

POLARIS



Royal Astronomical Society of Canada
London Centre Newsletter
April 2008

Lunar Reconnaissance Orbiter

By Patrick Whelan

The LRO mission will conduct investigations that will prepare the way for future human exploration of the Moon. It is the first mission in NASA's 'Vision for Space Exploration', a plan to return to the moon and then to travel to Mars and beyond. LRO will launch in late 2008 with the objectives to finding safe landing sites, locate potential resources, characterize the radiation environment, and demonstrate new technology. The LRO is scheduled for launch on an Atlas V 401 rocket. Transfer to the Moon will take approximately four days. The LRO will enter an elliptical orbit (called the commissioning orbit) from which it will move into its final orbit. LRO's final orbit will be a circular polar orbit approximately 50 km above the Moon's surface (a little over 30 miles).

On April 10th, work was completed on the Ka-band communications system. The battery was installed in the craft. By doing this so close to launch it will preserve as much battery life as possible for the mission.

The spacecraft will be placed in low polar orbit (50 km) for a 1-year mission. LRO will return global data, such as day-night temperature maps, high resolution color imaging and the moon's UV albedo. There will be particular emphasis on the polar regions of the moon. This is to search for permanent water on

the Moon. Let's hope the LRO, like many other NASA spacecraft, will continue to do science well beyond its planned 1 year mission.

It will have six scientific instruments and one technological 'demonstration':

Cosmic Ray Telescope for the Effects of Radiation

The Cosmic Ray Telescope for the Effects of Radiation (CRaTER) will characterize the lunar radiation environment and determine its potential biological impacts. CRaTER will also test models of radiation effects and shielding, which may enable the development of protective technologies.

Diviner Lunar Radiometer Experiment

The Diviner Lunar Radiometer (DLRE) will provide orbital thermal mapping measurements, giving detailed information about surface and subsurface temperatures (identifying cold traps and potential ice deposits), as well as landing hazards such as rough terrain or rocks.

Lyman Alpha Mapping Project

The Lyman Alpha Mapping Project (LAMP) will map the entire lunar surface in the far ultraviolet. LAMP will search for surface ice and frost in the polar regions and provide images of

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Moon Phases



April 6 2008 3:55



April 12 2008 18:32



April 20 2007 10:25



April 28 2008 14:12

Letter from the Editor

April 2008

Bring back the night: Earth Hour

During our annual banquet we got to celebrate Earth Hour. Part way through the banquet we had the restaurant turn off the lights and we lit candles. Unfortunately the rest of the restaurant was still lit electrically, but tried to do our part. It was fun and it certainly enhanced the 'ambience'. Just to let you know, Londoners cut their electricity use for Earth Hour by two per cent, saving enough juice to light 117,000 bulbs for an hour. What can be learned from this? Turn off the lights you aren't using. Don't waste electricity! It isn't just money that you are wasting, it is a huge resource. I read that North American cities use 2X more electricity than European cities of the same size. Try to conserve!

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LONDON RASC MONTHLY MEETINGS

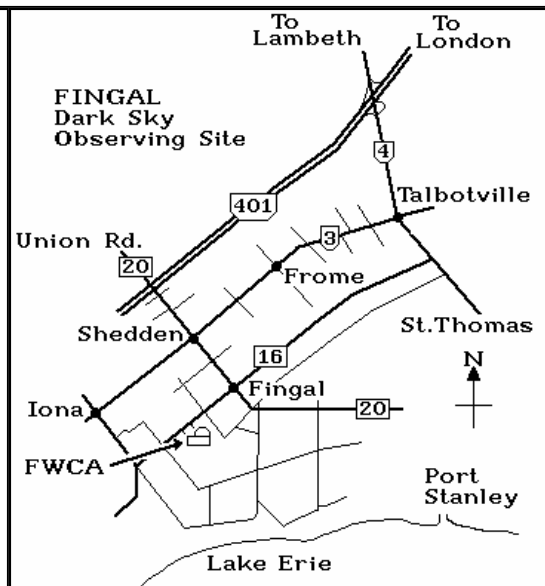
The London RASC group meets at Fanshawe college in London Ontario, September through July on the third Friday of the month at 19:00. They meet in room B1073.

Everyone interested in astronomy is invited to attend and enjoy our guest speaker, member activity and observing reports, announcements of new discoveries and upcoming events, telescopes and telescope accessories show and tell, and other fun activities. Have a look at our future and past activities on our website to see what we are doing.

Parking is free on Friday evenings, and there is plenty of room in the east parking lot off Oxford St. and parking spaces on the south side of B building. Enter the college by B building doors near Oxford Street, just west of the bus stop. College signs at key hallway locations will help you find us. The London RASC webpage can be found at:

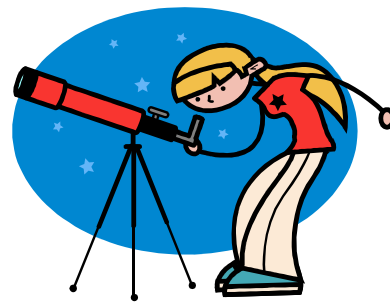
www.rasc.ca/London

We have a preferred observing site at Fingal Wildlife Management area.



Sky Events for April and May 2008

April 23 Antares 0.3° N of the Moon
 April 26 Double shadow transit on Jupiter
 April 29 Neptune 0.3° S of the Moon
 May 2 Mercury 2.0° S of the Pleiades (M45)
 May 6 Moon 0.9° N of the Pleiades (M45)
 May 10 Mars 0.2° S of the Moon
 May 11 Moon 0.2° S of the Beehive (M44)
 May 12 Regulus 1.2° N of the Moon
 May 14 Mercury greatest elongation E (22°)



Mars is high in the southwestern skies during evening twilight in the constellation Gemini

Saturn is near Regulus and transits around 9 pm (Beautiful!)

Jupiter rises around 1:30 in the morning

Venus is sinking towards the sun this month

Mercury will reappear in the evening sky at the end of the month

R.A.S.C. London Centre Library

Books of the Month March 2008

By Robert Duff

In order to make our library collection available to members, I bring three books to our general monthly meetings. These "Books of the Month" are available for loan, to be returned at the following monthly meeting.

The books for April 2008 are as follows:

The Backyard Astronomer's Guide, by Terence Dickinson & Alan Dyer. Revised Edition. c2002.

Burnham's Celestial Handbook: an Observer's Guide to the Universe Beyond the Solar System, by Robert Burnham. Revised and Enlarged Edition. c1978.

Volume Three, Pavo—Vulpecula.

Universe on a T-Shirt: the Quest for the Theory of Everything, by Dan Falk. c2002.

For a complete listing of our library collection please see our RASC London Centre Web site at: <http://www.astro.uwo.ca/~rasc/>

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

Sky and Telescope Subscriptions

Sky & Telescope subscriptions are available at a discounted rate through the London Centre. The cost is \$39.95USD instead of the normal \$49.95USD subscription rate. Please see Bill Gardner for details.

Astronomy Night, 31st B Pack Cubs March 27th, 2008

By Robert Duff

It was snowing Thursday night, March 27th, just before 7:00 p.m., when I arrived at Calvary United Church on Ridout Street in London for a presentation on astronomy and space exploration. The group included 9 Cubs and 4 Leaders of the 31st B Pack Cub. A number of images from the Internet were displayed using a digital slide projector and discussed by a Cub Leader, to which I added my own comments and answered questions.

Exploring the Stars Cronyn Observatory March 17th—April 10th, 2008

By Robert Duff

91st Guides, March 17th

Cloudy skies greeted the 91st Guides on Monday, March 17th, at 6:30 p.m. for an evening of Exploring the Stars. Graduate student Andrea Domokos made an interesting digital slide presentation on Life in the Universe to the group of 12 visitors, including 8 Guides and 4 leaders or adults. I made ready the big 25.4cm refractor in the dome, placing the 2-inch 52mm Erfle eyepiece in the telescope's diagonal. I also set up the RASC London Centre's 25.4cm Dobsonian on the roof patio, placing the Observatory's 2-inch 17mm Nagler eyepiece in the focuser, and directing the telescope towards the top of a coniferous tree to the east.

Andrea gave the group a talk about the Observatory's big refractor and then I took the group out on to the roof patio and showed them a view of the top of a coniferous tree through the 25.4cm Dobsonian with the 17mm Nagler eyepiece at 67X. We then gave them a view through the big 25.4cm refractor in the dome of the flashing red lights on communications tower to the south, using the 52mm Erfle eyepiece (84X). Andrea ended the evening with a constellation tour using Starry Night EDU.

The group had an enjoyable evening of discussing astronomy and looking through the telescopes despite the unfavourable weather.

Lucan Pathfinders, March 24th

Dave McCarter reported that 15 girls and 5 adults of the Lucan Pathfinders enjoyed an evening of Exploring the Stars on Monday, March 24th, from 7:00—9:00 p.m. Following Alyssa Moldowan's presentation on Life in the Universe the group enjoyed views of Saturn under clear skies. Dave set up the RASC London Centre's 25.4cm Dobsonian on the Cronyn Observatory's roof patio, directing it towards Saturn. Alyssa took over operating the Dobsonian and showing the Pathfinders Saturn while Dave directed the big 25.4cm refractor in the dome also towards Saturn. Thus the group enjoyed views of the ringed planet through both the big refractor in the dome and the Dobsonian telescope on the roof patio. It was an enjoyable night of observing under very clear skies and discussion about astronomy.

Exploring the Stars Open House, March 28th

Clear skies greeted visitors to the Cronyn Observatory on Friday, March 28th, at 7:00 p.m. for the Exploring the Stars Open House evening. After asking the audience of 21 visitors whether they wanted Constellations or Stars, graduate student Andrea Domokos began the chosen presentation on Stars. More people arrived during the course of the digital slide presentation until the group numbered 30. Some 42—45 visitors would arrive at the Cronyn by the end of the evening of observing.

I made ready the 25.4cm refractor in the dome, putting the 52mm Erfle eyepiece (84X) in the telescope's diagonal and placing the 35mm Erfle and 28mm Meade Ultra-Wide Angle eyepieces on the table. I also set up the RASC London Centre's 25.4cm Dobsonian on the roof patio with the Observatory's 17mm Nagler eyepiece in the focuser and the 6mm Orthoscopic eyepiece ready on a chair. One young person brought a 60mm refractor, which was also set up on the roof patio.

Peter Jedicke and Dave McCarter arrived to help out with the star night and Dave gave a brief introductory talk about the 25.4cm refractor in the dome. Since it was cold and still light out due to Daylight Saving Time we sent the visitors downstairs for a second digital slide presentation by Andrea, this time on Constellations.

McCarter directed the big telescope at Saturn. I directed the Dobsonian at Saturn and obtained a pleasing image with the 17mm Nagler eyepiece at 67X. I then switched to the 6mm Orthoscopic eyepiece, which yielded a splendid view of Saturn at a magnification of 190.5X.

The moon Titan was visible to the left (celestial west) and the moon Rhea to the right (celestial east) of Saturn as it drifted westwards across the field of view. For the visitors it was a splendid sight and a third moon was also noticed just to the left (celestial west of the rings), which may have been Tethys or Dione.

I also directed the Dobsonian briefly at Mars, which presented a small gibbous disk. Finally, I directed the telescope at the Orion Nebula (M42), which presented a splendid sight through the 17mm Nagler at 67X. The 60mm refractor also delivered good views of Saturn and the Orion Nebula. In the dome Dave McCarter showed visitors the Orion Nebula through the big refractor using the 52mm Erfle eyepiece (84X) together with the light pollution rejection filter, which enhanced contrast and gave a blue or green cast the stars and nebula. There was also a pass of the International Space Station, much to the delight of the visitors.

Thanks to the fine weather and the contributions of everybody it was a very nice Open House at the Cronyn Observatory.

65th Guides, March 31st

Cloudy skies greeted the 65th Guides on Monday, March 31st, for an evening of Exploring the Stars at the Cronyn Observatory. Graduate student Alyssa Moldowan made a digital slide presentation on Stars to the group of 13 visitors, including 9 Guides and 4 leaders and other adults. I

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made ready the big 25.4cm refractor in the dome, placing the 2-inch 52mm Erfle eyepiece in the telescope's diagonal. I also set up the RASC London Centre's 25.4cm Dobsonian on the roof patio, placing the Observatory's 2-inch 17mm Nagler eyepiece in the focuser, and directing the telescope towards the top of a coniferous tree to the east.

Alyssa gave the group a talk about the Observatory's big refractor and then I took the group out on to the roof patio and showed them a view of the top of a coniferous tree through the 25.4cm Dobsonian with the 17mm Nagler eyepiece at 67X. Alyssa ended the evening with a constellation tour using Starry Night EDU. It was an interesting and enjoyable evening for the group despite the cloudy weather.

2nd Lambeth Guides, April 1st

It was cloudy and windy when I arrived at the Cronyn Observatory on Tuesday night, April 1st, at around 6:45 p.m. Graduate student Andrea Domokos was already into her digital slide presentation on Constellations before a group of 20 visitors from the 2nd Lambeth Guides, including 14 Guides and 6 leaders and other adults. I set up the Observatory's 25.4cm refractor with the 52mm Erfle eyepiece in the diagonal. Andrea brought the group upstairs and gave them a talk about the big telescope. Afterwards she took them downstairs for a sky tour using Starry Night EDU. Despite the unfavourable weather it was an interesting and informative evening.

Beta Sigma Phi Sorority, April 3rd

Graduate student Alyssa Moldowan was already into her presentation on Stars when I arrived at the Cronyn Observatory around 7:00 p.m. There were in all 18 visitors from the Beta Sigma Phi Sorority, including 14 adults, 3 youth and one child. I made ready the 25.4cm refractor in the dome, placing the 52mm Erfle eyepiece in the diagonal. I also set up the RASC London Centre's 25.4cm Dobsonian on the roof patio with the Observatory's 17mm Nagler eyepiece (67X) in the focuser. Since it was cloudy, I directed the Dobsonian towards the top of a coniferous tree to the east.

Alyssa brought the group upstairs for a demonstration of the big telescope, opening the dome. However, we did not look through this telescope. Instead, I took the group out on the roof patio and, after explaining how a reflecting telescope worked, invited members of the group to look through the eyepiece at the coniferous tree towards the east.

Alyssa took the group downstairs for a sky tour using Starry Night EDU. It was an interesting night for the group in spite of the cloudy skies.

49th Brownies, April 7th

Clear skies greeted the 49th Brownies on Monday, April 7th, when they arrived for an evening of Exploring the Stars at the Cronyn Observatory. There were 28 visitors to the Cronyn that evening, including 27 from the 49th

Brownies (16 children and 11 adults) and a lady student from the Fanshawe College School of Broadcast Journalism, Radio FM106.9. The broadcast journalism student was just finishing her interview with graduate student Alyssa Moldowan when I arrived.

As Alyssa began her presentation on Constellations to the Brownies I went upstairs into the dome with the journalist to make ready the telescopes for an evening of observing. I set up the Observatory's 25.4cm refractor with the 52mm Erfle eyepiece in the diagonal and placed the Meade Ultra-Wide 28mm eyepiece on the table on standby. I also set up the RASC London Centre's 25.4cm Dobsonian on the roof patio, placing the Observatory's 17mm Nagler eyepiece in the focuser, with the 6mm Orthoscopic eyepiece ready on a chair nearby. I explained a few things about the telescopes to the broadcast journalist and was interviewed for Radio FM106.9. We then returned downstairs to view the rest of Alyssa's presentation.

In order to allow time for the sky to get dark, Alyssa followed her PowerPoint presentation on the Constellations with Starry Night EDU. Dave McCarter appeared at 8:00 p.m. and told me he had opened the dome and directed the big refractor at the crescent Moon in the west.

The group enjoyed great views of the Moon through the Observatory's big 25.4cm refractor, with the 52mm Erfle eyepiece delivering 84X. We also observed Saturn, briefly at 67X with the 17m Nagler and then at a much higher and more detailed magnification of 190.5X with the 6mm Orthoscopic eyepiece.

The clear skies and mild weather made for an enjoyable evening of observing following the interesting and informative digital slide presentation on Constellations and the sky tour with Starry Night EDU.

Blenheim Brownies/Guides, April 8th

There was clear sky and clouds when I arrived at the Cronyn Observatory on Tuesday, April 8th. RASC London member Richard Gibbens had also just arrived. There were 24 visitors from the Blenheim Brownies/Guides, including 6 adults and 18 children.

As graduate student Andrea Domokos began her presentation, I went up and opened the dome, directing the big 25.4cm refractor towards a flashing light on the communications tower in south London. I placed the 52mm Erfle eyepiece in the diagonal, which provided a magnification of 84X. I also set up the RASC London Centre's 25.4cm Dobsonian on the roof patio, placing the Observatory's 17mm Nagler eyepiece in the focuser, with the 6mm Orthoscopic eyepiece ready on a chair nearby.

Bringing the group upstairs, Andrea explained the features of the big 25.4cm refractor and then invited the children and adults in the group to climb the steps of the observing platform and look through the telescope at the communications tower.

Andrea then took the group downstairs again for a presentation of Starry Night EDU. This allowed more time

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for the skies to darken. Unfortunately, the clouds got worse and the best we could do when the group came back up again was to view the crescent Moon through hazy clouds with the RASC London Centre's 25.4cm Dobsonian, using the 17mm Nagler eyepiece at 67X.

However, the group enjoyed the digital slide presentation on Constellations and the sky tour with Starry Night EDU as well as the views through the telescopes.

36th Guides, April 10th

I arrived at the Cronyn Observatory a few minutes after 7:00 p.m. to find graduate student Alyssa Modowan already into her digital slide presentation on Constellations before a group of 19 visitors from the 36th Guides, including 14 young people and 5 adults. After her presentation on Constellations Alyssa proceeded with a sky tour with Starry

Night EDU.

I set up the big 25.4cm refractor in the dome with the 52mm Erfle eyepiece in the diagonal. I also brought out the RASC London Centre's 25.4cm Dobsonian and, because there was some rain, set it up for demonstration inside the dome, placing the 17mm Nagler eyepiece in the focuser.

The rain had stopped by the time the group came upstairs so Alyssa asked me to move the 25.4cm Dobsonian out on to the roof patio. After she had demonstrated the Observatory's 25.4cm refractor the group came out on to the roof patio. I gave a brief explanation of the Dobsonian telescope and then invited members of the group to view the top of a coniferous tree to the east through the telescope. The 17mm Nagler eyepiece gave a pleasing view at 67X.

In spite of the clouds and some rain the group had an enjoyable of Exploring the Stars at the Cronyn Observatory.

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permanently shadowed regions illuminated only by starlight.

Lunar Exploration Neutron Detector

The Lunar Exploration Neutron Detector (LEND) will create high resolution hydrogen distribution maps and provide information about the lunar radiation environment. LEND can be used to search for evidence of water ice on the Moon's surface, and will provide space radiation environment measurements useful for future human exploration.

Lunar Orbiter Laser Altimeter

The Lunar Orbiter Laser Altimeter (LOLA) will measure landing site slopes, lunar surface roughness, and generate a high resolution 3D map of the Moon. LOLA will also identify the Moon's permanently illuminated and permanently shadowed areas by analyzing Lunar surface

elevations.

Lunar Reconnaissance Orbiter Camera

The Lunar Reconnaissance Orbiter Camera (LROC) will retrieve high resolution black and white images of the lunar surface, capturing images of the lunar poles with resolutions down to 1m, and will image the lunar surface in color and ultraviolet. These images will provide knowledge of polar illumination conditions, identify potential resources & hazards, and enable safe landing site selection.

Mini-RF Technology Demonstration

The Mini-RF technology demonstration's primary goal will be to search for subsurface water ice deposits. In addition, Mini-RF will take high-resolution imagery of permanently-shadowed regions.

The above information was gathered from: <http://lunar.gsfc.nasa.gov/mission.html>

Moon Facts

The distance From Earth is 363,301 kilometers (225,745 miles).

The radius of the moon is 1,738 kilometer (1,080 miles), the diameter is 3476 kilometers (2,160 miles).

Total weight: of the moon is 74 sextillion kilograms (81 Quintillion Tons).

The surface temperature during the day is 134 iC (273i F), and at night is - 153i C (244i F)

Gravity at the surface of the moon is 1/6 that of the Earth.

It would take 135 days to drive by car (@70 mph) to the moon

It takes 60 to 70 hrs flying time to get to the moon by rocket.

The age of the oldest rock collected is 4.5 Billion years old.

The rocks collected by Apollo weigh 382 kg (842 pounds).

On July 20, 1969, Neil Armstrong became the first human being to set foot on the Moon.

The moon is actually moving away from earth at a rate of 1.5 inches per year.

The earth rotates about 1000 mph. By comparison, the moon rotates about 10 mph.

If you weigh 120 pounds, you would weigh only 20 pounds on the moon.

The moon has no atmosphere or clouds.