



The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER JULY 2009

The next meeting will take place on Wednesday 22 July at 19h15 at Christian Brothers College, Mount Edmund, Pretoria Road, Silverton, Pretoria.

PROGRAM

Annual general meeting *

What's Up in the Sky? by Gareth Gregory

10 minute interval — library will be open

Main talk: Topic to be announced — by Dr Rodney Milford

The meeting will be followed by tea/coffee and biscuits as usual.

The next observing evening will be held on Friday 17 July at the Pretoria Centre Observatory, which is also situated at CBC. Arrive any time from 18h30 onwards.

*It will be done as quickly as possible. It usually takes only about ½ hour. Come and speak your mind.

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Last month's meeting –24th June 09 – by Percy Jacobs

Quite an interesting evening. A few of us a little unprepared.

We once again had the pleasure of welcoming visitors and new members who joined in the past few months.

Anyway, Fred was supposed to present "Using Small Telescopes", but after a few weeks in the bush, I think he forgot about a few things in life and did a small reading on "Obliquity – Axial Tilt".

Axial tilt is the [inclination](#) angle of a [planet's rotational axis](#) in relation to its [orbital plane](#). The axial tilt is expressed as the [angle](#) made by the planet's axis and a line drawn through the planet's center [perpendicular](#) to the orbital plane.

The axis remains tilted in the same direction throughout a year; however, as the Earth orbits

the Sun, the hemisphere (half part of earth) tilted away from the Sun will gradually become tilted towards the Sun, and vice versa. This effect is the main cause of the [seasons](#).

The Earth's axial tilt varies between 22.1° and 24.5°, with a 42,000-year period, and at present, the tilt is decreasing. In addition to this steady decrease, there are also much smaller short term (18.6 years) variations.

What's up for July 09 was presented by Danie. A few very interesting targets and observing highlights were noted by Danie.

The main Topic for the evening was presented as a Video on a presentation given by Michael Melvill, a test pilot, of "Space Ship One, that won the X-prize of \$10M for the first private company to use the same aircraft to make two flights 100 km's in altitude – at the tip of space Sept 2004.

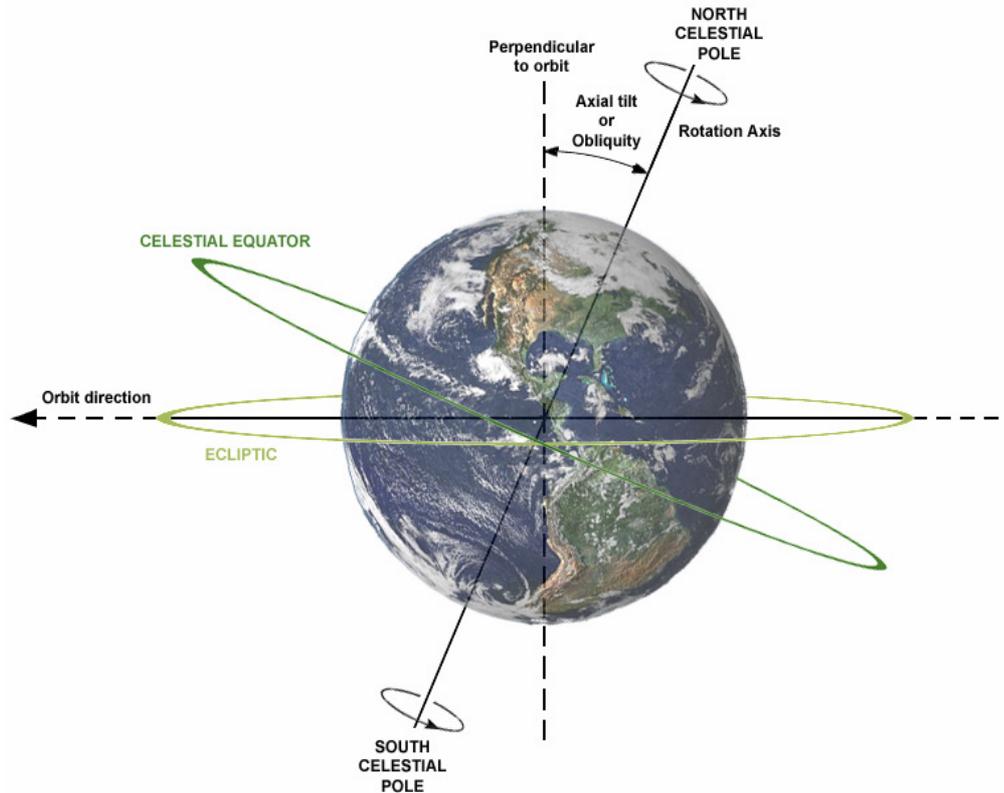
The Company, "Scaled Composites" built the mother ship and the space ship one aircraft on their premises. A small team of not more than 300 employees.

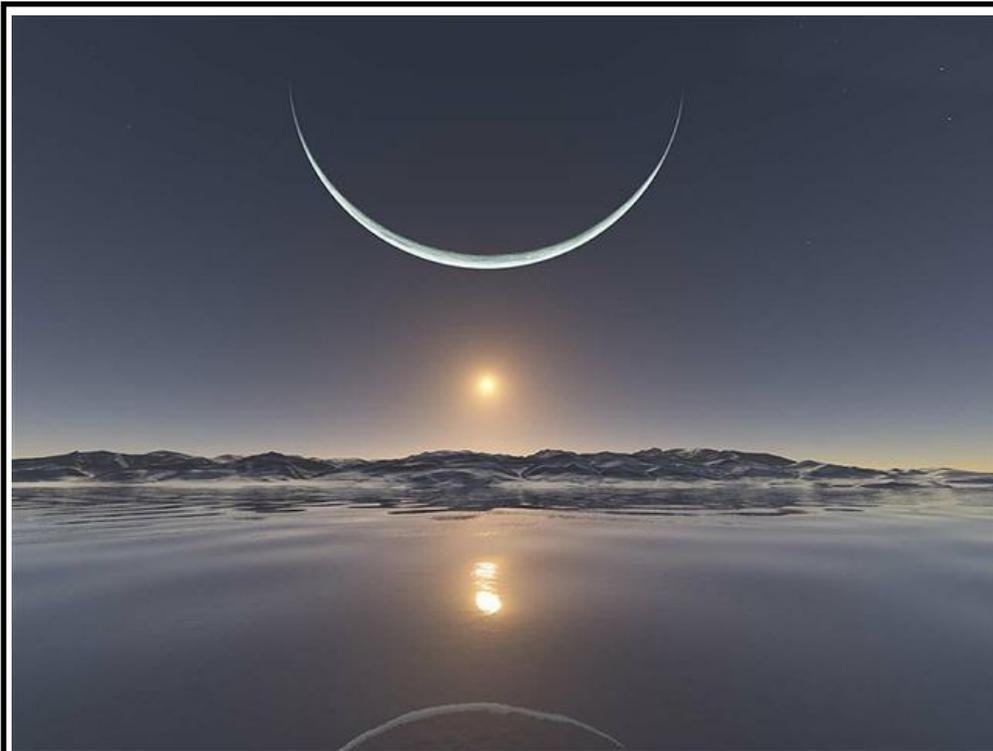
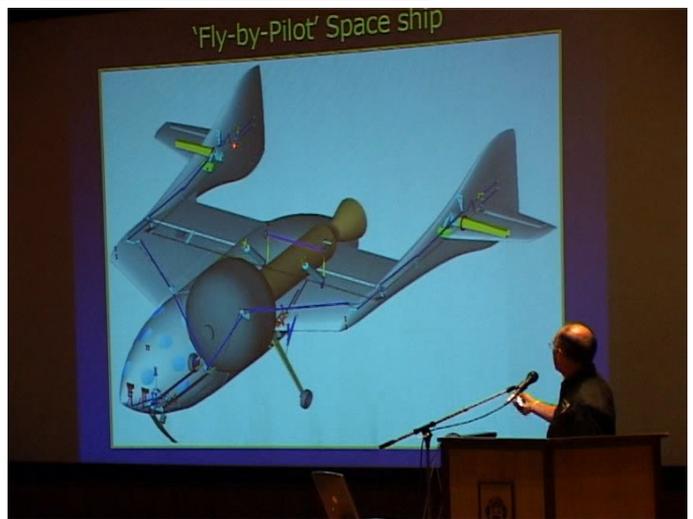
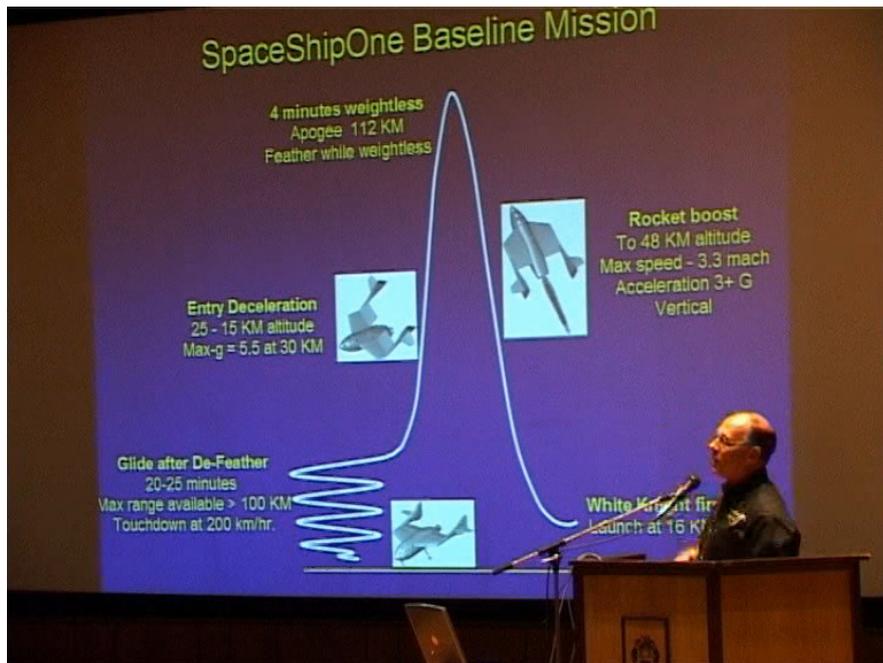
The aircraft was built as simple and light as possible. Only the absolute necessary was built into the aircraft. The company, "Scaled Composites", did not have all the facilities and test engineering equipment that NASA has at its disposal and successfully completed the objective of winning the X-Prize. The lesson to be learnt here, "small organizations with simple facilities, motivated and skilled staff, can also achieve great things".

The next step for Scaled Composites is to prepare & complete the ambition of Richard Branson of offering private individuals the benefit of flying into the edge of space and returning. (See page 10 of this newsletter in this regard.)

Thanks to Johan for organizing the DVD. I am sure it was enjoyed by all.

The evening closed off with tea & coffee.





Test your knowledge of astronomy

This “photograph” was presented with the following caption:

“This is the sunset at the North Pole with the moon at its closest point.”

However, the “photograph” is a fake, for more than one reason. Try and find all the reasons. Then turn to page 4 of this newsletter.

Last month's observing evening — Johan Smit

With much excitement we went to the viewing evening. The sky during the day was crystal clear and the date being close to the winter solstice a long evening waited.

Lots of visitors were expected. A group of Swedish scholars and young members of the "Kultiertjies" book club promised to visit our observing evening. There were 6 member telescopes available for viewing.

Early in the evening we showed the early visitors Saturn while we waited for the main groups of visitors to arrive. Much to our disgust clouds rolled in and by the time our visitors arrived it was nearly totally overcast. While it was overcast we opened the 12 inch telescope observatory dome and showed everyone how the big telescope work. Johan also did a short what's up presentation to the young visitors.

Just before we decided to pack up, the sky started clearing up, and as luck would have it in just the right places. We could show the Swedish visitors, the southern sky jewels.

They were obviously very excited to see the Southern Cross, Jewel Box and Omega Centauri. What I did not expect was their excitement at seeing Scorpio. That is when we started comparing what we could see and what they can see back home. At their high northern latitude that can never see the whole of Scorpio. So, something that we take for granted was a major treat for them.

We also had a look at some of the brighter clusters, M6 and M7, in that area of the sky. An evening that looked bad at the start turned out very good and many new friends were made.

Our next viewing evening is on 17 July 2009. That is the same day as our planned Settlers weekend. Our viewing evening will go ahead as normal.

So, on 17 July 2009 if you are not going to Settlers, come to our viewing evening regardless of what the weather looks like. You may just be surprised and actually enjoy it.



Why the "photograph" on page 3 is a fake — Michael Poll

1 The picture has obviously been manipulated, because the sun and the moon always look about the same size in the sky. You would never see the moon this big compared with the sun, from anywhere on Earth. The sun is actually 400 times the diameter of the moon, but it is also 400 times further away, a co-incidence which makes them look to be the same size in the sky.

2 No date and time is given with the picture.

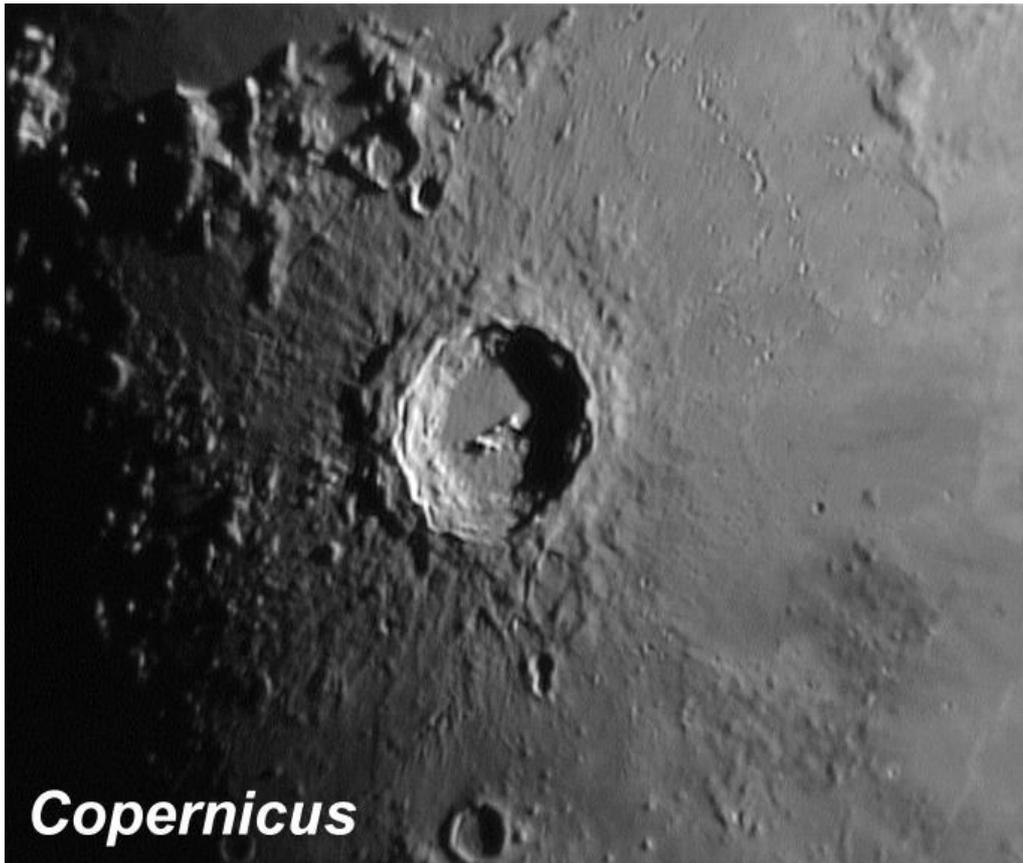
3 What is meant in the caption by "the moon at its closest point"? Closest to what??

4 Comparative sizes notwithstanding, for the moon to be in this relative position to the sun, the ecliptic (the sun's path around the sky as viewed from earth, a path which is effectively followed by the moon) would have to be standing upright in the sky and this does not happen at the poles. In fact the crescent moon is more likely to be vertical than horizontal at the poles. Having the ecliptic standing upright or nearly so, from the observers viewpoint, only happens in the tropics or very near them - and at this time the crescent moon will be horizontal or nearly so. The ecliptic is more or less vertical as viewed from Pretoria after sunset, in August. Have a look at the new moon in the early evening sky around August 21st - 22nd 2009.

4 PS the topography in the picture is not what I imagine it to be like at the north pole. It looks to me like water in the foreground, and mountains in the background.

Editor's note: If anyone would like to comment on what Michael wrote, send your comments to me at pierre.lourens@pbmr.co.za

The Lunar Crater Copernicus - Michael Poll



The lunar crater Copernicus is named for Nicolaus Copernicus (1473-1543). The crater is visible with [binoculars](#), and is labelled as object Number 18 on page 59 of the 2009 Sky Guide. The crater is estimated to be 800 million years old, and so is quite young in terms of lunar history.

Simple craters are formed by impacts of small objects. They are bowl shaped, and are about 15 km or less in diameter. Copernicus is 93 km in diameter and is an example of a complex crater. Complex craters are bigger than simple craters, and are

formed when larger projectiles collide with the moon - the holes resulting from such impacts are deeper and wider than those from small impacts.

Just after a large impact, the walls of the excavation are too weak to remain unsupported, so large masses of rock crumble randomly onto the crater floor. In smaller complex craters (i.e. those about 15 – 30 km in diameter) there are isolated slumps of broken rock. During the formation of large complex craters (i.e. those larger than about 30 km in diameter, which includes Copernicus) the entire wall of rock around the rim fails, and the rock slides down the slope, creating terraces. Copernicus shows a series of terraces indicating that the wall fractured a number of times, each time dropping a ring of rock that steps down to the crater floor. In the case of Copernicus, three distinct terraces are visible, and there are also arc-shaped [landslides](#) caused by slumping of the inner wall as the crater debris subsided.

The inner wall of Copernicus rises from the crater's floor to a height of about 3,800 metres (about 12 300 feet). The rim of the crater rises to a height of 900 meters (about 3000 feet) above the surrounding maria. The rampart slope from the rim down to the surrounding maria is about 30 km wide.

As well as excavating the crater, the energy of these large impacts also compresses the rock at the impact site so much that the terrain rebounds upward, creating a peak in the middle of the crater floor. The greater the energy of the impact, the greater the rebound of the floor, so that larger and more complex central peaks are thrown up. The central peaks of Copernicus consist of three isolated mountainous rises which are about 900 meters high, although these are proportionally lower than in some other craters.

Many of these features of Copernicus (and of other complex craters) are easily seen in a small telescope.

Principal Reference:

The Crater Main Sequence. Charles A Wood. Sky and Telescope, June 2008 page 63.

ASSA - Pretoria

Dark Sky Weekend 2009

(Settlers)

ASSA Pretoria will again be hosting a Dark Sky Weekend on Friday the 17th and Saturday 18th of July 2009. (The dark sky weekend in 2008 was supported by over 60 ASSA members from the Pretoria and Johannesburg centres. Feedback indicated that the quality of the observing was of a high standard).

The venue lends itself to 1st class observing due to its location (approx. 20km East of Bela Bela). Observing conditions should be near perfect at this time of the year. The entire campus has 24hr security and the observing fields are situated far from any lights.

Accommodation has been provided for in the dormitories. Each member will have access to their own room. Each room has four beds that will lend itself to family / children etc. The dormitories are fully equipped with showers and baths. You are required to bring your own linen.

Food & Beverage: Each member is responsible for their own requirements. There is a hotel near to the school, overall feedback has been positive. Braai facilities are provided.

Date: 17/18th July 2009.

Venue : Lord Milner School

Directions: Map Attached.

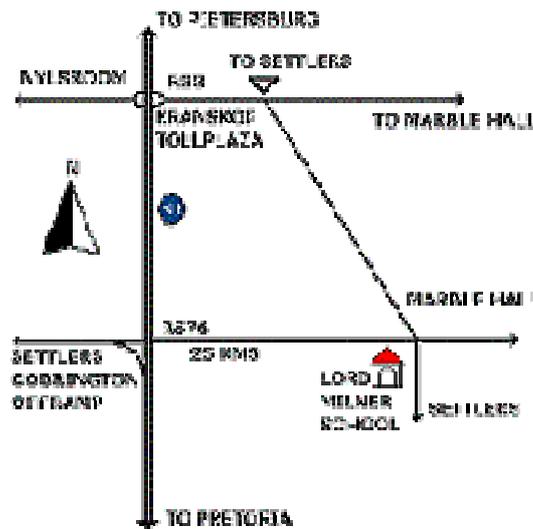
Cost: R50pp per night

Provided:

- Dark Sky
- Dormitories
- Braai Facilities
- Braai Wood
- 24hr Security

You need to bring:

- Linen
- Food & Beverage
- Mosquito Repellent
- Skottel for breakfast



RSVP – SMS name and number of people to 073 220 6824 or e-mail gareth.gregory@gregoryint.com.

To confirm your booking please deposit the total funds (No. of people x number of nights @ R50 pp/pn) + optional breakfast @ R40pp.

Bank – Nedbank

Account Number – 1634 049 209

Branch Code – 163 445

Reference – Surname / 1 or 2 nights / no. of people / breakfast (y/n)

The Settlers hotel has planned a **breakfast** for Saturday morning @ 9:30. Cost R40 per person. Please confirm numbers by the 3rd of July 2009.

**Summary of 'What's Up in the Sky?' to be presented on the 22nd of July 2009
by Gareth Gregory**

Sunset/Sunrise for the month of August
 Beginning – 17:45 to 06:42
 Middle – 17:50 to 06:35
 End – 17:55 to 06:21
 * **Dark Sky**

Phases of the Moon:
 Full Moon – 6th August (rise 18:14, sets 06:48)
 Last Quarter – 13th August (rise midnight, sets 10:40)
 New Moon – 20th August (rise 06:19, sets 18:03)
 First Quarter – 27th August (rise 10:52, sets 00:13)
 * **Dark Sky – 14th August to the 31st August**

| Meteor Showers: | Duration | Max. |
|----------------------------------|------------------|-----------------------|
| Shower | | |
| Piscis Australids | July 19 – Aug 17 | July 28 th |
| Southern Delta Aquarids | July 21 – Aug 29 | July 29 th |
| Alpha Capricornids | July 15 – Aug 25 | July 30 th |
| Observing Prospect - Good | | |

Constellation Culminations: the nights on which they reach the highest part of their course across the sky.

| Day | Constellation |
|-----|------------------|
| 04 | Microscopium |
| 05 | Capricorn |
| 09 | Equuleus |
| 13 | Indus |
| 25 | Piscis Austrinus |
| 26 | Aquarius |
| 28 | Lacerta |
| 29 | Grus |

Planets

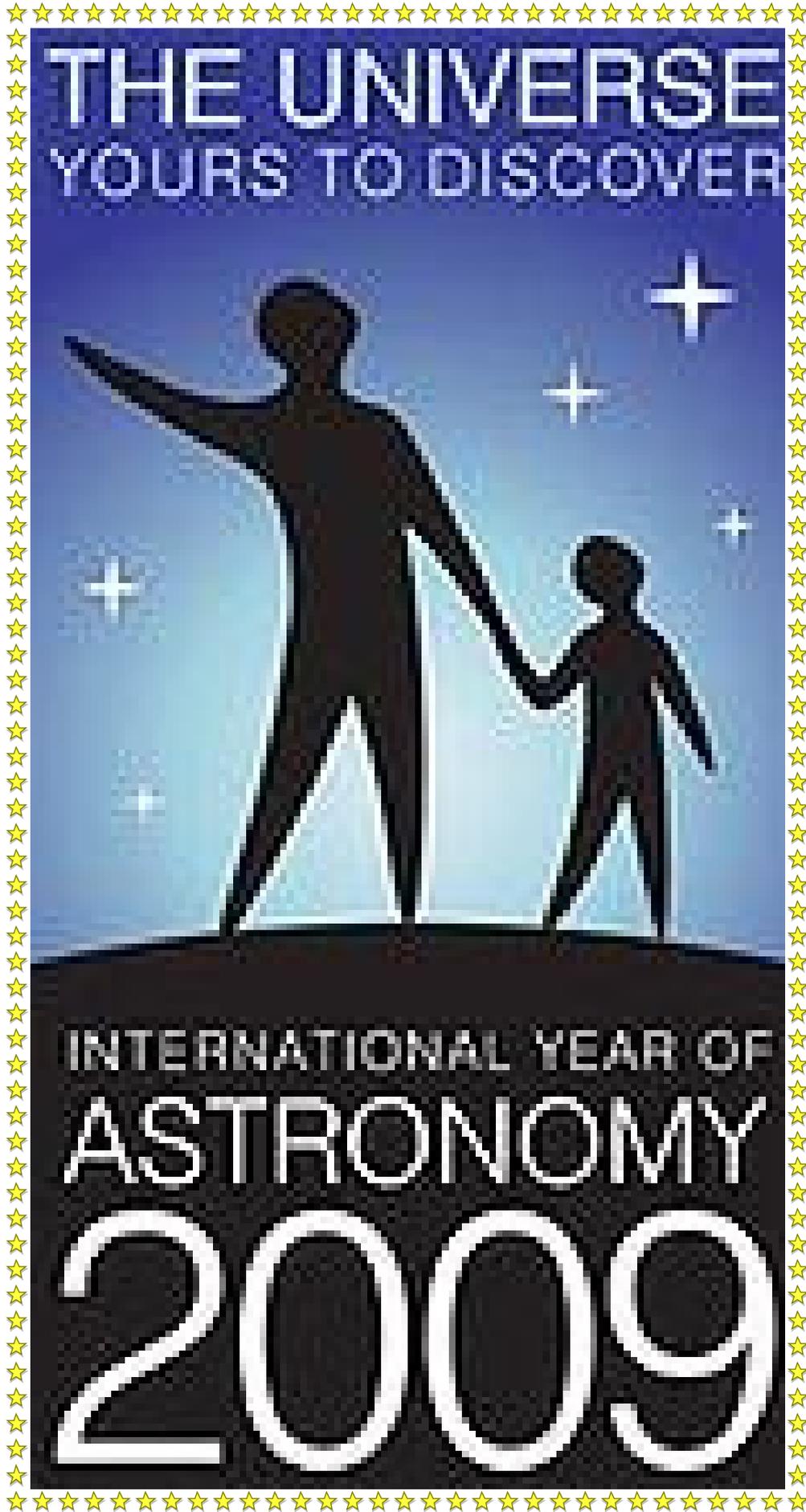
- Mercury – (mag. -0.5) can be observed after sunset / greatest altitude near month end.
- Venus – (mag. -4.0) brilliant morning object all month for an hour or two before sunrise.
- Mars – (mag. 1.1) visible for several hours before sunrise (constellation Taurus)
- Jupiter – (mag -2.8) rise just after sunset, visible the whole night up to mid month. Will set before sunrise for the remainder of the month. Watch for the occultations and transits of the Galilean moons.
- Saturn - (mag. 1.1) visible hour or two (sunset) for most of the month, thereafter will set with the sun.
- Uranus - (mag. 5.8) rises a few hours before midnight and can be seen all night.
- Neptune - (mag. 7.8) remains close to Jupiter all month. All night apparition and is at opposition on the 15th.

Look out for:

August 17th 05:00 (Gemini) – 15% Moon appears with Mars and Venus (mag. -4.0). Moon is within one degree of the star Epsilon Geminorum (mag. 3.2 / 900ly from earth / supergiant / dia. 150x our sun).

August 22nd 18:30 (to the right of Const. Crater) – Crescent Moon above Mercury (mag. 0.3) and Saturn (mag. 1.1) straight after sunset.

We will discuss in detail at the meeting.



Cosmic blasts

Four cosmic blasts are discussed briefly on this page and the next.



1. Powerful explosion

The most powerful explosion ever observed may have been even more powerful than first thought. Nearly three weeks after the bright gamma-ray burst occurred, it is still outshining its host galaxy, dumbfounding astronomers with its amazing longevity.

The cataclysmic event appears to have been caused by the collapse of an extremely massive star, perhaps as massive as 50 Suns, lying about 7.5 billion light years from Earth.

For a brief period on 19 March, it was easily the most distant object visible to the naked eye, lying thousands of times farther than the nearby Triangulum Galaxy, which normally holds that title. It was intrinsically 2.5 million times brighter than the next brightest explosion, a supernova that occurred in 2005.

<http://www.newscientist.com/article/dn13659>

2. Hubble mystery light puzzles astronomers

Three years ago, astronomers using the Hubble Space Telescope were perusing a cluster of galaxies about 8 billion light-years from Earth when they came upon a flash of light unlike anything they had seen before. Chemical analysis of the light proved just as puzzling as its visual effects, "We have never seen anything like it," said an astronomer. "No one has been able to come up with a good explanation for this object."

<http://dsc.discovery.com/news/2009/01/12/strange-light-hubble.html>



3. Remote GRB detected

The cataclysmic explosion of a giant star early in the history of the Universe is the most distant single object ever detected by telescopes. The blast was picked up first by Nasa's Swift space observatory which is tuned to see the high-energy gamma-rays emitted from extreme events. Other telescopes then followed up the signal, confirming the source to be more than 13 billion light-years away.

"This gets us into a realm where we've never been before," said Professor Nial Tanvir, of the University of Leicester, UK. The explosion is being viewed when the Universe was only 630 million years old, a mere one-20th of its current age (estimated to be 13.7 billion years). This is the most remote gamma-ray burst (GRB) ever detected,

and also the most distant object ever discovered.

The image is an artist's illustration of a current theory of the origin of GRB's: the core of a giant star collapses, then the star explodes, becoming a supernova. During the collapse of the core, super-fast jets of particles burst out from the star along the spin axis. These particles collide with gas already shed by the star before the collapse, thus generating the GRB.

<http://news.bbc.co.uk/2/hi/science/nature/8022917.stm>

http://en.wikipedia.org/wiki/Gamma_ray_burst#Energetics_and_beaming

This was brought to my attention by Danie Barnardo, one of our committee members.— Editor.

4. Multi-star pile-up caused brightest supernova

Supernova 2006gy, one of the brightest supernovas ever observed, burst into view in September 2006 in a distant galaxy, 240 million light years away. The blast was 100 times more powerful than a normal supernova, suggesting the exploding star had a mass of more than 100 solar masses. (It was reported on in the June 2007 newsletter, page 10.)

But astronomers found a puzzling detail in their observations: the supernova debris contained large amounts of hydrogen, which they would not have expected for such a massive star: It should have shed its outer hydrogen layers at an earlier stage.

The mystery over what caused it finally appears to have been solved. Two astronomers in the Netherlands say the explosion was the result of a cosmic pile-up: dozens of massive stars crashing into each other, producing a monstrous heavyweight star that eventually exploded, leaving a giant black hole in its wake.

<http://www.newscientist.com/article/dn12918>

Construction starts on world's first spaceport



This is science fiction becoming reality. On June 20, ground was broken in New Mexico for Spaceport America, the world's first commercial spaceport for launching private citizens into space.



Groundbreaking ceremonies included a flyover by WhiteKnightTwo, the mother ship that will send tourists on their way to space in SpaceShip2. Already more than 250 people have put money down to take trips to the edge of space as early as next year.

The image on the left is an artist's depiction of the finished spaceport.

<http://www.spaceportamerica.com/>

<http://www.universetoday.com/2009/06/17/worlds-first-spaceport-begins-construction/#more-32760>

Agenda for the Annual General Meeting of the ASSA Pretoria Centre to be held on July 22nd 2009

Opening
Apologies for Absence
Approval of Minutes of AGM : 2008 July
Chairman's Report
Treasurer's Report
Election of Committee for 2009 – 2010
Jack Bennett Award
Any Other Business

Information about the ISS visible in daylight (and more)

<http://www.heavens-above.com/>



Two lunar missions launched

NASA, with its eye on sending astronauts to Earth's natural satellite by 2020, launched the dual LRO* and LCROSS^ missions on 18 June 2009 atop an Atlas V rocket.

The LRO is an unmanned mission to comprehensively map the entire moon. One of the instruments aboard, the Lunar Radiometer Experiment, will make the first global survey of the temperature of the lunar surface while the orbiter circles some 50 kilometers above the moon. The mission will gather crucial data on the lunar environment that will help astronauts prepare for long-duration lunar expeditions.

"The more we learn about the moon, the better scientific questions we can pose, and the better locations we can find for future lunar landings for robotic and human explorers. By getting a comprehensive view, NASA can tailor future landing sites to specific goals," said David Paige, principal investigator for the instrument at UCLA.

The image above shows the Lunar Radiometer Experiment. The drawing on the right depicts the Lunar Module in which men first landed on the moon in July 1969, 40 years ago.

[http://www.moondaily.com/reports/JPL Instrument Set For Lunar Orbiter Mission 999.html](http://www.moondaily.com/reports/JPL_Instrument_Set_For_Lunar_Orbiter_Mission_999.html)

[http://www.planetary.org/news/2009/0618 Blog LRO and LCROSS Launch.html](http://www.planetary.org/news/2009/0618_Blog_LRO_and_LCROSS_Launch.html)

*LRO = Lunar Reconnaissance Orbiter

^LCROSS = Lunar Crater Observation and Sensing Satellite



The South African Square Kilometre Array Project

Call for applications for Postgraduate Bursaries for 2010 NOW OPEN.

The SA SKA Project supports students who wish to pursue postgraduate research in astronomy or fields of engineering appropriate to radio telescopes.

CLOSING DATE FOR APPLICATIONS: 31 August 2009.

Application forms are available at

<http://www.ska.ac.za/>

South African and Australia are the only two countries remaining on the shortlist to site this mega radio telescope. A final decision on the site is expected by 2010 and construction should start in 2014.



Arp 194

A peculiar group of interacting galaxies named Arp 194 is located in the northern constellation Cepheus approximately 600 million light-years from Earth.

Arp 194 is object number 194 in the **Atlas of Peculiar Galaxies** by Dr. Halton C. Arp.

The Hubble Space Telescope captured this image of Arp 194. It contains a bright blue streamer of stars, gas and dust that stretches about 100,000 light years.

The streamer seen in the image is really a stretched spiral arm full of newborn blue stars. This stellar activity typically happens when two galaxies interact and gravitationally tug at each other.

<http://www.space.com/scienceastronomy/090421-hubble-cosmic-fountain.html>

Pretoria Centre committee

Chairman and
ASSA Council Representative : Michael Poll 012 331 1615 (h)

Vice Chairman and

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Secretary :

Newsletter Editor :

Treasurer and

Membership Secretary :

Public Relations Officer :

Librarian :

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Johan Smit 072 806 2939 (c)

Tony Viljoen 012 654 5783 (h) 072 247 6648 (c)

Pierre Lourens 012 654 6366 (h) 072 207 1403 (c)

Rynhardt van Rooyen 011 441 3458 (w) 083 654 1862 (c)

Fred Oosthuizen 072 373 2865 (c)

Danie Barnardo 084 588 6668 (c)

Percy Jacobs 082 498 4680 (c)

Pat Kühn 082 895 5686 (c)

Hein Stoltsz 083 302 5096 (c)

