

WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society

Official website: www.was.org.uk

Affiliated websites: www.observatory99.freemove.co.uk



Number 151

March 2002

ALMANAC

All times U.T.

March./ April.

LUNAR

March	Date	Time	rise	set
Last Quarter	6th	01.24	** **	09.09
New moon	14th	02.02	06.58	18.23
First Quarter	22nd	02.28	10.03	02.28
Full Moon	28th	18.25	18.06	06.08
April				
Last Quarter	4th	15.29	02.10	09.35
New moon	12th	19.21	05.34	18.29
First Quarter	20th	12.48	09.58	02.14
Full Moon	27th	03.00	19.57	05.08

20th 15
22nd 12

Pluto at stationary point
Jupiter 1° S. of moon

April

Mercury in superior conjunction
Mercury 4° N. of moon
Venus 3° N. of moon
Mars 2° N. of moon
Saturn 0.8° S. of moon
Jupiter 2° S. of moon

7th 09
13th 10
14th 19
16th 00
16th 20
18th 23

Minima of Algol

March 26th 03.30 29th 00.18 31st 21.06
April 15th 05.12 18th 02.00 20th 22.48

EARTH

March	Sunrise	Sunset
6th	06.35	17.49
14th	06.17	18.03
22nd	05.59	18.16
28th	05.45	18.27
April		
4th	05.30	18.38
12th	05.12	18.52
20th	04.55	19.05
27th	04.40	19.17

PLANETS

(as at March 28th.)

Constellation	Rises	Sets	Mag.
Mercury Pisces	05.44	17.26	-1.0
Unfavourable			
Venus Pisces	06.25	20.04	-3.9
Visible in the West south west just after sunset			
Mars Aries	07.06	22.22	+1.5
Visible in the Southwest			
Jupiter Gemini	09.56	02.23	-2.3
Visible in south-western skies			
Saturn Taurus	08.21	00.10	+0.1
Visible in western skies			
Uranus Capricornus	04.41	14.34	+5.9
Unfavourable			
Neptune Capricornus	03.59	13.03	+8.0
Unfavourable			
Pluto Ophiuchus	23.48	09.48	+13.8
Small hours object			

PHENOMENA

Day	Hour	March
12th	03	Mercury 3° N. of moon
15th	10	Venus 4° N. of moon
18th	03	Mars 4° N. of moon
20th	10	Saturn 0.4° S. of moon

Lunar Occultations

Times as at W.A.S. Observatory

Date	U.T.	S.A.O.No	Mag	Phase
March				
17th	19.15.38	92922	7.2	diss
18th	19.12.59	93321	8.6	diss
19th	20.55.50	93739	8.8	diss
20th	20.26.56	76828	8.7	diss
20th	20.29.00	76824	8.8	diss
20th	20.37.20	76832	9.0	diss
20th	21.09.50	76850	7.5	diss
21st	00.21.37	76920	4.7	diss
21st	21.09.33	77647	7.0	diss
22nd	20.00.38	78761	8.4	diss
22nd	20.54.19	78786	8.5	diss
22nd	22.59.40	78844	8.8	diss
22nd	23.12.34	78855	6.8	diss
22nd	23.31.39	78870	8.5	diss
25th	23.46.55	98862	7.4	diss
April				
1st	02.57.41	159452	7.7	reapp
15th	20.03.28	93619	8.4	diss
17th	20.50.34	77318	8.7	diss
17th	20.50.53	77319	8.9	diss
17th	21.13.27	77332	8.5	diss
17th	21.50.28	77355	7.8	diss

This is only about 20% of the predictions for the W.A.S. observatory.

By Dave Wells

Editors Note

Little or no room this month for my usual gay-banter, its been squeezed out by Articles and Notices galore, some sad, but all interesting & informative. Until next month then – clear skies.

Rob

Dates for your Diary

Observatory Announcement

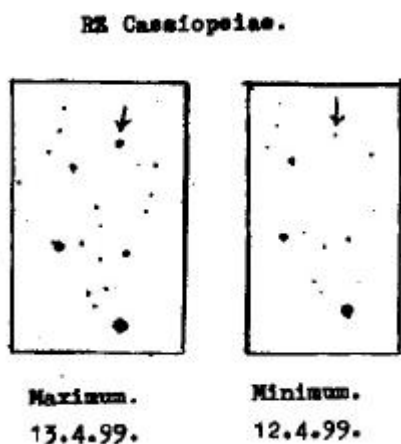
Graham Boots

I am sorry but I am away on Friday the 5th April next and therefore there will be no Observer's Night on that evening.

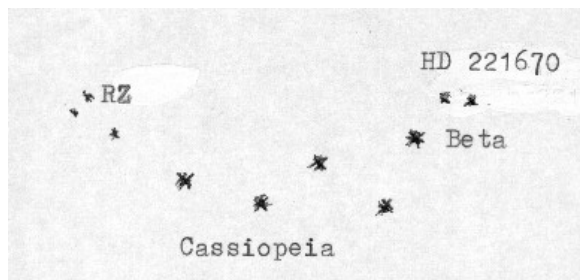
Possible Eclipsing Binary Star

Alex Vincent

The Star HD 221670 in Cassiopeia is a spectroscopic binary star some five degrees north of Beat Cas and it is possible that it is an eclipsing binary. Its magnitude at maximum is 7.34. RA is 23h 33.6m and dec is +60° 28' (2000). It is very close to the 7.18 magnitude star HD 221639 which can be used as a comparison star.



The last dates of possible eclipses were on May 10 1994, Dec 7 1995, Jul 3 1997, Jan 31 1999 & Aug 27 2000. It seems to have a period of about 576 days and so the next minimum is due sometime between March 16 & April 2. The amplitude may be very small and so astrometric measurements may be needed to show its fade.



Also in Cassiopeia is the eclipsing binary star RZ Cas which will be at minimum on March 18 at 01.12, March 24 at 20.00, March 26 at 00.42, March 30 at 19.24, April 1 at 00.06 & April 6 at 23.30. All times are UT.

Although not the brightest eclipsing binary, it is one of the easiest to observe with a magnitude of 6.18 at maximum and drops to 7.72 at minimum. Eclipses occur every 1.195 days and duration of eclipses being 4.8 hours, 2.4 hours to fade to minimum and then another 2.4 hours to rise back to maximum.

Comets

Alex Vincent

Comet 2000 WM1 Linear

Date	RA		Dec		Mag
	h	m	°	ç	
March 15	00	23.8	+19	09	4.5
March 21	23	48.5	+26	25	4.7
March 27	23	02.6	+31	56	5.2
April 2	22	13.3	+35	15	5.7
April 8	21	26.1	+36	41	6.3
April 14	20	42.7	+36	48	6.8

This comet underwent an outburst recently and so it could be brighter than the magnitude given if it has not faded again by then.

Comet 2002 C1 Ikeya-Zhang

Date	RA		Dec		Mag
	h	m	°	ç	
March 17	19	20.7	-09	48.2	8.2
March 27	19	15.9	-01	46.4	8.7
April 6	19	07.7	-06	09.7	9.2
April 16	18	55.6	+13	47.5	9.7
April 26	18	39.0	+20	45.9	

This comet is promising as it goes through Pisces, Pegasus and Cygnus. It will only be 24 degrees from the Sun in the middle of March, but will be 70 degrees by mid April.

The coordinates for both comets are for Epoch 2000.0

Reports

Planetary Section Report - March 2002

Glen Thomas

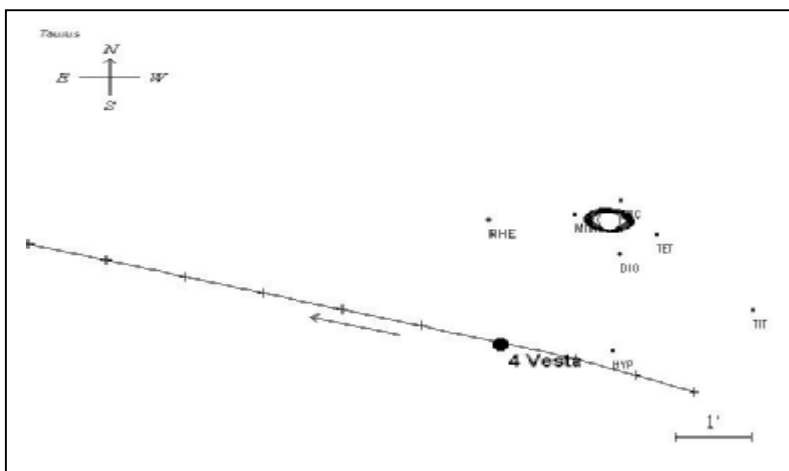
Mercury is unfavourable this month.

Venus becomes the Evening Star in March rising to 10° altitude as the sky darkens by the end of the month.

Mars continues to recede and now distinctly gibbous, with one limb looking less sharp than the other.

Jupiter still dominates the evening sky. It marks the end of a line of four planets visible at the beginning of the evening, as we look forward to a nice grouping of the five brightest planets in May.

Saturn is joined by the bright asteroid **4 Vesta**, which passes just 2' south of Saturn on March 19. The finder chart shows the position of Vesta relative to Saturn and its moons. Mimas is tricky at magnitude 12.9, needing at least a 15 cm (6 inch) telescope whereas Enceladus (11.7), Tethys (10.2), Dione (10.4), Rhea (9.7) should be visible in small telescopes. Titan and Vesta (both at about magnitude 8.4) should be visible with binoculars, as long as the optical quality is good and they are steadily held. (See the finder chart. Positions are shown for 1900 UT, with tick marks every hour to show Vesta's motion during the evening.)



Uranus and **Neptune** have only recently passed through conjunctions with the Sun are still too close-to-close to it for observation.

Pluto is a morning object in Ophiuchus, but does not get very high in the sky before the dawn twilight arrives. Wait until easier conditions around opposition in the summer.

4 Vesta reaches a very close conjunction with **Saturn** - motion should be visible. See above.

1819 Laputa, a 45km diameter asteroid, occults a bright star shortly after midnight on March 24/25. The asteroid is faint, at magnitude 16, but at 0007 UT on Mar 25 it occults 45 Rho2 Cancri (RA 8h 55.7m, Dec.+27° 56', mag. 5.2). It should last about 8 seconds, with a dimming 10.9 magnitudes.

(Note. All times are UT. Add 1h to find BST)

Solar Section Report - February 2002

By Section Director, Brian Halls

Winter is always a difficult time for regularly observing the Sun. The Sun rises late and sets early – a difficult subject to observe if one has a living to attend to and the telescope is not handy. On top of that there is the weather to contend with – rarely is the weather good enough to observe the Sun when the telescope is within easy reach!

However during the month members observed the Sun on 15 days during February. Observations were recorded by Graham Boots, Nick Quinn and the Director.

There were a large number of groups visible on a number of days, but the 'quality' of the spots and groups was less than we have seen in previous months.

There were two groups – 9800 and 9802 which were sufficiently large enough to reach theoretical naked eye visibility.

By the second and third weeks, sunspot numbers dropped, though there were many small and individual spots/groups on the disk – one exception being region 9825 N14⁰ L=204⁰. This group was the only major sunspot group on the Sun for this period as sunspot numbers declined.

By February 21, sunspot activity began to increase once more until the conclusion of the month. Some amateurs who are lucky to observe in hydrogen-alpha witnessed a large prominence appear which was immediately nick named 'The Caterpillar'. This feature was associated with a large active area that had crossed the west limb a few days previously.

Minimum of RZ Cas

Alex Vincent

On the evening of February 16/17 2002, I, Graham Boots and Colin Thomson observed and recorded the eclipse of RZ Cas, using the Astrovid camera. Mid eclipse was at 23.18 UT and the whole event lasts 4.8 hours. A 135 mm lens at f2.8 was used piggyback on the 12 inch and recording began at 21.10 and ended 4.5 hours later at 01.42.

Several stars could be seen on the monitor screen and were used as comparison stars for RZ Cas. This eclipsing binary is 6.18 at maximum and drops to 7.72 at minimum. Because RZ Cas eclipses are fast, I thought about recording it on video.

The drive went very well throughout and there was no dew or cloud to hamper viewing at all. As recording progressed, we watched the star and it's fading was first noticed after some half an hour after the start, but from 22.30 the star faded more rapidly. At 23.18 (precise minimum) the star was as faint as the one to its right (see photographs of it elsewhere in this issue of Wasnews).

After minimum we saw the star start to brighten from 23.35 back to maximum when it regained its normal magnitude. We had tea and something to eat during the event. This was a great success after our failed attempt to record GR Tauri last year. If other members wish to observe this eclipsing binary visually through binoculars or a telescope, you only need to take a look at it once every 10 to 15 minutes to see its fade and rise. Dates and times of minima for RZ Cas in March/April are in this issue of Wasnews.

Reviews

Presented by Graham Boots

Extract from a book with the title 'The Five Ages of the Universe'

By Fred Adams & Greg Laughlin

Published by The Free Press in 1999
ISBN 0-684-85422-8 Price £16.99

The extract below is from page 184 and summaries the contents of this book.

In a lonely garret not far from the British Museum: Cornelius grabbed a clean sheet of paper, spun it through the roller, and began typing. The starting point for his

saga was the Big Bang itself, when the cosmos embarked upon its ever-expanding journey towards the future. After a short burst of inflation, the Universe cascaded through a series of phase transitions and generated an excess of matter over anti-matter. Throughout this Primordial Era, the Universe had no cosmic structures of any kind.

After a million years and many reams of paper, Cornelius reached the Stelliferous Era, a span of time when stars vigorously churned through their life cycles and generated energy from nuclear reactions. This bright chapter draws to a close when galaxies run out of hydrogen gas, star formation ceases, and the longest-lived red dwarfs slowly fade away.

Typing persistently, Cornelius and his story enter the Degenerate Era, with its brown dwarfs, white dwarfs, neutron stars, and black holes. In the midst of this frozen desolation, dark matter slowly collects within dead stars and annihilates into radiation that powers the cosmos. Proton decay ushers in the end of this chapter as the mass-energy of the degenerate remnants slowly leaks away and carbon-based life reaches a definitive extinction.

As the weary author continues his task, the only remaining characters are black holes. But black holes cannot live forever. Shining ever so faintly, these dark objects evaporate through a slow quantum mechanical process. With no other energy source, the Universe draws its power from this meagre radiative output. After the largest black holes have evaporated, the awkward twilight of the Black Hole Era gives way to a deeper blackness.

Beginning his final chapter, Cornelius runs out of paper, but not out of time. The Universe contains no stellar objects, only the leftover waste products from previous cosmic dramas. In this cold, dim, and far-distant Dark Era, activity within the cosmos slows down markedly. The extraordinarily low levels of energy are matched with enormous expanses of time. After its fiery youth and energetic middle age, the Universe now slowly shuffles into the darkness.

My own comments: -

'There is more to Heaven and Earth than there can ever be in man's philosophy'

I cannot remember who originally made this quotation. For my part I cannot accept our universe will end nor end in nothingness and darkness, otherwise what was the purpose?

Editors Note: Shakespeare's Hamlet, I, v, 166 "There are more things in heaven and earth, Horatio, than are dreamed of in your philosophy."

Notices

Lewis Peter Bushby

1934 – 2002

Obituary by

Graham Boots

I met Peter in August 1962 when he lived in London Street, Worthing. A friend of mine who worked with Peter at Marleybone Optical Co., Ltd., in Brougham Road, East Worthing informed me that he was selling a 6" Newtonian reflecting telescope which he had made. I purchased this telescope for £15.

I used the telescope many times between 1962 and 1968 before having use of a larger telescope. I then sold the telescope to member, Nick Quinn in 1973 who made great use of it over the next ten years before he too obtained a larger telescope. Nick now has it in storage as a backup instrument. I think Peter would have been pleased to know that his telescope received so much use over a period of 16 years and is still in existence today.



Peter was a member of our society from the very early days and is seen here, fifth from the left in a photograph of a group of our members attending an exhibition held at a member's home in 1967. He joined viewing parties that members made into the Southdowns that included watches for unidentified flying objects (UFOs), which were topical in those years. In recent years he would project the solar image which he recorded by video camera.

Marleybone Optical Co., Ltd., closed down in the early nineties and Peter chose to retire at that point which gave him a few years of retirement to enjoy his hobbies more.

His hobby was anything that was electrical or mechanical and he would spend much of his time investigating and

inventing. He had a deep love of astronomy and owned a beautiful collection of books that also reflected his interest in mathematics and optics. He had a commanding ability on how to perform calculations for the manufacture of optics that he did at great speed. Other interest included spending many hours using his scanner as a radio ham to speak to his contacts around the world. He also built computers and restored cars, including his cherished 1946 Hillman Minx.

He died suddenly but peacefully at his home in Goldsmith Road, Worthing. He leaves Donna and his two children, Stellar and David.

Obituary by

Brian Halls

I remember way back in 1970, the first time I attended a monthly meeting of WAS's forerunner, the Newtonian Observatory Astronomical Society (NOAS).

I had been encountering a problem with my small refractor, a 60mm Japanese job that had cost brand new, the sum of £20! I was frustrated and on the point of giving it all up.

I mentioned that I was having a problem with my telescope and I was introduced to the society's Instrument Section director, Peter Bushby. After listening a couple of minutes to the problem I had, he made a suggestion regarding the alterations I could make, which I duly did. The telescope is still operational 32 years later and, is used in my daily solar observations.

Thank you Peter for helping and, stopping a newcomer to astronomy from giving up.

Astronomical Journals & Magazines

Graham Boots

Currently the society subscribes to the monthly Sky & Telescope and Astronomy Now magazines, the quarterly Society of Popular Astronomy and the bi-monthly British Astronomical Association journals.

These are free to all members and in order to receive them your name and address are entered on a circulation list for each one. The circulation list is attached to the envelope containing the item. Members are allowed to receive more than one of the titles. When you receive the copy you can retain it for 7 days before passing it on to the next member on the list.

This means you may receive a particular publication quite a few weeks after publication date so some of the contents will be out of date. Every effort is made to construct circulation lists which keep members in close proximity so you do not have far to travel when passing a copy on.

The problems come when members live outside of Worthing which adds to the delay in receiving a particular copy, if indeed you receive any at all. I feel the best answer is to post the copy on to the next member on the list which should cost no more than 84p first or 66p second-class.

At present the SPA and BAA journals are put in one or other of the envelopes containing either Sky & Telescope or Astronomy Now. I propose to issue four separate circulation lists so as to make distribution fairer, simpler and quicker. Therefore I need to bring your requirements up to date.

Those of you already on the circulation lists for Sky & Telescope and Astronomy Now need do nothing if you wish to continue receiving these magazines. I need to hear from members who wish to receive the SPA journal which has become an excellent publication for beginners or who have a limited knowledge of the subject and those of you who just want to have fun, it has a realistic approach to amateur astronomy, whereas the BAA journal is a technical publication and would appeal to those who have deep specialist interests.

Please let me know what publications you would like to receive or if you wish to change the publications you currently receive or if you want to be deleted from an existing circulation list. Telephone 01903 505346

PATAG & The Liverpool Telescope

Graham Boots

PATAG is the body responsible for allocating use of the above 2-meter robotic reflecting telescope at a prime observing site on the island of La Palma in the Canary Islands and it will soon be available for unattended use. Up to 250 nights a year are clear at this site with some of the best seeing conditions in the world. 5% of the observing time will be available for non-professional use such as schools and colleges, also application from astronomical societies will be considered.

Do you have a project in mind? if so this may prove to be an excellent opportunity to gather superior data to that you would get in your back garden in the UK.

I have an application form and have much of the technical data regarding the equipment available such as CCD and filtering equipment which is very technical. Personally I do not currently have a project in mind but I would help, advise and encourage those who do.

You need to ask your selves the following questions.

- (a) Why do you want to do the study?
- (b) What you think the results may be?
- (c) What set of data do you need to achieve your aims and objectives?

I have been told that it would help if proposals for observing time concern a project being carried out with your own equipment so that the two sets of observations complement each other in some way. I am not too sure what is meant by this. Having inspected the application form and the technical data it is clear to me that only really serious amateurs with an advanced knowledge would be successful applicants, however this is a very new facility and we are all certain to be unsure how to apply at first. Please let me know if you are interested and I will give you a copy of the application form and technical data about the facility.

Urgent Anouncement

Graham Boots

Optimus bookshop in Warwick Street, Worthing has reduced the prices of their entire stock by 40% until Saturday the 16th March 2002. They have an astronomical section. Their telephone number is 01903 205895. I am sorry I could not let you know earlier.

Library Book Amnesty

Following is a list of Library Books the librarians *believe* to be overdue. Alongside only the initials of the last borrower have been tactfully displayed. If we are wrong and your book has been returned please visit the library at the next meeting to put us right!

Astronomical Equipment for Amateurs	GW
In the centre of Immensities	RB
Astronomy	PM
The Night Sky	JH
Stars at a Glance	AS
Astronomy (The evolving Universe)	AB
Radio Astronomy	KG
Our Universe	CH
Black Holes	DJ

The Origin of the Universe	RT
Seasonal Star Charts	RB
Comets (Video)	JR
Atlas of the Universe	PL
The Telescope	Mr. S
The Beginners Guide to Astronomy	JR
The Amateur Astronomy	RT
Black Holes	NG
Philips Planisphere	PM
Hunting Down the Universe	GT
A Brief History of Time	NG
Hubble Space Telescope	Mr& Mrs C
The Lighter side of Gravity	DJ
Universe	GB
Our Evolving Universe	AB
Illustrated Guide to the Night Sky	WS
The Universe	GT
Universe	AC
Star Hopping	SM
Burnham's Celestial Handbook 1, 2 & 3	KP

Articles

Telescopes

Robert Mathews (The Sunday Telegraph 3rd Feb 2002)

As someone quite capable of getting lost of the school run, the fact that I drove two companions and myself safely across the Atacama Desert in Chile last month has prompted gasps of astonishment in my household. Admittedly, there was only one road to drive along so even I would have trouble taking a wrong turning.

Still I made a good stab at it. As we drove along towards the aptly named Very Large Telescope Observatory in the Andes, I lost my bearings, and began panicking that we were supposed to be heading north while the road was taking us into the sun. Then one of my companions pointed out that we were south of the Equator.

It was comforting to know that had we failed to arrive, a military rescue squad would have been dispatched to look for us. Quite how often it has to scour this most arid desert on Earth for lost astronomers I do not know, but it later occurred to me that the military has long been helping astronomers in some surprising ways.

As the Sunday Telegraph reported last month, the enormous power of telescopes such as the VLT – which would be able to see a light as faint as a car's headlights on the Moon (if they ever get more than buggies up there) – is now being used to probe the mystery of so-called gamma-ray bursters (GRBs), the most violent explosions in the universe. Astronomers have yet to unravel their

cause, but their very existence was unsuspected until they were spotted in the late 1960s by spy satellites, launched by the Americans to detect signs of Soviet nuclear tests in space. The United States Military, eventually convinced that they weren't anything to do with the Soviets, declassified their GRB observations in 1973 – leaving civilian astronomers to puzzle over their origin ever since.

Many of the giant telescopes being used to probe GRBs exploit an ingenious trick for boosting the sharpness of images. Seen through the Earth's turbulent atmosphere, the otherwise pin-sharp images of stars and galaxies become fuzzy. To combat this, the telescope's mirror focuses on a bright star close to the object being studied, and flexes thousands of times a second to cancel out the turbulence effect – thus producing a pin-sharp image of the stars. Astronomers claim that this "adaptive optics" technique allows their ground-based telescopes to see as much detail as the Hubble Space Telescope high above the atmosphere. While they may have perfected the technique, the original idea came from the military – which has long used adaptive optics to boost the quality of images from its spy satellites.

According to the late astronomical historian Colin Ronan, even the origin of the telescope has its roots in military matters. In 1993, Dr Ronan produced evidence that Leonard Digges, the Tudor physicist, used mirrors and lenses to produce reflecting and refracting telescopes as early as the 1550s – pre-dating the work of Hans Lippershey, the Dutch optician usually credited with inventing the telescope, by half a century. Digges developed his "perspective glasses" for use by the Royal Navy – whose officials deemed the work top secret, and banned all mention of it.

Only years later did his son, Thomas, make references to his father's invention in works published in the 1570s. Thomas also promoted the claims of Copernicus that the Sun was the centre of the solar system and to argue that the universe was infinite – views that may have been based on Thomas's own cosmic observations using his father's telescope.

More than 400 years later, Digges's invention can now be found in space itself, in the form of the giant Hubble Space Telescope. The military still likes to keep one step ahead of the astronomical community, however. Rumour has it that the HST is merely the most powerful space telescope pointing **away** from the Earth.

Article submitted by Kay Smith

What's on the Box

Sunday 17th March 2002



20:00 to 21:00 ~ Killer Sun

Documentary about the creative and destructive power of the sun, including computer-generated imagery, satellite photography

Monday 18th March 2002

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03:25 to 04:15 ~ Moscow We Have a Problem

British-born astronaut Michael Foale reveals the details of exactly what went wrong during his 140 days in space on board the troubled Russian space station, Mir

WAS News News

An early NASA probe still on the job in deep space

NASA-AMES News Release

It took a little extra effort, but NASA this weekend bridged a nearly seven-and-a-half billion mile span to make contact with Pioneer 10, a plucky space probe that first left Earth's gravitational pull more than 30 years ago.

On Friday, scientists at the NASA Jet Propulsion Laboratory's (JPL) Deep Space Network in Goldstone, Calif., sent a signal to the spacecraft, which is still hurtling toward the fringes of the solar system. Twenty-two hours later, at 1:47 p.m. EST, researchers at the network's facility in Madrid, Spain, carefully monitoring a 70-meter dish antenna, heard Pioneer's response.

"We are overjoyed that we still have the spacecraft," said Robert Hogan, chief of NASA Ames Research Centre's Space Projects Division, where the Pioneer project is managed.

"As an eternal optimist, I was confident it would succeed. Pioneer 10 has been discounted in the past, but somehow it always manages to land on its feet," recalled Pioneer 10 Project Manager Dr. Larry Lasher of Ames, located in California's Silicon Valley. "This success is a testament to good solid design."

"From Ames Research Centre and the Pioneer Project, we send our thanks to the many people at the Deep Space Network and JPL who made it possible to hear the spacecraft signal again," said Pioneer 10 Flight Director David Lozier.

NASA previously lost contact with Pioneer 10 in August 2000, but made contact again in April of last year by switching the spacecraft to a different communications mode. NASA most recently made contact with the spacecraft on July 9, 2001.

Launched on March 2, 1972, Pioneer 10, built by TRW Inc., Redondo Beach, Calif., is now 7.4 billion miles from Earth. Pioneer 10 was the first spacecraft to pass through the asteroid belt and the first to make direct observations and obtain close-up images of Jupiter. During its tour of the Jovian system, Pioneer 10 also charted Jupiter's intense radiation belts, located the planet's magnetic field, and established that Jupiter is predominantly a liquid planet.

In 1983, it became the first man-made object to leave the solar system when it passed the orbit of Pluto, the most distant planet from the Sun.

The spacecraft continued to make valuable scientific investigations in the outer regions of the solar system until its science mission ended on March 31, 1997. Pioneer 10's weak signal continues to be tracked by the Deep Space Network as part of an advanced concept study of communications technology. The probe was also used to help train flight controllers how to acquire radio signals from space.



Pioneer 10 is headed toward the constellation Taurus, where it will pass the nearest star in the constellation in about two million years.

"Pioneer 10 has performed much better than expected," added Hogan, who is also a member of the original launch team for the spacecraft. "It's amazing that it's lasted this long."

Scientific data received from Pioneer 10's Geiger-Tube Telescope instrument is analyzed by original principal investigator Dr. James Van Allen of the University of Iowa, who discovered the Earth's radiation belts bearing his name. Based on the previous data received, Van Allen concluded that galactic cosmic radiation is being moderated by the Sun's influence, meaning Pioneer 10 has not yet crossed the boundary into interstellar space.

Diary

March 13 *The Aurora*, by Neil Bone (South Downs AS, Astronomy Now) 19.30, Heene Church Rooms, Heene Road, Worthing

March 22- 24 Winchester Weekend. King Alfred's College, Winchester. Day tickets for lectures including lunch@£28.

April 2-4 *Third Annual British Rocketry Oral History Project (BHOHP)* Conference, Charterhouse School. (More details at BROHP@aol.com)

April 10 *The Planet Vulcan*, by Dr David Brand. 19.30, Heene Church Rooms, Heene Road, Worthing.

May 8 *White Dwarfs*, by Konrad Malin-Smith FRAS (Croydon AS), 19.30, Heene Church Rooms, Heene Road, Worthing.

July 10 *Members Evening* –members get a chance to show what they have been doing over the last year.

July 13 Summer SAGAS Meeting, Portsmouth Naval Base, Hampshire.

September 11 *The Moon – a Biography* by Dr David Whitehouse (BBC On-line Science Editor)

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: worthing_astronomical_society@hotmail.com

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Note to Contributors

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

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