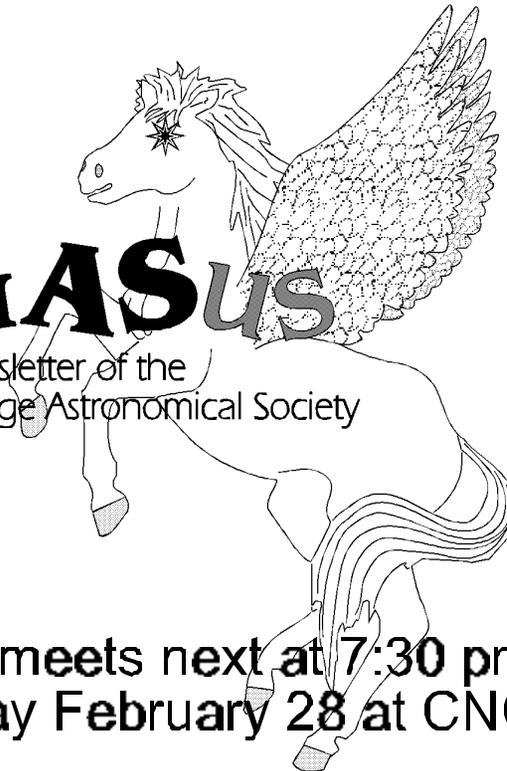


FEBRUARY 2001 ISSUE #109

*the*

# PeGASus

Newsletter of the  
The Prince George Astronomical Society



The **pgas** meets next at 7:30 pm  
Wednesday February 28 at CNC

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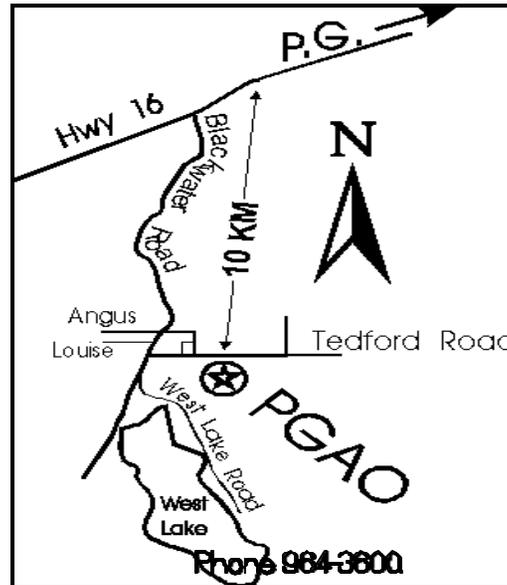
**the PeGASus**  
is published monthly  
by the *Prince  
George  
Astronomical  
Society.*

Our pursuits are out of this world.  
Our activities are astronomical.  
Our aim is the sky.

Contributions to the newsletter are  
welcome.

**Deadline for the next issue is  
March 16**

Send correspondence to  
The PGAS  
3330 - 22nd Avenue  
Prince George, BC, V2N 1P8  
or



<http://www.pgweb.com/astronomical/>

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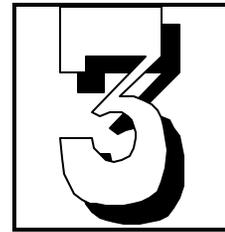
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Brian Battersby

*Building*  
Bob Klick

**PeGASus Editor**

## EDITORIAL

By Gil Self



How many times in the last few years have we heard, “we’ve done it all”? “There’s nothing left to discover”. It seems that science has crawled into so many nooks and crannies, and gathered so much data, that there is little left that is a surprise. It is not always the case, and anyone speaking so brashly sometimes ends up eating a little crow.

So with that in mind, this is but a question not a prediction.

Are we nearing the end of astronomy as we know it?

There has been a plethora of on-line resources in the last few years. We have had easy access to data from the most sophisticated instruments ever built. Even this amazing ability will soon be eclipsed by an on-line database.

The Two Micron All-Sky Survey (2MASS) is the most thorough census ever made of our Milky Way galaxy and the nearby universe. It detects infrared wavelengths that are longer than the red light in the rainbow of visible colors. Infrared light penetrates dust more effectively than visible light, so it is particularly useful for detecting objects obscured within the Milky Way, as well as the faint heat of very cool objects that give off very little visible light of their own. For the next two years, data processing will continue for the 24 terabytes of archive data. Catalogues containing more than 300 million stars and galaxies extracted from the images have begun to yield significant astronomical discoveries, they also archive and distribute the data to the public via the Internet, in essence, turning home computers into desktop observatories.

And there lies the question, “are we nearing the end of astronomy as we know it”? !!!!

Would you drive out to the observatory, prep all the equipment, just to take a picture of NGC1942? --- Yes!, Why?---

Because it’s fun, enjoyable, rewarding-- fill in your own words \_\_\_\_\_.

Ok, I think we all agree on that.

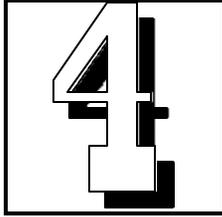
Now, (everybody but Bob N) same question, except it is 30 below outside?

I think I will stay home and use the internet.

“Times, They are a-changing”

All that aside, and not to forget the ongoing contributions in projects like variable star observing and near earth object databases, to name a few. There is still one area in which we excel.

The one area that we hold an edge on and that technology won’t over-run is bringing astronomy to the public. Every year we host hundreds of guests at our observatory. With a very large percentage of these people it is their first exposure to astronomy. Spring observing starts in March, come to the next meeting and sign-



## Coming Events

*If you are involved with any astronomical or otherwise scientific activity on behalf of the PGAS, please list the activity here.*

The **PGAS**.

meets next February 28 , 7:30 pm at CNC

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The Night Sky for March 2001

by Bob Nelson, PhD

Hi Folks,

As I write this, I am once again late with this edition of 'The Night Sky' (sorry Gil!!) and am hunched over my laptop in the classroom at the observatory squinting at the keys and trying to type. All the while I'm keeping an eye on the remote monitor as the CCD frames of this star field appear one after the other (they are being taken automatically on the 24" telescope and saved to disk under sequential file names). I'm fervently hoping that the telescope does not speed up or slow down in (its tracking) sending one or another of the stars dangerously near the edge of the frame. If that happens, I have to make this mad dash into the dome and 'tweak' the fine control for the tracking speed and maybe move the telescope a bit. Generally, the tracking works quite well but I've noticed that there are fast regions and slow regions on the bronze worm gear that I have to watch out for.

I also have to remember to move the dome every 15-20 minutes or so lest the edge of the dome clips the beam and ruins the data. The problem here is that looking at my bright laptop monitor kills my night vision and I have to take the time to dark adapt, all the while getting cold. The life of an observer!

Why am I doing all this, you might ask? Well, I am tracking the progress of this eclipsing binary system, EK Com (in this case). Eclipsing binaries are star systems in which two stars orbit around their mutual centre of mass. (Oops, time to reduce some more data. While the frames are loading I'll type some more.) The stars are so distant that not even Hubble can see them as two stars (unless they are very close to the Earth). All you see is a dip in the light intensity as one star passes in front of the other. The precise determination of the exact time of minimum yields information as to possible changes in the period of the system, which in turn yield information as to astrophysical changes going on (mostly mass transfer from one star to the other), and possible their evolutionary fate. Heady stuff, eh?

Well, I see that the system is past minimum, I'm on to the home stretch, and it's time to finish the article. (I'll let you know how EK Com turns out.)

Here is what is happening in the sky next month:

#### PLANET ROUNDUP

MERCURY is a morning object in late February and into March but is a poor target for northern observers at this time. At mid-month, it rises about a half hour before the Sun.



VENUS is an evening object all month. It's very visible on the 15th (it's roughly 20 degrees above the horizon at sunset and is a whoppingly large 54" crescent only 7% illuminated) but is fading fast as it races toward the Sun. It reaches inferior conjunction (i.e., is between Earth and Sun) on March 29 and is therefore not visible then. Venus will become a morning object next month.

MARS, in Ophiuchus almost all the month, rises at 2:38 AM and is a 8" disk of magnitude -0.27 (getting brighter!). Good for the early risers as they scurry off to work.

JUPITER, in Taurus until July, sets on the 15th at 1:00 AM and is a 36" disk of magnitude -2.1. It's still a magnificent sight. According to the Observer's Handbook, there are three double shadow transits (you see shadows from two of the Galilean moons on Jupiter) this month, but none is visible from our longitude in the evening.

SATURN, in Taurus all year, sets on the 15th at midnight and is a 17" disk of magnitude -0.2.

URANUS, in Capricornus all year, rises on the 15th at 5:30 AM and is a 3" disk of magnitude 5.9.

NEPTUNE, in Capricornus all year, rises at about 5:00 AM on the 15th. As usual, it's a 2.3" disk at about magnitude 8.0.

PLUTO, in Ophiuchus all year, rises at 12:30 AM on the 15th. As usual, it's a 0.1" disk at magnitude 13.8. Let's go after it later this spring.

March Equinox occurs on March 20 at 5:31 AM PST. Spring will have begun in Prince George (well, according to the Observer's Handbook anyway).

CONSTELLATIONS to look for in March (at 9:00 PM, PST) are Pyxis, Puppis, Western Hydra, Cancer and Lynx.

Pyxis ("the compass on the Argonaut's ship") is visible on the extreme south at 9:30 PM on the 15th. It's just at the edge of the Milky Way but contains little of interest (no open clusters, etc.).



Puppis ("the stern on the Argonaut's ship") is just to the northwest of Pyxis. Straddling the Milky Way, it contains numerous goodies including open clusters M46, M47, M93, NGC 2477 and others. M46 (at 7 deg south, and therefore visible in P.G.) is a rich open cluster, about 1/2 degree in diameter containing around 150 stars between magnitude 8 and 13 lying about 500 light years away. It also contains the planetary nebula NGC 2438 about 7' north of the cluster centre. Recent radial velocity measurements (spectra which show motion along the line of sight - towards or away from the Earth) show that the nebula and cluster are moving apart and are therefore not linked. The nebula should be a good target for CCD imaging.

Hydra ("the Sea Serpent" - not to be confused with Hydrus, a small boring constellation) extends all the way up to declination +5 . The western part contains M48, another fine open cluster.

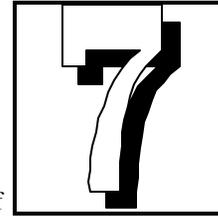
Cancer ("the Crab") is more familiar to us northerners, lying as it does between Gemini and Leo. It contains the famous "Praesepe" or "Beehive" Cluster, M44 and M67, a rich old cluster, both of which I talked about last year. It also contains Zeta Cancri, a remarkable multiple star system. The dual nature was discovered by Mayer, in 1756. It was therefore listed as a double star until 1781 when Sir William Herschell discovered a third component. The closer pair, A & B, form a binary system separated by 0.6 to 1.2" and with a period of about 60 years, while the third component, Zeta C, revolves at 5.8" with a period of about 1150 years! Needless to say, the orbital elements of the outer orbit are very uncertain! But wait, there's more. By careful measurements of Zeta C's positions, it is deduced that it is orbited by an unseen companion with a period of about 18 years. Some astronomers even believe that there may be a fifth star. Analysis of the motions reveals that all four stars are a little under the Sun's mass and lie about 70 light years distant. The stars are regrettably a little too close for any observations by our group.

Lynx ("the Lynx" -- gee!) lies to the north of Cancer, out of the Milky Way and contains only NGC 2419, the famous "Intergalactic Wanderer", the most distant of the globular clusters. (This is a repeat from last year, but is still interesting.) It was discovered in 1788 by William Herschel (and rediscovered by his son John in 1833), observed by Lord Rosse in 1861, and finally classified as a globular in 1922 when photos were taken by the 42" reflector at Lowell Observatory. The distance was determined by observing 31 RR Lyrae stars in the cluster; it's some 182,000 light years (55,800 pc) from us (and 210,000 light years = 64,400 pc) from the galactic centre. This distance is comparable to that of the Magellanic Clouds and suggests that this cluster indeed is intergalactic. Let's get a CCD image of it!!!

Clear skies, Bob

## Boost the performance of your old dusty 60mm

Refractor: by Mathew Burke



If you are like me you purchased a cheap 60mm refractor as your first telescope. After using it for a while you became frustrated with it and eventually relegated it to the bottom of the closet or under your bed. The primary problem with my first scope was the rickety mount, poor optics, small size, and useless finder. Last summer I dusted it off and tried using it again. What I found was that its performance was worse than I remembered. Looking through it was like looking through a fish bowl.

After joining the Astronomy club I was introduced to the world of high performance optics and the only thought I ever had for my old refractor was to resent I ever paid money for it. I even tried to sell it in a garage sale for \$40 (there were no takers!). Recently I purchased a larger Celestron Newtonian Telescope that has vastly better optics, along with the scope came some nice 1 1/4" eye pieces. I remember looking over a friend's Bushnell 4 1/2" Newtonian and commenting to him that he needed to convert the unit from using 0.96" eye pieces to 1 1/4" eye pieces in order to make it useable. Then the thought occurred to me, "If you can convert an old Newtonian to use larger eye pieces, why not my 60mm refractor?". But how?

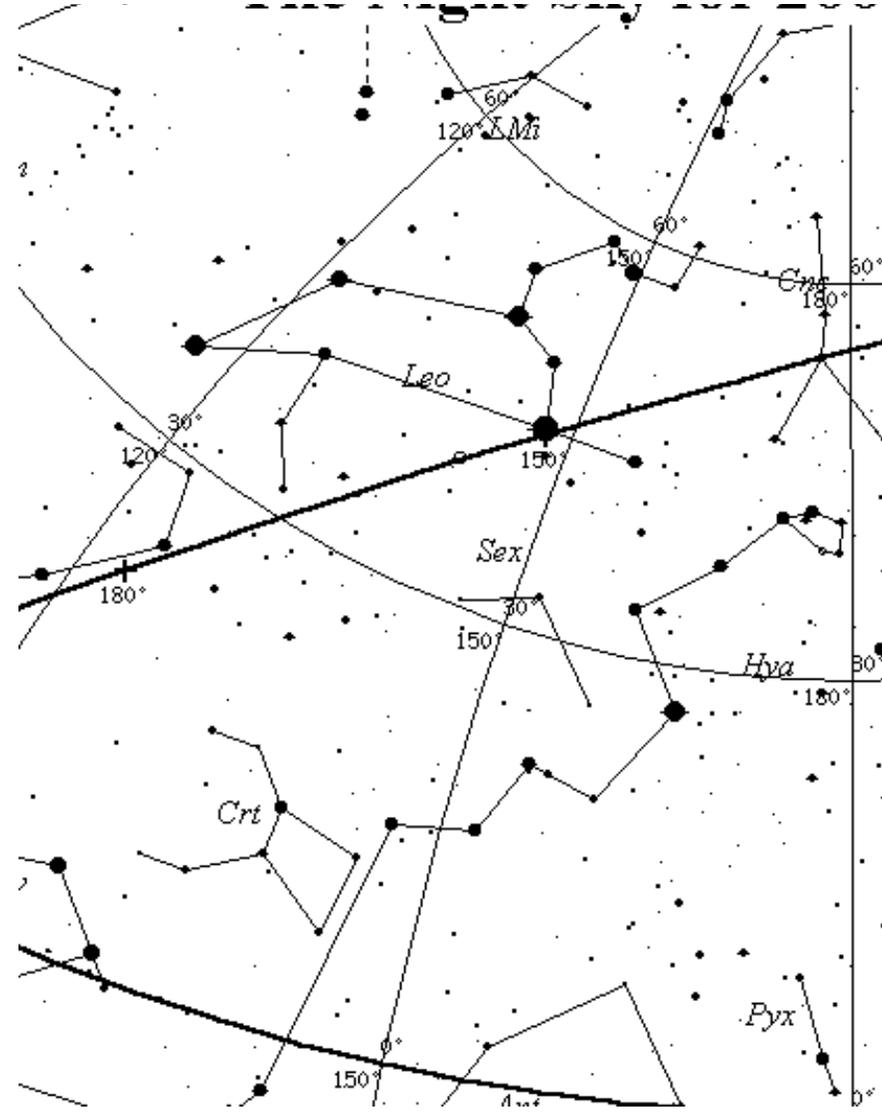
After thinking it over for a while and checking to see if my little scope could focus with the larger eye pieces I decided to modify the diagonal. Why not? I don't have anything to lose!! I immediately started rummaging through my garage and my barn with the vague thought, "maybe I can find something that can hold a 1 1/4" eye piece and can attach to my diagonal". I eventually came back with a handful of PVC pipe and fittings. From the pile it looked like a 1 1/4" threaded coupling would do the job. I then drilled a hole for the locking screw in the PVC coupling, then sawed off the old eye piece holder in my old diagonal, and crazy glued on my new eye piece holder. The result? I now have a diagonal that can attach to my telescope and yet a 1 1/4" eye piece (see photo).



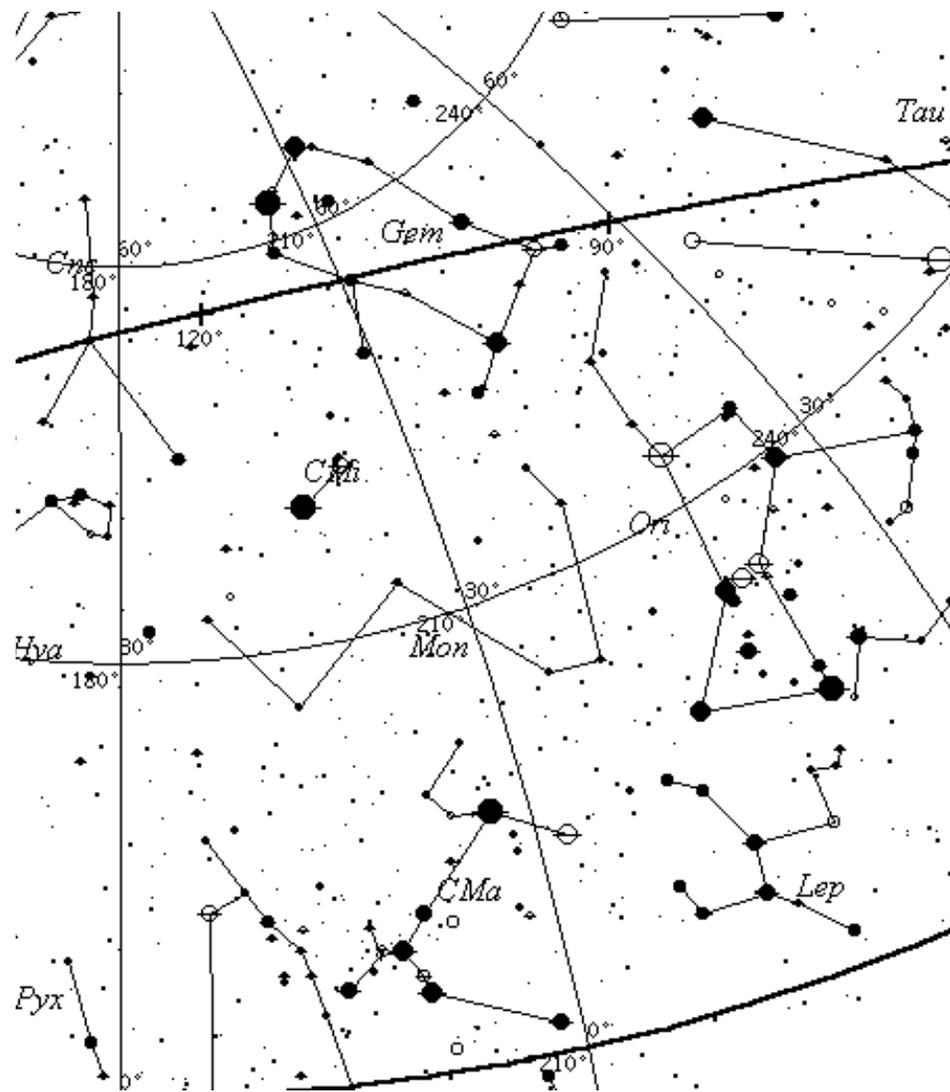
Modified 0.93" diagonal to hold 1 1/4" eye pieces



My 60mm Scope on a Camera



Night Sky for March courtesy Dr. Bob Nelson



Night Sky for March courtesy Dr. Bob Nelson

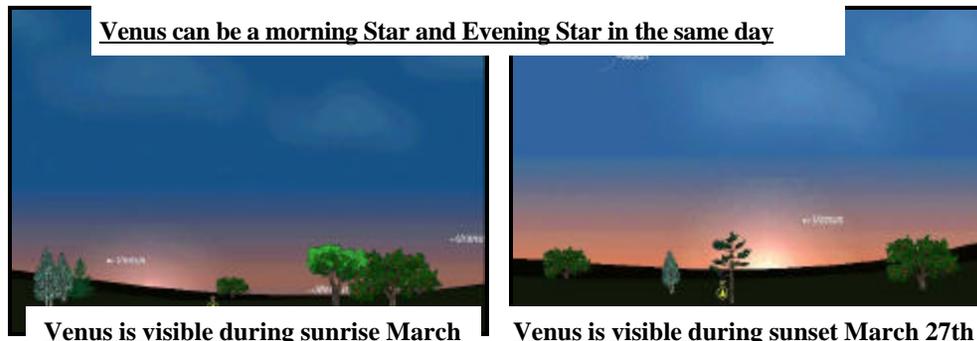
# 10

Now that I had my newly converted diagonal I was eager to try out my 40mm and 20mm 1 1/4" eye pieces in my 60mm scope. What would be the results? Right from the first glance I could hardly believe my eyes! During day time terrestrial viewing the images were sharp and crisp. This was a stark contrast to the fuzzy fishbowl like performance of the past. Later at night I turned my converted scope towards the Orion nebula using my 40mm eye piece. I was surprised that I could clearly see the nebula if not faintly. Prior to this I was lucky to see anything other than the brightest objects like the moon or Venus. I then took a look using my 20mm eye piece at Jupiter and to my surprise I could clearly see two bands on the planet's surface. I then swung over to Saturn and once again I was surprised. I could clearly see Saturn's rings! Prior to my modifications Saturn in this scope was just a blob. Details on the moon were also clear.

Conclusions? The objective lenses on an average 60mm scope are really not all that bad. After all how hard can it be to manufacture a 60mm lens? To keep costs down the manufacturers of such telescopes tend to scrimp on things like tripods, eye pieces and finder scopes. The 0.96" eye pieces yield very poor eye relief and image quality.

To make my point compare my two 1 1/4" eye pieces with the 0.96" eye piece (on the far right). By replacing the old eye pieces and mounting your 60mm scope on a decent camera tripod you can dramatically boost its performance.

Sure the 1 1/4" eye pieces are worth more than an entire 60mm refractor, but if you already own a larger scope chances are you already have them. Owning a smaller scope with half decent performance opens up some opportunities that you may not have had before. You could take it camping or possibly on that overnight hiking trip you are planning this summer (would you lug along your 45 lb. - 75 lb. Scope up a mountain side?). You might think twice about passing up a 60mm refractor in the bargain finder now that you know



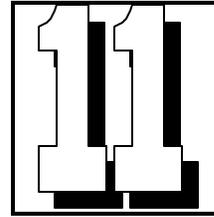
**Venus can be a morning Star and Evening Star in the same day**

**Venus is visible during sunrise March**

**Venus is visible during sunset March 27th**

On the mornings & evening of March 27th-30th keep an eye on Venus. On these days it will be the morning star and evening star on the same day! This seemingly impossible maneuver is the result of Venus being quite north of the sun during inferior conjunction. Apparently this cycle repeats itself once every eight years

# ISS



I have reproduced below the text of a e-mail from Doug Wayland. I have been suggesting on our local e-mail list that the members should attempt to catch the International Space Station. The dates and times from my source seem "less than accurate" . If you miss the space station you are not alone, I have yet to catch it. I have been trying to spot it since mid December. This last week would have been outstanding ,since the shuttle was either docked or nearby. I believe that the times quoted on the website at [heavens-above.com](http://heavens-above.com) are the best times available, but either because of overcast skies or forgetfulness -- I still have not caught it. Lets see how many of you can spot it before I can!

*Hi Gil,*

*That site you get your info from must be a little hard to interpolate, that info about the ISS is not right. ISS will start to become visible in our skys in the evening again on Feb. 9. It always travels from west to east at*

*various altitudes in the southern half of our sky. It only takes about 2 or*

*3 minutes to traverse the sky. It's altitude above the earth is about 350 km., Mir is about 305 km right now.*

*If you go to [heavens-above.com](http://heavens-above.com) web site and enter those coordinates you*

*mentioned or select Prince George from their data base you can get very easy*

*to see data on any of the satellites orbiting the earth. Once you have P. G.*

*or any other location you select, you can bookmark at that point so you can*

*go back quickly at any time.*

*You can get star charts showing the exact line that the satellites trace across the sky. It's easy to see Iridium flares from the predictions on this*

*site. Solar system and constellation info is here as well, a very informative and interesting site.*

*Hope you have fun with it.*



## NEAR AND EROS MEET

Although given no better than a 1-in-100 chance of survival, the Near Earth Asteroid Rendezvous (NEAR) spacecraft thumped onto the dusty, boulder-strewn surface of minor planet 433 Eros on Monday and lived to tell about it. The spacecraft continued to broadcast to Earth after touching down at an estimated 1.5 meters per second at 3:05 p.m. EST (20:05 Universal Time). As mission personnel looked on anxiously, NASA tracking stations in California and Spain continued to receive a low-power signal (but no data) after the first-ever landing on a small solar-system body.

The landing sequence began about 4 hours earlier, as a rocket firing forced NEAR-Shoemaker out of its 35-kilometer-high orbit and sent it on a collision course with Eros. Four more rocket firings, beginning at altitude of 5 km, slowed the craft during its 47-minute freefall. Engineering data and altitude measurements showed that the spacecraft descended to the surface just as planned, perhaps bouncing once before settling down tipped to one side and resting on the corners of two solar-cell panels. The touchdown site is on the shoulder of Himeros, a broad depression in the southern hemisphere.

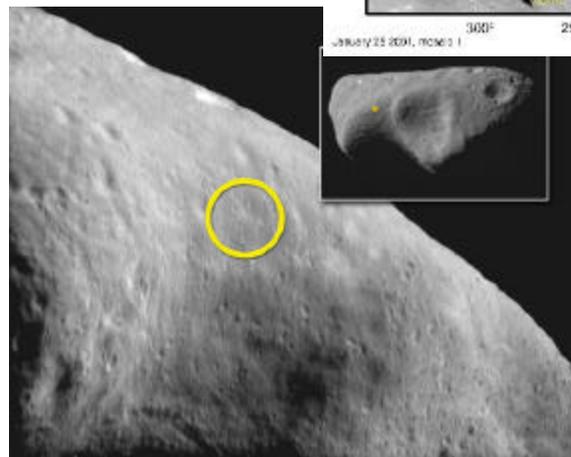
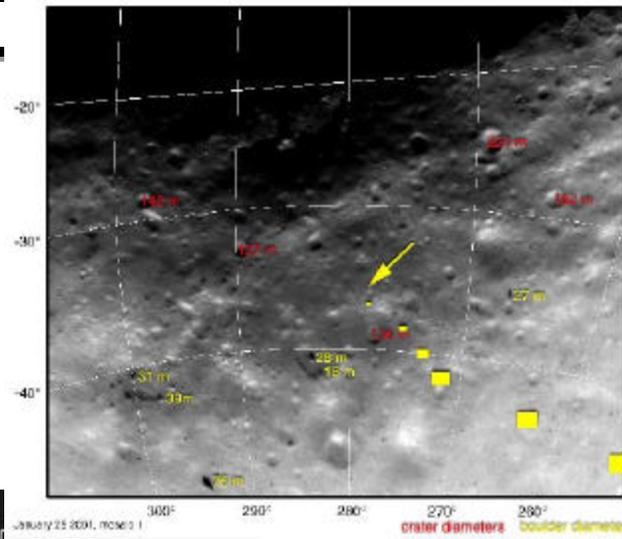
NEAR Shoemaker's onboard camera radioed more than 50 pictures as the surface drew closer. The landscape looked smooth and dust-covered for the most part, peppered with myriad boulders ranging from house- to fist-size. But mission scientists were most surprised by the lack of small impacts. "We are absolutely amazed by the absence of small, fresh craters," exclaimed imaging-team leader Joseph Veverka, as well as by numerous shallow sinkhole-like depressions. The final frame, taken from a height of 125 m, showed an area 6 m wide and revealed details only about 1 centimeter across. NASA had intended to cease tracking the spacecraft on February 14th, when the mission was to officially end. However, since the spacecraft survived, it has been granted a reprieve as scientists try to glean more useful data from the probe.

(Please see photos on page 13 and 14)



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NEAR Estimated Impact Site



# 14

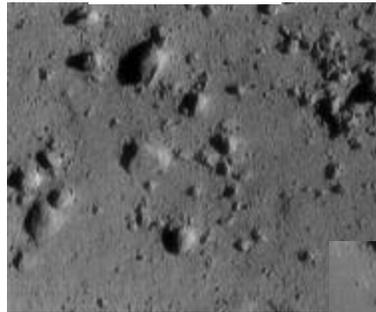
1050 M.



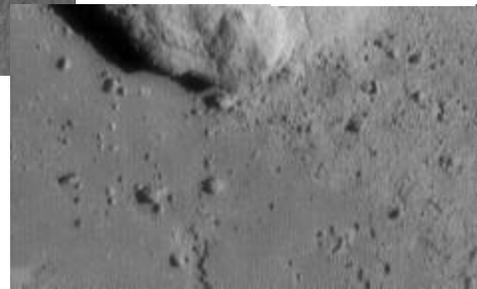
700 M.



250 M.



Less than 100 M.



NEAR STILL SENDING DATA ( Feb 25 ) Flight controllers report that NASA's Near spacecraft continues to function well on the surface of asteroid 433 Eros, it is still collecting useful scientific data from two instruments. The one experiment that stood to lose the most by NEAR's early retirement, the X-ray and gamma-ray spectrometer, benefited the most from the craft's newfound role as a lander. The gamma-ray spectrometer has suffered from poor sensitivity -- it failed to detect anything even when the spacecraft was close to Eros.

The instrument not only survived the February 12th touchdown, but in doing so it gets to assess the surface from a closer range than ever imagined. (The detector may even be immersed in dusty rubble.) NASA managers had expected to silence NEAR Shoemaker for good on February 14th, but because of the gamma-ray instrument's fortuitous survival they granted the mission a two-week extension. A set of calibration data, trickled to Earth at 10 bits per second on February 16th, has paved the way for relaying abundance measurements for iron, potassium, and silicon over the next week.

# Nova

(New Observers to Visual Astronomy ) by Robert Frith

The Nova Program will be offered to interested members during late March into April. This mini coarse will help the beginner get started in amateur astronomy.

Topics will include reading sky charts, star hopping, interpreting sky catalogue data, deep sky targets for small instruments, equipment set up, care and use, and many other observing tips. Interested people can sign up at the Feb. meeting or give me a call (Rob at 563-6084).I will talk to everyone signing up personally so as I can tailor the coarse to suit every participants needs. Three to four nights should cover everything.

Also I encourage members to participate in open houses and members night at the observatory. Lots of fun and knowledge to be gained on these nights. See you under dark skies. Rob.



## **PGAS CONTRIBUTORS**

The PGAS would like to thank the following individuals, corporations and government agencies who, since 1991, have donated money, goods or services to the construction and operation of the Prince George Astronomical Observatory.

	\$25,000
Ministry of Adv. Ed. Training and Tech.	16,000
BC Science Council	3,900
BC Lotteries	1,932
Helmar Kotsch (Acme Mas.)	1,665
Northwood Pulp and Timber	1,583
Electrical Services Ltd.	1,500
Royal Bank of Canada	1,300
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Rustad Broth & Co Ltd	744
Canfor Polar Division	500
Bisque Software	
Canfor Clear Lake	

The greatest contributors to the construction and operation of the observatory are from PGAS members who have generously contributed their time to this project. The value of their contribution surpasses all external contributions.

*The PGAS is a non-profit organization dedicated to the advancement of astronomy and science in general in Prince George and the neighboring*



*Join the PGAS*



The P.G.A.S Would like to thank  
**BISQUE SOFTWARE**  
for their donation of  
**THE SKY** (Level 4 software)  
To The Prince George Observatory

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