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Island Eyepiece and Telescope Ltd

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](mailto:Brian.Robilliard) our resident expert to get the "inside scoop" on what's hot or not in astronomy gear.

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](mailto:Bryon.Thompson) our Editor and master of Astronomy 101 basics.

Looking for something different for a birthday or fundraiser in your community? How about a "Starparty"? Find out how we can help you organize it and provide demonstrations. For more information contact the president@starfinders.ca

1. Editor Greetings!

"Clear Skies" is put together by a small team of volunteers. We need you to help us. Your opinions on future content and stories of interest are crucial to keep the club moving forward. So please, get active and send your ideas, pictures and posts to The editor. If you dream it, photograph it or come across it...We want it!

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

Your editor's took a hiatus in August to enjoy our little piece of heaven. I hope that many of you did the same and were outside enjoying the weather during the Perseid meteor shower and the Blue Moon (2nd full moon in one month).

Speaking of "going out" care for another field trip? The Island Savings Centre, Duncan is hosting on **Nov. 25, 2 pm The Galileo Project: Music of the Spheres** concert and as Genevieve says:

I think this sounds like a fantastic afternoon, only hitch is the tickets are \$40 for adults, and \$20 for students. No senior rates. I called the Cowichan Symphony Society and if I am able to round up 25 people we can get tickets for \$25. You may have read in the paper that the Cowichan Symphony's on very hard times due to their aging audience. They have brought in this show in hopes that it would bring in a larger audience. Who better than Starfinders Club Members to attend this astronomy concert!!! Please contact me if interested. 250-746-8052 or twinflower4@gmail.com For more info, see the Upcoming Events section.

And last but not least, the end of summer is also the end of the Island's two big Star Parties (Island Star Party July 20-22 Rascal Star Party Aug 17-19). We are looking for those fortunate few who braved the parties to come forward the "shine" for the opening of our 2012-13 Social. Bring your flash drive, SD Card or CD, DVD to the social on Sept 26th and show the rest of us what we missed!

Many thanks to this month's contributors: Genevieve S, Moe R, Bryon T and Brian V.

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2. Socials

Socials are held on the 4th Wednesday of each month (except for July and August) at the home of Bryon and Freda.

Click on the [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

4th 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 September 26th**

Feature: "Star Party Show & Tell"

Hey everyone this is your "time to shine" ☺. Bring your flash drive, SD Card or CD, DVD to the social and show the rest of us what we missed from both the Island Star Party and the Rascals Star Party.

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Social Highlights /12

No updates available.

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3. Upcoming Events



Every Saturdays & Wednesdays* 1:00-1:30 PM, CHLY 101.7 FM

Not Rocket Science (NRS) is a thirty minute weekly radio show about the science of everything and everything science. Dial them up or listen to past podcasts at

<http://chly.dailysplice.com/notrocketscience/>

Every Wednesday, Astronomy Open House, sponsored by the UVic Department of Physics &

Astronomy. Held at the Wright Center (5th Floor), this event is held from 8pm - 10pm October to April and 9pm - 10pm from May to August. In January, April and December, the open house may not run regularly, please contact Michelle Shen by phone at 250-721-7700 or by email at mshen@uvic.ca to confirm. Admission: Free More info: <http://astrowww.phys.uvic.ca/events/>

Sept 10th 3:30 – 4:30pm "The Philosophy of Science is too Serious a Matter to be left to Philosophers"

by Professor David Ruelle (Institute des Hautes Etudes Scientifiques Bures-sur-Yvette France). At UVIC WRIGHT CENTRE A104. David Ruelle is one of the world leaders in mathematics and its applications to physics. His work with Floris Takens in the 1970's describing the onset of turbulence was one of the major achievements in physics in the last fifty years, leading to the new paradigm now known as chaos. He is also known as an excellent expositor, both on the mathematics and physics of chaos, and also on more philosophical aspects of science. Admission: Free. More details click [here](#)

Sep 11th 6:30- 8:00 pm – "The First Stars in the Universe" by Dr. Kim Venn, Dept. of Physics & Astronomy, UVIC. At Hermann's Jazz Club, 753 View St. Café Scientifique is sponsored by: Faculty of Science, U. Victoria. Admission: Free. For more info click [here](#).

Sept 28 -29th UVIC 50th Anniversary Homecoming Festival. The UVic 50th Anniversary Festival welcomes you to campus for a jam-packed events schedule in celebration of 50 years of UVic excellence. As part of the Festival, UVic welcomes back Alumni worldwide to Homecoming. For more details and event times click on the website: <http://www.uvic.ca/anniversary/festival/index.php>

Nov 2-22, 2012 - South Pacific Eclipse Cruise Honolulu, Hawaii to Sydney, Australia - observe the 2012 eclipse from the deck of the Celebrity Millennium. Please Contact Sandy Campbell of Expedia CruiseShipCenters by [email](#) or by telephone 250-477-4877 or 250-588-1276 for more details.

Nov. 25, 2 pm The Galileo Project: Music of the Spheres concert, at Island Savings Centre, Duncan
 “Explore the fusion of arts, science and culture in the 17th and 18th centuries in this imaginative concert commemorating Galileo's first public demonstration of the telescope. Tafelmusik musicians perform the music by memory to a back drop of high definition images from the Hubble telescope and Canadian astronomers. The Galileo Project: Music of the Spheres features poetic narration, choreography and music by Monteverdi, Vivaldi, Bach and Handel. “ The Galileo Project has been performed around the world and the musicians are specialist s in historical performance practice. Tafelmusik, a world famous baroque orchestra of 17 remarkably talented performers, will be playing this fully staged concert.

Please contact Genevieve if you are interested in being one of the 25 who wish to attend . 250-746-8052 or twinflower4@gmail.com

NASA Launches credit NASA.Com:

No launches scheduled.

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4. This Month In Exploration

Courtesy of: NASA History Program Office

160 Years Ago - 1857

September 5: Konstantin E. Tsiolkovskiy born in village of Izhevsk, Spassk County, Ryazan Province.
 Research done in Kaluga, USSR.

65 Years Ago - 1947

September 6: V2 fired from deck of USS Midway, near Bermuda.
 September 25: First launch Aerobee, White Sands, NM.

50 Years Ago – 1962

September 12: President John F. Kennedy's address at Rice University on the nation's space effort. In this well-known speech, Kennedy stated that we explore space not because it is easy but because it is difficult.

September 18: Tiros 6 launched by Thor Delta, 4:53 a.m., EDT, Cape Canaveral, Fla.

September 28: Alouette 1 launched, by Thor Agena, 2:05 a.m., EDT, Vandenberg AFB. Although launched by the U.S., it became the first satellite operated by a country (Canada) other than the USSR or the United States.

45 Years Ago - 1967

September 7: Biosatellite 2 launched by Thor Delta, 6:04 p.m., EDT, Cape Canaveral, Fla.
 September 8: Surveyor 5 launched by Atlas Centaur, 13:47 a.m., EDT, Cape Canaveral, Fla.
 September 28: Intelsat 2 F4 launched aboard Delta rocket from Cape Canaveral at 8:45 p.m. EDT.

40 Years Ago – 1972

September 22: Explorer 47 (IMP 7) launched by Delta, 9:20 p.m., EDT, Cape Canaveral, Fla.

35 Years Ago – 1977

September 5: Voyager 1 launched at 8:56 a.m., EDT from Cape Canaveral on a Titan III-Centaur launch vehicle.

September 29: USSR launched Salyut-6 space station aboard Proton K rocket from Baikonur at 06:50 UTC.

30 Years Ago – 1982

September 27: Intelsat 5 F5 launched aboard Atlas Centaur from Cape Canaveral at 7:41p.m., EDT.

25 Years Ago – 1987

September: Ariane 3 launches Aussat-3 and Eutelsat 4 satellites from Kourou, French Guiana - significant because the Ariane rocket program had been grounded 16 months after a 1986 launch failure.

20 Years Ago - 1992

September 12: STS-47 (Space Shuttle Endeavour) lifted off, 10:23 a.m., EDT, KSC. Crew: Robert L. “Hoot” Gibson, Curtis L. Brown, Jr., Mark C. Lee, Jerome “Jay” Apt, N. Jan Davis, and Mae C. Jemison. Payload specialist: Mamoru Mohri (Japan). Mae C. Jemison becomes first African-American woman in space. Mamoru Mohri first Japanese astronaut to fly on Space Shuttle. Mark C. Lee and N. Jan Davis first married couple in space together. Landed September 20, 8:53 a.m., EDT, KSC. Mission Duration: 7 days, 22 hours, 30 minutes.

September 25: Mars Observer launched on Titan III, 1:05 pm., EDT, Cape Canaveral, Fla. Spacecraft fell silent Aug. 21, 1993, three days before it would have entered Mars orbit.

15 Years Ago – 1997

September 23: Launch of Intelsat 803 aboard Ariane 42LP rocket from Kourou, French Guiana, at 23:58:00 UTC.

September 25: STS-86 (Space Shuttle Atlantis) launched from KSC at 10:34 p.m. EDT. Crew: James D. Wetherbee, Michael J. Bloomfield, Vladimir G. Titov (Russia), Scott E. Parazynski, Jean-Loup J.M. Chrétien (France), Wendy B. Lawrence, and David A. Wolf. Docked with Mir and exchanged David Wolf for Michael Foale who returned with the rest of the crew. Landed at KSC, October 6 at 5:55 p.m., EDT. Mission Duration: 10 days, 19 hours, 20 minutes.

10 Years Ago – 2002

September 6: Launch of Intelsat 906 aboard Ariane 44L rocket from Kourou, French Guiana at 06:44:00 UTC.

5 Years Ago – 2007

September 18: WorldView 1, a U.S.commercial (DigitalGlobe) imaging satellite, was launched by a Delta 2 rocket from Vandenberg AFB at 2:35 EDT. The camera is a panchromatic imaging system featuring half-meter resolution imagery. The National Imagery and Mapping Agency (NIMA) is among the primary customers.

September 14: Kaguya, a Japanese (JAXA) lunar orbiter, also known by its pre-launch name SELENE (for SELEnological and ENgineering Explorer), was launched by a H-2A rocket from Tanegashima Island at 01:31 UTC. Kaguya entered lunar orbit on October 3 and subsequently deployed two subsatellites.

September 27: Dawn was launched by a Delta 2 rocket from Cape Canaveral at 8:34 a.m. EDT. It is to visit two nearby asteroids, Vesta (between August 2011 and May 2012) and Ceres (by February 2015), and transmit multi-color images of them.

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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".

Kepler Explorer Now an APP on iTunes: Armchair explorers of the cosmos can now have at their fingertips the nearly 2,000 distant planetary systems discovered by NASA's Kepler Mission. Kepler Explorer, an innovative app for iPads and iPhones. Now available for free from the iTunes App Store

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6. Featured Articles

Articles

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Visit the Solar System in Fort St. John – July 18/12 Credit: Vancouver Sun

FORT ST. JOHN, B.C. — A journey to the farthest reaches of Earth's solar system begins with a single step — and you can be home for lunch.

Forget space shuttles, this extraterrestrial exploration only requires some good hiking shoes and visit to the northeastern B.C. city of Fort St. John.

The city and its school district have created what they say is Canada's largest scale model of the earth's solar system, starting from the sun and ranging outward, past Earth, Jupiter and Saturn, all the way to Pluto and the Kuiper Belt.

The entire walk covers an 8.6 kilometre path, with planets and other objects placed to scale along it, and marked with a sign and QR code that can be scanned by a smartphone to access a webpage for further information.

Fort St. John students have worked for more than a year, compiling facts about the solar system and creating the webpage content.

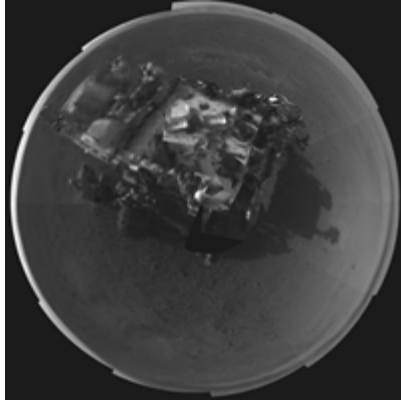
School district officials say the layout easily conveys the massive distance to this system's most far-flung planet because walkers travel from the Sun to Mars within the first 334 metres, but must trek for more than eight kilometres before reaching Pluto. Read more:

http://www.prn.bc.ca/projects/solar/?page_id=2

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First 360° From Curiosity Rover – Aug 9/12 Credit: NASA JPL

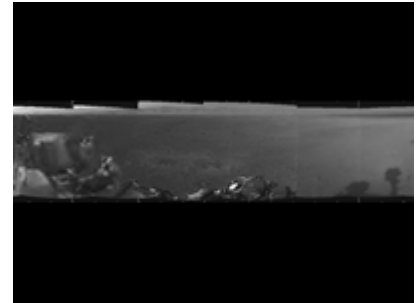
Remarkable image sets from NASA's Curiosity rover and Mars Reconnaissance Orbiter (MRO) are continuing to develop the story of Curiosity's landing and first days on Mars.



The images from Curiosity's just-activated navigation cameras (Navcams) include the rover's first self-portrait, looking down at its deck from above (left). Another Navcam image set, in lower-resolution thumbnails, is the first 360° view of Curiosity's new home in Gale Crater (below). Also downlinked were two higher-resolution Navcam shots providing the most detailed depiction to date of the surface adjacent to the rover.

"These Navcam images indicate that our powered descent stage did more than give us a great ride, it gave our science team an

amazing freebie," said John Grotzinger from the California Institute of Technology in Pasadena. "The thrust from the rockets actually dug a one-and-a-half-foot-long (0.5 meters) trench in the surface. It appears we can see martian bedrock on the bottom. Its depth below the surface is valuable data we can use going forward."



Another image set, courtesy of the Context Camera (CTX) aboard NASA's MRO, has pinpointed the final resting spots of the six 55-pound (25 kilograms) entry ballast masses. The tungsten masses impacted the martian surface at a high speed about 7.5 miles (12 kilometers) from Curiosity's landing location (below).



On August 8, the team deployed the 3.6-foot-tall (1.1m) camera mast, activated and gathered surface radiation data from the rover's Radiation Assessment Detector, and concluded testing of

the rover's high-gain antenna.

Curiosity carries 10 science instruments with a total mass 15 times as large as the science payloads on NASA's Mars rovers Spirit and Opportunity. Some of the tools, such as a laser-firing instrument for checking rocks' elemental composition from a distance, are the first of their kind on Mars. Curiosity will use a drill and scoop, which are located at the end of its robotic arm, to gather soil and powdered samples of rock interiors, then sieve and parcel out these samples into the rover's analytical laboratory instruments.

To handle this science toolkit, Curiosity is twice as long and five times as heavy as Spirit or Opportunity. The Gale Crater landing site places the rover within driving distance of layers of the crater's interior mountain. Observations from orbit have identified clay and sulfate minerals in the lower layers, indicating a wet history.

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Proba-1 Microsat Snaps Olympic Neighbourhood – Aug 12/12 *Credit: ESA Portal*

This Olympics has been watched from all over the world – and beyond. Benefiting from a cloudless sky, this view of London's Olympic Park was captured by the smallest imager aboard ESA's smallest mission: the High Resolution Camera on the Proba-1 microsatellite.

The Olympic Park, dominated by the circular Olympic Stadium, is visible towards the base of this 5 m-resolution image, with Victoria Park to its west and Hackney Marsh to the northwest.

This image was acquired by the High Resolution Camera (HRC). This black and white digital camera incorporates a Cassegrain telescope miniaturised to fit aboard Proba-1. Orbiting Earth at 720 km altitude, the entire satellite's volume is less than a cubic metre.

HRC operates alongside Proba-1's larger CHRIS (Compact High Resolution Imaging Spectrometer) hyperspectral imager, which takes 15 m-resolution scenes across a programmable selection of up to 62 spectral bands, from a variety of viewing angles. This HRC image was acquired on 11 August.



About Proba-1

Operational for more than a decade, Proba-1 was the first in ESA's series of satellites aimed at providing in-orbit testing of new space technologies. Smaller than a cubic metre, Proba-1's many experiments include the compact HRC that acquires monochromatic images with an area of 25 sq km. Proba stands for 'Project for Onboard Autonomy' – both cameras are largely autonomous. Controllers at ESA's Redu station in Belgium send up the location to be imaged – latitude, longitude and altitude – then the satellite itself does the rest, lining up its instruments with its target on the ground.

Proba-1 was launched in October 2001 as an experimental mission but is still going strong, having since been reassigned to ESA's Earth observation

team. This year a software fix returned its radiation-damaged star trackers to full operations. In November 2009 Proba-1 was joined in orbit by Proba-2, focused on solar monitoring. Proba-V, to monitor global vegetation, is due to launch next year.

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Neil Armstrong Dies at Age 82 – Aug 27/12 Credit NASA Headquarters



Neil Armstrong, the first man to walk on the Moon during the 1969 Apollo 11 mission, has died, following complications resulting from cardiovascular procedures. He was 82.

Armstrong in the lunar module Eagle on the surface of the Moon, July 20, 1969.

Armstrong's words, "That is one small step for (a) man, one giant leap for mankind," spoken on July 20, 1969, as he became the first person ever to step onto another planetary body, instantly became a part of history.

Those few words from the Sea of Tranquillity were the climactic fulfillment of the efforts and hopes of millions of people and the expenditure of billions of dollars. A plaque on one of the lander's legs that concluded, "We came in peace for all mankind," further emphasized that Armstrong and fellow astronaut Edwin "Buzz" Aldrin were there as representatives of all humans.

In a 2001 oral history interview, Armstrong credited those behind the scenes for the mission's success: "When you have hundreds of thousands of people all doing their job a little better than they have to, you get an improvement in performance. And that's the only reason we could have pulled this whole thing off."

Armstrong is survived by his wife, two sons, a stepson, a stepdaughter, 10 grandchildren, and a brother and sister.

"Neil Armstrong was a hero not just of his time, but of all time," President Barack Obama said via Twitter. "Thank you, Neil, for showing us the power of one small step."

Armstrong's family released the following statement on Saturday: "Neil Armstrong was also a reluctant American hero who always believed he was just doing his job. He served his nation proudly, as a navy fighter pilot, test pilot, and astronaut. He also found success back home in his native Ohio in business and academia and became a community leader in Cincinnati. "While we mourn the loss of a very good man, we also celebrate his remarkable life and hope that it serves as an example to young people around the world to work hard to make their dreams come true, to be willing to

explore and push the limits, and to selflessly serve a cause greater than themselves." "As long as there are history books, Neil Armstrong will be included in them, remembered for taking humankind's first small step on a world beyond our own," said NASA Administrator Charles Bolden. "Besides being one of America's greatest explorers," Bolden added, "Neil carried himself with a grace and humility that was an example to us all."

Apollo 11 lunar module pilot and fellow moonwalker Buzz Aldrin on Armstrong's passing: "I am very saddened to learn of the passing of Neil Armstrong today. Neil and I trained together as technical partners but were also good friends who will always be connected through our participation in the Apollo 11 mission. Whenever I look at the Moon, it reminds me of the moment over four decades ago when I realized that even though we were farther away from Earth than two humans had ever been, we were not alone."

As news of Armstrong's death became widely known, many NASA officials offered their thoughts on the agency's best-known representative: "The passing of Neil Armstrong has shocked all of us at the Johnson Space Center," said Center Director Michael Coats. "The whole world knew Neil as the first man to step foot on the Moon, but to us he was a co-worker, a friend, and an outstanding spokesman for the Human Space Program. His quiet confidence and ability to perform under pressure set an example for all subsequent astronauts. Our role model will be missed." "Neil Armstrong was a very personal inspiration to all of us within the astronaut office," said Bob Behnken, chief of NASA's Astronaut Office. "His historic step onto the Moon's surface was the foundation for many of our personal dreams to become astronauts. The only thing that outshone his accomplishments was his humility about those accomplishments. We will miss him as a friend, mentor, explorer and ambassador for the American spirit of ingenuity." Armstrong's single sentence, though it was focused above the national divisions and quarrels of Earth, still signified unquestionably the U.S. victory in the desperate space race with the Soviet Union.

Neil A. Armstrong was born August 5, 1930, in Wapakoneta, Ohio. He earned an aeronautical engineering degree from Purdue University and a master's in aerospace engineering from the University of Southern California. He was a naval aviator from 1949 to 1952. During the Korean War, he flew 78 combat missions. In 1955 he joined the National Advisory Committee for Aeronautics (NACA), NASA's predecessor, as a research pilot at Lewis Laboratory in Cleveland.

Armstrong later transferred to NACA's High Speed Flight Research Station at Edwards Air Force Base in California. As project pilot, he was in the forefront of the development of many high-speed aircraft, including the X-15, which flew at 4,000 mph (6,400 km/h). He flew more than 200 aircraft models. They included jet and rocket-powered planes, helicopters, and gliders.

Armstrong was selected as an astronaut in 1962.

His first space flight was Gemini 8, which he commanded. He was the first civilian to fly a U.S. spacecraft. With fellow astronaut David R. Scott, Armstrong performed the first docking in space, with an Agena target satellite. Less than an hour later, their spacecraft began an unplanned rolling motion. After undocking, it increased to one revolution per second. One of the Gemini's 16 thrusters had stuck open because of an electrical short circuit. Armstrong used reentry thrusters to control the capsule, and after a 30-minute struggle, it was stabilized. Flight rules required a return to Earth after use of the reentry thrusters, so the crewmembers fired retrorockets that sent Gemini 8 to a contingency landing zone in the Western Pacific. The eventful flight on March 16, 1966, had taken just over 10 hours, 41 minutes.

Apollo 11 lifted off July 16, 1969, with Armstrong, Aldrin, and Collins aboard. Collins remained in lunar orbit in the command module while Armstrong and Aldrin descended in the lunar module they had named Eagle to their historic landing on the Moon's surface. "Houston, Tranquillity Base here. The Eagle has landed," Armstrong said, telling a tense and waiting Earth that men had finally reached the lunar surface.

He and Aldrin spent about two hours exploring, gathering more than 50 pounds (23 kilograms) of Moon rocks and setting up three scientific experiments. The next day, after 21 hours and 37 minutes on the Moon, they fired Eagle's engine to begin the return to Collins and the command module.

The crew returned to Earth, landing near the USS Hornet in the Pacific after a mission of just over eight days. President Richard M. Nixon was on the aircraft carrier's deck to welcome them.

"This is the greatest week in the history of the world since the creation," Nixon told the three. After 16

days in quarantine to protect Earth from any returned Moon germs, the crew went on U.S. and international tours. Millions greeted them as heroes.

Armstrong later served as deputy associate administrator for aeronautics in the Office of Advanced Research and Technology at NASA Headquarters. He resigned from the space agency in 1971. As a professor at the University of Cincinnati from 1971 to 1979, he was involved in both teaching and research. He later went into the business world. Among other positions, he served for 10 years as chairman of Computing Technologies for Aviation Inc. of Charlottesville, Virginia, and later as chairman of ALL Systems Inc., an electronic systems company based in Deer Park, New York.

Armstrong was a fellow of the Society of Experimental Test Pilots and the Royal Aeronautical Society, and an honorary fellow of the American Institute of Aeronautics and Astronautics and the International Astronautical Federation.

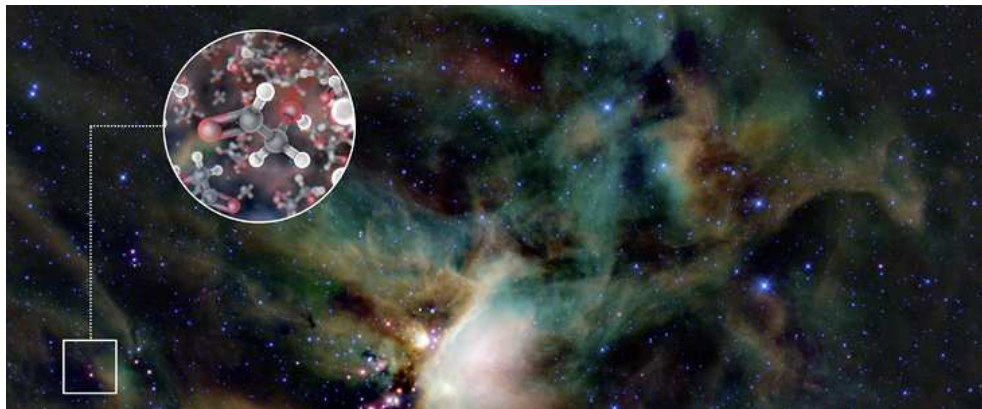
He was a member of the National Academy of Engineering. He served as a member of the National Commission on Space in 1985 and 1986, and in 1985 was vice chairman of the Presidential Commission on the Space Shuttle Challenger Accident. He also was chairman of the Presidential Advisory Committee for the Peace Corps from 1971 to 1973.

Seventeen countries decorated Armstrong. He received many special honors, including the Presidential Medal of Freedom, the Congressional Gold Medal, the Congressional Space Medal of Honor, NASA's Ambassador of Exploration Award, the Explorers Club Medal, the Robert H. Goddard Memorial Trophy, the NASA Distinguished Service Medal, the Harmon International Aviation Trophy, the Royal Geographic Society's Gold Medal, the Federation Aeronautique Internationale's Gold Space Medal, the American Astronautical Society Flight Achievement Award, the Robert J. Collier Trophy, the AIAA Astronautics Award, the Octave Chanute Award, and the John J. Montgomery Award.

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Sweet Result from ALMA – Aug 29/12 Credit: ESO

A team of astronomers using the Atacama Large Millimeter/submillimeter Array (ALMA) has spotted sugar molecules in the gas surrounding a young Sun-like star. This is the first time sugar been found in space around such a star, and the discovery shows that the building blocks of life are in the right place, at the right time, to be included in planets forming around the star.



The astronomers found molecules of glycolaldehyde — a simple form of sugar [1] — in the gas surrounding a young binary star, with similar mass to the

Sun, called IRAS 16293-2422. Glycolaldehyde has been seen in interstellar space before [2], but this is the first time it has been found so near to a Sun-like star, at distances comparable to the distance of Uranus from the Sun in the Solar System. This discovery shows that some of the chemical compounds needed for life existed in this system at the time of planet formation [3].

"In the disc of gas and dust surrounding this newly formed star, we found glycolaldehyde, which is a simple form of sugar, not much different to the sugar we put in coffee," explains Jes Jørgensen (Niels Bohr Institute, Denmark), the lead author of the paper. "This molecule is one of the ingredients in the formation of RNA, which — like DNA, to which it is related — is one of the building blocks of life."

The high sensitivity of ALMA — even at the technically challenging shortest wavelengths at which it operates — was critical for these observations, which were made with a partial array of antennas during the observatory's Science Verification phase [4].

"What it is really exciting about our findings is that the ALMA observations reveal that the sugar molecules are falling in towards one of the stars of the system," says team member Cécile Favre (Aarhus University, Denmark). "The sugar molecules are not only in the right place to find their way onto a planet, but they are also going in the right direction."

The gas and dust clouds that collapse to form new stars are extremely cold [5] and many gases solidify as ice on the particles of dust where they then bond together and form more complex molecules. But once a star has been formed in the middle of a rotating cloud of gas and dust, it heats the inner parts of the cloud to around room temperature, evaporating the chemically complex molecules, and forming gases that emit their characteristic radiation as radio waves that can be mapped using powerful radio telescopes such as ALMA.

IRAS 16293-2422 is located around 400 light-years away, comparatively close to Earth, which makes it an excellent target for astronomers studying the molecules and chemistry around young stars. By harnessing the power of a new generation of telescopes such as ALMA, astronomers now have the opportunity to study fine details within the gas and dust clouds that are forming planetary systems.

"A big question is: how complex can these molecules become before they are incorporated into new planets? This could tell us something about how life might arise elsewhere, and ALMA observations are going to be vital to unravel this mystery," concludes Jes Jørgensen.

The work is described in a paper to appear in the journal *Astrophysical Journal Letters*.

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Southern Observatory (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and in East Asia by the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI) and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.

Notes

[1] Sugar is the common name for a range of small carbohydrates (molecules containing carbon, hydrogen and oxygen, typically with a hydrogen:oxygen atomic ratio of 2:1, as in water). Glycolaldehyde has the chemical formula $C_2H_4O_2$. The sugar commonly used in food and drink is sucrose, which is a larger molecule than glycolaldehyde, and another example of this set of compounds.

[2] Glycolaldehyde has been detected in two places in space so far — first towards the Galactic Centre cloud Sgr B2, using the National Science Foundation's (NSF) 12 Meter Telescope at Kitt Peak (USA) in 2000, and with the NSF's Robert C. Byrd Green Bank Telescope (also USA) in 2004, and in the high-mass hot molecular core G31.41+0.31 using the IRAM Plateau de Bure Interferometer (France) in 2008.

[3] Accurate laboratory measurements of the characteristic wavelengths of radio waves emitted by glycolaldehyde were critical for the team's identification of the molecule in space. In addition to the glycolaldehyde, IRAS 16293-2422 is also known to harbour a number of other complex organic molecules, including ethylene glycol, methyl formate and ethanol.

[4] Early scientific observations with a partial array of antennas began in 2011 (see eso1137). Both before and after this, a range of Science Verification observations have been performed to demonstrate that ALMA is capable of producing data of the required quality, and the data produced have been made publicly available. The results described here use some of these Science Verification data. Construction of ALMA will be completed in 2013, when 66 high-precision antennas will be fully operational.

[5] They are usually around 10 degrees above absolute zero: about -263 degrees Celsius.
More information

This research was presented in a paper "Detection of the simplest sugar, glycolaldehyde, in a solar-type protostar with ALMA", by Jørgensen et al., to appear in *Astrophysical Journal Letters*.

The team is composed of Jes K. Jørgensen (University of Copenhagen, Denmark), Cécile Favre (Aarhus University, Denmark), Suzanne E. Bisschop (University of Copenhagen), Tyler L. Bourke (Harvard-Smithsonian Center for Astrophysics, Cambridge, USA), Ewine F. van Dishoeck (Leiden Observatory, The Netherlands; Max-Planck-Institut für extraterrestrische Physik, Garching, Germany) and Markus Schmalz (Leiden Observatory).

The year 2012 marks the 50th anniversary of the founding of the European Southern Observatory (ESO). ESO is the foremost intergovernmental astronomy organisation in Europe and the world's most productive ground-based astronomical observatory by far. It is supported by 15 countries: Austria, Belgium, Brazil, the Czech Republic, Denmark, France, Finland, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom. ESO carries out an ambitious programme focused on the design, construction and operation of powerful ground-based observing facilities enabling astronomers to make important scientific discoveries. ESO also plays a leading role in promoting and organising cooperation in astronomical research. ESO operates three unique world-class observing sites in Chile: La Silla, Paranal and Chajnantor. At Paranal, ESO operates the Very Large Telescope, the world's most advanced visible-light astronomical observatory and two survey telescopes. VISTA works in the infrared and is the world's largest survey telescope and the VLT Survey Telescope is the largest telescope designed to exclusively survey the skies in visible light. ESO is the European partner of a revolutionary astronomical telescope ALMA, the largest astronomical project in existence. ESO is currently planning a 40-metre-class European Extremely Large optical/near-infrared Telescope, the E-ELT, which will become "the world's biggest eye on the sky".

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7. Community Affairs

By Brian Robilliard

Shawngigan Lake School Observatory Project

Shawngigan Lake had an Observatory and Telescope donated to them. They have requested our club's help in dismantling, moving and choosing on a site for the Observatory. Last month Brian and Bryon T did a presentation at Shawngigan Lake School to advise them further on what is required to get the observatory up and running and then what is essential to keep it functioning.

No new update available.

Island Star Party(ISP) Planning Committee

Thanks to the committee for doing such a great job planning and during the ISP.

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8. Kreative Korner

If you have any ideas that may spark a Kreative Korner, please send your submissions to the editor. Here's a space related mind bender from Family Fun. Test your memory and have fun.

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9. The Sky This Month

By oneminuteastronomer.com

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

Spring comes this month to the southern hemisphere and autumn comes to the north, and there's a change afoot in the sky. The brilliant star clouds along the spine of the Milky Way still linger. But sparser constellations also come into view: Pegasus and Andromeda in the north, and Sculptor, Tucana, and Pavo in the south. And there are planets... Saturn and Mars fading in the southwest after sunset, and brilliant Venus and Jupiter visible well before sunrise. Even Uranus takes a turn in the

spotlight this month. The 7th planet rises opposite the Sun on September 29, and passes a 6th-magnitude star a week before, making the planet easy to find and see. Here's what to look for in the night sky this month.

8 Sept. Last Quarter Moon, 15:15 UT.

8 Sept. Look for Jupiter above the last-quarter Moon from near midnight to dawn. The big planet brightens this month to magnitude -2.5 and grows to an impressive apparent size of 43". The planet is 90° west of the Sun, so its moons cast maximally displaced shadows on the face of the planet.

12 Sept. Look for brilliant Venus near the waning crescent Moon about an hour before sunrise. The bright planet dominates the eastern sky this month, far outshining any other object in the sky except for the Sun and Moon.

16 Sept. New Moon, 02:11 UT.

15-30 Sept. If you have very dark and clear sky, look for the zodiacal light in the eastern sky before sunrise. It looks like large a glowing wedge thrusting out from the horizon. This year, the wedge of the zodiacal light points directly at Venus.

18 Sept. The waxing crescent Moon nears Saturn and Mars on Sept. 18-19. Look for the spectacle in the southwestern sky after sunset.

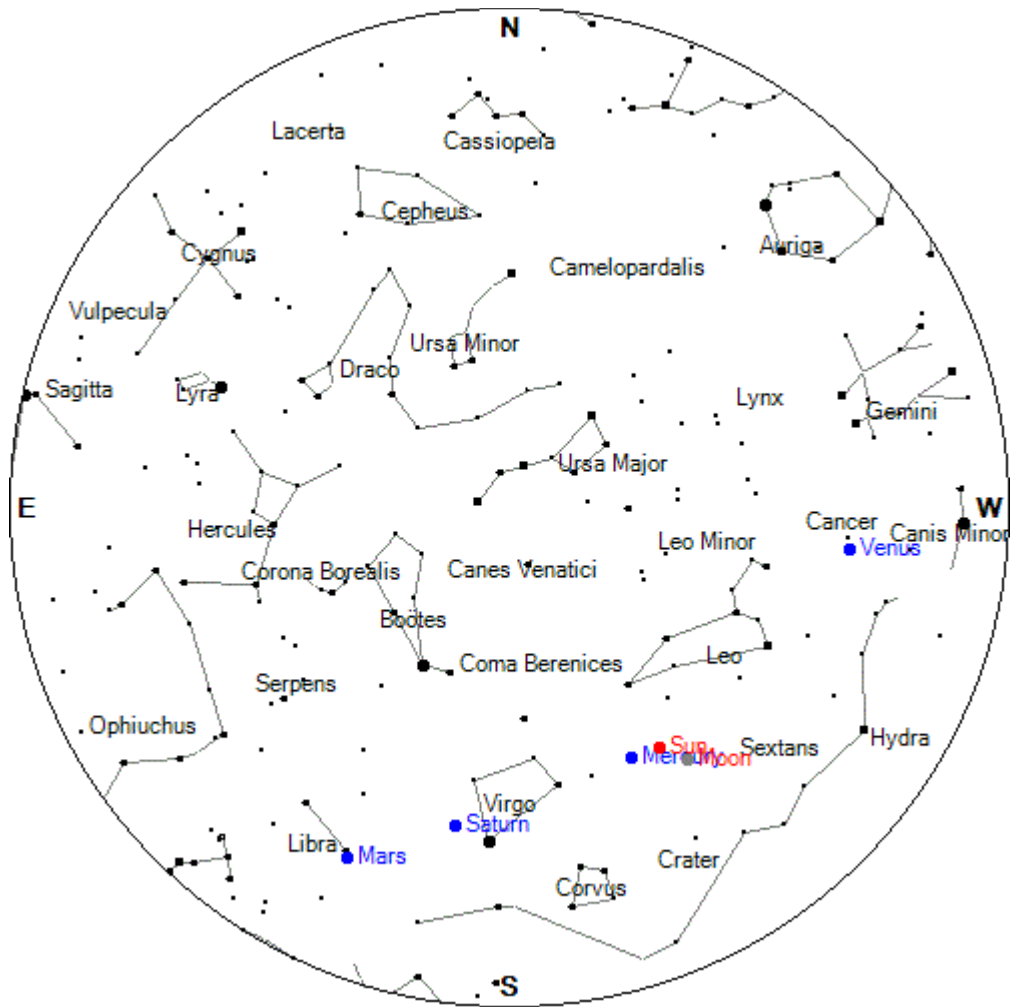
22 Sept. Spring begins in the southern hemisphere and autumn begins in the north at 14:49 UT as the Sun moves south across the celestial equator.

22 Sept. First Quarter Moon, 19:41 UT.

22-23 Sept. The planet Uranus passes within 2 arc-minutes of the 6th-magnitude star 44 Piscium. Star and planet have roughly the same brightness. But look for the colour difference between the two. The star is yellow-white, while the planet is greenish or aquamarine. The planet is seen best after midnight, and is visible in both northern and southern hemispheres.

29 Sept. The planet Uranus is at opposition, rising at sunset.

30 Sept. Full Moon, 03:19 UT.



SkyChart Courtesy of Heavens-Above

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