN13 2ES
Tel: 01903 695044

Treasurer: Michael Marshall

84 Bramley Road,
Worthing,
West Sussex.
BN14 9DT
Tel: 01903 823576

Note to Contributors

Contributions & Correspondence for the **December** issue of WAS NEWS should be with the Editor by **December 1st**. All material for inclusion should be sent to the Editor.

Rob Davis

61 Stirling Court Road,
Burgess Hill
West Sussex
RH15 0PS
Tel: (01444) 239205
Email: wasnews@tiscali.co.uk or wasnews@was.org.uk

