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1. Greetings!

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

Whenever May rolls around I can't help hearing Bugs Bunny singing "*the April showers, they come your way, they bring the flowers that a bloom in May*" It never fails to put a smile on my face and the promise of warmer weather to come.

Speaking of weather, you might say "the stars were with us" on April 24 Astronomy Day. The clouds parted long enough for us to get a feel for Bright Angel Park (which is where our 15th Annual Island Star Party ISP will be held). I would like to thank the brave volunteers that came out to share the evening with us. Crowd wise it was small but the few folks that came out were eager to learn. Many thanks goes out to our buddies from the RASC Victoria group that provided us with some much needed material for the event. Also to the Cowichan Newsleader for posting our event in the calendar and Brian Robilliard for securing the site. For more Astronomy Day; check out the photos of the event in the "Cool Pics/Video" section. Lauren, one of younger members, provided us with her first try at astrophotography(I think there may be a future here).



We also want to bring your attention to a FREE Telescope! You read it right; Alex Haddad at the Science Department at the Cowichan Secondary has this to offer. "*please pass around to any and all who may be interested in this behemoth. Our offer still stands: FREE TO A GOOD HOME*" If you are interested in owning this scope, contact Alex at ahaddad@sd79.bc.ca

This week, the International Space Station (ISS) is making a series of bright evening flybys over North America., Check the Simple [Satellite Tracker](#)

Last but not least we have a date for the Island Star Party (ISP). Mark your calendars for **September 3-5** at Bright Angel Park. The Club will be forming a planning committee,

so if you are interested let us know. Don't forget about our friends the RASCals, their star party is on **August 13-15** at their new location the Metchosin Cricket Field. More will be posted on both Star Parties as time draws near.

Many thanks to this month's contributors Moe R, Brian R, Lauren R and Bryon T.

By Freda Eckstein

"Astronomers, like burglars and jazz musicians, operate best at night"- Miles Kington

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2. Socials

Socials 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 Social will be held at **7:30** on **WEDNESDAY May 26th**

Feature: "Living and Working on the International Space Station" Dr. Robert Gifford will be showing a film and providing information on what it is like on the ISS. Dr. Gifford is a Professor in the Department of Psychology at UVIC. His research interests are at the interface of environmental psychology, social psychology, and personality psychology. He is a member of the Life Sciences Advisory Committee of the Canadian Space Agency as well as being active on various other boards and listserves. He has taught environmental psychology for over 30 years and has put his experience to words with his book *Environmental Psychology: Principles and Practice* (4th ed.,) published by Optimal Books. Dr. Gifford gives us an opportunity to get into the psyche of what it may be like to live and work on the ISS.

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Highlights – April 28/10

By Freda Eckstein

Well somehow we got our wires crossed and Dr. Gifford did not show. The great thing is that Dr. Gifford will be our presenter in May. We were fortunate in the fact that Doug Dulmage brought a really funny movie called "The Dish" The Dish takes a smart, witty, comical look at the differing cultural attitudes between Australia and the U.S. while revisiting one of the greatest events in history. In the days before the July 19, 1969 space mission that marked humankind's first steps on the moon, NASA was working with a group of Australian technicians who had agreed to rig up a satellite interface. That the Aussies placed the satellite dish smack dab in the middle of an Australian sheep farm in the boondocks town of Parkes was just one of the reasons that NASA was concerned. Based on a true story, A great show, not to be missed. We have a CD copy available for any member wishing to borrow.

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3. Upcoming Events



May 15 7:00PM Elevator to Space The H.R. MacMillan Space Centre, Vancouver

Guest Speaker: MICHAEL LAINE GroundStation Canada Theatre Admission \$10.75

Here's to taking the fear of heights to a much higher level. Michael Laine, of LiffPort Group, presents the Space Elevator, an innovative and revolutionary concept for transporting cargo and eventually people beyond the Earth's atmosphere.

Now Playing Hubble, Change How You View Our Universe! National Geographic IMAX Theatre, Victoria

Narrated by Leonardo DiCaprio and vividly captured with IMAX technology, HUBBLE recounts the amazing journey of the most important scientific instrument since Galileo's original telescope and the greatest success in space since the Moon Landing. For show times see website:

<http://www.imaxvictoria.com/index.cfm>

Now Playing AVATAR: The IMAX Experience (2D) National Geographic IMAX Theatre, Victoria

James Cameron, the director of Titanic, takes us to a spectacular new world beyond our imagination, where a reluctant hero embarks on a journey of redemption, discovery and unexpected love — as he leads a heroic battle to save a civilization in this epic action adventure fantasy.

<http://www.imaxvictoria.com/now-playing/index.cfm>

NASA Launches credit NASA.Com:

Date: May 14

Mission: STS-132

Launch Vehicle: Space Shuttle Atlantis

Launch Site: Kennedy Space Center - Launch Pad 39A

Launch Time: 2:20 p.m. EDT

Description: Space shuttle Atlantis mission will carry an integrated cargo carrier to deliver maintenance and assembly hardware, including spare parts for space station systems. In addition, the second in a series of new pressurized components for Russia, a Mini Research Module, will be permanently attached to the bottom port of the Zarya module.

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4. This Month In History

Courtesy of: Windows to the Universe

May 1,

1965: Luna 5, USSR Lunar Soft Lander, launched. The lunar soft-lander failed and impacted the moon.

May 3

1961: First silo launching of an ICBM, a USAF Titan at Vandenberg Air Force Base.

May 10

1897: Konstantin Eduardovitch Tsiolkovsky (Russian Rocketry Pioneer) created his calculations about space flight theory.

1971: Kosmos 419, USSR Mars Probe, launched. Failed to leave Earth orbit.

May 12

1961: USAF announced plans to institute special course for the instruction of space pilots at Edwards Air Force Base, and it was activated in June.

May 16

1969: Venera 5, USSR Venus Atmosphere Probe, (launched January 5, 1969) arrived at Venus. Along with Venera 6, atmospheric data was returned indicating an atmosphere composed of 93-97 carbon dioxide, 2-5 nitrogen, and less than 4 oxygen. The probe returned data down to within 26 kilometers of surface and was then lost - crushed by the pressure on Venus.

May 18

1969: Apollo 10, USA Lunar Manned Orbiter, (May 18-26, 1969) launched. Crew: Thomas Stafford, Eugene A. Cernan, John W. Young. Manned lunar fly-around and Earth return. Stafford and Cernan tested the Lunar Module, separating it from the Command and Service Module and descended to within 50,000 feet of the lunar surface. The astronauts acquired a large number of excellent 70-mm photographs,

May 20

1978: Pioneer Venus 1, USA Venus Orbiter, launched. Pioneer Venus 1 (also known as Pioneer 12) arrived at Venus on December 4, 1978. It operated continuously from 1978 until October 8, 1992, when contact was lost with the spacecraft. It was expected to burn up in the Venusian atmosphere 6 days later. The orbiter was the first spacecraft to use radar in mapping the planet's surface. The electron field experiment detected radio bursts presumably caused by lightning. No magnetic field was detected. From 1978 to 1988 the amount of sulfur dioxide in the atmosphere decreased by 10%. The reason for this decrease is unknown. Perhaps a large volcano erupted just before the orbiter arrived and the amount of sulfur dioxide slowly declined.

May 25

1543: Nicolaus Copernicus died in Frauenburg (now Frombork), Poland.

May 26

1973: Skylab, USA Space Station, launched. Skylab, which was America's first space station, was manned for 171 days by three crews during 1973 and 1974. The space station included the Apollo Telescope Mount (ATM), which astronauts used to take more than 150,000 images of the Sun. Skylab was abandoned in February 1974 and re-entered the Earth's atmosphere in 1979.

May 27

1862: Astronomer John Campbell born in Lisburn, Co Antrim, Ireland.

May 28

1971: Mars 3, USSR Mars Orbiter/Soft Lander, launched. Mars 3 arrived at Mars on December 2, 1971. The lander was released and became the first successful landing on Mars. It failed after relaying 20 seconds of video data to the orbiter. The Mars 3 orbiter returned data until August, 1972.

It made measurements of surface temperature and atmospheric composition.

May 29

1974: Luna 22, USSR Lunar Orbiter, launched. Successfully entered lunar orbit.

May 30

1971: Mariner 9, USA Mars Orbiter, launched. Mariner 9 arrived at Mars on November 3, 1971 and was placed into orbit on November 24. This was the first US spacecraft to enter an orbit around a planet other than the Moon. At the time of its arrival a huge dust storm was in progress on the planet. Many of the scientific experiments were delayed until the storm had subsided. The first high-resolution images of the moons Phobos and Deimos were taken. River and channel like features were discovered. Mariner 9 is still in Martian orbit.

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5. Cool Pics/Videos

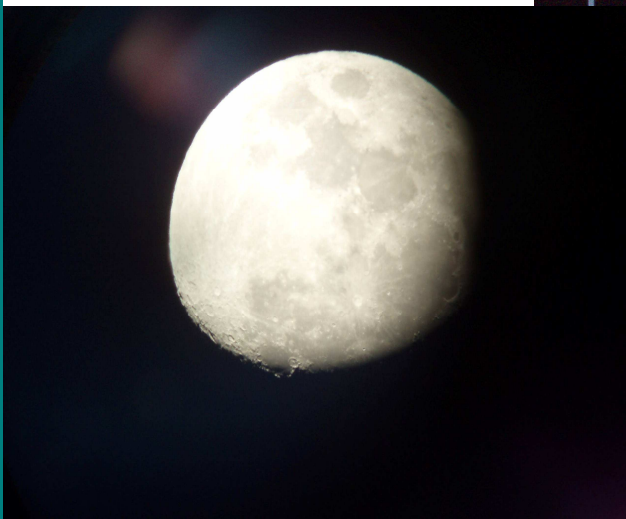
Want to show off your latest pics? Well here's your chance; email the editor at [My Cool Pics](#) and we will try to post them in the next edition of "Clear Skies".

Here are a couple of good shots from Astronomy Day at Bright Angel Park.



You're looking at the basic set up with the telescopes off to the left of this picture.

The multi-media presentation tent.



And Lauren's first astrophotography shot of the moon taken from Bryon's Dob. Good Work Lauren ☺

NASA New Eye on the Sun Delivers Stunning First Images

http://www.youtube.com/watch?v=QrmUUcr4HXg&feature=player_embedded

Check out our Photo gallery on the website where you can find pics from past and current Island Star Parties (ISP). Quick link is <http://starfinders.ca/photogallery.htm>

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6. Featured Articles

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VISTA Captures Celestial Cat's Hidden Secrets – April 21/10 credit

ESO



The Cat's Paw Nebula, NGC 6334, is a huge stellar nursery, the birthplace of hundreds of massive stars. In a magnificent new ESO image taken with the Visible and Infrared Survey Telescope for Astronomy (VISTA) at the Paranal Observatory in Chile, the glowing gas and dust clouds obscuring the view are penetrated by infrared light and some of the Cat's hidden young stars are revealed.

Towards the heart of the Milky Way, 5500 light-years from Earth in the constellation of Scorpius (the Scorpion), the Cat's Paw Nebula stretches across 50 light-years. In visible light, gas and dust are illuminated by hot young stars, creating strange reddish shapes that give the object its nickname. A recent image by ESO's Wide Field Imager (WFI) at the La Silla Observatory (eso1003) captured this visible light view in great detail. NGC 6334 is one of the most active nurseries of massive stars in our galaxy.

VISTA, the latest addition to ESO's Paranal Observatory in the Chilean Atacama Desert, is the world's largest survey telescope (eso0949). It works at infrared wavelengths, seeing right through much of the dust that is such a beautiful but distracting aspect of the nebula, and revealing objects hidden from the sight of visible light telescopes. Visible light tends to be scattered and absorbed by interstellar dust, but the dust is nearly transparent to infrared light.

VISTA has a main mirror that is 4.1 metres across and it is equipped with the largest infrared camera on any telescope. It shares the spectacular viewing conditions with ESO's Very Large Telescope (VLT), which is located on the nearby summit. With this powerful instrument at their command, astronomers were keen to see the birth pains of the big young stars in the Cat's Paw Nebula, some nearly ten times the mass of the Sun. The view in the infrared is strikingly different from that in visible light. With the dust obscuring the view far less, they can learn much more about how these stars form and develop in their first few million years of life. VISTA's very wide field of view allows the whole star-forming region to be imaged in one shot with much greater clarity than ever before.

The VISTA image is filled with countless stars of our Milky Way galaxy overlaid with spectacular tendrils of dark dust that are seen here fully for the first time. The dust is sufficiently thick in places to block even the near-infrared radiation to which VISTA's camera is sensitive. In many of the dusty areas, such as those close to the centre of

the picture, features that appear orange are apparent — evidence of otherwise hidden active young stars and their accompanying jets. Further out though, slightly older stars are laid bare to VISTA's vision, revealing the processes taking them from their first nuclear fusion along the unsteady path of the first few million years of their lives.

The VISTA telescope is now embarking on several big surveys of the southern sky that will take years to complete. The telescope's large mirror, high quality images, sensitive camera and huge field of view make it by far the most powerful infrared survey telescope on Earth. As this striking image shows, VISTA will keep astronomers busy analysing data they could not have otherwise acquired. This cat is out of the bag.

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Location Chosen for European Extremely Large Telescope— April 26/10 credit BBC News

Europe has chosen the place it wants to build the world's biggest optical telescope.

The observatory will be constructed on Cerro Armazones, a 3,000m-high mountain in Chile's Atacama Desert.

The E-ELT (European Extremely Large Telescope) will have a primary mirror 42m in diameter.



Astronomers say the next-generation observatory will be so powerful it will be able to image directly rocky planets beyond our Solar System. It should also be able to provide major insights into the nature of black holes, galaxy formation, the mysterious "dark matter" that pervades the Universe, and the even more mysterious "dark energy" which appears to be pushing the cosmos apart at an accelerating rate.

Construction could start in 2011; likely cost is one billion euros. Final go-ahead for the E-ELT is expected at the end of this year. The European Southern Observatory (Eso) organisation which is managing the project says it hopes the telescope can be operational by 2018.

The decision on the E-ELT site was taken by the ESO Council after several years of study at competing locations that included other places in Chile, and in the Canary Islands, Spain.

The E-ELT will detect a range of wavelengths from the optical to mid-infrared. Cerro Armazones is just 20km from Cerro Paranal, where Eso operates its Very Large Telescope facility - a suite of interconnected optical telescopes that includes four units with primary mirrors measuring 8.2m. E-ELT is therefore about five times the width of today's best optical telescopes (antennas for radio telescopes are still very much bigger). Like Paranal, Armazones will enjoy near-perfect observing conditions - at least 320 nights a year when the sky is cloudless. The Atacama's famous aridity means the amount of water vapour in the atmosphere is very limited, reducing further the perturbation starlight experiences as it passes through the Earth's atmosphere.

Coming up with a workable design has been a challenge. It is impossible to make a monolithic mirror on such a scale and so the primary reflecting surface will be composed of 984 hexagonal segments, each 1.45m in size. The E-ELT will thus be able to gather 15 times more light than the largest optical telescopes operating today. It will also provide images 15 times sharper than those from the Hubble Space Telescope.

The huge telescope is one of the major projects listed on a roadmap of research infrastructures that Europe feels it needs to fulfil its scientific goals over the next 20 years. Other facilities range from high-powered laser systems through to a plan to construct the world's most advanced polar ice-breaker.

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Arecibo Telescope Tracks Potentially Dangerous Asteroid within 1.5 Million Miles of Earth – April 29/10 credit Cornell University, Ithaca, New York

A near-Earth asteroid named 2005 YU55 — on the list of potentially dangerous asteroids — was observed with the Arecibo Observatory's planetary radar April 19 when it was about 1.5 million miles (2.4 million kilometers) from Earth, which is about 6 times the distance to the Moon, according to Michael Nolan, director of the Arecibo Observatory. The Arecibo telescope is located in Arecibo, Puerto Rico, and it is managed by Cornell University on behalf of the National Science Foundation.

Arecibo radar imaging of 2005 YU55 at 25-foot resolution showed that the asteroid is about 1,300 feet (400 meters) in size — about a quarter-mile long — and about twice as large as previously estimated.

This object is on the list of potentially hazardous asteroids maintained by the Minor Planet Center of the Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts.

High-precision radar astrometry reduced orbit uncertainties by 50 percent. This improvement eliminated any possibility of an impact with Earth for the next 100 years, so the asteroid was removed from the risk page maintained by NASA's Near-Earth Object Program Office at the Jet Propulsion Laboratory. After circling the Sun, 2005 YU55 next will approach Earth to about 0.8 lunar distances November 8, 2011. It will pose no impact hazard at that time. Robert McMillan of the Spacewatch asteroid detection program discovered the asteroid December 28, 2005.



President Barack Obama has proposed that NASA's Near Earth Object Program be increased from \$3.7 million in 2009 to \$20.3 million in 2011. NASA has indicated that it intends to provide support to the Arecibo radar program if that funding remains in the budget.

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NASA Set to Send Robot into Space— May 4/10 credit About.com



This fall the Space Shuttle Discovery will have an extra passenger onboard, and it won't be human. Robonaut2, or R2 for short (huh, that sounds strangely familiar, isn't that from a movie or something?), will become the first humanoid to live and work in space.

Developed through a joint project with General Motors, NASA has created a robot that is capable of completing routine maintenance tasks. This will allow the crew of the International Space Station more time for important work such as scientific experimentation.

For those of you getting images in your head of a crazed robot rampaging through the ISS, bringing

harm to the crew, fear not; R2 will not have free run of the ISS, but will instead be fastened to a specific section of the orbiting laboratory. And even though R2 is quite a sophisticated achievement, it lacks the self-awareness found in the killer robots of film.

Instead, R2 is fed commands from either the crew of the ISS or from engineers on the ground. Since R2 can "see", its progress can be monitored in nearly real-time. So, if at any point R2 is performing a task in an improper manner (or is in danger of damaging equipment), commands can be sent to stop the current activity and to try something else instead.

The hope is that over time R2 can be given more complicated and important tasks. This will take time however, as NASA needs to help R2 adapt to a low gravity environment and see how they can improve R2's functionality. In the future, NASA could use similar robots to explore the surface of planets (by adding wheels or legs of course), or go places that humans can not go.

This is a significant step in technology, and one that has nearly endless possibilities. It will be interesting to monitor how successful R2 is. Only time will tell, so stay tuned.

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Anybody Out There? - May 5/10 credit NRC

In the 1960's astronomer Frank Drake pointed a radio telescope at nearby stars in a search for signals from alien civilizations. He was the one who came up with the famous "Drake Equation", which is used to estimate how many other civilizations might be scattered around our galaxy. No matter how one plays with the equation, all realistic numbers end up predicting there are lots of other civilizations out there. If so, why then have we not picked up any signals from them? Now maybe we are beginning to see an answer to that question.

Back in the 1960's we were transmitting countless radio, TV and high-power radar signals. These radiated out into space in all directions, detectable by any alien radio telescopes pointing our way. The big assumption was that once a civilization had reached a level of high radio visibility, it would remain so for a long time. However, that assumption seems to be wrong.

In the old system, now gradually going out of use, we allocate frequency channels in which radio and TV stations can transmit. Any radio receiver can be tuned across these channels and detect what are very clearly artificial signals. If you have ever driven past a high-power radar with your car radio on you will know that the rough, sharp buzz of radar transmissions are also easy to identify.

Now we are in the midst of a big change. While the number of radio applications has exploded, the nature of the signals has become very different. Over coming decades this new approach will apply to more and more of our radio transmissions.

Instead of strong, easily identified signals, many devices now use a coding scheme called "spread spectrum". The information, which can be speech, TV, internet traffic or almost anything else, is digitally encoded and then transmitted as a relatively weak signal that is smeared out over a wide range of frequencies. This technology has become known as "broadband". The signals can overlap one another because even when partly buried they can be identified and decoded by the receivers for which they are intended. Anyone else will just pick up a hiss. Unfortunately, this is exactly what the naturally occurring cosmic radio emissions sound like. If our alien friends are using energy-efficient, information-efficient systems like these, it is unlikely we will be able to identify their signals.

These days there are lots of signals we no longer transmit from an antenna; we find it more efficient to distribute our radio, TV and other information over cable and fibre, and then broadcast them only locally, at low power. If the users are directly connected to the fibre or cable, there is no need to transmit them into the air at all. So it seems the period of time a civilization squirts out radio signals in all directions is quite short, maybe a few decades. After that they go relatively quiet.

The Allen Telescope Array, a radio telescope designed to search millions of stars for planets radiating radio signals, is now coming into operation. However, if our alien friends are using broadband techniques and cable systems, or something even more efficient, will they be radiating enough of anything into space for us to pick up?.

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A new eye in the sky to keep an eye on the sky– May 10/10 credit SpaceReview

The last few years have demonstrated more than ever the importance of space situational awareness (SSA), or keeping better track on the increasing number of objects orbiting the Earth. The Chinese ASAT test in January 2007 created thousands of additional debris objects, some of them in long-lived orbits that will pose collision risks to satellites for decades. Last year an active Iridium satellite collided with a defunct Russian Cosmos satellite, creating additional debris in low Earth orbit as well as illustrating the shortfalls in identifying potential collisions.

In the wake of the Iridium-Cosmos collision the US took additional steps to ramp up their calculations of potential satellite collisions to prevent similar collisions. However, such predictive efforts require frequently-updated observations of satellites and potential debris. Currently the bulk of those observations come from a network of groundbased sensors, both radars and telescopes. If all goes well, it will be joined later this year by the first of a proposed series of space-based sensors.

Next Page: the first SBSS spacecraft, seen here undergoing testing, is scheduled for launch later this year to help track other objects in orbit. (credit:Ball Aerospace) "It's going to provide 24/7 capability, increased timeliness, increased capacity," Col. Jordon said of the SBSS spacecraft. "It is critical to have this asset in space to augment what we have on the ground today."

The Space Based Space Surveillance (SBSS) Pathfinder satellite, built by Boeing and Ball Aerospace, is scheduled for launch this summer on a Minotaur 4 rocket from Vandenberg Air Force Base into polar orbit. From that orbit it will look out towards geosynchronous orbit (GEO), with the capability of scanning the entire GEO belt once a day and transmitting those observations back to Earth.

"SBSS is going to provide a lot of capability to the Air Force," said Col. James "J.R." Jordon, SBSS mission director and vice commander of the Air Force's Space Superiority Systems Wing, during a briefing about SBSS at the National Space Symposium in Colorado Springs last month. "It's going to provide 24/7 capability, increased timeliness, increased capacity. It is critical to have this asset in space to augment what we have on the ground today."

SBSS will provide this capability with a 30-centimeter telescope, mounted on a two-axis gimbal and equipped with a 2.4-megapixel sensor. The gimbal gives the telescope a very wide field of view: 3π steradians, or three-quarters of the entire sky. All this is incorporated into a BCP-2000 spacecraft bus provided by Ball Aerospace, with a total mass of under 1,100 kilograms. "What we're delivering is a factor of three improvement in the probability of detecting threats and over a factor of three improvement in timeliness," said Todd Citron, director of space superiority and special missions for Boeing, at the symposium briefing.



SBSS won't be the first space-based sensor used to track objects in space. For several years the Space Surveillance Network (SSN) used the Midcourse Space Experiment (MSX) satellite, launched in the mid-1990s originally to test sensors for tracking ballistic missiles. Jordon, though, said that SBSS would be the only space-based sensor for the SSN. It will also be considerably better than the MSX: Citron said that SBSS will have over twice the sensitivity and ten times the capacity of "prior space-based sensors".

The third "S" in SBSS is "System", implying that the initial, or Block 10, satellite scheduled for launch this year will be the first of several. While there are notional plans for a network of several similar satellites, there are few details about the follow-on system. "We're going to do an open competition, and we're working through the acquisition strategy right now," Jordon said. He did, though, make it clear that the Air Force was committed to a successor to this initial satellite, which has a mission life of five and a half years. "The Air Force is not going to let this system just fall off," he said. "We need this capability in space, so we're planning on doing a follow-on program" that will have spacecraft in orbit or ready to launch by the time the initial spacecraft reaches the end of its life.

The data that SBSS provides, though, is only as good as the ability to use it to identify potential "conjunctions" between objects and alert satellite operators so that they can take action, as the Cosmos-Iridium collision last year illustrated. (Even SBSS may not have been able to help provide observations, since it is designed primarily to look out towards GEO.) In the last year the Air Force has been taking steps to address those issues with the data currently provided by the SSN.

"All of our activity in [space] situational awareness is intended to go from where we have always been in maintaining a catalog of objects on orbit to realtime awareness of what is happening on orbit," said Gen. Robert Kehler, commander of Air Force Space Command, in a speech at the National Space Symposium. "That is the way we are headed and we are having spectacular success there." Since last year's collision the Joint Space Operations Center (JSpOC, pronounced "jay-spock") has increased the number of conjunction analyses—using the data provided by the SSN to look for

potential collisions between objects in orbit—by more than threefold, Kehler said, and now looks at all active satellites in orbit.

At the time of the Cosmos-Iridium collision, available resources limited conjunction analyses to human spaceflight missions, critical US government spacecraft, and “as best we could, other satellites of interest,” said Maj. Gen. Susan Helms, director of plans and policy for US Strategic Command (STRATCOM) and a former NASA astronaut. “To this date, we still don’t have the capacity to manage all 20,000-plus objects” currently tracked, she said, but since the collision they have built up their conjunction analysis capability to examine 1,100 “maneuverable” objects against the full catalog.

Another change since the collision is the transition last December of what’s known as the Commercial and Foreign Entities (CFE) program STRATCOM. Originally a pilot program by Air Force Space Command to share space situational awareness data with organizations outside the US government, CFE is now a permanent program. Helms said that, as of last month, STRATCOM had 16 agreements, all with commercial entities, to share such data. Over the long term, she said, she hopes to “broaden the aperture” of those agreements by both increasing the number of organizations they share data with as well as the scopes of those agreements.

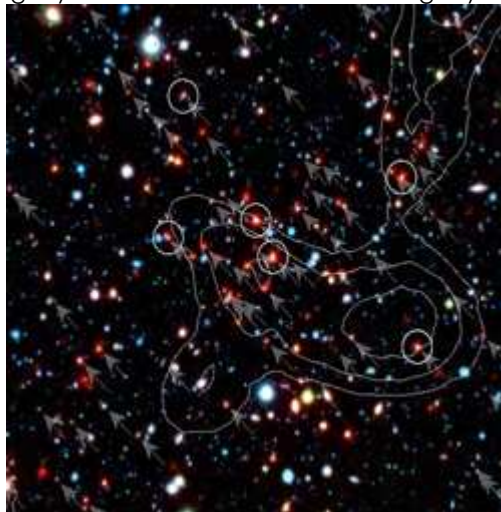
“The good news is that the US Air Force is moving forward with major initiatives to improve SSA,” said Joseph Sheehan, president of Analytical Graphics, Inc. (AGI), a company that provides software and services for SSA. The commercial sector, though, is also working to better share data among itself. The Space Data Association was formed last year by a number of satellite operators to exchange information about the location of their satellites, and recently selected AGI to operate their data center. Creating the center is a “huge step forward” for improving SSA, he said. Even with the new data center, though, he said there’s an increasing need for cooperation among governments and commercial operators. “What this all boils down to across the board is a need for true collaboration among the space community,” Sheehan said. “SSA shouldn’t be a competitive mission, because when one country or operator faces a crisis, all of us are in jeopardy.”

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Invisible Light Reveals the Most Distant Cluster of Galaxies— May 10/10 credit PMU, Kashiwa, Japan

Scientists found a distant cluster of galaxies 9.6 billion light-years away in the constellation Cetus. Masayuki Tanaka of the Institute for the Physics and Mathematics of the Universe (IPMU) in Tokyo, Alexis Finoguenov of the Max Planck Institute for Extraterrestrial Physics in Garching, Germany, and Yoshihiro Ueda of Kyoto University in Japan discovered the most distant cluster of galaxies in the universe, 9.6 billion light-years away, using light invisible to our eyes.

The image is 3.4 arcmin on a side (1 arcmin is 1/60th of a degree), which corresponds to 5,700,000 light years in the universe 9.6 billion light-years away. The arrows indicate galaxies that are likely



located at approximately the same distance, and these galaxies cluster around the center of the image. The cluster emits X-rays as shown by the contours. The circles show galaxies whose distances are accurately measured from the near-infrared observations and have been confirmed to be at 9.6 billion light-years away. Though the number of the confirmed members may be small, the combination of the X-ray detection and the confirmation of massive galaxies unequivocally prove a real gravitationally bound cluster. IPMU

The universe hosts a multitude of galaxies that are not uniformly distributed in the universe, but they are arrayed in filamentary structures. Filaments permeate the universe and form a gigantic cosmic spider web. Galaxy clusters are often located at the knots of the filaments. The most distant cluster known, at least until now, is located about 9.2 billion light-years away. A

team of astronomers from Japan and Germany has discovered an even more distant cluster of galaxies using light invisible to human eyes.

The universe is a time machine — you can go back in time as you look deeper into the universe. Astronomers have used this principle in search of clusters that are in the distant past. But the expansion of the universe forces distant galaxies away from Earth at high velocities, shifting their light away from

visible wavelengths to infrared wavelengths. This shift makes the light from the distant universe invisible, which has impeded progress over the years. The powerful capability of Subaru's near-infrared eye, the Multi-Object InfraRed Camera and Spectrograph (MOIRCS), now enables astronomers to peer deeper into the early universe.

Tanaka and collaborators found a distant cluster of galaxies in the constellation Cetus. MOIRCS was used to measure the distances to massive galaxies in the cluster. "MOIRCS has an extremely powerful capability of measuring distances to galaxies," said Tanaka. "This is what made our challenging observation possible." The team succeeded in measuring the distances and confirmed that several galaxies actually have congregated at a distance as far as 9.6 billion light-years away. "Though we confirmed only several massive galaxies at that distance," Tanaka said, "there is convincing evidence that the cluster is a real gravitationally bound cluster."

Galaxy clusters host a vast amount of matter heated to extreme temperatures. Every material emits light, but at such high temperatures, the emission is so blue that the light is not visible to the human eye. The team used the orbiting X-ray observatory XMM-Newton to search for invisible light from the cluster. "Despite the difficulties in collecting X-ray photons with a small, effective telescope, size similar to the size of a backyard telescope," Finoguenov said, "we detected a clear signature of hot gas in the cluster." The combination of observations in invisible wavelengths, near-infrared, and X-ray has led to the discovery of the cluster at 9.6 billion light-years away, making it the most distant cluster known today, some 400 million more light-years away than the previous record-holder. The cluster is an ideal laboratory for studying the evolution of galaxies. Also, a collection of such distant clusters can be a sensitive probe of the origin of the universe. The team is continuing their search for still more distant clusters.

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7. 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.

For Sale : Telescope and mount package "offers on \$1800 Cdn "
Please contact [Gail Roberson 250-715-1116](#)

DETAILS:

Telescope Optical Tube

- Celestron 8" Schmidt Cassigrain Telescope with XLT coating model year 2002?
- Tube rings and vixen style dovetail bar to fit scope
- Celestron 25mm Modified Achromat eyepiece
- Celestron 10mm Modified Achromat eyepiece Antares 8x50mm - Finder scope with illuminated reticule and quick release bracket
- Celestron Radial Guider (off axis), model 94176
- Celestron f/6.3 Reducer/Corrector (focal reducer)
- 12.5mm Illuminated Reticule eyepiece (Skywatcher ?)

* Some scratches on scope, but overall in good condition.

EQ6 Mount

- Sky Watch EQ-6 Heavy Duty Mount, (black) with EQ-6 SynScan GOTO Upgrade kit
- Steel tripod with 2" legs.
- Two counterweights
- Home made wheel cart (mount sits on top, not attached)
- All cables, chargers and adapters

* Some paint chips, ran well as of last use. Used for astrophotography

Software and Manuals

- The Sky Level 1, v.5
- NextStar Observer List, v.2.0.2c
- Imaginovia
- Starry Night Skytheater (DVD)
- Starry Night v. 6 Users Guide
- Starry Night v.6 Companion

Additional

- USB to Serial adapter (Hap Griffin) for Nikon
T-adapter for Nikon
- The Backyard Astronomer, Dickinson and Dyer
- A Guide to the Night Sky, Burnham, Dyer et tel
- Voyages to the Stars and Galaxies, Fraknoi, Morrison, Wolff

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8. 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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9. 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.

Aristotle's Nose

Courtesy of the Sanddot Science

They say that this is one of many illusions which Aristotle discovered. I'd give a lot to go back in time and watch Aristotle fiddle with his nose. The effect is actually quite amazing, and depends upon the fact that we are extremely familiar with how we touch things.

Get comfortable and cross your fingers as if "for luck," as illustrated below. Now simply reach up and touch the bridge of your nose. Feel up and down the length, and make sure you make contact with both fingers. Weird huh? It feels strange, like someone else's nose, or that you have two noses. Legend has it that this "illusory" nose is an echo from the past; Aristotle still fiddling with his nose.



So familiar are we with our own fingers and how we use them to touch things, that crossing our fingers puts a jujitsu on our brain's ability to reason. It simply can't cope with the "right" input coming from the "wrong" side.

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10. The Sky This Month

By Bryon Thompson

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

With the nights getting warmer and the dark skies getting shorter you might think that would lead to frustration setting in. The month of May is likely to encourage fascination rather than frustration however as the planet put on a great show.

The evening opens up with Venus as the main player putting on a show you can't miss as it shines like a beacon at Magnitude -3.9 in the west in Taurus, a full 20° high behind the setting sun. If your view to the

west is clear you will see this inner beauty set 45 minutes after the sun around 10pm local time. The views of this bright planet are unremarkable through a telescope however as the disc is about 89% lit and just appears as a bright roundish dot. Later this summer when the inner planet has come closer to earth the look of the planet will improve as we will be treated to its phases at the eyepiece. Venus is still best enjoyed naked eye or through a pair of binoculars. Watch for a thin crescent moon to share the scene on the **15th of May**. By the end of the month Venus moves into Gemini.

As the sky begins to darken, look back along the path the sun took for a small orange dot between Cancer the crab and Leo the Lion. Shining at magnitude 1.1 Mars sits high in the sky throughout May although a telescope reveals only slight details due to its great distance, at least 130 million miles. If the seeing is good, you may be able to just make out the polar cap but you'll need a large aperture telescope; it is still a fun object to watch on a clear warm night.

If you continue back along the sun's path you'll come across Saturn in the western part of Virgo. Where Mars disappoints Saturn excels. The great ringed giant is high in the sky for most of the night throughout the month. Saturn starts the month at magnitude 0.8 and fades to 1.0 by month's end. The rings are impressive in the eyepiece. They tilt at 1.7° near the end of the month, the smallest angle they will reach, and will then continue to widen through to 10° by the end of 2010. If Saturn appears to be wider than it is tall it is not your eyes playing tricks, the planet is about 10% bigger in the waist or "flattened" and is the most noticeable of all our planets with this feature. With the rings essentially out of the way now is a good time to look for slight details in Saturn's disc. More subtle than the storms on Jupiter a night of good seeing will show Saturn's dark top and dark equatorial belt. Saturn's moon Titan is the brightest dot near the planet and shines at 8th magnitude. A good time to see a transit of Titan across the face of Saturn occurs on **May 17th**. With a telescope of 10 inches or better you may be able to see the slight peach coloured hue of Titan as it passes in front of the duller surface of Saturn. The transit starts about 11:20pm PST and lasts about 4 hours. Titan will be occulted by Saturn on **May 9th** at 2:50am PST and again on the **25th** at 12:55am PST.

After Saturn sets you can find Neptune in the constellation Aquarius. A little hard to see unless you have a clear view of the eastern horizon; Neptune rises shortly after 2am local time and only reaches 20° before twilight makes it impossible to see. Before that it is a good binocular object found halfway between Mu Capricornii and 38 Aquarii at magnitude 7.9.

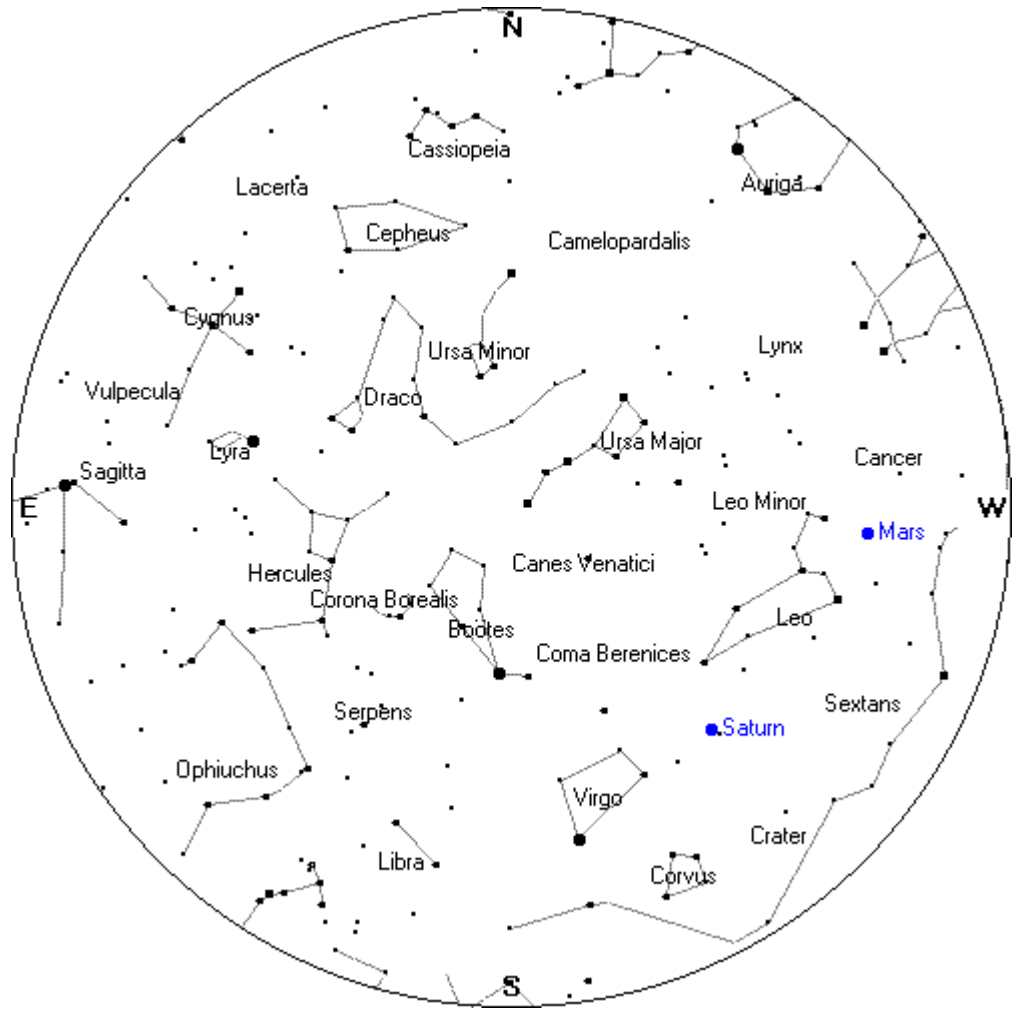
Another early riser is Jupiter. Jupiter is easy to spot as it outshines all of its companions in the predawn sky shining at magnitude -2.2. Jupiter will continue to rise a little earlier each night and promises some great views later this summer.

Another outer planet that will get better as the summer progresses is Uranus. If you have a clear horizon you may be able to spot Uranus at magnitude 5.9 north east of Jupiter by 5° . This distance closes to 1° by month's end.

The nights are still fairly dark and you shouldn't have to worry about freezing your eyelid to the eyepiece so get out there and do a little spring viewing. If you get any good shots or have an exceptional night and can't wait to tell someone, please consider sending something in to the newsletter editor. Until then, remember, astronomy is looking up!

May 5	09:15 PM PST	Last Quarter Moon
May 9	02:50 AM PST	Titan is occulted by Saturn
May 10	05:00 PM PST	Mercury is stationary
May 13	06:04 PM PST	New Moon
May 15	Sunset	Crescent Moon's Horns point toward Venus
May 17	Evening	Transit of Titan across the face of Saturn
May 20	04:43 PM PST	First Quarter Moon
May 25	07:00 PM PST	Mercury at Greatest Western Elongation 25°
May 25	12:55 AM PST	Titan is occulted by Saturn
May 27	04:07 PM PST	Full Moon
May 31	09:00 AM PST	Saturn is stationary
May 31	07:00 AM PST	Neptune is stationary

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.



SkyChart Courtesy of Heavens-Above

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