



# Clear Skies

Volume 12, Issue 11

March 2008

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## Greetings!

Welcome to the Cowichan Valley Starfinders Astronomy club's "Clear Skies" monthly newsletter.

What a great couple of days and nights here on the island. The clouds parted and we were blessed with an outstanding view of the Lunar eclipse. Bryon and I spent our time on the beaches of Mill Bay viewing the event, what made it even more spectacular was the drumming heard from across the bay where the First Nations were having a celebration. An event I'm sure that has been going on for generations. I hope you all had a chance to view the eclipse if only for a while.

Many thanks to this month's contributors:

Moe Raven, Gail Robertson, Bryon Thompson and Ed Maxfield

*Freda Eckstein*

"Shoot for the moon. Even if you miss, you'll land among the stars". ~Les Brown

## Message from the President:

Ed Maxfield [president@starfinders.ca](mailto:president@starfinders.ca)

Another month come and gone and not much in the way of observing. I think the weather gods are saving up the good nights until it warms up some.

In the good news department... we have the Rod and Gun club for our Island Star Part on July 4th and 5th. Thank you Norm for your tenacious pursuit of the R&G president. We still need to get insurance coverage but that should be a minor hurdle. There is much to be done to organize this event. Now that we have a firm date we can get the ball rolling.

John McDonald has kindly consented to be our guest speaker this month. John will be showing us some of his secrets of astrophotography which have made him one of our foremost astrophotographers. For a preview of some of John's work check out... <http://rascvic.zenfolio.com/>

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## Meeting Highlights

Meetings are held on the **4<sup>th</sup> Wednesday** of each month at the home of Bryon and Freda. See the website for a map or follow these directions.

### Island Hwy, Mill Bay

Turn on Frayne Rd towards ocean (Serious Coffee is on the corner)

Turn right on Huckleberry Rd

3rd house on the left across from Springbank road and Mail boxes.

### Look for the STAR sign

Please park on Huckleberry or Springbank Rd's.

Call Brian 743-6633 if you need directions

**Our next meeting will be held at 7:30 on WEDNESDAY March 26th** with Bill Weller as our featured presenter. Hope to see you all there.

# January Minutes

By Gail Robertson

With Bryon and Freda hosting the Starfinders meetings at their home, the January 23rd get-together attracted a record number of members. Many thanks, Freda and Bryon!

Advertising for Star Party: Gail Robertson volunteered to do poster artwork and Pete suggested sending ads to each school.

Pres. Ed announced that in February John McDonald will give a presentation on astrophotography and in April Chris Fisher will give a talk on the history of space.

Insurance for Star Party: Lively discussion on this issue. Joe Carr said our event might not be includable as a rider under the Victoria Fish & Game Club's insurance because ours is a public event.

Events and activities at Star Party: Chris Martins and Gerry Rozema suggested a kids' scavenger hunt in which children could use binoculars, scopes and charts to find celestial items or groupings (and a more difficult one for the adults) to win pins or other prizes. Also a different type of scavenger hunt during the day to give the kids something to do. Gail suggested a lecture presentation geared to kids and novices re spectacular events such as supernovas and black holes. It was pointed out that many such projects and videos are available on the NASA website. Many members volunteered to help out with the Star Party preparations and during it. Details re door prizes – some already finalized, others being checked into.

Pete volunteered our home location for viewing. Address: 5160 Elliot Road (off Glenora Road just past Glenora Hall at the 4-way stop and two Corner Stores). Glenora is 6 km southwest of Duncan. Phone 715-1116 if you are coming at any time and need directions.

Bryon reported that the Duncan Farmers' Market (at the town square location) asked us to put on a display in May through July at their location. He asked me to provide site photos from last year's Star Party on the Malahat.

Brian Robillard showed and put through its paces a very impressive mini laptop called ASUSEEE, which runs on Linux.

For more information about upcoming meetings go to [Starfinders Meetings](#) [back](#)

# Upcoming Events

**Space Shuttle Endeavour targeted for 11 March** - Mission STS-123 will deliver the Kibo Japanese Experiment Logistics Module - Pressurized Section (ELM-PS) on the twenty-fifth mission to the International Space Station. The mission will deliver NASA Astronaut Garrett Reisman to the complex and return European Space Agency astronaut Léopold Eyharts to Earth. Launch site is the Kennedy Space Center.

The **Centre of the Universe** is offering the perfect spring break activity! The return of our 'space days' camps on March 18th and 20th. Both a younger scientists camp (ages 6–8) and an older scientists camp (ages 9–12) are available on each day. For info or to register, please call 250-382-8262 or e-mail: [cu@nrc.gc.ca](mailto:cu@nrc.gc.ca) [back](#)

# Web News

## Cool Pics

Want to show off your latest pics? Well here's your chance; email the editor at [My Cool Pics](#) and we will try to post them in the next edition of "Clear Skies".

Check out our NEW Photo gallery on the website where you can find pics from the Island Star Party (ISP) 2007. Quick link is <http://starfinders.ca/photos.htm>

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## Featured Articles

### Articles

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### Linked Hawaiian Telescopes Catch a Nova Surprise - January 28/08 Credit NASA

First results from a new NASA-funded scientific instrument at the W. M. Keck Observatory at Mauna Kea, Hawaii, are helping scientists overturn long-standing assumptions about powerful explosions called novae and have produced specific information about one nearby nova.

This sophisticated new system, called the Keck Interferometer, combines the observing power of the two 10-meter (33 feet) Keck telescopes into a single mega-telescope. Using the interferometer's "nulling" mode, data were taken by the Keck Interferometer team on a nearby nova called RS Ophiuchi.

In "nulling" mode, the Keck Interferometer suppresses the blinding light of a star so researchers can study the surrounding environment. The instrument helps them observe very faint objects near bright sources and produces 10 times more resolving power than a single Keck telescope working alone. It is the only instrument of its kind in operation.

The nulling mode was developed to search for dust regions around nearby stars, where planets might be forming, but the bright starlight poses a great challenge. "Because a star is so much brighter than the dust, something has to block the light, which is what the nuller does," said Rachel L. Akeson, Keck Interferometer project scientist at the California Institute of Technology's Michelson Science Center. "This technique turns out to be useful for lots of other kinds of objects, including this one, where dust is near a star that just went nova."

These nova data were taken by a team led by Wes Traub of NASA's Jet Propulsion Laboratory, Pasadena, Calif., and the data analysis and unified model for the nova were produced by a team led by Richard Barry and William Danchi of the Goddard Space Flight Center, Greenbelt, Md.

The star in the constellation Ophiuchus went nova at the perfect time for the team, on Feb. 12, 2006. "We were extremely lucky, because we had astronomers in place at two mountain-top interferometers, Keck in Hawaii and Infrared Optical Telescope Array in Arizona. Within minutes of hearing about the discovery of the nova, we alerted both teams to start observing it that night," said Traub, a senior research scientist at JPL.

The nova system, known as RS Oph consists of a white dwarf and a red giant. The red giant is gradually shedding its massive gaseous outer layers, and the white dwarf is sweeping up much of this wind, growing in mass over time. As the matter builds up on the white dwarf's surface, it eventually reaches a critical temperature



that ignites a thermonuclear explosion that causes the system to brighten 600-fold.<sup>4</sup> RS Oph was previously observed blowing its stack in 1898, 1933, 1958, 1967 and 1985, so astronomers were eagerly anticipating the 2006 eruption.

About three-and-a-half days after the nova was detected, the group observed the explosion with the Keck nuller. They set the instrument to cancel the nova's light, allowing them to see the much fainter surrounding material, and then the extremely bright blast zone.

The instrument's versatility was key to a surprising discovery. The nuller saw no dust in the bright zone, presumably because the nova's blast wave vaporized dust particles. But farther from the white dwarf, at distances starting around 20 times the Earth-sun distance, the nuller recorded the spectral chemical signature of silicate dust. The blast wave had not yet reached this zone, so the dust must have pre-dated the explosion.

"This flies in the face of what we expected. Astronomers had previously thought that nova explosions actually create dust," said Richard Barry of Goddard, lead author of the paper on the observations that will appear in the *Astrophysical Journal*. The team thinks the dust is created as the white dwarf plows through the red giant's wind, creating a pinwheel pattern of higher-density regions that is reminiscent of galaxy spiral arms. Inside these arms, atoms become cool enough and dense enough to allow atoms to stick together to form dust particles. The nova's blast wave has since destroyed RS Oph's pinwheel pattern, but it should reform over the next few years, and future observations by NASA's Spitzer Space Telescope could see it. Barry is also coauthor of a paper based on Spitzer observations of RS Oph.

Most studies of RS Oph have relied on spectroscopic models, which have not been able to distinguish various nova components with as much detail as the interferometer. The Keck nuller measured one component of the RS Oph system to an accuracy of just 4 milliarcseconds, or about the size of a basketball seen 7,500 miles away.

The Keck Interferometer is part of NASA's ongoing quest to search for planets orbiting other stars. JPL, a division of Caltech, manages the Keck Interferometer for NASA. The Keck Interferometer was developed by JPL, the W.M. Keck Observatory and the Michelson Science Center. The W.M. Keck Observatory is funded by Caltech, the University of California and NASA, and is managed by the California Association for Research in Astronomy, Kamuela, Hawaii. More information on the Keck Interferometer is at <http://ki.jpl.nasa.gov>.

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## **NASA and The Beatles Celebrate Anniversaries by Beaming Song Across The Universe Into Deep Space**- February 4/08 Credit NASA

WASHINGTON For the first time ever, NASA will beam a song The Beatles "Across the Universe" directly into deep space at 7 p.m. EST on Feb. 4.

The transmission over NASAs Deep Space Network will commemorate the 40th anniversary of the day The Beatles recorded the song, as well as the 50th anniversary of NASAs founding and the groups beginnings. Two other anniversaries also are being honored: The launch 50 years ago this week of Explorer 1, the first U.S. satellite, and the founding 45 years ago of the Deep Space Network, an international network of antennas that supports missions to explore the universe.

The transmission is being aimed at the North Star, Polaris, which is located 431 light years away from Earth. The song will travel across the universe at a speed of 186,000 miles per second. Former Beatle Sir Paul McCartney expressed excitement that the tune, which was principally written by fellow Beatle John Lennon, was being beamed into the cosmos.

"Amazing! Well done, NASA!" McCartney said in a message to the space agency. "Send my love to the aliens. All the best, Paul."

Lennons widow, Yoko Ono, characterized the songs transmission as a significant event.

"I see that this is the beginning of the new age in which we will communicate with billions of planets across the universe," she said.

It is not the first time Beatles music has been used by NASA; in November 2005, McCartney performed the song "Good Day Sunshine" during a concert that was transmitted to the International Space Station. "Here Comes the Sun," "Ticket to Ride" and "A Hard Days Night" are among other Beatles songs that have been played to wake astronaut crews in orbit.



Feb. 4 has been declared "Across The Universe Day" by Beatles fans to commemorate the anniversaries. As part of the celebration, the public around the world has been invited to participate in the event by simultaneously playing the song at the same time it is transmitted by NASA. Many of the senior NASA scientists and engineers involved in the effort are among the groups

biggest fans.

"I've been a Beatles fan for 45 years – as long as the Deep Space Network has been around," said Dr. Barry Geldzahler, the networks program executive at NASA Headquarters, Washington. "What a joy, especially considering that Across the Universe is my personal favorite Beatles song."

NASAs Jet Propulsion Laboratory in Pasadena, Calif., operates the Deep Space Network. For information about the Deep Space Network, go to <http://deepspace.jpl.nasa.gov/dsn/index.html>

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### **Astronomers given Gemini reprieve-** February 12/08 Credit BBC News

British astronomers have been given a temporary reprieve over their access to two of the world's finest telescopes. In January, administrators announced their intention to withdraw from UK participation in Gemini, as they looked to plug an £80m hole in their finances.

This would have barred UK astronomers from viewing the Northern Hemisphere sky with the largest telescope class. The UK will now continue its operations payments for 2008 and plans to explore options for continued involvement.



Membership of the Gemini consortium gave British astronomers direct access to two of the biggest optical-infrared reflecting telescopes in the world.

Gemini South, located in the Chilean Andes, and Gemini North, in Hawaii, are only now reaching their full potential after 15 years of development.

The UK currently puts about £4m into Gemini each year, with an equal 24% share of the North and South telescopes.

Researchers were aghast when the Science and Technology Facilities Council (STFC), which looks after UK astronomy funding, announced its intention to cancel the subscription to Gemini.

### **Time reinstated**

But some observers now say the STFC appears to have altered its position with regards to involvement in the consortium, from negotiating its withdrawal to negotiating a reduction in its investment.

However, a spokesman for the Science and Technology Facilities Council told BBC News: "STFC's position in respect to the Gemini Observatory has always been to negotiate a reduced level of investment due to (comprehensive spending review) budget allocation constraints.

"These discussions with Gemini are currently ongoing."

A request was made last year to the Gemini partners to allow the UK to come out of the organisation but still maintain some access to the Frederick C Gillett (Gemini North) facility through to the end of the current contract in 2012.

This request, however, was rebuffed by the partners; and the STFC announced in January that it had no option but to seek a formal cancellation of its subscription. In a statement, the Gemini partnership said: "The board has received new correspondence from the STFC regarding the UK involvement in Gemini.

"The UK has committed to continue their operations payments during 2008, and wishes to open negotiations with the [Gemini] executive agency and the board to explore their options for continued participation in the Gemini Observatory."

Accordingly, the Gemini board said it would conditionally reinstate observing time allocations for UK astronomers on both Gemini North and Gemini South for the current 2008 semester, which runs from February to July. This means that astronomers can continue using the telescopes until at least this summer.

### **Access rights**

Sources said the earlier decision by Britain to cancel its Gemini subscription had prompted an angry reaction from within the consortium, which had taken the UK flag down "very quickly" at its headquarters. However, the most recent language from the Gemini board sounded more conciliatory, they observed.

The news received a cautious welcome from astronomers. One researcher told the BBC that the decision to withdraw from Gemini had been "hasty", but that the latest news was a "potential first step" towards the UK remaining a partner.

Observers speculate that the UK could save money by selling some of its observing time on the Gemini South telescope in order to retain access to Gemini North. UK astronomers can still view the Southern Hemisphere sky through their access to the four large 8.2m telescopes at the Paranal Observatory in Chile. But Gemini North provides their only view of the Northern Hemisphere sky with the largest class of telescope.

The latest development on Gemini is understood to have followed consultation between the STFC's executive, its science board and the Astronomy and Nuclear Physics Science Committee (PPan).

The PPan sub-committee is understood to have placed Gemini as a higher scientific priority when it assessed individual projects as part of the STFC's latest programmatic review.

### Forthcoming negotiations

Observers are now wondering about the possible knock-on effects of remaining within the Gemini partnership.

The Astronomy Technology Centre (ATC) in Edinburgh had been well-placed to pick up the main contract for building a next generation instrument at one of the Gemini sites called the Precision Radial-Velocity Spectrometer (PRVS). When the STFC signalled its intention to withdraw from the consortium, the contract "turned to dust". But observers now wonder whether it could now be back on the table, with the potential to safeguard jobs at the centre.

The STFC's problems emerged from the government's last spending round which left the council short of £80m in the three-year budget plan to 2011. In order to manage its way out of the crisis, the STFC announced its intention to close certain programmes and cut research grants. Science societies and union officials warned the damage to UK physics and astronomy would be incalculable and would lead to hundreds of job losses.

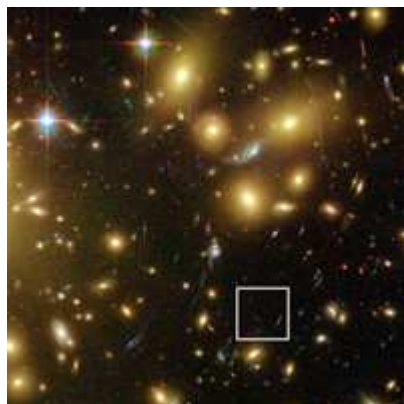
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### Astronomers Eye Ultra-Young, Bright Galaxy in Early Universe-

February 12/08 credit NASA

NASA's Hubble and Spitzer space telescopes, with a boost from a natural "zoom lens," have uncovered what may be one of the youngest and brightest galaxies ever seen in the middle of the cosmic "dark ages," just 700 million years after the beginning of our universe.

The detailed images from Hubble's Near Infrared Camera and Multi-Object Spectrometer reveal an infant galaxy, dubbed A1689-zD1, undergoing a firestorm of star birth during the dark ages, a time shortly after the Big Bang but before the first stars reheated the cold, dark universe. Images from NASA's Spitzer Space Telescope's Infrared Array Camera provided strong additional evidence that it was a young star-forming galaxy in the dark ages.



"We certainly were surprised to find such a bright young galaxy 12.8 billion years in the past," said astronomer Garth Illingworth of the University of California, Santa Cruz, and a member of the research team. "This is the most detailed look to date at an object so far back in time."

"The Hubble images yield insight into the galaxy's structure that we cannot get with any other telescope," added astronomer Rychard Bouwens of UC Santa Cruz, a co-discoverer. The new images should offer insights into the formative years of galaxy

birth and evolution and yield information on the types of objects that may have contributed to ending the dark ages. The faraway galaxy also is an ideal target for Hubble's successor, the James Webb Space Telescope, scheduled to launch in 2013.

During its lifetime, the Hubble telescope has peered ever farther back in time, viewing galaxies at successively younger stages of evolution. These snapshots have helped astronomers create a scrapbook of galaxies from infancy to adulthood. The new Hubble and Spitzer images of A1689-zD1 show a time when galaxies were in their infancy.

Current theory holds that the dark ages began about 400,000 years after the Big Bang, as matter in the expanding universe cooled and formed clouds of cold hydrogen. These cold clouds pervaded the universe like a thick fog. At some point during this era, stars and galaxies started to form. Their collective light reheated

the foggy, cold hydrogen, ending the dark ages about a billion years after the Big Bang.

"This galaxy presumably is one of the many galaxies that helped end the dark ages," said astronomer Larry Bradley of Johns Hopkins University in Baltimore, Md., and leader of the study. "Astronomers are fairly certain that high-energy objects such as quasars did not provide enough energy to end the dark ages of the universe. But many young star-forming galaxies may have produced enough energy to end it."

The galaxy is so far away it did not appear in images taken with Hubble's Advanced Camera for Surveys, because its light is stretched to invisible infrared wavelengths by the universe's expansion. It took Hubble's near infrared camera/spectrometer, Spitzer, and a trick of nature called gravitational lensing to see the faraway galaxy. The astronomers used a relatively nearby massive cluster of galaxies known as Abell 1689, roughly 2.2 billion light-years away, to magnify the light from the more distant galaxy directly behind it. This natural telescope is called a gravitational lens.

Though the diffuse light of the faraway object is nearly impossible to see, gravitational lensing has increased its brightness by nearly 10 times, making it bright enough for Hubble and Spitzer to detect. A telltale sign of the lensing is the smearing of the images of galaxies behind Abell 1689 into arcs by the gravitational warping of space by the intervening galaxy cluster.

The images reveal bright, dense clumps of hundreds of millions of massive stars in a compact region about 2,000 light-years across, which is only a fraction of the width of our Milky Way Galaxy. This type of galaxy is not uncommon in the early universe, when the bulk of star formation was taking place, Bradley and Illingworth said.

Spitzer's images show the galaxy's mass is typical of galaxies in the early universe. Its mass is equivalent to several billions of sunlike stars, or just a tiny fraction of the mass of the Milky Way. "This observation confirms previous Hubble studies that star birth happens in very tiny regions compared with the size of the final galaxy," Illingworth said.

Even with the increased magnification from the gravitational lens, Hubble's sharp "eye" can only see knots of the brightest, heftiest stars in the galaxy. The telescope cannot pinpoint fainter, lower-mass stars, individual stars, or the material surrounding the star-birthing region. To see those things, astronomers will need the infrared capabilities of the Webb Telescope. The planned infrared observatory will have a mirror about seven times the area of Hubble's primary mirror and will collect more light from faint galaxies. It also will be able to view even more remote galaxies whose light has been stretched deep into infrared wavelengths that are out of the reach of Hubble.

Team member Holland Ford of Johns Hopkins University said this galaxy will be one of the first objects the Webb Telescope will observe, saying, "This object is a pathfinder for the James Webb Space Telescope for deciphering what is happening in young galaxies." The astronomers noted that the faraway galaxy also would be an ideal target for the Atacama Large Millimeter Array, which, when completed in 2012, will be the world's most powerful radio telescope.

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### **Sun-like star flips its magnetic field**— February 13/08 Credit Astronomy.com

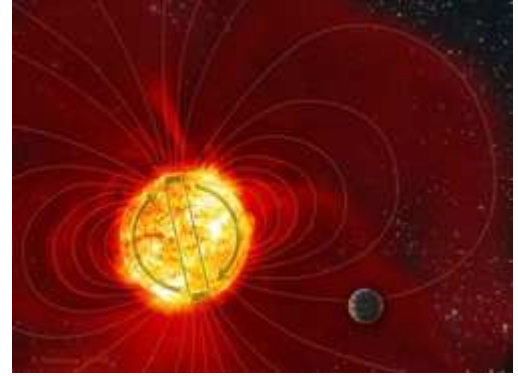
An international group of astronomers that includes the University of Hawaii's Evgenya Shkolnik reported today that they have discovered that the Sun-like star tau Bootis flipped its magnetic field from north to south sometime during the last year.

It has been known for many years that the Sun's magnetic field changes its



direction every 11 years, but this is the first time that such a change has been observed in another star. The team of astronomers, who made use of Canada-France-Hawaii Telescope atop Mauna Kea, are now closely monitoring tau Bootis to see how long it will be before the magnetic field reverses again.

Magnetic field reversals on the Sun are closely linked to the varying number of sunspots seen on the Sun's surface. The last "solar minimum," the time when number of sunspots was the lowest and the magnetic flip occurred, was in 2007. The first sunspot of the new cycle appeared just last month.



The magnetic cycle of the Sun impacts the Earth's climate and is believed to have caused the little ice age in the seventeenth century. The Earth's magnetic field also flips, although much less frequently and more erratically.

The international team led by Jean-Francois Donati and Claire Moutou of France caught tau Bootis in the process of flipping its magnetic field while they were mapping the magnetic fields of stars.

What makes tau Bootis even more interesting is that it harbors a giant planet orbiting very close to the surface of the star. The planet is actually so close (only one twentieth the distance between the Sun and Earth) and so massive (about 6.5 times the size of Jupiter) that it succeeded in forcing the surface of the star to co-rotate with the planet's orbital motion through tidal torques. This is the same effect that causes the moon to co-rotate around Earth so that we see only one side of the moon.

Since the astronomers managed to catch tau Bootis in this state of magnetic flipping during just 2 years of observations, it is likely that this event is much more frequent on tau Bootis than it is on the Sun. It is possible that the giant planet that has already managed to speed up the surface of tau Bootis is also spinning up the magnetic engine of its host star. The astronomers will keep their telescopes focused on tau Bootis in coming years to make sure they catch the star's next magnetic turnover. Their goal is a better understanding of how magnetic engines work in stars, including our Sun.

Slightly hotter and 20 percent more massive than the Sun, tau Bootis is fairly bright and visible with the naked eye and located only 51 light-years away from us. It is currently rises about midnight and is visible for most of the night near the bright star Arcturus in the constellation Bootis in the northeast part of the sky.

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### **Name that satellite!** – February 12/08 Credit Astronomy.com

NASA announced Thursday that members of the general public from around the world will have a chance to suggest a new name for the cutting edge Gamma-ray Large Area Space Telescope, otherwise known as GLAST, observatory before it launches in mid-2008. The satellite will observe some of the most powerful forces known in the universe.

"The idea is to give people a chance to come up with a name that will fully engage the public in the GLAST mission," says Steve Ritz, the mission's project scientist at NASA's Goddard Space Flight Center.

The mission's scientific objectives are to:

Explore the most extreme environments in the universe, where nature harnesses energies far beyond anything possible on Earth.

Search for signs of new laws of physics and what composes the mysterious dark matter.



Explain how black holes accelerate immense jets of material to nearly light speed. Help crack the mysteries of the stupendously powerful explosions known as gamma-ray bursts. Answer long-standing questions about a broad range of phenomena, including solar flares, pulsars and the origin of cosmic rays.

"We're looking for name suggestions that

will capture the excitement of GLAST's mission and call attention to gamma-ray and high-energy astronomy. We are looking for something memorable to commemorate this spectacular new astronomy mission," says Alan Stern, associate administrator for science at NASA Headquarters in Washington. "We hope someone will come up with a name that is catchy, easy to say and will help make the satellite and its mission a topic of dinner table and classroom discussion."

Suggestions for the mission's new name can be an acronym, but it is not a requirement. Any suggestions for naming the telescope after a scientist may only include names of deceased scientists whose names are not already used for other NASA missions. All suggestions will be considered. The period for accepting names closes on March 31, 2008. Participants must include a statement of 25 words or less about why their suggestion would be a strong name for the mission. Multiple suggestions are encouraged.

Anyone who drops a name into the "Name That Satellite!" suggestion box on the web page can choose to receive a "Certificate of Participation" via return e-mail. Participants also may choose to receive the NASA press release announcing the new mission name. The announcement is expected approximately 60 days after launch of the telescope.

Go to <http://glast.sonoma.edu/glastname/> to submit a suggestion for the mission name.

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### **U.S. successfully destroys satellite**— February 20/08 Credit Astronomy.com

A network of land-, air-, sea- and spaced-based sensors confirms that the U.S. military intercepted a non-functioning National Reconnaissance Office satellite which was in its final orbits before entering the earth's atmosphere.



At approximately 10:26 P.M. EST today, a U.S. Navy AEGIS warship, the USS Lake Erie (CG-70), fired a single modified tactical Standard Missile-3 (SM-3) hitting the satellite approximately 133 nautical miles (247 kilometers) over the Pacific Ocean as it traveled in space at more than 17,000 mph. USS Decatur (DDG-73) and USS Russell (DDG-59) were also part of the task force.

The objective was to rupture the fuel tank to dissipate the approximately 1,000 pounds (453 kg) of hydrazine, a hazardous fuel which could pose a danger to people on earth, before it entered into earth's atmosphere. Confirmation that the fuel tank has been fragmented should be available within 24 hours.

Due to the relatively low altitude of the satellite at the time of the engagement, debris will begin to re-enter the earth's atmosphere immediately. Nearly all of the debris will burn up on reentry within 24-48 hours and the remaining debris should re-enter within 40 days.

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## Buy and Sell

Here's your chance to clean out the closet and find a home for your slightly used treasures. Post your buy and sell items by emailing the [Editor](#) with your details.

### Newtonian for Sale

Good permanent Newtonian scope (not portable) with 13 1/2 inch mirror, 4" Steel Alt Azimuth mount with concrete counter balance. Includes various eyepieces. More info contact John MacArthur at [jandlmac@shaw.ca](mailto:jandlmac@shaw.ca)

### Single 8" Meade Looking for an Astronomer

Lonely 8" Meade Newtonian with motorized German equatorial steel post mount is looking for a pair of lovely eyes to spend long nights gazing at the stars together. Includes homemade Dobsonian mount, one 40 mm eyepiece and telescope carrying bag. Asking \$750.00 OBO contact Bryon Thompson at [bryonjt@shaw.ca](mailto:bryonjt@shaw.ca).

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## Ask an Expert

Have you been thumbing through the Astronomy or Sky and Telescope magazine and have some questions on the latest and greatest in astronomy gear? Or maybe you're narrowing down your search for just the right telescope and want to know the difference between Dobsonians, Schmidt-Cassegrains, Reflector and Refractors. Well wonder no more, email [Brian Robilliard](#) our resident expert to get the "inside scoop" on what's hot or not in astronomy gear.

Are you seeing double or unable to focus? Chances are you need to collimate your scope. Are you looking for a good eyepiece? Why do you need to know the focal length of your telescope's mirror and how do you determine the focal length? For answers to these and other telescope questions email [Ed Maxfield](#) our expert on telescope tips, hints and suggestions.

Are you new to astronomy? Want to know the how to find objects in the sky? Or just wondering what that bright object in the evening sky is? Well wonder no more; email [Bryon Thompson](#) our Public Outreach Officer and master of Astronomy 101 basics.

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## Kids Korner

For the younger astronomers. We want your input on what you would like to see happening at the club. Tell us a bit about yourself and why you love astronomy. Email the [Editor](#) with your submissions.

For the older folks, if you have any ideas that might spark the interest of a young upcoming astronomer, please send your submissions to the editor.

**Spaceflight - Word Search** - Courtesy of Canadian Space Agency

A	M	I	S	S	I	O	N	C	D	G	S	A	P	D
Y	R	O	T	A	R	O	B	A	L	F	K	A	D	S
K	H	B	O	N	D	A	R	E	E	X	Y	U	P	M
G	T	E	B	G	N	I	D	N	A	L	S	A	N	A
F	T	Y	T	I	V	A	R	G	O	R	C	I	M	I
U	H	H	A	S	D	A	W	A	V	E	G	A	I	L
S	J	O	I	C	C	E	D	R	W	G	C	R	M	L
A	V	P	K	R	O	Y	B	A	U	R	A	F	O	I
S	S	E	N	S	S	E	L	T	H	G	I	E	W	W
T	G	W	U	H	M	K	R	Z	K	L	A	T	S	O
R	N	I	A	U	O	A	I	O	R	B	I	T	O	T
O	I	L	E	T	N	L	H	A	D	F	I	E	L	D
N	N	E	N	T	A	L	I	R	M	H	F	Y	C	T
A	I	K	R	L	U	U	Q	H	C	N	U	A	L	E
U	A	L	A	E	T	N	E	M	I	R	E	P	X	E
T	R	Y	G	V	A	S	S	O	N	I	L	L	A	F
E	T	I	U	S	E	C	A	P	S	D	I	L	R	E

**A**  
ASTRONAUT FUEL

**M**  
MACLEAN  
MICROGRAVITY TRAINING  
MISSION  
**T**  
THIRSK  
TRYGVASSON

**B**  
BONDAR  
**G**  
GARNEAU

**O**  
ORBIT  
**W**  
WEIGHTLESSNESS  
WILLIAMS

**C**  
COSMONAUT  
**H**  
HADFIELD

**P**  
PAYETTE  
PAYLOAD

**E**  
EXPERIMENT  
**L**  
LABORATORY  
**S**  
SHUTTLE

LANDING  
LAUNCH  
SPACESUIT  
SPACEWALK

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## RASC News

By Ed Maxfield

Royal Astronomical Society of Canada, Victoria Centre <http://victoria.rasc.ca>

### Meetings

Meetings are held on the second Wednesday of each month except July and August downstairs in the Elliot Bldg at U of Vic.

### Astronomy Café

The Astronomy Café Meets on Monday evenings at Sir James Douglas School on Fairfield Road. This is a really fun meeting where anything astronomical can be discussed.

### New Observatory

The observatory project is close to completion. The building is almost done and the pier has been constructed. For more pictures, see the website.



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## The Sky This Month

By Bryon Thompson

Observing Site: **Duncan, 48.783°N, 123.700°W**

Well it seems the cloudy, rainy weather that held out for most of February thankfully didn't show up for the lunar eclipse on February 20<sup>th</sup>. I hope that many of you had the opportunity to get out and experience the wonder of the Moon and Saturn rising into a beautiful eclipse. March may not have an eclipse to look forward to but the month holds some great sights all the same.

Spring comes back this month officially on the 19<sup>th</sup> at 10:48pm PST when the sun reaches the vernal equinox, but our cool nights and dark skies still help to promote some good seeing. The less than freezing temperatures are not hard to take either. "Oops! Sorry Frank, you are probably still sitting in the lower register of the thermostat out there in snowy Saskatchewan." Anyway, March does promise some good nights and hopefully some clear skies to look forward to.

The Planets in this month's night sky are few and far between, no pun intended! Mars and Saturn are the ones to focus on for March. Mars, although growing fainter and fainter as we move further apart is still an object of interest if for no other reason than it is in the zenith of the sky. The small planet's apparent disk spans only 9" diminishing to 7' of arc at month's end. However in the middle of March on the 14<sup>th</sup> Mars and the new quarter moon share the sky overhead just under 2 degrees apart. Another close paring is when Mars tracks just over one and a half degrees north of M35 on the 9<sup>th</sup> and 10<sup>th</sup> of March. M35 is an open cluster of over 500 stars at a distance of 2800 light years. It contains some post-main sequence stars, including several yellow and orange giants. Try comparing Mars rusty glow with these older stars. At just over 24 light years in diameter it is estimated that the central density is just over 6 stars per cubic parsec. We don't have any neighbours quite that close. If you'd like a challenge try to find NGC2158 only 15 arc minutes southwest of M35. At magnitude 8.6 it is 10 times older and over five times further away (approx. 16,000 light years).

Saturn of course rises early in the evening and can be found all night long in the stars of Leo. Saturn is brighter than the brightest star in Leo, Regulus, by one magnitude. Saturn reached opposition in late February and as time goes on its great shadow will slowly start to appear on the far side of the rings. By the end of the year the Earth moves in line with the plane of the rings and the gas giant's best feature will disappear from view.

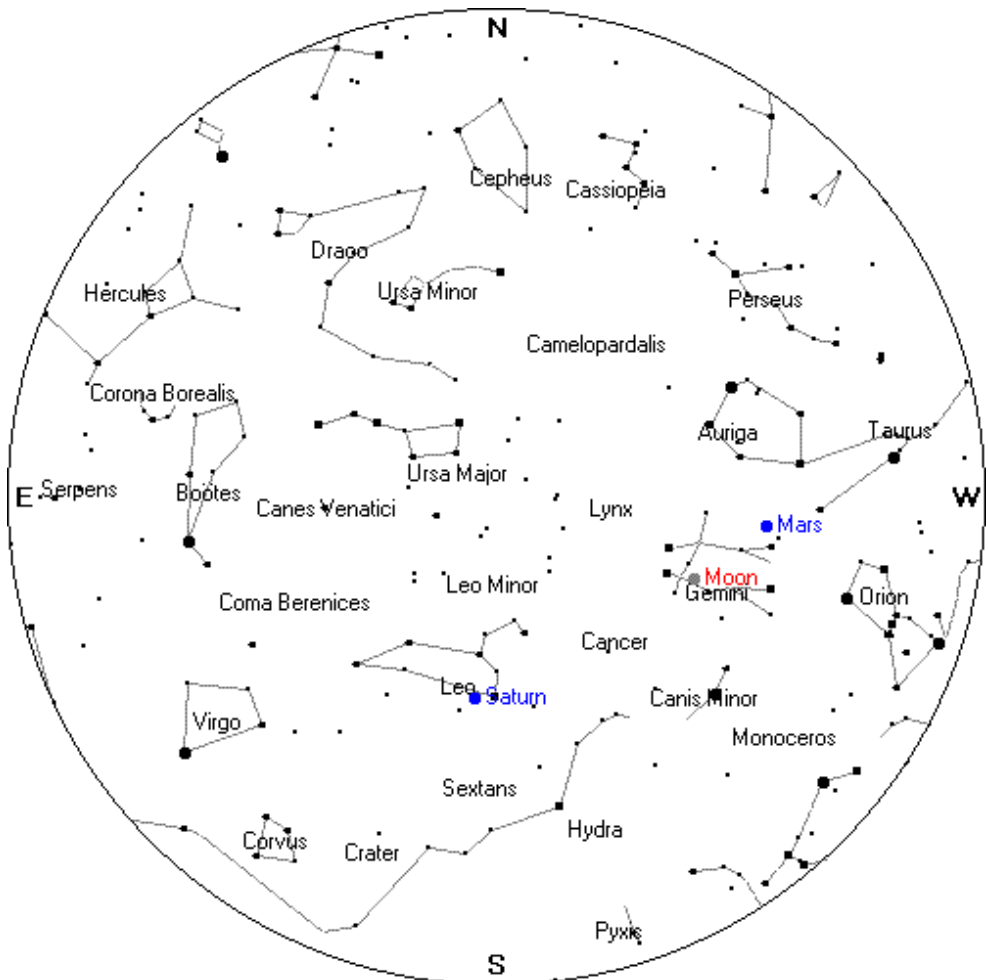
There are other planets to view in March but they are all early risers. Jupiter gets up above the horizon at 4 am early in the month and about an hour and a half earlier than that by month's end. Look for it in the stars of Sagittarius before it becomes lost in the early morning glow. Venus and Mercury are also early morning sights but you will need a good view of the eastern horizon. The two planets are a close pair for most of the month but don't rise higher than about 5 degrees and are followed by sunrise only 30 or so minutes later.

Although there is not much in the way of meteors for March there is a good chance of seeing a comet. Comet 46P/Wirtanen can be found in Auriga. It's 9<sup>th</sup> magnitude short tail is visible in scopes as small as 4 inches, but you will need a dark sky with no moon in order to see it best. Try nearer to the end of the month

from the 23<sup>rd</sup> to the 31<sup>st</sup> as the moon rises later each night. I hope you can get out **14** and enjoy our night sky this month and remember, the science of astronomy is looking up!

March 07	09:14pmPST	New Moon
March 09		Mars passes within 1 ½ degrees of M35
March 14	03:46amPST	First Quarter Moon
	08:00pmPST	Moon passes 1.7 degrees North of Mars
March 19	10:48pmPST	Vernal Equinox
March 29	02:47pmPST	Last Quarter Moon

**Sky Chart** —Here's your mid-March midnight sky chart. In order to use the sky chart properly remember the centre of the chart is the sky directly above your head (or the Zenith). Turn the chart so that the direction you are facing is at the bottom of the chart (or pointed toward your toes). The star field directly in front of you will be between the bottom of the chart and the centre.



Sky Chart Courtesy of Heavens-Above

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