CANOPUS

The Astronomical Society of Southern Africa

Johannesburg Centre

Monthly Newsletter for
December 2003 *and* January 2004

Contents:

The Sir Herbert Baker Library, 18a Gill Street, Observatory, Johannesburg
P.O.Box 93145, Yeoville, 2143

Editorial

What a month it's been - your editor's PC has been afflicted with the dreaded CHDS *(Crashed Hard Disk Syndrome)* and as a result the ASSA Jo'burg Centre IT department has had to resort to pencil and paper and a backup PC which is a little slow and retarded compared to the one normally in use. Which has also resulted in a combined "Yearend 2003" issue covering both December 2003 and January 2004. I hope this has not been too much of an inconvenience and yes, rest assured, steps have been initiated to prevent a recurrence of the situation.

Venus is really bright in the evening sky and should make a beautiful combination with the sickle Moon in the early evening on Christmas day. In the morning, Saturn and Jupiter are still looking really good. Orion also looks magnificent, especially after rain has cleared the muck and bullets from the atmosphere and the clouds have retreated. Mars is still in everyone's sights with a total of four spacecraft with three landers arriving at the Red planet from Christmas Eve onwards over the next couple of weeks.

Eben van Zyl has submitted a really interesting article on the "Process of Accretion" which has certainly corrected some of my misconceptions about how the whole process worked, and our **Chairman Dave Gordon "**chats" once again in his regular column - lucky Dave - over the next few months, he's getting to do what most of us only dream about doing!

Evan Dembskey supplies another in his "Web between the Worlds" articles, and **Brian Fraser** supplies us with the heavenly happenings for the first 2 months of 2004. Strange, it seems only a short while back that all the people were looking to celebrate the new millennium and we're already well into it.

Your editor has also grabbed an article or three from the space agency email lists and amongst these is one which reminds us to celebrate the ISS's birthday - has it been up that long already???

The Committee wishes You and Yours all the Very Best over the Festive Season.

The Editor

chris@penberthy.co.za

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Notice of Monthly Meeting

The Monthly Meeting of the Johannesburg Centre of the Astronomical Society will be held in the Sir Herbert Baker Library, 18a Gill Street, Observatory, on Wednesday, 14th of January, 2004 at 20:00.

Telescope Making

(with a demo)

By: **Brian Fraser**

Telescope Making Classes

Would you like to make your own telescope?…or finish off a partially completed one? Well here's your opportunity. Join the Telescope Making Class being held under the guidance of Brian, Vince and Chris. Contact Chris on (011) 763-3301 or email *cstewart@alcatel.altech.co.za* if you are interested.

ASSA Lists

ASSA Jo'burg Centre:- To subscribe to the new ASSA announcs list, send a blank mail to: *assajhb_subscribe@yahoogroups.com.*

You will receive instructions by return mail. ASSA Jo'burg centre members are strongly advised to subscribe to this list to receive late-breaking announcements (e.g. venue changes for meetings).

Amateur Telescope Making:- news and discussion on the subject of telescope making, a means for people involved or interested in our telescope making class to share their experience.
assaatm_subscribe@yahoogroups.com

Imaging:- News and discussion on the subject of astro imaging (film and electronic); a means for people involved in or interested in our imaging group to share their experiences and techniques.
assaimaging_subscribe@yahoogroups.com

and finally, a periodic digest of general news relating to astronomy and space exploration
Zastro_subscribe@yahoogroups.com

Public Viewing *(weather permitting)*

Public viewing nights are held subject to suitable weather conditions on the Friday nearest First Quarter, and are held at the Old Republic Observatory, 18a Gill Street, Observatory, Johannesburg. Starting time around 19:30. See the ASSA event calendar for the proposed viewing dates. Please check with **Constant** on 717-1397 or email- *tabbie@icon.co.za* to ensure that viewing IS taking place on the specified evening.

Welcome to new Members

We are responding to an invitation to swap monthly news with the **ASSA Garden Route Centre**

Rudi de Louw

We wish you clear skies and many happy years of observing

ASSA Jo'burg Centre - Calendar of Events

Month	Day/ Date	Event	Details
Dec	Mon 8	Committee meeting	*Cancelled*
	Sat 13	**Monthly Meeting** *** * * YEAR END STAR PARTY * * *** at Skeerpoort Farm	Contacts: Dave Gordon and Chris Middleton
		No Public viewing in December	
Jan	Mon 12	Committee meeting	
	Wed 14	**Monthly Meeting**	Telescope Making - maybe with demo -**Brian Fraser**
	Fri 23	*Public Viewing*	
Feb	Mon 9	*Committee Meeting*	
	Wed 11	**Monthly Meeting**	Land of the Midnight Sun **Gil Jacobs**
	Fri 20	*Public Viewing*	
Mar	Mon 8	Committee Meeting	
	Wed 10	**Monthly Meeting**	Galaxy Classification in the 21st Century: The Hubble Tuning Fork Strikes a New Note. **Robert Groess**
	Fri 19	*Public Viewing*	
Apr	Mon 12	Committee Meeting	Maybe *(this is Easter Monday)*
	Wed 14	**Monthly Meeting**	Impact Craters **Dr. Smart**
	Fri 16	*Public Viewing*	
May	Mon 10	Committee Meeting	
	Wed 12	**Monthly Meeting** *(at the Planetarium)*	Pre-Venus Transit Meeting
	Fri 14	*Public Viewing*	
Jun	Mon 7	Committee Meeting	
	Wed 9	**Monthly Meeting**	T.B.A.
	Fri 11	*Public Viewing*	
Jul	Mon 12	Committee Meeting	
	Wed 14	**Annual General Meeting**	T.B.A.
		Public Viewing	

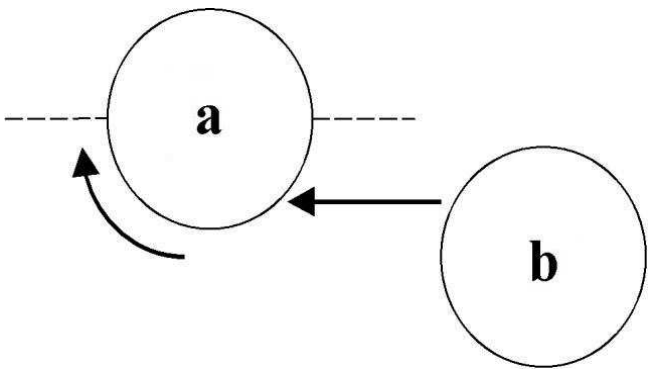
Reminders

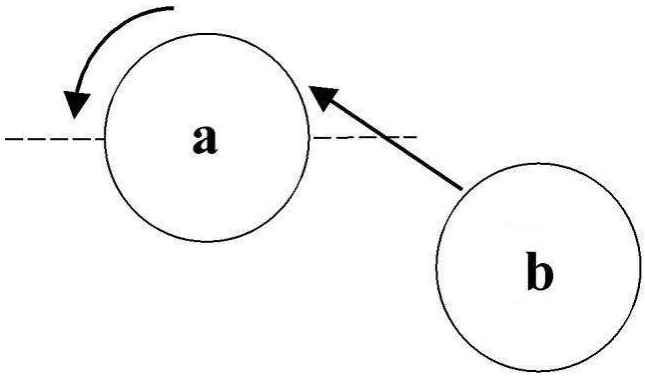
2003	Centenary of Flight
2004	**March - Centenary:** Sir Herbert Baker Library Building *Johannesburg Centre to host 2004 ASSA Symposium* **June 8:** Venus Transit
2006	**March 29:** Total Solar Eclipse

The Process of Accretion

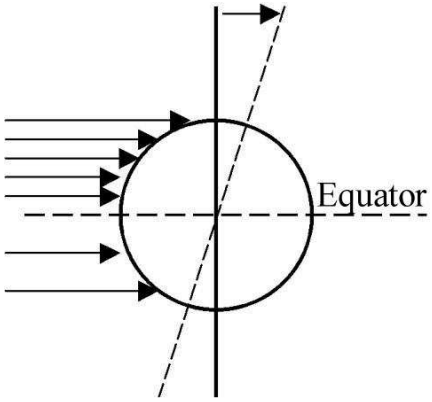
Most of the first stars that condensed from the hydrogen and helium formed in the cosmogenesis (Big Bang) were massive stars because these gases were very dense. In the nuclei of these stars protons (hydrogen nuclei) were fused together by pressure exerted on the nucleus by the overlying layers of gas and helium was formed at the reigning temperature of 15 million degrees Centigrade. 0,07% of the mass of the protons was converted into energy in the form of gamma rays at a frequency of 10^{25}**.** As this energy was radiated it was constantly absorbed and re-emitted by surrounding protons and electrons and by the time the energy reached the surface (after some millions of years) the frequency had dropped to 10^{14}**,** i.e. it had become visible light**.** Because of their great masses, these stars very quickly used up such a percentage of their hydrogen fuel that their production of energy suddenly decreased so that they collapsed under the weight of the overlying layers of gas**.** Then a rebound took place and these stars were blown to smithereens in supernova explosions**.** Besides converting hydrogen into helium, some heavier elements were formed, such as carbon, oxygen and nitrogen. No atoms heavier than iron can be formed by fusion. But the tremendous temperature and pressure in the explosion formed other atoms with nuclei heavier than iron. The exploded material now contained about 1% of atoms heavier than hydrogen and helium. These supernovae took place about 9 milliard years ago (9 thousand million). This material became the matter from which the second generation of stars was formed - the finely-divided matter packing together. These new stars underwent a similar lifestyle until they, about 5 milliard years ago, also went supernova.

The material thrown out by the second generation of stars was enriched to the extent of 2% by atoms heavier than hydrogen and helium. This became the material for the third generation of stars to condense from. The Sun is one of the members of this third generation of stars. The Sun and it's planets condensed from this finely-divided gas and dust by the process known as accretion. How did it work? The process of accretion started about 5 milliard years ago and by 4½ milliard years ago had been completed. How did the finely-divided dust and the gases come together to form stars? The densest spot in this finely-divided primeval nebula, by it's force of gravity, attracted the most of the material and where the matter collected together, the Sun came into existence when sufficient matter had been collected together to exercise sufficient pressure to raise the temperature to 15 millions degrees so as to set the nuclear fires burning. While this was going on, the outlying dust and gases took on the shape of a disc revolving around the protostar. As the particles fell towards the star, their increased speed, drove them forward in orbits of low eccentricity. From this disc the planets condensed between 5 milliard and 4½ milliard years ago. How did this condensation take place from the finely-divided matter of the primeval nebula? The particles moved in orbits which were very nearly parallel, the particles nearer the Sun moving faster than those further from the centre of attraction. Particle **a** would be overtaken by particle **b**. Particle **b** would cleave onto particle **a**, either on the inside or on the outside. In the first case, **b** would push **a** in a





clockwise direction and in the second case in a counterclockwise direction. In rare cases the point of contact would be directly behind, thus speeding up without causing any spin. As this process went on, the particles grew bigger and bigger. It seems that the counterclockwise spin became twice as prevalent as the clockwise spin as only three of the planets spin clockwise (Venus, Uranus and Pluto) while the other six spin counterclockwise as seen from the north.

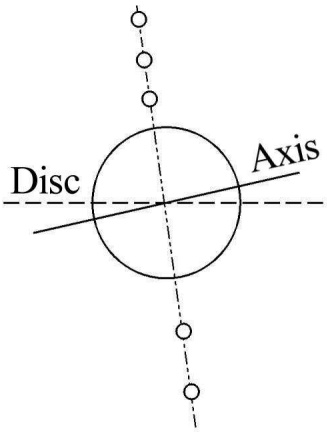


If we view the particles from the side, the place of revolution, we see that the axes of spin of the particles were also subject to being tilted from the vertical to the plane of revolution, depending upon how many particles struck the leading particles above or below their equators. The axis of spin of Neptune grew to a value of 29º33'; Saturn 26º43'; Mars 25º12'; Earth 23º27'. The tilt of the axis of spin of Jupiter reached only 3º7' while that of Mercury remained zero.

The surfaces of the Moon and Mercury bear silent testimony of the end results of the process of accretion. Most of the craters on the side of the Moon facing the Earth that are greater the 10km have a diameter of 48 kilometres. To form a crater of this size requires a clump of material eight kilometres in diameter. The smaller clumps of aggregated material were loosely packed, but as the clumps became bigger, they became more solid. With no atmosphere or water, Mercury and the Moon retained their surfaces as they were when the process of accretion came to an end.

G W Wetherill (Scientific American, October 1969) explained how he started with a model containing 100 clumps (planetesimals) and allowed them to revolve around a protosun. His model showed that after 30,2 million years, the 100 planetesimals would have accreted to 22 planetoids; and after 79 million years to 11. After 100 million years there were only 4 planets, showing that the Sun's 4 inner planets could have condensed in only 100 million years.

The axis of rotation of Mercury remained vertical because of the great force of gravity exercised by the Sun which kept the particles crashing into Mercury very confined to the plane of revolution.



The great mass of Jupiter probably obviated its axis from being tilted. But the planet Uranus poses a very difficult problem. Not only has the axis of rotation of Uranus been tilted by an angle of 97° 53', but the planet's 5 large moons also revolve in a plane tilted to the plane of revolution by the same angle. This cannot be explained away by postulating a collision because the ellipses in which those 5 moons revolve are of very low eccentricity - they are nearest to circles of all the orbits in the Solar System. The most eccentric of the orbits of the five moons has an eccentricity of only 0,005. The eccentricity of the orbit of our Moon, by contrast is 0,0549 or ten times greater. The whole Uranian system must have had this configuration since the beginning. Perhaps Uranus developed at a very great speed of rotation so that it cast material off from its equatorial plane and this materiel subsequently condensed into five moons. The rings outside the furthest moon also revolve in this plane tilted at 97° 53'.

The retrograde revolution of the two moons of Neptune, Triton and Nereid, and the furthest away moon of Saturn, Phoebe, are most probably captured bodies.

The other moons in the Solar System were formed by accretion of material that revolved around the planets as they formed in the disc.

The thousands of Minor Planets all revolve counterclockwise around the Sun and they were also formed by accretion but were prevented from forming one large planet by the resonances that their orbits developed with the orbit of Jupiter as shown by the Kirkwood gaps at resonances of 2:1; 3:2; 5:2.

Jan Eben van Zyl

Chairman's Chat

Incredible Journey

Firstly, a little bad news. Some of our treasured assets have, yet again, been involuntary redistributed. In November, we fell victim to a pair of particularly malicious burglaries at the Sir Herbert Baker Building. Some of our prized possessions, including the autographed Marsha Ivins collage, have been re-appropriated. We also lost, *inter alia*, our refrigerator, hot tray, the audio-visual projector and a number of valuable books, posters and catalogues. The theft also had a malicious taint to it; our librarian, Evan Dembskey, discovered a portion of our AAVSO Variable Star Catalogue used for kindling in the nearby vicinity.

Our response was swift. After an emergency committee meeting, we decided to install an alarm and armed response system in all the buildings, including the two observatories. This was done in order to attempt to safeguard what assets we have left. How unfortunate that in this day and age we are forced to allocate a portion of your precious annual subscriptions to what I consider to be a non-value-adding expense.

This traumatic experience has forced us to look introspectively and at the bigger picture. Your committee has known for some time that there are a number of members who will not risk life and limb to attend monthly meetings or make use of the telescopes because of the perceived - and, I must add reluctantly, real - danger of driving to a rapidly deteriorating part of Johannesburg.

We have therefore started looking for alternative convenient meeting venues. Some of the ideas proposed include moving our meetings to the Planetarium, the Johannesburg College of Education, or the Military History Museum. This final option does appear to be the most attractive from the perspectives of centrality, ease of access, safety and, of course, our very good working relationship with the management of the Military History Museum (as a consequence of annual ScopeX).

Your feedback and suggestions would be most valuable and a quick email from you to the editor, Chris Penberthy, giving us your endorsement or alternative suggestions, allows your committee to move forwards with the knowledge that the majority of the membership would be satisfied with the outcome.

And now, at last, the good news: For the next three months you will not be subjected to my awful attempts at telling jokes at meetings. By the time you read this, I will be in the Southern United States on a mission to visit as many of the famous and large observatories as time will permit. I will be taking many photographs and interviewing working astronomers as well as observatory staff.

I intend visiting the McDonald Observatory in Texas, (home of SALT forerunner, HET), Lowell Observatory, Kitt Peak Observatory and, if time and finances permit, the Keck I & II, Gemini North and Subaru Telescopes atop the extinct volcano of Mauna Kea in Hawaii.

Then, around mid-January, I plan to catch buses southwards, through Mexico (spending time visiting the Aztec Pyramids), Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Ecuador, Peru (Machu Picchu and the Inca ruins), Bolivia, Chile (visiting the ESO Telescopes) and completing my journey in Buenos Aires, Argentina for a flight back to South Africa on 30 March 2004.

I will be travelling light and will follow a skeleton itinerary with the flexibility to change plans as circumstances unfold. If internet access permits, I hope to keep you informed of my progress.

Why am I doing this? The experience will cross-pollinate virtually everything I am passionate about: astronomy, ancient history and adult training, particularly leadership skills in business. However, to lower the communication frustration levels, I have been teaching myself Spanish; the South American peoples *no hablo inglés*.

So, as you see, madness manifests in a variety of forms. One thing is certain – the experience will be of cosmic proportions.

Until I see you all again.
Adiós!

NASA Spacecraft Pinpoints Where the Wild Thing is

JPL News
December 1, 2003

Forty-nine days before its historic rendezvous with a comet, NASA's Stardust spacecraft successfully photographed its quarry, comet Wild 2 (pronounced Vilt-2), from 25 million kilometers (15.5 million miles) away. The image, the first of many comet portraits it will take over the next four weeks, will aid Stardust's navigators and scientists as they plot their final trajectory toward a Jan. 2, 2004 flyby and collection of samples from Wild 2.

"Christmas came early this year," said Project Manager Tom Duxbury at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "Our job is to aim a 5 meter (16 foot) long spacecraft at a 5.4 kilometer (3.3 mile) wide comet that is closing on it at six times the speed of a bullet. We plan to "miss the comet" by all of 300 kilometers (188 miles), and all this will be happening 389 million kilometers (242 million miles) away from home. By finding the comet as early and as far away as we did, the complexity of our operations leading up to encounter just dropped drastically."

The ball of dirty ice and rock, about as big as three Brooklyn Bridges laid end-to-end, was detected on November 13 by the spacecraft's optical navigation camera on the very first attempt. The set of images was stored in Stardust's onboard computer and downloaded the next day where mission navigator Dr. Shyam Bhaskaran processed them and noticed a white blob of light bisecting the base of a triangle made by three stars Stardust uses for deep space navigation.

"When I first looked at the picture I didn't believe it," said Bhaskaran. "We were not expecting to observe the comet for at least another two weeks. But there it was, very close to where we thought it would be."

The Wild 2 sighting was verified on November 18 using the second set of optical navigation images downloaded from Stardust. To make this detection, the spacecraft's camera saw stars as dim as 11th visual magnitude, more than 1,500 times dimmer than a human can see on a clear night.

The early detection of Wild 2 provides mission navigators critical information on the comet's position and orbital path. Future optical navigation images will allow them to do more fine-tuning. In turn, these new orbital plots will be used to plan the spacecraft's approach trajectory correction maneuver. Stardust's first such maneuver is planned for December 3.

Unlike other orbiting bodies, the paths of comets cannot be precisely predicted because their orbits about the Sun are not solely determined by gravity. The escape of gas, dust and rock from comets provides a "rocket effect" that causes them to stray from a predictable orbital path. The actual orbital path cannot be precisely determined from Earth-based telescopes because the comet is shrouded in a cloud of escaping gas and dust. What is seen from Earth is not the actual 5.4 kilometer (3.3 mile) wide body composed of rock and ice, but the cloud of debris and gas that envelops it.

"With these images we anticipate we will flyby comet Wild 2 at an altitude of 300 kilometers, give or take about 16 kilometers," added Bhaskaran. "Without them, we wouldn't be able to safely get any closer to the comet than several thousand kilometers."

Stardust will return to Earth in Jan. 2006 to make a soft landing at the U.S. Air Force Utah Test and Training Range. Its sample return capsule, holding microscopic particles of comet and interstellar dust, will be taken to the planetary material curatorial facility at NASA's Johnson Space Center, Houston, where the samples will be carefully stored and examined.

Stardust's cometary and interstellar dust samples will help provide answers to fundamental questions about the origins of the solar system. More information on the Stardust mission is available at http://stardust.jpl.nasa.gov .

Stardust, a part of NASA's Discovery Program of low-cost, highly focused science missions, was built by Lockheed Martin Astronautics and Operations, Denver, Colo., and is managed by JPL for NASA's Office of Space Science, Washington, D.C. JPL is a division of the California Institute of Technology in Pasadena. The principal investigator is astronomy professor Donald E. Brownlee of the University of Washington in Seattle.

Submitted by **Chris Stewart**

An interesting Item for Sale

Williamson Manufacturing Comp. Ltd. (London UK) Type F 96 Aerial reconnaissance camera. It was made in the sixties for the Canberra bomber.

This large camera contains lots of interesting electro/mechanical components. Exact optical characteristics are uncertain, but the lens (diameter approx 165mm, f/ratio around f/5.5 to f/7.5) would probably make the basis of a nice wide-field refractor.

Interested parties can phone to view the unit and/or to make an offer to purchase. (All reasonable offers would be considered.)

Contact:	Fred Stander
Phone:	(011) 394 8974 direct
Cell:	083 266 7829

Going to Mars for Christmas

ESA News
13 November 2003

Europe's mission to the Red Planet, Mars Express, is on schedule to arrive at the planet on Christmas Day, 2003.

The lander, Beagle 2, is due to descend through the Martian atmosphere and touch down also on 25 December. Mars Express is now within 20 million kilometres of the Red Planet and the next mission milestone comes on 19 December, when Mars Express will release Beagle 2. The orbiter spacecraft will send Beagle 2 spinning towards the planet on a precise trajectory.

Into orbit
Beagle has no propulsion system of its own, so it relies on correct aiming by the orbiter to find its way to the planned landing site, a flat basin in the low northern latitudes of Mars.

ESA engineers will then fire the orbiter's main engine in the early hours of 25 December to put Mars Express into orbit around Mars (called Mars Orbit Insertion, or MOI).

Landing
When Beagle 2 begins its descent, it will be slowed by friction with the Martian atmosphere. Nearer to the surface, parachutes will deploy and large gas-filled bags will inflate to cushion the final touchdown. Beagle 2 should bounce to a halt on Martian soil early on Christmas morning.

The first day on Mars is important for the lander because it has only a few hours to collect enough sunlight with its solar panels to recharge its battery.

Waiting for signal
We then have to wait for the radio 'life' signal from Beagle 2, relayed through the US Mars Odyssey spacecraft, to see if the probe has survived the landing. This could take hours or even days.

If nothing is received on Christmas morning, the UK Jodrell Bank Telescope will search for the faint radio signal from Beagle 2 in the evening. The Mars Express orbiter can also search for the lander but, because of its orbit, it will not be in place to do this until early January.

If all goes well, Mars Express and Beagle 2 will then begin their main mission - trying to answer the questions of whether there has been water, and possibly life, on Mars.

INTERNATIONAL SPACE STATION MARKS FIVE YEARS IN ORBIT

NASANEWS@mail.arc.nasa.gov
RELEASE: 03-95AR

The International Space Station reaches the historic five years in space milestone on November 20, 2003. The unique orbiting laboratory complex has grown from a lone, uninhabited module into a permanently staffed, house-sized research facility.

The Station remains the largest and most complex international space research project in history. The Station will eventually triple scientific capacity with components awaiting the Space Shuttle's return to flight.

The first Space Station element, the Russian Zarya control module, was launched from Baikonur, Kazakhstan, Nov. 20, 1998. Two weeks later, the Space Shuttle Endeavour delivered the second element, the U.S. connecting module called Unity. The challenges, triumphs and tragedy shared by the international partnership since then have solidified cooperation on the Station among the United States, Russia, Canada, Japan and Europe.

"Together with our international partners we have learned how to build, operate and maintain a very complex spacecraft, through the good times and the bad," said Bill Gerstenmaier, NASA Space Station Program Manager. "With this experience to guide us, we look forward to the future, with a vast expansion of the Station on the horizon."

At five years old, the Station is still growing. More than 80 tons of equipment and hardware are in the Space Station Processing Facility at NASA's Kennedy Space Center (KSC), Fla. being prepared for launch.

The Space Station has orbited the Earth more than 29,000 times. It is visible in the night sky as it flies more than 210 miles overhead. The living and working area inside the Station has a volume of about 15,000 cubic feet, larger than a three-bedroom house.

The orbiting complex has been inhabited since Nov. 2, 2000. Eight successive crews, 22 people, have staffed the Station. Residents have conducted research in bioastronautics, physical sciences, fundamental space biology, space product development and space flight disciplines. In the U.S. Destiny Lab alone, astronauts have worked on over 70 different science experiments.

Hundreds of people on Earth support Station operations from the Station Mission Control Center at NASA's Johnson Space Center in Houston. Round-the-clock science operations are handled by the Payload Operations Center team at NASA's Marshall Space Flight Center in Huntsville, Ala. Hundreds of other scientists and engineers perform important jobs, such as training Station crews and building new hardware that will become part of the orbiting laboratory.

NASA Ames Research Center, Moffett Field, Calif., is contracting a life science research facility aboard the ISS. The facility consists of many pieces of hardware, including a centrifuge, life sciences glove box and habitats for biological experiments. In addition, NASA Ames supplied a suite of radiation-measuring dosimeters, known as the Passive Dosimeter System, which serves as a radiation monitor inside the ISS to ensure the astronauts' safety.

Additional research facilities are being readied for launch on future Shuttle missions. They will enhance Destiny's capabilities in the areas of fundamental space biology; glass and porous ceramics materials processing research; human physiology research; combustion research; research on the behavior of fluids; Earth observations; and experiment refrigerator/freezer conditioned sample storage.

Also awaiting launch at KSC are solar arrays and support structures that will triple the sunlight-gathering, solar cell area, thereby increasing the power dedicated to research by 84 percent.

The Node 2 module that will serve as a connector between the U.S., European and Japanese research labs is at KSC undergoing pre-launch processing. The Kibo Japanese Experiment Module, including a pressurized lab already at KSC, will also be added

to the Station. The European Columbus Laboratory, under construction in Bremen, Germany, will expand the Station's volume to almost that of a five-bedroom house.

For information about NASA, human spaceflight, astronauts, and the International Space Station on the Internet, visit:

http://www.nasa.gov

Web Between The Worlds

The climateprediction.net experiment has been developed to allow a state-of-the-art climate prediction model to be run on home/ school/ work computers. By getting data from thousands of climate models, we will generate the world's largest climate prediction experiment.

Climate change, and our response to it, are issues of global importance, affecting food production, water resources, ecosystems, energy demand, insurance costs and much else. There is a broad scientific consensus that the Earth is likely to warm over the coming century, but estimates of how much vary hugely. By taking part in the climateprediction.net experiment you can help to improve scientific forecasts of 21st century climate.

http://www.climateprediction.net/index.php

To make a Deep Impact on Comet Tempel 1, enter your name in the web site below. It will be included with other names on a disc attached to the impactor spacecraft, which will collide with Tempel 1. You can make your own personalized certificate after you click the "Send My Name" button with your name entry.

Once you're entered in the campaign, you can sign up for future newsletters.

http://deepimpact.jpl.nasa.gov
/sendyourname/index.html

Clear Skies

Evan Dembskey

The Sky this Month

January 2004

dd hh	dd hh
3 20 Moon at apogee	17 15 Mercury greatest elong. W(24)
4 02 *Earth at Perihelion*	19 18 Moon at perigee
4 14 Jupiter stationary	20 03 Mercury 4.7 N of Moon
6 22 Mercury stationary	21 21 **NEW MOON**
7 00 Saturn 4.5 S of Moon	22 13 Neptune 5.0 N of Moon
7 15 **FULL MOON**	23 21 Uranus 4.4 N of Moon
10 13 Mercury greatest brilliancy	24 16 Venus 3.5 N of Moon
12 11 Jupiter 3.4 S of Moon	28 03 Mars 2.7 N of Moon
15 01 Venus 0.0 S of Uranus	29 06 **FIRST QUARTER**
15 05 **LAST QUARTER**	31 14 Moon at apogee

February 2004

dd hh	dd hh
2 10 Neptune in conj. with Sun	20 09 **NEW MOON**
3 04 Saturn 4.3 S of Moon	20 09 Uranus 4.2 N of Moon
6 08 **FULL MOON**	22 02 Uranus in conj. with Sun
8 14 Jupiter 3.2 S of Moon	23 19 Venus 3.0 N of Moon
13 13 **LAST QUARTER**	26 01 Mars 0.9 N of Moon Occn.
15 09 Mercury 2.0 S of Neptune	26 23 Mercury 1.5 S of Uranus
16 08 Moon at perigee	28 03 **FIRST QUARTER**
19 00 Neptune 5.2 N of Moon	28 11 Moon at apogee
19 12 Mercury 2.9 N of Moon	

LOCAL TIMES of RISE and SET for the MAJOR PLANETS, 2004

Site Location:- Long. **+28.0** deg. Lat. **-26.0** deg. Local Time:- UT **+2.0** hrs.

Date	Sun		Mercury		Venus		Mars		Jupiter		Saturn	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
Jan 01	5.20	19.02	4.38	18.07	7.52	21.13	12.06	23.57	22.57	10.41	18.54	5.27
Jan 11	5.27	19.03	3.52	17.24	8.10	21.14	11.54	23.35	22.18	10.01	18.11	4.44
Jan 21	5.35	19.03	3.49	17.27	8.26	21.11	11.43	23.13	21.37	9.20	17.28	4.01
Jan 31	5.43	18.59	4.05	17.44	8.41	21.05	11.32	22.52	20.56	8.37	16.46	3.18
Feb 10	5.50	18.54	4.33	18.03	8.54	20.59	11.21	22.32	20.14	7.54	16.04	2.36
Feb 20	5.57	18.46	5.09	18.21	9.07	20.51	11.11	22.13	19.31	7.09	15.23	1.55