

# POLARIS



## Royal Astronomical Society of Canada London Centre Newsletter July 2015

### Pluto

By Patrick Whelan

Unless you live under a rock, (a big rock), then you know the spacecraft New Horizons has completed its flyby of Pluto and is currently sending images to Earth. Pluto is the last planet to be visited by a spacecraft. Yes, I know, Pluto isn't a planet anymore, but what the heck! Meaningfully, the July 14 flyby of Pluto will occur 50 years to the day after humans first explored Mars with NASA's Mariner 4 on July 14, 1965.

New Horizons' six-month encounter with the Pluto system started in January 2015 and culminates in the July flyby. Its suite of seven science instruments — which includes cameras, spectrometers, radio science, and plasma and dust detectors — will map the geology of Pluto and Charon; map their surface compositions and temperatures; examine Pluto's atmosphere and search for an atmosphere around Charon; study Pluto's smaller satellites; and look for rings and new satellites around Pluto.

It is hard to imagine that the spacecraft can send data back to us. It and Pluto are currently 4.5 light HOURS from Earth. Light hours! It is hard to imagine just how far away that is. (about 5 BILLION kilometers!) You need pretty large antennas to send data over billions of miles - and fortunately, NASA has them. The New Horizons mission operations team communicates with the spacecraft through NASA's Deep Space Network (DSN) of antenna stations. The DSN consists of facilities in California's Mojave Desert; near Madrid, Spain; and near Canberra, Australia. These stations (with 70 meter dishes) are separated in longitude by about 120 degrees, assuring that any spacecraft can be observed without interruption as Earth rotates. The New Horizons spacecraft has a plutonium battery (yes the Pluto spacecraft has a Pluto battery!) which should last until the late 2020's. It

has spent much of its journey in hibernation mode, but it made some close-up observations of Jupiter and its moons when it completed a slingshot flyby of the planet in 2007. These included a time-lapse video of a volcanic eruption on Jupiter's moon Io, the first detailed recording of a volcanic event outside Earth.



The mission is carrying the ashes of Clyde Tombaugh, who discovered Pluto in 1930. Before dying in 1997, he requested that his ashes be sent to space. Nasa obliged, affixing a small container with his remains to the inside upper deck of the probe. It bears the inscription: "Interred herein are remains of American Clyde W.

Tombaugh, discoverer of Pluto and the solar system's 'third zone', Adelle and Muron's boy, Patricia's husband, Annette and Alden's father, astronomer, teacher, punster, and friend: Clyde W. Tombaugh (1906-1997)." His ashes will be the first to leave the solar system.

After imaging Pluto, New Horizons will transmit high priority and low resolution data first. It has close to 10 years of data to transmit. After that transmission, it will send all the full resolution data to Earth. That will take 16 months! The data rate from that distant spacecraft is about 300 baud. You may not remember computer modems, but their slowest speed was about 300 baud. I remember because I had one and if I was downloading a text file, I could read it as it streamed onto my computer. That is how slow 300 baud is!

Would you like a model of the New Horizons spacecraft? You can download the paper model and instructions! <http://pluto.jhuapl.edu/Participate/museums/Design-and-Build.php> (there are even files for 3D printing!)

## Moon Phases



July 2 2015



July 8 2015



July 16 2015



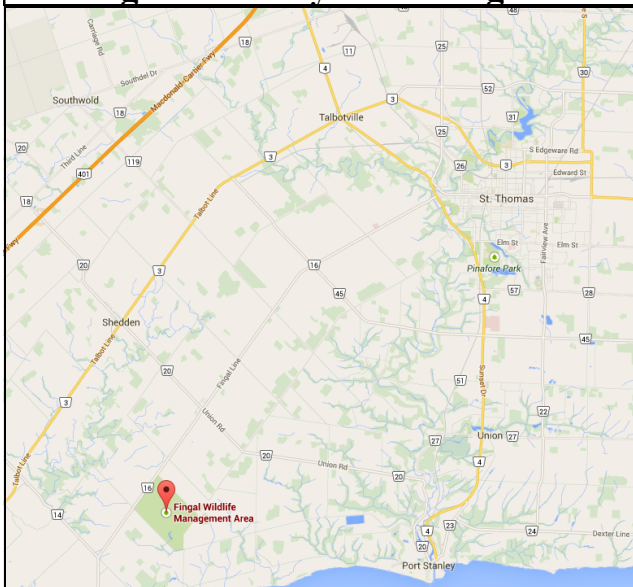
July 24 2015

### July

The guest speaker will be Eduardo Martin-Martinez with the topic 'Light Echoes from the Early Universe'.

Eduardo and his colleagues think they have found clues about the very early universe. They calculated that events which produce photons - such as an atom releasing energy - also create certain echoes in the electromagnetic field, the very field which forms the basis of light.

## Fingal Dark Sky Observing Site



## London Centre Executive

### President

Rick Saunders  
email: ozzy (at) bell.net

### Vice-President and Newsletter Editor

Patrick Whelan  
email: ratman (at) rocketmail.com

### Treasurer

Bill Gardner  
email: gardner.w (at) rogers.com

### Secretary

Everett Clark  
email: Secretary (at) rasclondon.ca

### National Representative

Peter Jedicke  
email: PJedicke (at) fanshawec.ca

### Observer's Chair

Dale Armstrong  
email: observing (at) rasclondon.ca

### Honorary President and once National President

Peter Jedicke  
email: PJedicke (at) fanshawec.ca

### Past President

Public Outreach Coordinator  
Dave McCarter  
email: dmccarter (at) sympatico.ca

### Higher Education Liaison and Librarian

Robert Duff  
email: rduff (at) sympatico.ca

### ATM Chair

Mike Hanes  
email: subareau (at) gmail.com

### Observatory Committee Chair

Pete Raine  
observatory@rasclondon.ca

### Councilor at Large

John Rousom  
councilor2@rasclondon.ca

### System Administrator

Jeff Harrison  
admin@rasclondon.ca

London RASC Website: <http://www.rasclondon.ca/>

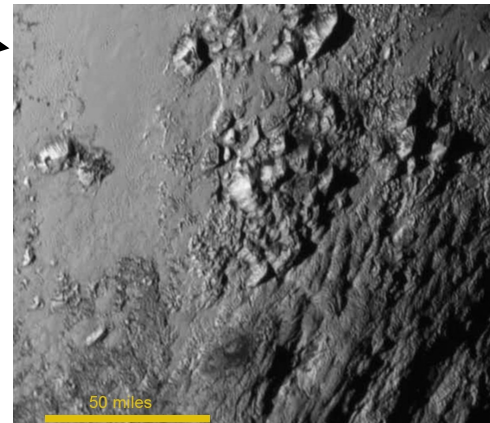
London RASC Forums: <http://forums.rasclondon.ca/>

The ESA sent tardigrades into space in a mission they called Tardigrades in Space. For 12 days in September 2007, some 3000 water bears hitched a ride into space on ESA's orbital Foton-M3 mission. They shortened the mission name to **TARDIS!** Any Dr. Who fans present?

## Sky Events for Late June and August

July 25 Ceres at opposition  
 August 5 Uranus 1.0 N of Moon  
 August 7 Mercury 0.6 N of Jupiter  
 August 7 Mercury 1.0 N of Regulus  
 August 9 Aldebaran 0.7 S of Moon  
 August 10 Jupiter 0.4 N of Regulus  
 August 13 Perseid meteors peak  
 August 20 Mars 0.5 S of Beehive (M44)  
 August 30 Large tides  
 Sep 1 Neptune at opposition  
 Sep 1 Uranus 1.1 N of Moon  
 Sep 4 Mercury greatest elongation East  
 Sep 5 Aldebaran 0.5 S of Moon  
 Sep 11 Zodiacal light visible in northern latitudes in E before morning twilight

Pluto! →



Mercury well placed in morning sky  
 Venus too close to the Sun by Aug 15  
 Mars not visible, in Cancer in the twilight by end of August  
 Jupiter low in the WNW evening twilight in Leo, vanishes in early August  
 Saturn well placed in evening sky in Libra, in Western evening sky in August  
 Uranus rises near midnight in Pisces, rises in late evening in August  
 Neptune rises in late evening in Aquarius, rises in midevening in August



### R.A.S.C. London Centre Library Books of the Month July 2015 By Robert Duff

As always, these “Books of the Month” are available for loan to members, to be returned at the following monthly meeting. The books for July 2015 are as follows:

The Backyard Astronomer's Guide, by Terence Dickinson & Alan Dyer. Revised Edition. 2002.

NightWatch: a Practical Guide to Viewing the Universe, by Terence Dickinson. 3rd Edition, Revised and Expanded for Use Through 2010. 1998 (2003 printing).

Pale Blue Dot: a Vision of the Human Future in Space, by Carl Sagan. c1994.

For a complete listing of our library collection please go to the Main Menu on the left side of the RASC London Centre Web site main page and click on Club Library: <http://www.rasclondon.ca/index.php/library-and-rentals>

If there is a particular book or video you wish to borrow, please feel free to contact me by telephone at (519) 439-7504 or by e-mail at [rduff@sympatico.ca](mailto:rduff@sympatico.ca)

#### **Cronyn Observatory Public Nights, June 13th—July 11th, 2015**

**By Robert Duff**

#### **Cronyn Observatory Public Night, Saturday, June 13th, 2015**

Partly cloudy skies greeted some 40 visitors to Western University's Cronyn Observatory Public Night, Saturday, June 13th, 2015, 8:30 p.m. Graduate student Neil Bhatt made 2 presentations of his digital slide presentation “Decoding Star-

light,” which was about spectroscopy, to about 10 people in total.

Graduate student Shannon Hicks was telescope operator and reported around 35 people, although not everyone came to the big 25.4cm refractor in the dome. Shannon showed visitors Venus, which was at half-phase, in the big 25.4cm refractor, using the 2-inch 32mm Erfle (137X) eyepiece, and then swapping in the 1—¼-inch adaptor to use the 18mm Radian (244X) and 8mm Ortho (548X) eyepieces. The view of Venus at these high magnifications was wonderful, although slightly blurred with atmospheric seeing in the western sky. Jupiter was a fine

July 2015

sight in the big 25.4cm refractor when viewed with the 18mm Radian (244X) eyepiece. Shannon also showed visitors an unprecedented view of Saturn, with the 32mm Erfle (137X) and 18mm Radian (244X) eyepieces. However, the best view of Saturn was with the 8mm Ortho (548X) eyepiece with cloud belts on the planet's surface and the Cassini Division in the rings visible.

Graduate student and RASC London Centre member Emily McCullough assisted Shannon with directing the big 25.4cm refractor and also operated the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) set up on the roof patio outside the dome. She was joined by RASC London Centre members Tricia Colvin and Mark Tovey who operated the Observatory's 8-inch (20.3cm) Meade 2080/LX3 Schmidt-Cassegrain. London Centre member Richard Gibbens listened to the slide lecture and visited the roof patio. Objects observed in these telescopes included Venus, Jupiter, Saturn and the orange and blue double-star Albireo.

Emily distributed 6 "Star Finder" planispheres to 4 adults and 2 children and one couple indicated they may attend the upcoming meeting of the RASC London Centre. Graduate student Dilini Subasinghe was also there along with Western's Physics and Astronomy Department computer resources person and RASC member Henry Leparskas, who took pictures with his camera throughout the evening and assisted Neil with closing the dome. The last visitor left around 11:15 p.m. after a very successful evening of astronomy.

### **Cronyn Observatory Public Night, Saturday, June 20th, 2015**

Partly cloudy skies greeted some 50 visitors to Western University's Cronyn Observatory Public Night, Saturday, June 20th, 2015, 8:30 p.m. Graduate student Sahar Rahmani made the first of 2 presentations of her digital slide presentation "The Life Cycle of the Stars," before an audience of some 18 people. With more people arriving she made her presentation a second time for an estimated total of some 50 visitors for the evening.

Graduate student Dilini Subasinghe was telescope operator in the dome and made ready the big 25.4cm refractor. RASC London Centre was represented by Bob Duff, Dale Armstrong, Tricia Colvin, Mark Tovey, Peter Jedicke, Paul Kerans and graduate student and RASC London Centre member Emily McCullough. London Centre member Richard Gibbens was also there and listened to the slide lecture.

Early in the evening Emily reorganized the bulletin board and map display case drawers in the dome. The newly received pamphlets "Getting Started in Astronomy" (RASC, SkyNews [2015]), which had been brought by Peter Jedicke June 6th, were made available to interested visitors. Bob brought the RASC London Centre newsletter "Polaris" (June 2015), which was posted on the bulletin board along with an earlier "Polaris" issue.

Dilini showed visitors the 4-day-past-new crescent Moon and Venus in the western sky, through the big 25.4cm refractor in the dome, using the 32mm Erfle eyepiece (137X). She then showed them Jupiter, swapping in the 28mm Meade Super Wide Angle eyepiece (157X) for a better view. On the roof patio outside the dome, Tricia and Mark showed visitors the Moon, Venus, Jupiter

and Saturn in the London Centre's 25.4cm Dobsonian, using the 17mm Nagler eyepiece (66X). Peter also showed them Mizar and Alcor in the 25.4cm Dobsonian (17mm Nagler eyepiece, 66X).

Dale showed visitors the Moon, Jupiter and Arcturus in the Observatory's powered 8-inch (20.3cm) Meade 2080/LX3 Schmidt-Cassegrain. Emily operated the recently donated 8-inch (20.3cm) Meade Schmidt-Cassegrain, which had no power supply and had to be moved manually, showing people the Moon and Jupiter, using the Tele Vue 26mm Plossl eyepiece (77X) and then swapping in the 15mm Sky-Watcher Ultra-Wide (133X) and the 8mm eyepiece (250X) for a better view of Jupiter.

Emily also showed a few visitors Saturn in the powered 8-inch (20.3cm) Schmidt-Cassegrain, using the 15mm Sky-Watcher Ultra-Wide (133X) and 8mm (250X) eyepiece. Saturn drifted in and out of clarity with clouds but a few people were impressed with their first time view of the ringed planet. Dale took some time to collimate the other 8-inch (20.3cm) Meade Schmidt-Cassegrain, which had no power supply and Emily had been operating.

Bob, Dale and Peter spoke with one young lady visitor who had brought her Go-To Celestron 90mm Maksutov telescope and set it up on the roof patio, where she showed a few visitors the Moon, Saturn and Vega.

Western's Physics and Astronomy Department computer resources person and RASC member Henry Leparskas took pictures throughout the evening with his camera, including a group portrait in the dome of volunteers at the end of the evening. The Observatory was closed down between 11:08—11:30 p.m. after an excellent evening of astronomy slide presentations and observing through telescopes.

### **Cronyn Observatory Public Night, Saturday, June 27th, 2015**

Cloudy skies and rain greeted 14 visitors to Western University's Cronyn Observatory Public Night, Saturday, June 27th, 2015, 8:30 p.m. Professor Margaret Campbell-Brown made her digital slide presentation "When World's Collide: Comets, Asteroids and the Earth."

Graduate student Laura Lenkic was telescope operator for the big 25.4cm refractor in the dome and astronomy undergraduate student Nathalie Thibert was crowd manager. RASC London Centre was represented Bob Duff, Tricia Colvin, Mark Tovey, Paul Kerans, Charlene Kerans, graduate student and London Centre member Emily McCullough and new London Centre member Scott Vodon.

Since it was raining Emily and Bob set up the London Centre's 25.4cm Dobsonian (17mm Nagler eyepiece, 66X) inside the dome and briefly viewed the communications tower in south London through the door to the roof patio, although no visitors looked through this telescope. When everybody arrived upstairs in the dome Emily gave a telescope talk and demonstration of the big 25.4cm refractor. She showed them the 17mm Nagler eyepiece and explained the 25.4cm Dobsonian as a reflector telescope. Emily then invited a young lady visitor who had set up her Go-To

July 2015

Celestron 90mm Maksutov telescope to demonstrate and explain about her telescope. Bob explained how a Maksutov telescope worked and the difference between a Maksutov-Cassegrain and Schmidt-Cassegrain telescope by accessing the Internet on the dome computer. Everybody was gone and the Observatory closed down by around 11:00 p.m. after an interesting astronomy slide presentation and discussion of telescopes.

### **Cronyn Observatory Public Night, Saturday, July 4th, 2015**

Clear hazy skies greeted some 104 visitors to Western University's Cronyn Observatory Public Night, Saturday, July 4th, 2015, 8:30 p.m. Graduate student Emily McCullough made her digital slide presentation "Pluto," featuring the latest pictures and data from the New Horizons spacecraft, due to make its flyby of Pluto on July 14th. There were some 80 visitors by the end of the first presentation around 9:15 p.m. and Emily made her slide presentation 3 times during the course of the evening, inviting later arrivals down from the dome as well as those just coming in the door.

Graduate student Collin Knight was telescope operator for the evening and directed the big 25.4cm refractor in the dome towards Venus in the western sky. RASC London Centre was represented by Steve Gauthier, Bob Duff, Dale Armstrong, Mark Tovey, Tricia Colvin, Everett Clark and Steve Imrie, as well as graduate student and RASC London Centre member Emily McCullough.

Everett assisted Collin with the big 25.4cm refractor, showing visitors Venus (32mm Erfle eyepiece, 137X) and then Jupiter, swapping in the 18mm Radian eyepiece (244X) for a better view. Saturn made a splendid view in the big 25.4cm refractor with the 18mm Radian eyepiece (244X), with the Cassini Division in the rings and moon Titan clearly visible.

Steve Gauthier and Bob set up the Observatory's powered 8-inch (20.3cm) Meade 2080/LX3 Schmidt-Cassegrain on the roof patio outside the dome and Dale operated it, using the 15mm Sky-Watcher Ultra-Wide eyepiece and 2X Barlow lens (266X) to show visitors Saturn and the double-stars Izar and Albireo. (The 2X Barlow lens was from the 90mm Coronado H-Alpha Solar Telescope.) Dale later swapped in the 26mm Plossl (77X) and 15mm Sky-Watcher (133X) eyepieces, to show people the 3-day-past-full waning Moon rising in the east.

Tricia and Mark showed visitors Venus and Saturn in the 8-inch (20.3cm) Meade Schmidt-Cassegrain, which had no power supply using the 26mm Tele Vue Plossl eyepiece (77X) before going downstairs to take in Emily's later slide presentation. Bob took over the unpowered 20.3cm Schmidt-Cassegrain and showed visitors Saturn using the 12.5mm Ortho (160X) and 20mm Plossl (100X) eyepieces. Throughout the evening, Bob talked to visitors and answered questions about astronomy. Steve Gauthier operated the RASC London Centre's 25.4cm Dobsonian, showing visitors Venus (17mm Nagler eyepiece, 66X), Saturn (12.5mm Ortho eyepiece, 89X) and the double-star Albireo (66X). A young lady visitor who has been bringing her telescope to the Cronyn Observatory set up her Go-To Celestron 90mm Maksutov telescope (17mm eyepiece, 73X) on the roof patio and showed visitors Venus and Saturn and the stars Arcturus and Mizar and Alcor.

Observing continued until nearly midnight when the Observatory was finally shut down after a very interesting evening with Emily's slide presentation on Pluto and the New Horizons spacecraft mission, many questions asked about astronomy and much observing despite the hazy skies.

### **Cronyn Observatory Public Night, Saturday, July 11th, 2015**

Partly cloudy, hazy skies greeted some 75 visitors to Western University's Cronyn Observatory Public Night, Saturday, July 11th, 2015, 8:30 p.m. Graduate student Laura Lenkic made her digital slide presentation "Ground Based Telescopes (but really) a Look at Radio Astronomy" before an audience numbering 52 people by 9:00 p.m., and with more arrivals there were an estimate 75 visitors by the end of the evening.

Graduate student Maryam Tabeshian was telescope operator for the big 25.4cm refractor in the dome and was assisted by undergraduate student Nathalie Thibert who was crowd manager. RASC London Centre was represented Bob Duff, Steve Gauthier, Paul Kerans, Dale Armstrong, Scott Vodon, Tricia Colvin, Mark Tovey, Steve Imrie, Dave McCarter and Peter Jedicke. London Centre member Roman Dubinski was there as was Richard Gibbens, who listened to the slide lecture and later showed up on the roof patio outside the dome. Physics and Astronomy Department computer resources person and RASC member Henry Leparskas was also there.

Maryam Tabeshian and Nathalie Thibert, later assisted by Dale Armstrong and Peter Jedicke, showed visitors Venus and Jupiter in the big 25.4cm refractor, using the 32mm Erfle eyepiece (137X); and later showed people Saturn, using the 28mm Meade Super Wide Angle eyepiece (157X). Peter gave a telescope talk as people lined up to view through the big 25.4cm refractor.

Visitors had a variety of telescopes to view through on the roof patio. Dale operated the Observatory's 8-inch (20.3cm) Meade 2080/LX3 Schmidt-Cassegrain, using the 15mm Sky-Watcher Ultra-Wide eyepiece and 2X Barlow lens (266X) to show visitors Saturn and the double-stars Izar and Albireo. (The 2X Barlow lens was from the 90mm Coronado H-Alpha Solar Telescope.) Dale also showed visitors Albireo in the Schmidt-Cassegrain, using just the 15mm eyepiece (133X) without the 2X Barlow lens. Steve Gauthier operated the RASC London Centre's 25.4cm Dobsonian, showing visitors Saturn, using the 17mm Nagler (66X), 12.5mm Ortho (89X) and 8mm (139X) eyepieces; and the double-star Albireo (66X).

There were 2 RASC London Centre members who brought their telescopes. Paul Kerans set up his 12-inch (30.5cm) Meade LightBridge Truss-Tube Dobsonian and showed visitors Saturn, using a 31mm Baader Hyperion (49X) and 15mm Celestron Axiom LX (101X) wide field eyepieces, and the Ring Nebula (M57), using the 15mm (101X) eyepiece. Scott Vodon set up his newly acquired Celestron AstroMaster 130EQ Newtonian reflector telescope with motor drive and Bob assisted him in acquiring Saturn using the 20mm (33X) and 10mm (65X) eyepieces.

July 2015

Heather MacIsaac has been bringing her telescope to the Cronyn Observatory and recently joined the RASC as an unattached member. She set up her Go-To Celestron 90mm Maksutov telescope (32mm eyepiece, 39X) on the roof patio and showed visitors Venus and Saturn.

At Peter's suggestion, Bob announced and distributed copies of the newly received pamphlet "Getting Started in Astronomy" (RASC, SkyNews [2015])—brought by Peter Jedicke, June 6th—to several interested visitors in the dome. Observing continued until around 11:30 p.m. with the Observatory finally closing down around 11:50 p.m. after a very interesting evening with Laura's slide presentation on radio astronomy, much observing through telescopes and many questions asked about astronomy.

### **RASC London Centre Star Nights, July 2015**

**By Robert Duff**

#### **Star Night, Eldon House, Canada Day, July 1st, 2015**

On Canada Day, Wednesday, July 1st, 2015, Eldon House hosted a fundraising event with guests paying \$70.00 for dinner and seats on the west lawn to watch the fireworks across the Thames River in Harris Park. Building on the success of the April 12th, 2015, celebration of 19th Century Star Gazing for Yuri Gagarin Night "Yuri's Night" at London's Eldon House, RASC London Centre member Mark Tovey coordinated the Star Night. The observing session was scheduled from 9:00—10:00 p.m., to be followed by viewing the fireworks, beginning at 10:00 p.m.

Mark set up his 8-inch (20.3cm) Celestron CPC 800 GPS Schmidt-Cassegrain on the south lawn as the guests enjoyed dinner on the south porch. Mark and RASC London Centre member Tricia Colvin (who helped the team acquire Venus before it was readily visible) operated the Schmidt-Cassegrain for the evening. They were joined by Patrick Whelan, with his 10-inch (25.4cm) Meade LX75 Schmidt-Newtonian on a homebuilt Dobsonian mount; and Roman Dubinski, with his Sky-Watcher 127mm Maksutov on a Vixen alt-azimuth mount. They were assisted by London Centre member Bob Duff, later joined by Dale Armstrong and Scott Vodon. Mark's mother Mrs. Tovey was there along with Roman's wife and Patrick's daughter Bridget.

Early in the evening, while the sky was still bright, Tricia and Mark, and Roman directed their telescopes east and showed some of the guests the lettering and Canadian flag emblem high up on the Richard Pierpoint Building. It was appropriate for Canada Day and a delight for people who had never viewed through a telescope before.

Dale brought his digital camera and tripod and took many pictures of the telescopes set up on the lawn and of Eldon House, without a flash. Some 30—35 guests enjoyed viewing Venus and Jupiter in hazy skies and through tree branches. They later also viewed Arcturus. A few visitors viewed Saturn and its moon, Titan, in Patrick's 10-inch (25.4cm) Schmidt-Newtonian before the southern sky clouded over. The event was over by around 10:20 p.m. with many of the guests expressing their appreciation and return-

ing for a second view through the telescopes. Fireworks continued for some time with the last RASC London Centre members leaving by around 11:00 p.m.

#### **Star Night, Fanshawe Conservation Area, July 5th, 2015**

Partly cloudy hazy skies greeted some 20 visitors for a Star Night near the boat launch area in Fanshawe Conservation Area on Sunday, July 5th, 2015, around 9:00 p.m. RASC London Centre members with telescopes included Rick Saunders, 80mm Stellarvue refractor; Harold Tutt, 80mm Stellarvue Nighthawk refractor; Rob McNeil, Williams Optics 72mm refractor; and Norman McCall, Explore Scientific 152mm Maksutov-Newtonian Comet Hunter. They observed Venus and Jupiter and by 10:30 p.m. it was obvious that nothing more could be seen in the hazy sky.