

RASC Toronto Centre – www.rascto.ca
The Sky This Month – April 23, 2014 to May 21, 2014
by Chris Vaughan

NEWS

Space Exploration – Public and Private

Ref. <http://www.spaceflightnow.com/tracking/index.html>

April 28 am - Proton rocket from Baikonur Cosmodrome, Kazakhstan, payload Luch 5V & Kazsat 3 comsats

April 28 pm - Vega rocket from ZLV, Kourou, French Guiana, payload DZZ-HR earth imaging sat

May 6 pm - Antares rocket from Pad 0A, Wallops Island, Virginia, payload Orb-2 ISS cargo module

May TBD - Zenit 3SL rocket from Odyssey platform, Pacific Ocean (154° West, 0° North), payload Eutelsat 3B comsat

May TBD - Falcon 9 rocket from SLC-40, Cape Canaveral Air Force Station, Florida, payload Orbcomm OG2 comsat

May 15 pm - Delta 4 rocket from SLC-37B, Cape Canaveral Air Force Station, Florida, payload GPS 2F-6 navsat

May 16 TBD - Proton rocket from Baikonur Cosmodrome, Kazakhstan, payload Express AM4R comsat

May TBD - Atlas 5 rocket from SLC-41, Cape Canaveral Air Force Station, Florida, payload NROL-33 classified sat

ESA Rosetta Mission

Spacecraft currently about 4 AU (33 light-minutes) from Earth, about 5 million km from comet

On March 21, imaged the comet and on Mar 28, Philae lander was activated, took a selfie

Orbiter will map the comet's surface, measure gravity, mass, shape, and analyze the coma and plasma. The 100 kg Philae lander will make contact on Nov 11, 2014 and use ice-screws to drill/sample comet and harpoons to latch on. The mission will ride the comet to perihelion and beyond!

ESA Gaia Mission

Objectives: 3D map of Milky Way by surveying 1 billion stars, Exoplanet hunting via stellar wobble, NEO and Sunward asteroid detection, comet hunting, brown dwarfs hunting, early SN detection, quasars, and gravitationally warped light. Will orbit around Lagrange 2.

Carries twin Telescopes onboard, with rectangular mirrors each 0.7 m² in area, a total CCD detector area of 0.38 m² (1 Gpixel)

Instruments:

ASTRO astrometric instrument measuring Parallax change over 5 years

RVS radial velocity spectrometer measures spectral doppler shift

BP/RP photometric instrument measure star temp, mass, chemistry from red and blue spectra

This Month in History (a sampling)

Ref: <http://astroplanet.org/next.php>, <http://www2.jpl.nasa.gov/calendar/>,
<http://space.about.com/library/weekly/bldatechoice.htm>, <http://www.planetary.org/multimedia/space-images/charts/whats-up-in-the-solar-system-frohn.html>

Astro-Birthdays

Apr 23, 1858 – Max Planck, quantum physicist, namesake of the Planck satellite that mapped the CMB

May 15, 1857 - Scottish astronomer, Williamina Fleming. In nine years, she catalogued more than 10,000 stars. During her work, she discovered 59 gaseous nebulae (including the Horsehead Nebula), over 310 variable stars, and 10 novae. In 1907, she published a list of 222 variable stars she had discovered

May 17, 1836 - British solar astronomer, Sir Joseph Norman Lockyer, is born. Sir Lockyer named the Sun's outer layer the "chromosphere", co-discovered Helium, and founded the journal *Nature*.

May 18, 1048 - Persian poet, mathematician, astronomer, and stellar cartographer, Omar Khayyam, is born. He calculated the length of the year to 6 decimal places with a one day error every 5000 years. (The Gregorian calendar has a one day error every 3330 years.)

Astronomy and Space Exploration

Apr 24, 1990 - The Hubble Space Telescope is launched in the Space Shuttle Discovery.

May 1, 1543 - Copernicus circulates 'The Little Commentary,' showing the heliocentricity of the Solar System.

May 2, 1780 - William Herschel discovered the first binary star, Xi Ursae Majoris.

May 3, 1715 - Edmund Halley's total solar eclipse (the last one visible in London for almost 900 years). Halley observes total eclipse phenomenon "Baily's Beads."

May 5, 840 - Emperor Louis of Bavaria, son of Charlemagne, dies of fright during the 5 minutes of eclipse totality he witnessed

May 14, 1973 - The first US space station, Sky Lab, is launched on the last Saturn V rocket.

May 16, 1969 - Venera 5, USSR Venus Atmosphere Probe, descended on parachutes into Venus' atmosphere - 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 17, 1969 - Venera 6 probe returned data down to within 11 kilometers of surface and was then lost - crushed by the pressure on Venus.

Star Parties, etc.

Ref: <http://ontariostargazing.ca/astronomy-star-parties-events-ontario/>,
<http://www.amsky.com/calendar/events/#may>

"RASC Dark Skies Observing", Long Sault Conservation Area, ON – window opens April 28

"RASC City Skies Observing", Bayview Village Park, Toronto – window opens May 5

"ASTROCATS", Mohawk College, Hamilton, ON – May 3-4, 2014

"Astronomy Day", David Dunlap Observatory – May 10, 2014 (www.theddo.ca)

"Astronomy Night", Gordon's Park Dark Sky Preserve, Manitoulin Island – May 17 (www.gordonspark.com)

“Riverside Telescope Makers Conference (RTMC) & Starlight Festival”, Big Bear City, CA – May 22-26
(www.rtmcastronomyexpo.org)

“Texas Star Party”, Ft Davis, TX – May 25-June 1 (www.texasstarparty.org)

OBSERVING

Globe at Night 2014

A citizen science program to map light pollution around the world. During the observing window, you are encouraged to make a visual measurement to determine the limiting magnitude of stars you can observe at your location. The website provides charts for assisting observations, instructions for submitting results, and an interactive map showing current and historical results. Details are at <http://www.globeatnight.org/>

The April/May campaign focus is on Leo.

Sunrise/Sunset

April 30, sunrise at 6:17 am, sunset at 8:15 pm

May 31, sunrise at 5:45 am, sunset at 8:47 pm

Moon - Orbit

Perigee - April 22nd at 8 pm

Apogee - May 6th at 6 am

Perigee - May 18th at 8 am

Moon - Phases

April 22nd at 3:52 am – Last Quarter Moon (rises around midnight)

April 29th at 2:14 am – New Moon (Annular Solar Eclipse over Antarctica!)

May 6th at 11:15 pm – First Quarter Moon (sets around midnight)

May 6th at 10:15 pm – First Quarter Moon (sets around midnight)

May 14th at 3:16 pm – Full “Flower/Corn Planting/Milk” Moon

May 21st at 8:59 am – Last Quarter Moon (rises around midnight)

May 28th at 2:40 pm – New Moon

Moon - Conjunctions

Visible in pre-dawn of April 25, the Old Crescent Moon (17% illum.) sits about 6° west of Venus (65% illum.), low in the eastern sky. Photo op! The Moon sits about 8° northeast of Venus the next morning.

Visible with difficulty after sunset on April 29, the New Crescent Moon (1% illum.) sits less than 5° north of Mercury, low in the western sky.

Visible before midnight on May 3 and 4, the waxing crescent Moon sits about 9° east of Jupiter, halfway up western sky.

Visible all night on May 10, the Waxing Gibbous Moon (85% illum.) sits approx. 6° to the west of Mars. On the next night, the Moon sits between Mars and Spica.

Visible all night on May 13, the Full Moon sits approx. 5° to the west of Saturn and 0.6° from Zubenelgenubi. On the next night, the Moon will jump to sit about 9° to the east of Saturn.

Planets and Dwarf Planets

Mercury, reached superior conjunction on April 26th and will begin to be visible by month end. It brightens steadily until May 16th (-0.1, 58% illum.) and reaches greatest eastern elongation on May 25th. On that day, it sets at 10:45 pm and shows a 37% illuminated face. This will be a good apparition for observing the planet. Look for the New Moon less than 5° north of Mercury on April 29 pm.

Venus, a bright morning object, is swinging towards the Sun and moves from Aquarius into Pisces over the next month. It rises at 4:54 am on April 23th (mag -3.7 and 64% illum) and 4:15 am on May 21st (mag -3.5 and 74% illum). On the mornings of April 25th, the Old Crescent Moon (17% illum.) sits 6° to the west. On the 26th, the 10% illuminated crescent Moon is 8° away to the northeast.

Mars, just past opposition on April 8, is near Spica in Virgo all month, and is visible all night long – rising at 6:15 pm on April 23 (mag -1.1) and 4 pm on May 21 (mag -0.5). On May 10, the Waxing Gibbous Moon (85% illum.) sits approx. 6° to the west of Mars.

Jupiter can be viewed almost until after midnight now. By late May it will be low in the west at dusk. It is in Gemini moving prograde (east). It sets at 1:50 am on April 23rd (mag -1.6) and at 12:17 am on May 21st (mag -1.5). On May 3 and 4, the waxing crescent Moon sits about 9° east of Jupiter.

Saturn, moving in retrograde westward in Libra all month, is a late night and predawn object. It becomes an all-night target on May 10th when it reaches opposition. It rises at 9:32 pm on April 23rd (mag 0.3) and at 7:31 pm on May 21st (mag 0.3). On May 13, the Full Moon sits approx. 5° to the west of Saturn. At opposition the planet's disk will subtend 19 arc-seconds. The rings are now tilted 22°, heading to maximum of 25 in 2017.

Uranus, in Pisces, is not observable due to Solar conjunction.

Neptune, a morning sky object in Aquarius (mag 7.8), and rises at 4:23 am - too close to Sunrise for observers in the northern hemisphere.

Pluto, northeast of Sagittarius' teapot, a faint mag 14.1 object, rises at 1:30 am on April 23rd and at 11:39 pm on May 21st.

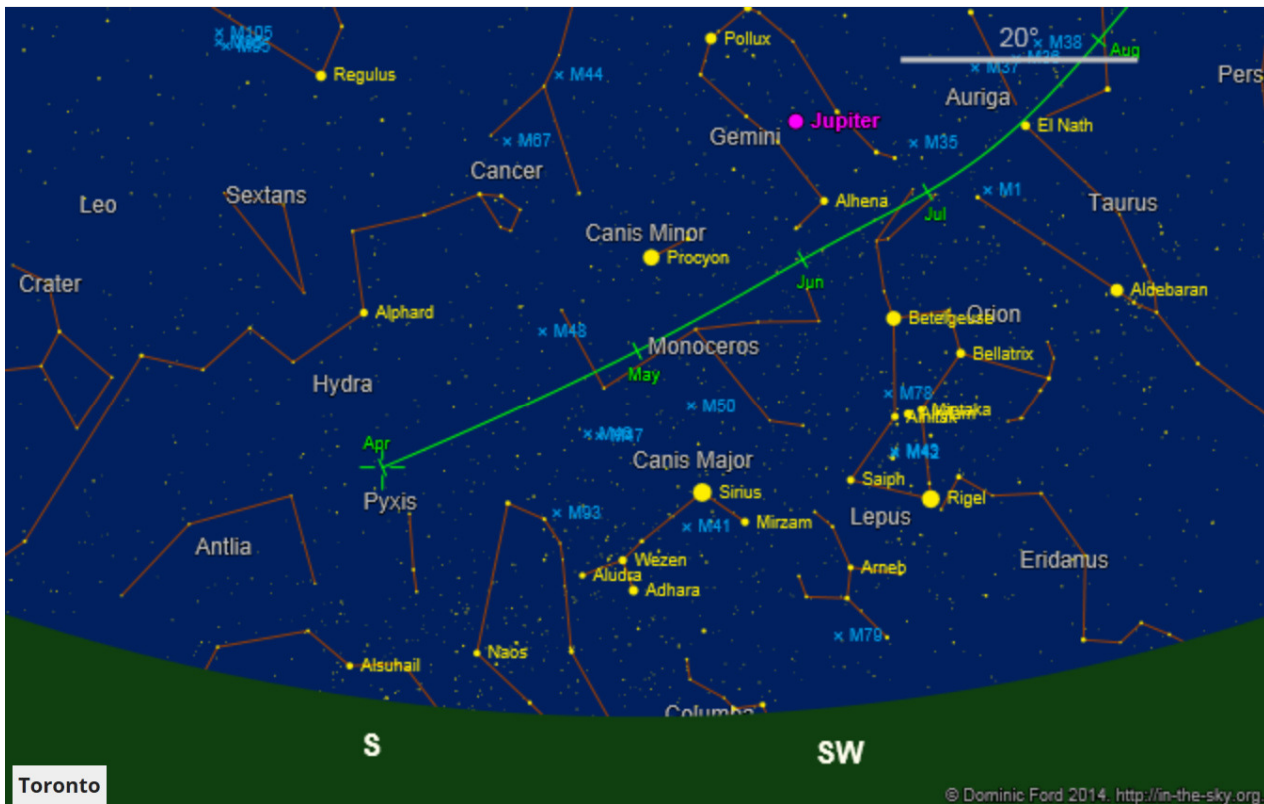
Vesta (mag 5.5) and **Ceres** (mag 6.7) are in the same area, about 9-12° northeast of Mars in Virgo. They are brighter and well placed for late night and early morning viewing. They reached opposition on April 13th and 15th respectively.

Comets

Ref <http://www.aerith.net/comet/weekly/current.html>, <http://cometchasing.skyhound.com/>, <http://in-the-sky.org/comets.php>

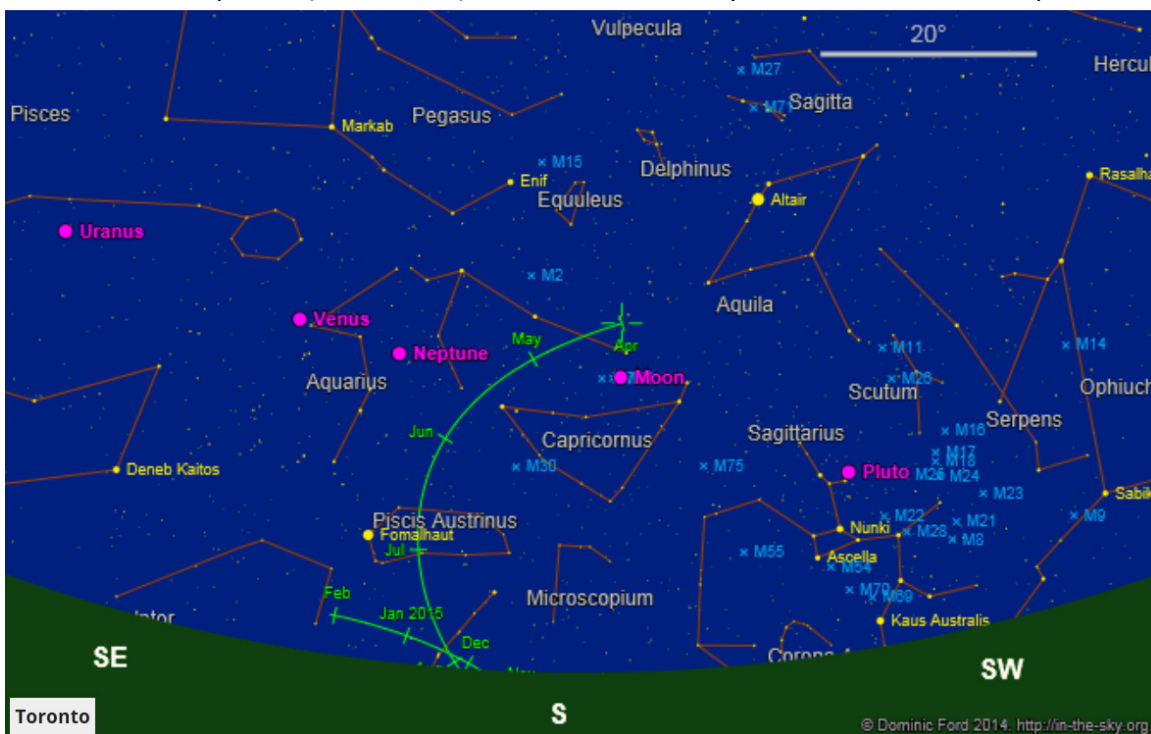
Comet C/2014 E2 (Jacques)

Jacques is a newly discovered comet. It is moving northwest through Monoceros, low in the evening southwestern sky, about mag 10 (medium scopes) and peaking in July. It sets at 12:30 am on April 23 and at 10:40 am on May 21. Remains observable for the next month, then becomes a morning object by late June.



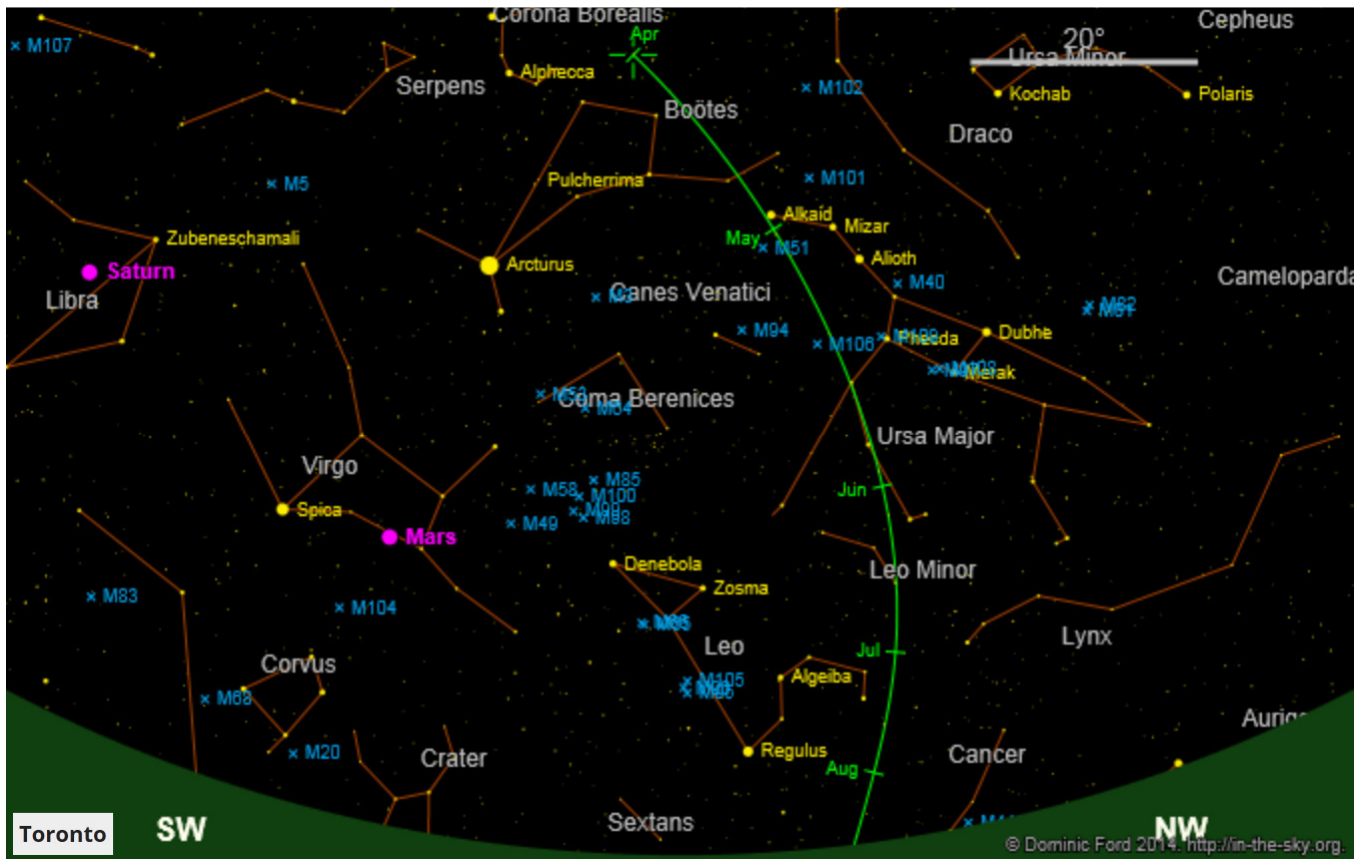
Comet C/2012 X1 Linear

Linear is about 8th magnitude, and has already peaked. It's shifting southeastward between Capricornus and Aquarius (more or less towards Fomalhaut) in the eastern pre-dawn sky (binos and small scopes). It rises about 3 am on April 23 (with Moon) and 2:27 am on May 21. It will remain well positioned for months.



Comet C/2012 K1 (PANSTARRS)

Comet C/2012 K1 (PANSTARRS) is approximately 10th magnitude and brightening, with a predicted peak in late 2014. It is curving westward between Boötes and Ursa Major towards Alkaid in the northern all-night sky. It will remain well positioned for months.



Meteor Shower(s)

Ref. <http://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/>

Lyrids

The Lyrids are a medium strength, narrow maximum meteor shower with a window that runs from April 16th to April 25th, peaking before dawn on April 22nd. Derived from debris from comet C/1861 G1 Thatcher, the meteors are medium speed that generally lack persistent trails, but may include fireballs. The peak rate is 10-20 per hour and the radiant is well placed for the GTA, about 9° Southwest of Vega, in the constellation of Hercules (RA 18h 04m, Decl. +34°). Last Quarter Moon spoils 2014 show.

Eta Aquarids

The Eta Aquarids are a strong, broad maximum meteor shower better viewed from southern latitudes as the radiant is southerly and rises soon before the Sun in the GTA. The window runs from April 19th to May 26th and peaks before dawn on May 6th. These are fast meteors with persistent trails, few fireballs at a rate of 10-30 per hour in the GTA. The source of the shower is Halley's Comet. The radiant is coincident with Eta Aquarius (RA 22h 32m, Decl. -1°). This year, the Moon will be near First Quarter and won't affect pre-dawn observers on the peak date.

COMET 209P LINEAR METEOR SHOWER

Astronomers are predicting a brand new meteor shower produced by debris from Comet 209P/LINEAR, a 5 year periodic comet with aphelion near Jupiter's orbit. Overnight on May 24, 2014, Earth will pass through a point where many previous 209P orbits have left debris trails – anywhere from five to 25 passes worth. The predicted peak zenith hourly rate (ZHR) is in the 200 to 400 range – more than double the Perseids and Geminids. The peak is expected to be brief, but intense – about 3 hours centred on 3:10 am EDT (7:10 UT). The meteors are predicted to be slow moving and bright, with some fireballs. The radiant is 8h 16m, +79°, in Camelopardalis, east of Dubhe in Ursa Major and 11° south of Polaris. The Moon is 4 days from new, only 20% illuminated.

Asteroids

Ref. <http://neo.jpl.nasa.gov/ca/>

No major events.

Satellites

Current GTA International Space Station evening pass series continues until April 25, morning passes commence on May 16 (Most are visible between 3 and 5 am).

Some higher/brighter ones include*:

Date	Mag.	Time	Direction	Alt.
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*far future predicted times may shift slightly

Iridium Flares most frequent evening passes occur between 9 and 11:30 pm. Local occurrences info at www.heavens-above.com and enter your location, from phone/tablet apps, Chris Vaughan's Skylights (subscribe to email or visit www.astrogeoguy.tumblr.com)

Occultations

Ref: <http://www.asteroidoccultation.com/> (additional links on the following URLs open track maps)

Rank 37 – 26 Apr 2014 , 01:36 UT Asteroid 37 (1006) Lagrangea (mag 17.1) occults star TYC 1355-01213-1 (mag 10.5) - visible over NE USA, SE Canada, drops 6.6 mags for 1.3 seconds, alt. 51°

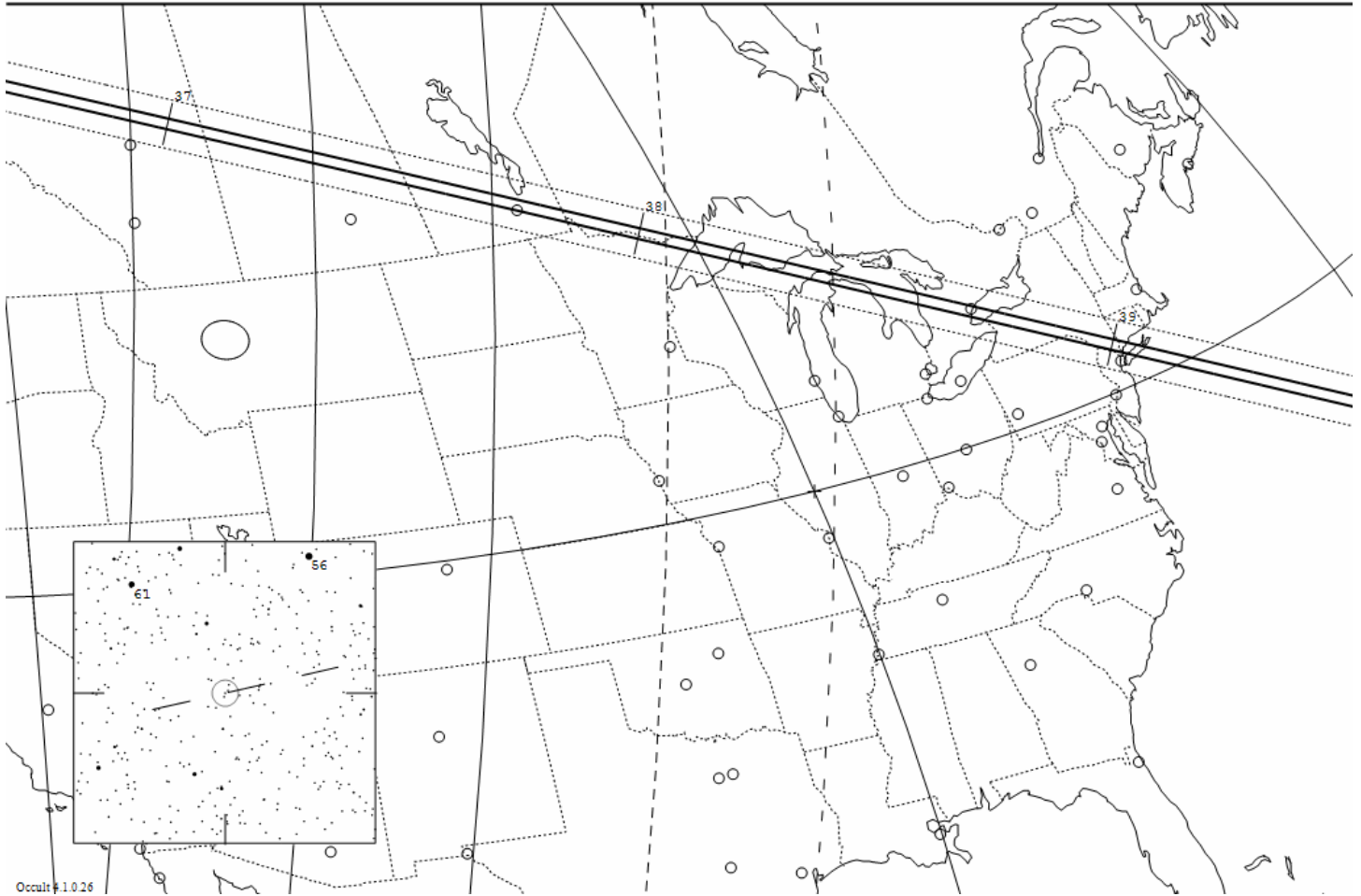
http://www.asteroidoccultation.com/2014_04/0426_1006_33634.htm

1006 Lagrangea occults TYC 1355-01213-1 on 2014 Apr 26 from 1h 33m to 1h 40m UT

Star:
Mv = 10.5 Mp = 11.0 Mr = 10.2
RA = 7 24 18.3718 (J2000)
Dec = 19 32 26.279
[of Date: 7 25 9, 19 30 34]
Prediction of 2014 Mar 14.0

Max Duration = 1.3 secs
Mag Drop = 6.6 (6.4r)
Sun : Dist = 74 deg
Moon: Dist = 115 deg
illum = 12 %
E 0.031"x 0.025" in RA 98

Asteroid:
Mag = 17.1
Dia = 32km, 0.014"
Parallax = 2.748"
Hourly dRA = 2.619s
dDec = -8.44"



Constellations near the Meridian (Annually in April/May)

- 10 pm: Hydra, Corvus, Crater, Sextans, Virgo, Leo, Coma Berenices, Leo Minor, and Canes Venatici
- 12 am: Virgo, Bootes, Coma Berenices, and Canes Venatici
- 2 am: Scorpius, Libra, Corona Borealis, Bootes, and Draco

Early Spring Star party Skylights (Annually in April/May)

- The Big Dipper, Leo, Hercules, and Auriga (eye / binoculars)
- Spring Buds – M81, M82 Bode’s and M101 Pinwheel Galaxy (UMa), M51 Whirlpool (CVn), Leo Triplet (Leo), etc. (telescope)
- Spring Bulbs – NGC 2392 Eskimo Nebula (Gem), NGC 3242 Ghost of Jupiter (Hya), NGC 6210 Turtle (Her), etc. (telescope)
- Spring Blooms - M13 and M92 (Her), M5 (Serp), M3 (CVn), NGC884/869 Double Cluster (Per), M44 The Beehive (Cnc), M53 (Coma), etc. (binoculars, telescope)
- Double Plays – Castor (Gem), Regulus and Algieba (Leo), iota Cancri (Cnc), Cor Caroli (CVn), Porphyrion (Vir), Izar (Boo), etc. (telescope)
- Hit Singles – Vega (Lyr), Arcturus (Boo), Procyon (CMi), Capella (Aur), (eye, binoculars, telescope)

Come out to Long Sault C A, Bayview Village Park, CAO or DDO!