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Greetings!

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

After just returning from a trip to Germany, I realized sometimes all it takes is a "new" view on a "old" perspective to bring back the wonder. For centuries, people in all parts of the world have looked at stars. The patterns of the stars have reminded them of familiar objects or characters from stories. Different cultures have associated mythological creatures and stories with different constellations of stars. The most familiar star pattern in the entire sky is the seven stars that make up the shape popularly termed the Big Dipper or Plough, part of the constellation Ursa Major, the Great Bear.

Chinese astronomers called this constellation the "Jade Balance of Fate." Chinese peasants called it the "Grain Measure." The Arabians saw a coffin and mourners in this constellation while the Irish refer to this group of stars as "King David's Chariot." The Romans called it the "7 Plough Oxen" who pulled a cosmic plough the "Great Cart". Italy later assumed the name, calling it the Carro, "Cart".

While I was in Germany I was intrigued to find out the "big dipper" to the Germans is known as the "GroBer Wagen" (big wagon). I did a bit of research and found this article from the New York Times dated January 7 1912 :

The peasant it is said, met our saviour near the shores of Galilee, and gave him a ride in his wagon. As a reward for his kindness he was offered a home in heaven, but he asked if he might be permitted to take his wagon with him. His request was granted, and he now drives it from east to west, and will continue to do so for all eternity. In North Germany it is believed that he start out on his journey before midnight and returns 24 hours later. His wagon turns around with a great noise, he is said to urge on his horses with loud cries which have sometimes been heard by lucky mortals.

Then I got to thinking how did the big dipper get it's name? Well here's the most popular answer on the internet: *The Big Dipper gets its name from the resemblance the pattern has to the type of ladle more commonly used in the past.*

Here's another more interesting one:

The invention of the name "Big Dipper" by most accounts involves a significant event in our history. African American slaves during and prior to the civil war saw this pattern of stars as the "drinking gourd" which was similar to the hollowed out gourds used for drinking by the slaves. During the Civil War, slaves escaping the South through the network of safe havens known as the underground railroad, made their way north by following the gourd which was always in the northern hemisphere and to freedom. After the war when slavery was abolished the drinking gourd in the sky evolved into what we call the "big dipper".

So there you go; be it the Big Dipper, Plough, Gourd, Oxen, Coffin, Grain measure, Chariot, Cart or wagon we all look at those same 7 stars and wonder. A big thanks goes out to my family in Selb, Germany (Johanna, Christine & Alois,

Christian & Lydia, Sieglinde, Susanne, Alexandra, Michaela and Jessica) for whom I greatly appreciate. Thanks for making our stay a memorable one.

And last but not least many thanks to this month's contributors:
Moe Raven, Norm Willey, 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

The Star Party is coming along. I have spoken with Ron Wiens the manager of the R&G and we should have the agreement signed by the time you read this. We owe Gail Robertson many thanks; she has created a real snazzy poster for us. Any ideas for the Star Party? Please let me know either at the meeting or email/telephone me (250) 710 8372. All comments are very welcome.

I have a little more information regarding the Cowichan 2008 North American Indigenous Games to be held in Duncan. A proposal has been sent to the Games Committee to hold the event at the Centre of the Universe/DAO. We are awaiting a response from the games committee. I think that this is a great opportunity for us to participate in an exciting project. We need to have a highly visible presence at the Star Party as many of the participants will be from the Cowichan Valley region. I will be looking for volunteers for the first week of August.

Bryon Thompson has arranged a speaker for May see Meeting Highlights for more details. I hope that everyone will come out and support our efforts to bring you first-class speakers for our meetings.

On May the 10th, we will be doing an information/solar observing day at the Farmers market in downtown Duncan. We have done one already. Thank you Freda and Bryon for organizing the events. Thanks too to Moe, Ed Nicholas and Nancy and Jamie for participating. We met and talked to many very interested people. The organizer of the Market was very enthusiastic about having us there. Bryon and Freda will be performing at May 10th event so we need a few more volunteers to help out. Please contact Bryon or Freda if you can help. This is a fun event and, in case you've forgotten, May 10th is International Astronomy Day. Telescopes are welcome but you don't need to bring one. Just meet and greet the public and talk about what we all hold so dear... astronomy. In Victoria, this year's International Astronomy Day event will be held at the Centre of the Universe (CU). I will be going there after our event so if anyone wants more details please contact me. Here is your chance to visit the Centre of the Universe and the Plaskett telescope for no charge! Bring the whole family.

On May 11th, Bryon and I are holding a star party at a private residence. This is a Mother's Day present from their daughter (neat idea!). The venue is Cobble Hill and they expect to have about 20 people there. They have a large property, covered car port and barbeque pit. Let me know if you can assist.

I will be departing for the wilds of Saskatchewan on April 25th to visit Frank but Bryon assures me that I will be back in time for the May 10th farmers market.

All the best and clear skies,

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Meeting Highlights

Meetings are held on the **4th 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 May 28th with Brad Cownden as our featured presenter. His talk will be on "Determining the Age and Metallicity of Early-Type Galaxies". Brad is a graduate of the Physics Astronomy Department at the University of Victoria. Hope to see you all there.

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February Minutes

By Bryon Thompson

We had a great turnout for the meeting 13 members were present and a reminder that we need volunteers for our farmers market dates was mentioned.

The meeting was graced with Dr. Bill Wellers presentation on "How amateur astronomers can help the pro's to do Astronomy research". Dr. Weller discussed ways to help both passively (through the use of SETI@home, Einstein@home and Milky Way@home) and actively (through accurate viewing logs). The key lies in keeping good to excellent records of your nights viewing. From measuring the exact times that the shadows of Jupiters moons take to pass through the planets disc complete with GPS readings of your location and measuring near earth objects through wide field views to measuring the size of craters and the age of Mars surface. The talk was both rivating and encouraging. A lot of great discussion ensued thanks again Dr. Weller.

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

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Upcoming Events

May 8th - Island Eyepiece and Telescope Ltd is moving – our beloved telescope and accessory supplier is expanding to include a science and nature store. Congratulations Joanne and Brian, see below for details.

www.islandeyepiece.com
Ph: 743-6633



Island Telescope Science Emporium

107-2690 Mill Bay Rd (near Thrifty's)

Opening May 08

**Telescopes, Spotting Scopes, Binoculars
Science Kits, Globes & Posters, Dinosaurs
Sea Creatures, Educational & Kinetic Toys
Microscopes & Magnifiers, Rocks & Minerals**



May 10th - International Astronomy Day - Astronomy Day is a grass roots movement designed to share the joy of astronomy with the general population - "Bringing Astronomy to the People." On Astronomy Day, thousands of people who have never looked through a telescope will have an opportunity to see first hand what has so many amateur and professional astronomers all excited. In our local area there are two events happening around this special day.

CVSF Celebrates at the Downtown Duncan Farmers Market- Our Club will be hosting a table with solar and regular telescopes and club info at the Downtown Duncan Farmers Market on Saturday May 10th complete with "Music From the Stars" provided by Freda Eckstien and Bryon Thompson. Please email [Bryon Thompson](mailto:Bryon.Thompson) or call 743-2412 to volunteer for this local extravaganza.

RASC at the Center of the Universe (CU)

This year's RASC event will be held at the Centre of the Universe (CU). For details check out their website at:

<http://victoria.rasc.ca/events/AstroDay/Default.htm>

May 11th – CVSF privately hosted Star Party in Cobble Hill, please contact Ed Maxfield at president@starfinders.ca if you can assist with the event.

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Cool Pics

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

It is serendipitous that I've received a pic from Norm Willey on the Lunar X. It is an optical illusion that can be seen at the first quarter for a period of about 4h (April 12 @ 2030h). It is a series of ridges formed from three adjacent craters. Norm's image was taken with a Nikon D50 at prime focus, at 1/100th of a second; the telescope was an 8" Meade on an EQ6 mount. Processing in Photoshop (crop, unmask sharpen).



For more on Lunar X check out Kids Korner where we challenge all Kids (young and old) to find Lunar X. Good work Norm!

Also, check out our 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

Naked-eye Gamma Ray Burst- March 21/08 Credit Science@NASA

A powerful gamma ray burst detected March 19th by NASA's Swift satellite has shattered the record for the most distant object that could be seen with the naked eye.

"It was a whopper," says Swift principal investigator Neil Gehrels of NASA's Goddard Space Flight Center. "This blows away every gamma ray burst we've seen so far."

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Swift's Burst Alert Telescope picked up the burst at 2:12 a.m. EDT on March 19, 2008, and pinpointed the coordinates in the constellation Bootes. Telescopes in space and on the ground quickly moved to observe the afterglow. The burst was named GRB 080319B and registered between 5 and 6 on the visual magnitude scale used by astronomers. (A magnitude 6 star is the dimmest visible to the human eye; magnitude 5 is almost three times brighter.)



Above: GRB 080319B makes a brief appearance among the stars of Bootes in a movie made by Pi of the Sky, a Polish group that monitors the sky for afterglows and other short-lived phenomena.

Later that evening, the Very Large Telescope in Chile and the Hobby-Eberly Telescope in Texas measured the burst's redshift at 0.94. A redshift is a measure of the distance to an object. A redshift of 0.94 translates into a distance of 7.5 billion light years, meaning the explosion took place 7.5 billion years ago, a time when the universe was less than half its current age and Earth had yet to form. This is more than halfway across the visible universe.

"No other known object or type of explosion could be seen by the naked eye at such an immense distance," says Swift science team member Stephen Holland of Goddard. "If someone just happened to be looking at the right place at the right time, they saw the most distant object ever seen by human eyes without optical aid."

Most gamma ray bursts occur when massive stars run out of nuclear fuel. Their cores collapse to form black holes or neutron stars, releasing an intense burst of high-energy gamma rays and ejecting particle jets that rip through space at nearly the speed of light. When the jets plow into surrounding interstellar clouds, they heat the gas to incandescent visibility. It is this gaseous "afterglow" which was visible to the human eye on March 19th.

GRB 080319B's afterglow was 2.5 million times more luminous than the most luminous supernova ever recorded, making it the most intrinsically bright object ever observed by humans in the universe. The most distant previous object that could have been seen by the naked eye is the nearby galaxy M33, a relatively short 2.9 million light-years from Earth.

Right: The afterglow of GRB 080319B as recorded by Swift's X-ray Telescope.



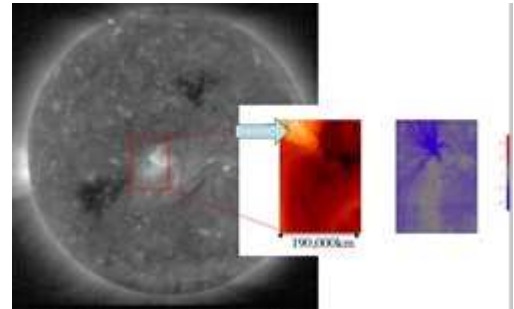
Analysis of GRB 080319B is just getting underway, so astronomers don't know why this burst and its afterglow were so bright. One possibility is the burst was more energetic than others, perhaps because of the mass, spin, or magnetic field of the progenitor star or its jet. Or perhaps it concentrated its energy in a narrow jet that was aimed directly at Earth.

GRB 080319B was one of four bursts that Swift detected on March 19th, a Swift record for one day. Swift science team member Judith Racusin of Penn State University comments, "coincidentally, the passing of Arthur C. Clarke seems to have set the universe ablaze with gamma ray bursts." A fitting farewell, indeed.

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An international team of scientists has found the source of the stream of particles ⁶ that make up the solar wind. In a presentation on Wednesday April 2 at the RAS National Astronomy Meeting (NAM 2008) in Belfast, Professor Louise Harra of the UCL-Mullard Space Science Laboratory will explain how astronomers have used a UK-led instrument on the orbiting Hinode space observatory to finally track down the starting point for the wind.

A X-ray image of the Sun made with the Hinode satellite on February 20, 2007. The insets show the flow of gas away from the bright region marked on the left. The blue image indicates material flowing towards us that will eventually make up the solar wind and the red image shows material flowing away from us back towards the surface of the Sun.



Harra/JAXA/NASA/ESA

The solar wind consists of electrically charged particles that flow out from the Sun in all directions. Even at their slowest, the particles race along at 200 kilometers per second, taking less than 10 days to travel from the Sun to the Earth. When stronger gusts of the wind run into the magnetic field of the Earth there can be dramatic consequences, from creating beautiful displays of the northern and southern lights to interfering with electronic systems on satellites and sometimes even overloading electrical power grids on the ground.

From its launch in the autumn of 2006, scientists have used the Hinode mission to study the Sun in unprecedented detail. One of the instruments on the probe, the UK-built Extreme Ultraviolet Imaging Spectrometer (EIS) measures the speed at which material flows out from the Sun.

The Sun is a cauldron of hot gas shaped by magnetic fields, which create bright regions of activity on the solar surface. Using EIS, the scientists found that at the edges of these bright regions hot gas spurts out at high speeds. Magnetic fields connect the regions together, even when they are widely separated. For example, in the Hinode images that Harra will present on Wednesday, magnetic fields linked two regions almost 500,000 kilometers apart — a distance equivalent to 40 Earths placed side by side in space. When magnetic fields from two regions collide they allow hot gas to escape from the Sun — this material flows out as the solar wind.

Harra says, "It is fantastic to finally be able to pinpoint the source of the solar wind — it has been debated for many years and now we have the final piece of the jigsaw. In the future we want to be able to work out how the wind is transported through the solar system."

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Finding Earthlike Worlds— April 8/08 Credit Harvard-Smithsonian CfA

The leading method of finding planets orbiting distant stars spots mostly Jupiter-sized worlds. Technology limitations make it difficult to detect smaller planets. But that is about to change. A revolutionary laser technology being developed by scientists and engineers at the Harvard-Smithsonian Center for Astrophysics (CfA), with colleagues at MIT, will enable scientists to spot Earth-sized worlds in Earth-like orbits.

"We are at the cusp of a new era in planet searches," says CfA astrophysicist Chih-Hao Li. "With this technology we are developing, astronomers will finally be able to find the first truly Earth-like worlds in terms of size and orbit."

Planets orbiting other stars are much too faint and far away to be seen directly and photographed. Instead, astronomers must look for the planet's effect on its star.

CfA astronomers are developing a new device that may be the first to spot Earth-like planets, like the hypothetical world with two moons shown in this artist's concept. David A. Aguilar (CfA)



While the gravity of a star tugs on a planet and holds the planet in orbit, the planet's gravity also tugs on the star. That tug makes the star wobble slightly back and forth. If the wobble is along our line of sight, then sensitive instruments called spectrographs may be able to detect it.

The size of the wobble depends on the planet's mass and its distance from the star. The larger the mass of the planet, the bigger the star's wobble will be, making larger planets easier to detect. At the same time, a planet in a tight, short-period orbit is easier to find than one in a wide, long-period orbit.

Current technology, although very stable and sensitive, isn't quite up to the task of finding Earths. The best instruments can only find 5-Earth-mass planets in tight, Mercury-like orbits.

The new device developed by Li and his colleagues, called an astro-comb, will be able to spot Earth-mass planets in Earth-like orbits. It uses ultrashort, femtosecond (one millionth of one billionth of a second) pulses of laser light, linked to an atomic clock, to provide a precise standard against which light from a star can be measured.

The astro-comb can make measurements accurate to one part in a trillion. This may increase the resolution of the wobble planet-hunting technique by about 100 times, which would allow astronomers to detect Earth-sized planets.

A prototype astro-comb will be tested this summer at CfA's Mount Hopkins Observatory in Arizona. Those tests will be used to refine the design. An improved astro-comb is destined for a project being built in the Canary Islands called the New Earths Facility. The researchers expect it to be operational sometime in 2010.

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Russian Space Shuttle Sails up the Rhine for German Home –

April 9/08 Credit Associated Press

COLOGNE, Germany (AP) - The one-time pride of the Soviet space program is making a decidedly sedate journey to its new home, chugging up the Rhine River aboard a pontoon boat.

The Buran 002 space shuttle is headed for the Technik-Museum Speyer in southwestern Germany, which says it has long had its eye on the spacecraft.



The shuttle has been in storage in Bahrain since 2002. Last month, the museum's new acquisition - with its wings removed for transport - was loaded onto a ship in Manama for its journey to the Dutch port of Rotterdam.

It was then loaded onto a barge for its stately trip up the Rhine. The shuttle sailed out of Cologne on Wednesday after floating past the city's landmark cathedral on Tuesday.

The Buran - the Soviet space program's answer to NASA's space shuttle, to which it bears a strong resemblance - made its maiden flight in 1988.

Soviet space officials claimed at the time that the Buran was superior to its American rival because of its ability to fly on autopilot and its bigger capacity, but the program was mothballed amid chaos and fund shortages in the run-up to the 1991 Soviet collapse. Several Buran shuttles were left rusting in hangars.

The shuttle is due to arrive at its new home on Saturday.

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Lander Zeroes in On Martian North Pole – April 11/08 Credit

Space.com

NASA's next spacecraft to visit Mars has changed course to zero in on its red planet landing site.

The Phoenix Mars Lander fired its thrusters for 35 seconds Thursday to fine-tune its heading for a planned May 25 landing near the Martian north pole.



"This is our first trajectory maneuver targeting a specific location in the northern polar region of Mars," said Brian Portock, chief of NASA's Phoenix navigation team at the Jet Propulsion Laboratory in Pasadena, Calif., in a statement.

Phoenix's targeted drop zone is an area that mission scientists have dubbed "Green Valley." The region is a broad, flat valley where mission planners plan to land Phoenix somewhere within a 62-mile by 12-mile (100-km by 20-km) ellipse.

"Our landing area has the largest concentration of ice on Mars outside of the polar caps," said Phoenix principal investigator Peter Smith of the University of Arizona, Tucson. "If you want to search for a habitable zone in the arctic permafrost, then this is the place to go."

Ray Arvidson, chair of the Phoenix landing site working group and veteran Mars scientist, told SPACE.com that the lander's target zone offers smooth terrain with a few scattered rocks. It is also home to so-called "polygonal" plains that are expected to harbor dirty water ice beneath their surface, added Arvidson, who is a co-investigator for Phoenix's robotic arm at Washington University in St. Louis, Mo.

Some five million rocks have been mapped in the region by spacecraft orbiting Mars, mission managers said. "We have never before had so much information about a Mars site prior to landing," Arvidson said in a statement.

NASA launched the \$420-million Phoenix last August on a mission to the martian arctic, where it is expected to use a robotic arm-mounted scoop to dig into the red planet's surface to study Mars water ice and soil.

Researchers hope the probe's onboard ovens, wet chemistry lab and other instruments will determine if its landing site may have once been habitable for microbial life. Phoenix is also designed to double as a Mars arctic weather and atmosphere-monitoring station.

But first, the probe has to reach Mars. Thursday's thruster firing was the second of five trajectory tweaks planned during Phoenix's 422 million-mile (679 million-km) trek to Mars. The spacecraft first changed course just after its August launch, with three more maneuvers planned between now and landing day.

Unlike NASA's Mars rovers Spirit and Opportunity, which used airbags to make a bouncy landing on the red planet in 2004, Phoenix's touchdown will rely on a set of rocket thrusters that will fire in pulses to slow the craft. They rockets are designed to begin firing just 3,000 feet (914 meters) above the Martian surface and slow Phoenix to about 5 mph (8 kph) before its three metal legs touchdown.

Similar powered landing approaches were used for NASA's successful Viking

landers in the 1970s, as well as the ill-fated Mars Polar Lander, which was lost just before landing near the martian south pole in 1999. 9

"Landing on Mars is extremely challenging. In fact, not since the 1970s have we had a successful powered landing on this unforgiving planet," said Doug McCuiston, director of NASA's Mars exploration program. "There's no guarantee of success, but we are doing everything we can to mitigate the risks."

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Cassini Receives Extension- April 16/08 credit NASA

NASA is extending the international Cassini-Huygens mission by 2 years. The historic spacecraft's stunning discoveries and images have revolutionized our knowledge of Saturn and its moons.

Cassini's mission originally had been scheduled to end in July 2008. The newly-announced 2-year extension will include 60 additional orbits of Saturn and more flybys of its exotic moons. These will include 26 flybys of Titan, seven of Enceladus, and one each of Dione, Rhea and Helene. The extension also includes studies of Saturn's rings, its complex magnetosphere, and the planet.

"This extension is not only exciting for the science community, but for the world to continue to share in unlocking Saturn's secrets," says Jim Green, director of the Planetary Science Division at NASA Headquarters in Washington, D.C. "New discoveries are the hallmarks of its success, along with the breathtaking images beamed back to Earth that are simply mesmerizing," Green says.

"The spacecraft is performing exceptionally well and the team is highly motivated, so we're excited at the prospect of another 2 years," says Bob Mitchell, Cassini program manager at NASA's Jet Propulsion Laboratory in Pasadena, California.

Based on findings from Cassini, scientists think liquid water may be just beneath the surface of Saturn's moon, Enceladus. That's why the small moon, only one-tenth the size of Titan and one-seventh the size of Earth's Moon, is one of the highest-priority targets for the extended mission. Cassini discovered geysers of water-ice jetting from the Enceladus' surface. The geysers, which shoot out at a distance three times the diameter of Enceladus, feed particles into Saturn's most expansive ring. In the extended mission, the spacecraft may come as close as 15 miles from the moon's surface.

Cassini's observations of Saturn's largest moon, Titan, have given scientists a glimpse of what Earth might have been like before life evolved. They now believe Titan possesses many parallels to Earth, including lakes, rivers, channels, dunes, rain, snow, clouds, mountains and possibly volcanoes.

"When we designed the original tour, we really did not know what we would find, especially at Enceladus and Titan," says Dennis Matson, the JPL Cassini project scientist. "This extended tour is responding to these new discoveries and giving us a chance to look for more."

Unlike Earth, Titan's lakes, rivers and rain are composed of methane and ethane, and temperatures reach a chilly minus 290° Fahrenheit (143° Celsius). Although Titan's dense atmosphere limits viewing the surface, Cassini's high-resolution radar coverage and imaging by the infrared spectrometer have given scientists a better look.

Other activities for Cassini scientists will include monitoring seasons on Titan and Saturn, observing unique ring events, such as the 2009 equinox when the Sun will be in the plane of the rings, and exploring new places within Saturn's magnetosphere.

Cassini has returned a daily stream of data from Saturn's system for almost 4 years. Its travel scrapbook includes nearly 140,000 images and information gathered during 62 revolutions around Saturn, 43 flybys of Titan and 12 close flybys of the icy moons. More than 10 years after launch and almost 4 years after entering into

orbit around Saturn, Cassini is a healthy and robust spacecraft. Three of its science ¹⁰ instruments have minor ailments, but the impact on science-gathering is minimal. The spacecraft will have enough propellant left after the extended mission to potentially allow a third phase of operations. Data from the extended mission could lay the groundwork for possible new missions to Titan and Enceladus.

Cassini launched October 15, 1997, from Cape Canaveral, Florida, on a 7-year journey to Saturn, traversing 2.2 billion miles (3.5 billion kilometers). It is one of the most scientifically capable spacecraft ever launched, with a record 12 instruments on the orbiter and six more instruments on the European Space Agency's Huygens probe, which piggybacked a ride to Titan on Cassini.

Cassini receives electrical power from three radioisotope thermoelectric generators, which generate electricity from heat produced by the natural decay of plutonium. The spacecraft was captured into Saturn orbit in June 2004 and immediately began returning data to Earth.

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Titan: Treasures of Earth's Oily Twin – April 16/08 Credit BBC News

If worlds have shadow twins elsewhere in the Universe, then Earth's would appear to lie just a block or two down the cosmic road, in orbit around Saturn.



Three different views of Saturn's largest moon

"We have on Titan many of the geological features that we find on Earth," enthuses Rosaly Lopes. "We find volcanism, we find tectonics, we find erosion and deposition, and wind activity forming dunes." It's very similar to the Earth." But there is a crucial difference: Titan is so cold that most of the water is solid. The rivers flowing across these plains are formed of a hydrocarbon soup with methane as its main ingredient.

The true nature of this once mysterious world is now finally emerging, courtesy largely of the Cassini-Huygens mission, a joint US-European venture, which deposited a landing craft on Titan, and continues to send back data and pictures of Saturn, its rings and its 60-odd moons.

Dr Lopes, from Nasa's Jet Propulsion Laboratory (JPL) in California, is one of the scientists reviewing the Titan findings at the European Geosciences Union (EGU) meeting in Vienna, Europe's largest annual gathering of scientists studying the Earth, its climate and its cosmic neighbourhood.

Four years after its arrival in the Saturnian system, Cassini is now showing researchers just how similar Titan is to our own planet.

Lake district

Last year, the craft's radar identified large areas close to the moon's north pole that are apparently lakes filled with the same methane-rich liquid. A few have subsequently turned up near the south pole, too.

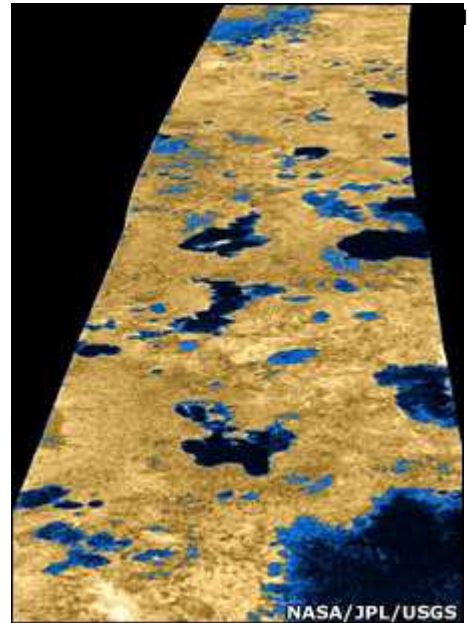
The radar instrument has identified lakes on Titan's surface

"What you have is very much like the hydrological cycle on Earth," explains Sushil Atreya from the University of Michigan in Ann Arbor.

"We have methane lakes in the high latitude regions, and the lower part of the atmosphere is sub-saturated, so there's about 40% relative humidity [of methane].

"And from time to time, it will rain methane onto the surface, which then collects into lakes; and there are also equatorial storms in the tropical regions."

So alike do the lakes appear to those on Earth that the cosmological "nomenclature police", the International Astronomical Union (IAU), have decreed that they can be named after those on our planet. Among others, Titan now features a Lake Abeya, a Lake Mackay and a Lake Ontario, named because their shapes resemble their terrestrial equivalents in Ethiopia, Australia and Canada.



Long trails

Perhaps the most spectacular example of Titan's mimicry of our terrestrial home lies in the river valleys, which are disturbingly Earth-like - long snaking structures with tributaries arranged like veins on a leaf.

Look at the images really hard, and you can almost imagine zooming in to find some Titanian vegetation growing along the banks, and a train of methane-guzzling animals heading down to drink.

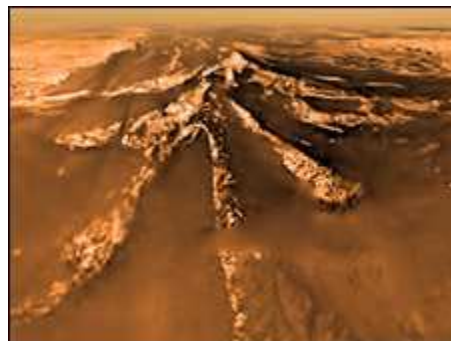
"There are a lot of valley systems, and a few are very huge, in the order of 1,000km long," notes Ralf Jaumann from the German Aerospace Center (DLR). Cassini has seen many valley systems on Titan's surface. "We tried to figure out what these systems are doing with erosion on the surface, and it's comparable with what we know on Earth; these rivers are doing erosion and sediment transport just as we know it from rivers like the Rhine, Elbe and probably the Mississippi. But the liquid in these rivers is not water, but methane."

Ask why methane plays the role here that water plays on Earth, and the answer is disturbingly simple: it is chance.

On Earth, water is warm enough that water is mobile, but not so warm that it evaporates into space, as would happen on Mercury. Titan is so cold - averaging about minus 180C - that water is largely frozen. Here, it is methane that is able to flow, to evaporate, freeze, thaw and condense, without trailing away into the void.

Water bed

So if methane has usurped the role that water plays on Earth, what part is there on



Titan for Earth's most important substance? For the most part, water here is solid, behaving in some ways as rock does on Earth; a surface to be eroded, a landscape to be sculpted. But in places it emerges violently in volcanoes.

A new analysis of the moon's rotation using Cassini's radar data indicates that large quantities of liquid water may lie under the icy surface.

The Huygens probe captured images of Titan's surface features as it parachuted through the atmosphere

"By matching up surface features that we saw on successive flybys, we were able to plot their positions relative to where we would have expected them to be if Titan was rotating the way it had always been expected to," explains Ralph Lorenz from Johns Hopkins University in Baltimore, US.

"In fact, on top of the expected rotation there is a little bit of a wobble back and forth that is driven by the atmosphere spinning up and spinning down with the seasons. "Now this actually happens on Earth; the length of our day changes by about a millisecond over the course of a year. But on Titan the change is considerably more because the atmosphere is denser than ours, and Titan is a smaller body.

"The displacement of surface features that we observe is such as to require the ice crust of Titan to be comparatively thin, perhaps 100 or 200km thick, and decoupled from the core with an ocean of liquid water."

Mission life

The atmosphere of Titan has also turned out to be reminiscent of Earth's, possessing layers that mimic the troposphere, stratosphere and ionosphere above our heads. There may be 1,000 times as much hydrocarbon as there is on Earth

In the higher levels, the interaction of solar radiation, nitrogen, and methane and other simple organic compounds leads to the formation of complex organic molecules such as benzene that later come down to the surface. There may be 1,000 times more liquid hydrocarbons in Titan's lakes than in all the oil wells on Earth. Its dunes may hold hundreds of times the content of Earth's coal reserves.

It makes an enticing prospect for the would-be life-hunter in space. "This combination of liquid water in the interior plus complex organic molecules composes two big ingredients for life - certainly life as we know it - and that makes Titan a very attractive body for future exploration," says Ralph Lorenz.

But Cassini is a busy craft. Its trajectory means it spends most of its time away from Titan, snapping strip-shaped radar images as it swings by the moon approximately once every month.

An ocean of liquid water may exist below Titan's surface

The first next step that scientists had been looking for was a two-year extension to Cassini's mission schedule, taking it past the original end date of July this year. As scientists were discussing the findings in Austria, Nasa officials back in Washington granted their wish. In those two years, further flybys of Titan will mean that about 44% of the moon's surface gets mapped, as compared to 28% currently. A further extension mission is also feasible, provided that Cassini continues to enjoy a healthy old age. Beyond that, something dedicated to Titan is envisaged; or perhaps a "double-dip" mission taking in Titan and another of Saturn's enticing moons, Enceladus. Balloons and further landers may be deployed to sample Titan's extravagant hydrocarbon riches.

Let us hope that the craft does not navigate by vision alone. If it does, it is as likely to alight in the lake-strewn landscape of Finland or the valley of the Mississippi as on the plains of this strange and fascinating world.

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Stars Born in Galactic Wilderness – April 18/08 Credit BBC News

Baby stars have been discovered spawning in the otherwise barren outskirts of a galaxy. The finding has surprised astronomers because the galactic periphery was assumed to lack high concentrations of ingredients needed to form stars.

The stars can be seen in a new image of the Southern Pinwheel galaxy, or M83, obtained by a Nasa space telescope and a ground-based observatory. They are forming more than 100,000 light-years from M83's bustling centre.

Nasa's Galaxy Evolution Explorer (Galex) satellite spotted bright features in the long "arms" of the galaxy - coloured red in the image - which astronomers think are large clusters of stars. "Every little pixel we see probably represents hundreds to thousands of stars. But we view them as a single blob," said Mark Seibert from the Carnegie Observatories in California. "It would add up to quite a good number of stars out there." Galex is equipped with a 50cm (19.7-inch) -diameter telescope to sweep the sky in search of ultraviolet light sources. But it cannot see individual stars because the design trades fine resolution for a large field of view. Dr Seibert told BBC News: "A telescope with finer resolution would wash out a bit in the background. But the lower resolution of Galex actually improves detection of these features."

'Stunning' find

To better understand how stars could form in such unexpected territory, the astronomers used the Very Large Array (VLA) in New Mexico to carry out radio observations of the galaxy. "It is absolutely stunning that we find such an enormous number of young stars up to 140,000 light-years away from the center of M83," said lead author Frank Bigiel from the Max Planck Institute for Astronomy in Germany.

Light emitted in the radio portion of the electromagnetic spectrum can be used to locate gaseous hydrogen atoms. These are seen as a good sign that the molecular form of the gas is also present. And it is from this molecular gas that stars are born. When the astronomers combined the radio and the Galex data, they found that they matched up. "Clearly, the basic ingredients for star formation are out in those regions," said Dr Seibert.

Close distribution

Co-author Fabian Walter, also of the Max Planck Institute for Astronomy, said: "The degree to which the ultraviolet emission and therefore the distribution of young stars follows the distribution of the atomic hydrogen gas out to the largest distances is absolutely remarkable."

Dr Seibert said that about 20% of the galaxies he had looked at showed ultraviolet emission in their outer regions. In the case of some galaxies, stars on the outskirts could have been scooped away from another galaxy that came too close. But this seems unlikely for M83. It appears to be too symmetrical - lacking the uneven appearance of a galaxy that has collided with another.

The astronomers speculate that the young stars seen in far-flung regions of M83 could have formed under conditions resembling those of the early Universe, a time when space was not yet enriched with dust and heavier elements. But this process is not well understood. M83 is located 15 million light-years away in the southern constellation Hydra.

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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

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.

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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.

Finding LUNAR X: Here's a neat treat to see if you can find the "X" courtesy of SpaceWeather.com

It's such a familiar sight, we often forget there's an alien world in our own backyard: the Moon. Scan the Moon with an ordinary pair of binoculars or a small telescope and you will observe a fantastic landscape of lava seas, ancient craters, deep valleys and towering mountains.

And don't forget the Lunar X:



Amateur astronomer Dennis Fell of Wetaskiwin, Alberta, took this picture on April 12th. "It was an excellent night for binocular viewing," he says. "The 'X' was very pronounced."

Every month—or to be more precise, every 29.530589 days—the Moon cycles through its phases and alternately reveals and hides the features on its surface. When the sun rises over Crater Werner in the Moon's southern hemisphere, sunlight floods the region's high terrain and makes an X. The effect lasts only about two hours so careful timing and a little luck is required to catch it. "Observing the 'X' has little or no scientific value. It is a trick of the light. But the effect is striking, and it is exciting to rediscover each month," writes David Chapman in "A Fleeting Vision near Crater Werner"

Mark your calendar with an X.

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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..

Star Party

The tentative dates for the RASC Star Party are August 29th to 31st. Mark your calendars

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**

For anyone who is tired of having ample opportunity to build that late spring snowman, there may just be a few chances at seeing some interesting sights in the May evening skies. Rain clouds and freak snow storms aside, May usually promises some nights of good seeing and we can only hope this one will be no exception.

The planet Mercury strut's its stuff at Magnitude -0.9 in the early evening twilight. Look to the West Northwest with either the naked eye or binoculars for the best views. The best time to see Mercury comes mid-month when the little gem stands at its greatest elongation of 22 degrees east of the sun. This means it will be 22 degrees above the horizon and not lost in the Sun's glare where it resides most of the year. As the month progresses the views of Mercury become poorer as both its brightness and height above the horizon once again diminish.

Saturn rises in Leo shortly after sunset and shines at magnitude at 0.6 near Regulus. The 10 degree tilt of the rings is still the prominent feature of this gas giant. By year's end of course the rings will seem to disappear as they are seen edge on from our perspective. During this time, more of the disc is then visible through telescopes. Saturn's moons put on a good show during this time as well. If you get a chance to see the planet from one night to the next you will see the moons change position relative to the planet. The brightest of these is Titan and the dimmest visible is Enceladus at magnitude 11.8.

Although Mars is reaching its furthest distance from the sun, you can still find this

little red planet in the Beehive cluster near the end of this month on May 21st to the 23rd. It is a better binocular or camera object as you would require a large telescope in order to make out any detail on its 5.8 " disc.

Jupiter is too low in the Southeast to see much in the month of May. It starts out at 7 degrees above the horizon and climbs to 22 degrees by the end of May. The best views of Jupiter come later on in the year in July.

Neptune is a good bet a couple of hours before sunrise. Its faint 8th magnitude disc can be seen in binoculars or telescopes just 2.4' North of Delta Capricorni.

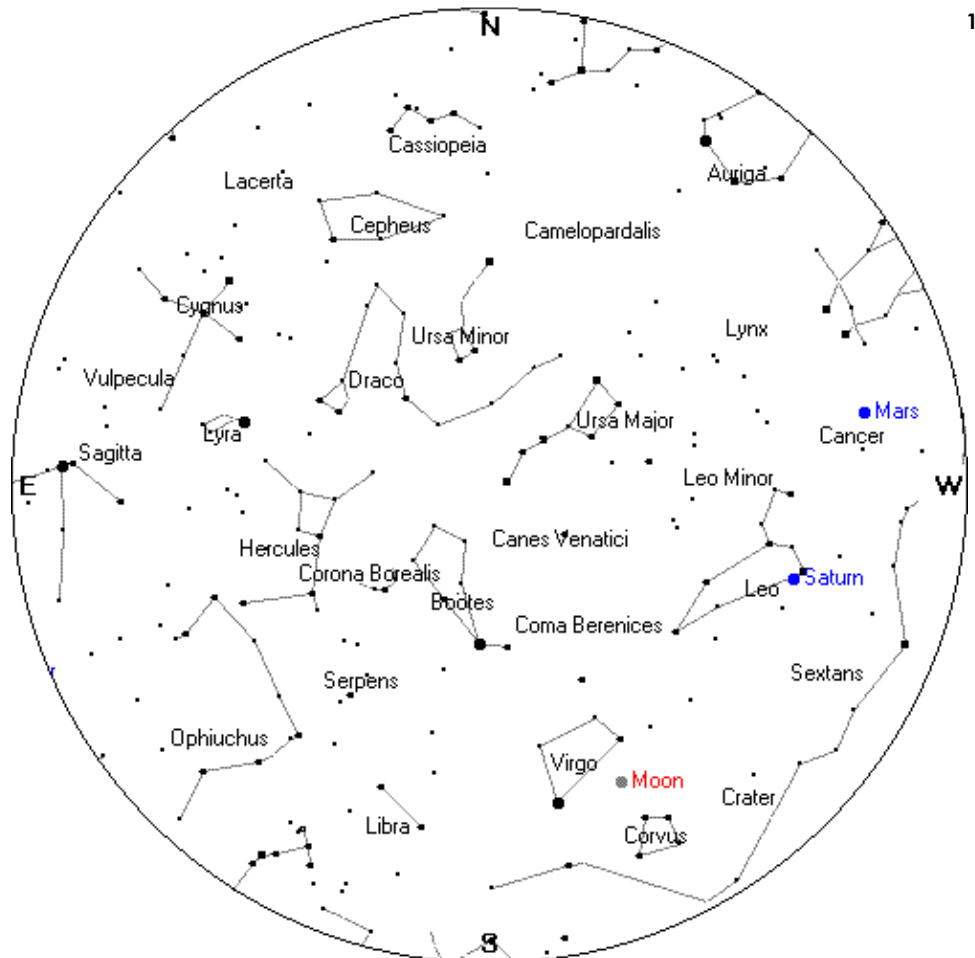
The Moon keeps its bright face out of the sky at the peak of the Eta Aquarid meteor shower on May 5th. Thirty meteors per hour can usually be seen at this time but some estimates go as high as 70 per hour for 2008. The radiant, low in the east at only 15 degrees may keep this number on the more moderate side. The comet 1P/Halley is the source of this show.

If you want a telescopic challenge this month try spotting a comet out in the asteroid belt between Mars and Jupiter. On May 16th Comet/2000 Q1 McNaught glows faintly at magnitude 11, 20' away from the equally faint NGC 3091, an elliptical galaxy in Hydra. You will need a 10 inch or larger telescope to gather enough light to see these faint companions. Comet McNaught is not a close traveller. It gets no closer to the sun than the asteroid belt - 200 million miles from Earth.

I am writing this article a little more than 24 hrs. after a surprise snowstorm here in the Cowichan Valley and can't help but wish you all Clear Skies for the month of May. I hope the only one of us that has more shoveling to do is Frank! Ha ha. So much for flat ground and dark skies! Don't forget to share you night of viewing with a friend and pass on the wonder and excitement of the night sky and let them know...astronomy is looking up.

May 05	05:18amPST	New Moon
		Eta Aquarid Meteor Shower Peaks
May 11	08:47pmPST	First Quarter Moon
May 12	07:00pmPST	Mars is at aphelion (approximately 155 million miles from the sun)
May 13	09:00pmPST	Mercury at greatest elongation (22 degrees)
May 16		Comet/2000 Q1 McNaught at magnitude 11
May 19	07:11pmPST	Full Moon
May 22		Mars in the Beehive Cluster
May 27	07:57pmPST	Last Quarter Moon

Sky Chart —Here's your mid-May 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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