RASC Toronto Centre – <u>www.rascto.ca</u> The Sky This Month – January 28 to February 25, 2015

by Chris Vaughan

NEWS

Space Exploration – Public and Private

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

Launches

Jan 28 at 8-10 pm - H-2A rocket from Tanegashima Space Center, Japan, payload radar reconnaissance sat. Jan 29 am - Delta 2 rocket from SLC-2W, Vandenberg Air Force Base, California, payload Soil Moisture Active Passive sat.

Feb 1 am - Proton rocket from Baikonur Cosmodrome, Kazakhstan, payload Inmarsat 5 F2 comsat.

Feb 1 TBD - Soyuz 2-1v rocket from Plesetsk Cosmodrome, Russia, payload Kanopus ST Earth observation sat. Feb 8 pm - Falcon 9 rocket from SLC-40, Cape Canaveral Air Force Station, Florida, payload Deep Space Climate Observatory for U.S.A.F, NOAA and NASA (to Lagrange 1).

Feb 11 am - Vega rocket from ZLV, Kourou, French Guiana, payload ESA's Intermediate Experimental Vehicle, or IXV on a suborbital trajectory, testing advanced flight control and re-entry technologies.

Feb 17 am - Soyuz rocket from Baikonur Cosmodrome, Kazakhstan, payload 58th Progress cargo delivery to ISS. Feb 17 TDB - Falcon 9 rocket from SLC-40, Cape Canaveral Air Force Station, Florida, payload Eutelsat 115 West B and ABS 3A comsats.

Feb TDB - Dnepr rocket from Dombarovsky, Russia, payload Kompsat 3A high-resolution Earth observation sat for Korea.

New Horizons Mission to Pluto-Charon

The New Horizons spacecraft is scheduled to fly through the Pluto-Charon system on July 14, 2015, travelling approx. 13.78 km per second (49,600 kph). The Pluto-and-moons system will be approximately face-on, so close attention will be placed to "thread the needle" up to the last days of approach. Radio signal travel times are more than 4 hours one-way. The spacecraft is awake and healthy.

DAWN to Ceres

The ion-drive equipped DAWN spacecraft is on track to enter orbit around the dwarf planet Ceres on March 6, 2015. It will remain in orbit to map the round world in detail. Using its small framing camera, the spacecraft on Jan 25th snapped a series of frames of Ceres from a distance of 237,000 km. These already show better detail than our best Hubble images to date.

Rosetta Update

Rosetta Orbiter is still mapping the comet's surface, classifying surface morphologies, measuring gravity, mass, shape, and analyzing the coma and plasma. Five basic categories of terrain type have been determined: dust-covered; brittle materials with pits and circular structures; large-scale depressions; smooth terrains; and exposed more consolidated ('rock-like') surfaces. Jets have been observed emanating from the neck area and from circular pits. Dust is carried aloft or remobilized by the jets. Any material without escape velocity falls to surface and forms dunes, etc. The interior of the comet is 70-80% empty space – likely a "foam-like" matrix of dusty ice. Primordial Organic Compounds, mainly carboxylic acids have been detected on the surface. The fate of little Philae is still uncertain.



This Month in History (a sampling)

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

Astro-Birthdays and Milestones

- Jan 28, 1608 Giovanni Alfonso Borelli, Naples, mathematician/astronomer
- Jan 28, 1611 Johannes Hevelius, Danzig, astronomer, star cataloger
- Feb 4, 1906 Clyde Tombaugh, discoverer of Pluto in 1930
- Feb 7, 1824 Sir William Huggins, pioneer of stellar and nebula spectroscopy
- Feb 14, 1898 Fritz Zwicky, Swiss Astronomer, supernova expert
- Feb 15, 1564 Galileo Galilei, renaissance man, astronomer
- Feb 15, 1858 William Pickering, American Astronomer, moons of Saturn
- Feb 19, 1473 Nicholas Copernicus, revolutionary author of "On the Revolution of the Heavenly Spheres"
- Feb 20, 1945 George Smoot, American Nobel Prize winning astrophysicist, cosmologist (COBE)

Astronomy and Space Exploration

Jan 28, 1986 – Shuttle Challenger explodes shortly after liftoff Jan 31, 1862 – Alvin Clark discovers Sirius B (the Flea) Feb 1, 1949 - First Light for the 200" (5.08-m) Hale telescope Feb 1, 2003 - Space Shuttle Columbia breaks up on re-entry over Texas. All seven lives are lost. Feb 4-9, 1971 – Apollo 14 mission Feb 9, 1497 - Nicolaus Copernicus observed the occultation of Aldebaran by the Moon Feb 10, 1720 - Edmund Halley named 2nd Astronomer Royal of England Feb 18, 1930 – Clyde Tombaugh discovers Pluto Feb 19, 1986 - USSR launches MIR Feb 20, 1994 - 20th Anniversary of Clementine Moon Orbit Insertion Feb 24, 1968 – Jocelyn Bell at Cambridge announces the first pulsar PSR1919+21 near Sagitta

Star Parties, etc.

Ref: <u>http://ontariostargazing.ca/astronomy-star-party-and-astronomy-events-listing-for-canada/</u>, <u>http://www.amsky.com/calendar/events/#may</u>, <u>http://stardate.org/nightsky/star_parties</u>

"RASC Solar Observing", Ontario Science Centre Teluscape – Saturday 10-noon, February 7 (or Feb 14?)
"RASC Dark Skies Observing", Long Sault Conservation Area, ON – window opens February 16
"RASC City Skies Observing", Bayview Village Park, Toronto – windows open January 26 and February 23
"Southern Cross Astronomical Society Winter Star Party", Florida Keys, Florida – Feb 16 to 22
(http://scas.org/winter-star-party/)

"Orange Blossom Special International Star Party", Tampa Bay, Florida – Feb 11 to 15 (http://www.stpeteastronomyclub.org/obs.php)

OBSERVING

Globe at Night 2015

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 <u>http://www.globeatnight.org/</u> The next campaign focus is on **Orion** from February 9-18.

Sunrise/Sunset

January 28, sunrise at 7:41 am, sunset at 5:22 pm (9h41m of daylight) February 25, sunrise at 7:03 am, sunset at 6:00 pm (10h57m of daylight)

Moon - Orbit

Apogee – Fri., Feb 6 at 1 am Perigee – Thu., Feb 19 at 2 am (large tides)

Moon - Phases

Mon., Jan 26 at 11:48 pm – First Quarter Moon (sets around midnight) Tue., Feb 3 at 6:09 pm – Full "Snow/Hunger" Moon Wed., Feb 11 at 10:50 pm – Last Quarter Moon (rises around midnight) Wed., Feb 18 at 6:47 pm – New Moon

Moon – Conjunctions, etc.

February 3rd evening, the Full Moon is less than 6° south (to lower right) of Jupiter. **February 12th** and **13th** predawn, the waning crescent Moon is 8° west (to upper right) and 5° east (to lower left) of Saturn respectively. **February 17th** before sunrise, the old crescent Moon (3.4% illum) sits 5° northeast (to left) of Mercury (45% illum). **February 20th** after sunset to 8:20 pm, the waxing crescent Moon (5.5% illum) is less than 2° southwest (to the right) of Venus and Mars. Photo op! **February 21st** early evening, the waxing crescent Moon (12% illum) occults Uranus (mag 6.4) from 5:50 pm to 6:45 pm. **February 25th** early evening, the First Quarter Moon passes about 35 arc-minutes north of Aldebaran. Closest around 6 pm in twilight.

Planets and Dwarf Planets

Mercury, after inferior conjunction on January 30th, becomes observable before dawn from February 6th, and reaches greatest western elongation on February 24th, when it rises at 5:56 am (mag 0.3). On February 17th the old crescent Moon (3.4% illum) sits 5° northeast (to left) of Mercury (45% illum), visible with difficulty from 6 am to sunrise.

Venus is climbing away from the Sun in the low WSW evening sky all month (moving from Aquarius into Pisces). On January 28th, it sets at 7:19 pm (mag -3.3 and 92% illum) and on February 25th it sets at 8:31 pm (mag -3.4 and 87% illum). On the evening of February 1st it sits approximately 0.8° south (to the left) of magnitude 7.8 Neptune. On February 20th after sunset to 8:20 pm, the waxing crescent Moon (5.5% illum) is less than 2° southwest (to the right) of Venus, with Mars only 0.8° above Venus. Photo op! On February 21st, Venus sits only 25 arc-minutes south (to the lower left) of Mars.

Mars continues to be observable low in the southwestern sky after dusk. Over the next month, it continues to recede and shifts eastward from Aquarius into Pisces, setting at 8:16 pm on January 28th (mag +1.4) and (still) at 8:19 pm (mag +1.5) on February 25th. On February 20th after sunset to 8:20 pm, the waxing crescent Moon (5.5% illum) is less than 3° west (to the lower right) of Mars, which itself is only 0.8° above Venus. Photo op! On February 21st, Venus sits only 25 arc-minutes south (to the lower left) of Mars.

Jupiter, magnitude -2.1, is well placed for observing – sitting in western Leo nearly all month, then shifting into Cancer. It rises at 6:05 pm on January 28th, reaches opposition on February 6th (with a 45 arc-second diameter), and rises at 3:56 pm on February 25th. On the evening of February 3rd, the Full Moon is less than 6° south (to lower right) of Jupiter.

Saturn is in Scorpius all month, observable in the eastern morning sky. On January 24th it rises at 3:08 am (mag 0.74) and on February 25th, it will rise at 1:29 am (mag 0.66). In the pre-dawn of February 12th and 13th the waning crescent Moon sits 8° west (to upper right) and 5° east (to lower left) of Saturn respectively.

Uranus (mag 6.2) is in Pisces all month, and is well positioned for observing in early evening. On January 28th it sets at 10:56 pm, and on February 25th it sets at 9:09 pm. On February 21st the waxing crescent Moon (12% illum) occults Uranus (mag 6.4) from 5:50 pm to 6:45 pm.

Neptune, in Aquarius all month (mag 7.8) is only observable low in the southwestern sky in early evening until early February. On February 1st, it sits about 0.8° northwest (to the right) of Venus. It reaches conjunction on February 26th. It sets at 7:44 pm on January 28th.

Pluto, north of Sagittarius' teapot, a faint mag 14.2 object in the southeastern predawn sky, rises at 6:10 am on January 28th and at 4:22 am on February 25th.

Vesta (mag 7.7 in Capricornus) is unobservable and **Ceres** (mag 9.1 in Sagittarius) becomes observable in the pre-dawn over the course of the month.

Comets

Ref <u>http://www.aerith.net/comet/weekly/current.html</u>, <u>http://cometchasing.skyhound.com/</u>, <u>http://in-the-sky.org/comets.php</u>, <u>https://www.ast.cam.ac.uk/~jds/</u>

Comet 15P/Finlay was discovered in 1886 and returns every 6.5 years. After abruptly going into outburst in December, 2015 it is now an early evening binocular object of around magnitude 8.5 and dimming. On January 28th it sets at 9:47 pm and on February 25th it sets at 10:45 pm. Over the next month, it moves east through Pisces, climbing higher in the western evening sky.



C/2014 Q2 (Lovejoy) has peaked in brightness but remains conveniently positioned for observing all month. In late January, it should still be visible with unaided eyes from a dark site. It is moving west from Triangulum, past Almaak in Andromeda on February 4th (nearest at approximately 40 arc-minutes), through western Perseus, and into Cassiopeia. On January 28th it sets at 3:20 am and after February 8th it becomes circumpolar.



Meteor Shower(s) Ref. <u>http://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/</u>

Nothing to report.

Asteroids

Ref. http://www.minorplanetcenter.net/According to the Minor Planet Centre...Near-Earth Objects Discovered This Year:110 (~109/month)Minor Planets Discovered This Year:19,777(?) (~6000/month)Comets Discovered This Year:3 (~1/month)

Satellites

Current GTA International Space Station morning pass series ends Jan 28th (Most are visible between 5 to 6:30 am). Evening passes commence on Feb 3rd running until Feb 24th (most between 6:30 and 8:30 pm). Some higher/brighter ones include*:

Date	Mag.	Time	Direction	Alt.
05-Feb	-2.9	7:17:23 pm to 7:20:12 pm	from SW to S	49°
06-Feb	-2.2	6:25:50 pm to 6:30:41 pm	from SSW to E	29°
07-Feb	-3.2	7:09:47 pm to 7:13:45 pm	from WSW to NE	70°
08-Feb	-3.3	6:17:48 pm to 6:24:02 pm	from SW to ENE	67°
09-Feb	-2.2	7:02:28 pm to 7:06:55 pm	from W to NNE	37°
10-Feb	-2.9	6:10:11 pm to 6:16:40 pm	from WSW to NE	57°
18-Feb	-2.8	7:17:03 pm to 7:20:39 pm	from NW to NE	43°
19-Feb	-2.2	6:24:53 pm to 6:30:47 pm	from NW to E	30°
20-Feb	-3.4	7:08:58 pm to 7:13:41 pm	from WNW to ESE	84°
21-Feb	-3.0	6:16:44 pm to 6:23:08 pm	from NW to ESE	50°
22-Feb	-2.3	7:00:57 pm to 7:07:11 pm	from WNW to SE	43°
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*far future predicted times may shift slightly

Iridium Flares most frequent evening flares occur between 5:45 pm and 7:30 pm, with morning flares common from 5:30 to 7 am. Local occurrences info at <u>www.heavens-above.com</u> and enter your location, from phone/tablet apps, Chris Vaughan's Skylights (subscribe to email <u>here</u> or visit <u>www.astrogeoguy.tumblr.com</u>)

Occultations

Ref: <u>http://www.asteroidoccultation.com/</u> and <u>http://www.poyntsource.com/New/Global.htm</u> (additional links on the following URLs open track maps)

Nothing to report.

Constellations near the Meridian (Annually in February)

8 pm: Columba, Lepus, Orion, Taurus, Auriga, and Camelopardalis 10 pm: Puppis, Canis Major, Monoceros, Canis Minor, Gemini, and Lynx 12 am: Pyxis, Antlia, Hydra, Sextans, Leo, Cancer, Leo Minor, Lynx, and Ursa Major **Interesting Targets in the Canis Major, Monoceros, Canis Minor, Hydra Region** Ref: <u>http://www.dibonsmith.com/mon_con.htm</u>, "Objects in the Heavens", Sky Safari app, etc.

The stars in the evening southern sky in late February pale next to Orion, Taurus, and Gemini, but there are many interesting objects to look at. The outer reaches of the Milky Way passes through Monoceros, while extra-galactic objects populate Hydra. (Note that the "symbol represents an angular measurement in arc-seconds or 1/3600 degree. The 'symbol is 1/60 of a degree. The Moon is 30' or 1800" across.)

Hydra (off galactic plane, lots of galaxies)

Caldwell 59 or NGC3242 or "Ghost of Jupiter" – A magnitude 9.0 planetary nebula T Hya – A pulsating variable star (between mags 6.7-13.5) cycling over 299 days Messier 48 – Large mag 5.8 open cluster (binoculars)

Canis Minor

Procyon or alpha CMi - Fifth distant star to Sun at 11.5 Light-years away Gomeisa or beta CMi – An eruptive variable star (mag 2.84-2.92) that is fast rotating (once per day)!

Monoceros (many nebulae and clusters)

Beta Mon - Triple star system! Visually mag 3.74, but the components are mag 4.5, 5.2, and 5.6 Messier 50 or Heart-shaped Cluster – A nice and compact mag 6.0 open cluster NGC 2237 or Caldwell 49 or Rosette Nebula – Mag 5.5 nebula surrounding young stars that form NGC 2244 NGC 2264 or Cone Nebula – A mag 3.9 nebula

Canis Major (Milky Way passes through, so lots of open clusters and nebulae)

Sirius – Night's brightest star only 8.6 LY away (4th distant). Brilliant colour flashes due to its low alt, extreme brightness (mag -1.46). Small companion Sirius B "The Pup" is an observing challenge needing larger apertures Canis Majoris Cluster or Caldwell 64 or NGC 2362 – Open Cluster of about 60 stars within about 8' Messier 41 or Little Beehive – A mag 4.5 open cluster with a deeply red star in its core 145 CMa or h3945 or "Winter Albireo" – Double star with deep colours of Bright Citrus orange (mag 5.0) and royal blue (mag 5.9) (sep 26.8")

Lepus

Messier79 – A bright mag 7.7 Globular Cluster Gamma Lep or γ Leporis – Yellow (mag 3.6) and Orange (mag 6.3) double star (sep 96") Hind's Crimson star or R Leporis – Mira type variable (mag 5.5-10.5) over 427 days, carbon star, very red NGC2017 – Multi-coloured close star grouping (cluster or multiple system) about 5' across

Puppis (Milky Way passes through it, rich in objects)

Zeta Pup or Naos – Blue-white mag 2.2 star, at 42,000° among the hottest stars known! Rho Pup – delta Scuti type variable, mag range is 2.68 to 3.87 every 3hours, 22 minutes, 52 seconds! Messier 46 or NGC2437 – A mag 6.1 open cluster containing the mag 10 Planetary Nebula NGC2438 Messier 47 or NGC 2422 – A bright mag 4.4 open cluster

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

Questions or comments to <u>chris.vaughan@astrogeo.ca</u> To subscribe to the weekly Skylights emails, please use the MailChimp signup form <u>here</u>. ("Skylights" content archived at <u>www.astrogeoguy.tumblr.com</u>)

