Space News Update – July 2014

By Pat Williams

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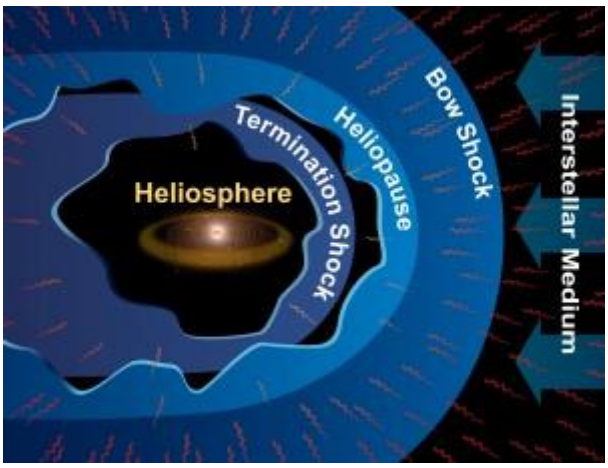
Disclaimer - I claim no authorship for the printed material; except where noted.

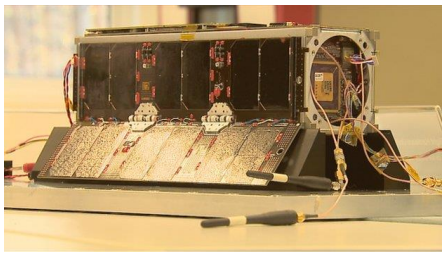
- **Voyager spacecraft may not have reached interstellar space** (23 July 2014)
- On Whether or Not Voyager 1 has Crossed the Heliopause - Abstract - The Astrophysical Journal - IOPscience



The heliosphere, in which the Sun and planets reside, is a large bubble inflated from the inside by the high-speed solar wind blowing out from the Sun. Pressure from the solar wind, along with pressure from the surrounding interstellar medium, determines the size and shape of the heliosphere. The supersonic flow of solar wind abruptly slows at the termination shock, the innermost boundary of the solar system. The edge of the solar system is the heliopause. The bow shock pushes ahead through the interstellar medium as the heliosphere plows through the galaxy.
Credit: Southwest Research Institute

In 2012, the Voyager mission team announced that the Voyager 1 spacecraft had passed into interstellar space, travelling further from Earth than any other manmade object. However, uncertainty about whether Voyager 1 really crossed the threshold continues. Two Voyager team scientists predict that, in the next two years, Voyager 1 will cross the current sheet – the sprawling surface within the heliosphere where the polarity of the sun's magnetic field changes from plus to minus. The spacecraft will detect a reversal in the magnetic field, proving that it is still within the heliosphere. But, if the magnetic field reversal doesn't happen in the next year or two as expected, that is confirmation that Voyager 1 has already passed into interstellar space.

- **Successful launch for UK Space Agency's first cubesat mission** (9 July 2014)
- **First Scottish satellite has 'successful' launch**



Scotland's first satellite has been launched successfully in Kazakhstan according to the team who built it. UKube-1 is a cubesat, packing six payloads into a space not much bigger than a shoebox. Its experiments include a study of space weather and a project to let school pupils interact with the satellite with the goal of enthusing and educating young people about radio, space, physics and electronics.

It was commissioned by the UK Space Agency and built by Glasgow company Clyde Space. Following successful launch and deployment, the UKube-1 Mission Operations Centre (UMOC) at STFC RAL Space established contact with the satellite and started in-orbit commissioning.

"It's one small satellite for Clyde and a giant leap for their extraterrestrial export business and a new hope for space science in Scotland!" Alex Salmond, First Minister of Scotland.

- Spaceport UK (15 July 2014)

The UK's bid to become Europe's leading space nation took a giant leap forward as government revealed the 8 locations now under consideration to base Britain's first spaceport. The Government's ambition is for a UK spaceport to open in 2018 – providing a focus for regional and international investment for growth and establishing the UK as a leader in the rapidly-expanding space market. Business Secretary Vince Cable said: "Space is big business for the UK. It already contributes £11.3 billion to the economy each year, supporting nearly 35,000 jobs. That's why it's important for us to prepare the UK for new launcher technology and take steps towards meeting our ambition of establishing the first British spaceport."

- **UK Space Agency 2013-14 Report to Parliament**
- **Greg Clark replaces David Willetts as UK Space Minister** (15 July 2014)

Greg Clark

On space policy, David Willetts proved his brainy nickname “Two Brains” by fully supporting what already is a real winning industry for the nation. He will be a hard act to follow for Greg Clark who replaces Willetts as Universities and Science Minister. Thankfully, Clark is no dimwit himself with an economics degree at Magdalene College, Cambridge, and a PhD from London School of Economics. Author - David Todd.

- **The heart of an astronaut, five years on** (22 July 2014)

The heart of an astronaut is a much-studied thing. Scientists have analysed its blood flow, rhythms, atrophy and, through journal studies, even matters of the heart. But for the first time, researchers are looking at how oxidative stress and inflammation caused by the conditions of space flight affect those hearts for up to five years after astronauts fly on the International Space Station. Lessons learned may help improve cardiovascular health on Earth as well. Many studies have looked at oxidative stress on Earth, but only astronauts are simultaneously exposed to so many factors known to cause it. The unique environment of a space mission combines a number of factors that can increase the risk of oxidative damage and inflammation, including radiation, psychological stress, reduced physical activity and, in the case of extravehicular activity, increased oxygen exposure. Knowing more about how space may cause changes in cardiovascular health will help scientists develop measures to counter its negative effects, in space and on Earth.

- **LINKS TO OTHER SPACE AND ASTRONOMY NEWS PUBLISHED IN July 2014**

ASTEROID

Asteroid Vesta to reshape theories of planet formation (16 July 2014)
EPFL researchers have a better understanding of the asteroid Vesta and its internal structure, thanks to numerical simulations and data from the space mission Dawn.

ASTROPHYSICS

Hotspot for powerful cosmic rays (8 July 2014)
An observatory run by the University of Utah found a “hotspot” beneath the Big Dipper emitting a disproportionate number of the highest-energy cosmic rays.

Van Allen probes show how to accelerate electrons (15 July 2014)
One of the great, unanswered questions for space weather scientists is just what creates two gigantic donuts of radiation surrounding Earth, called the Van Allen radiation belts.

BLACK HOLES

Black hole fireworks in nearby galaxy (2 July 2014)
A dazzling event is taking place in the galaxy Messier 106, as seen by NASA's Spitzer Space Telescope, Chandra X-ray Observatory and the Herschel Space Observatory.

Supermassive black hole blows molecular gas out of a galaxy at 1 million kilometres per hour (7 July 2014) New research by academics at the University of Sheffield has solved a long-standing mystery surrounding the evolution of galaxies, deepening our understanding of the future of the Milky Way.

COMET

Comet ISON's dramatic final hours (16 July 204)
A new analysis of data from the ESA/NASA Solar and Heliospheric Observatory (SOHO) spacecraft has revealed that comet 2012/S1 (ISON) stopped producing dust and gas shortly before it raced past the Sun and disintegrated.

Dual personality of comet 67P/C-G (17 July 2014)
This week's images of comet 67P/Churyumov-Gerasimenko reveal an extraordinarily irregular shape.

Comet probe Rosetta on the home straight (23 July 2014)
After a journey of more than seven billion kilometres that has taken over ten years, space probe Rosetta is now approaching the finish line: the probe is scheduled to reach its quarry – comet 67P/Churyumov-Gerasimenko – on 6 August.

NEOWISE spots a comet that looked like an asteroid (23 July 2014)
Comet C/2013 UQ4 (Catalina) has been observed by NASA's Near-Earth Object Wide-field Infrared Survey Explorer (NEOWISE) spacecraft just one day after passing through its closest approach to the sun.

Latest Rosetta comet pictures (24 July 2014)
In this week's images, taken on 20 July from a distance of 5500 km, comet 67P/Churyumov-Gerasimenko's largest features are beginning to stand out in the OSIRIS narrow angle camera view.

DARK MATTER

It’s go time for LUX-Zeplin experiment in dark matter (17 July 2014)
From the physics labs at Yale University to the bottom of a played-out gold mine in South Dakota, a new generation of dark matter experiments is ready to commence.

EARTH

Lifetime of gravity measurements heralds new beginning (30 July 2014)
Although ESA's GOCE satellite is no more, all of the measurements it gathered during its life skirting the fringes our atmosphere, including the very last as it drifted slowly back to Earth, have been drawn together to offer new opportunities for science.

EXOPLANETS

Newly spotted frozen world orbits in a binary star system (3 July 2014)
A newly discovered planet in a binary star system located 3,000 light-years from Earth is expanding astronomers' notions of where Earth-like—and even potentially habitable—planets can form, and how to find them.

Controversial clues of two "Goldilocks planets" that might support life are proven false (3 July 2014)
Mysteries about controversial signals coming from a dwarf star considered to be a prime target in the search for extraterrestrial life now have been solved in research led by scientists at Penn State University.

Friction from tides could help distant Earths survive, and thrive (8 July 2014)
Computer modelling by NASA scientists shows that friction could be the key to survival for some distant Earth-sized planets traveling in dangerous orbits.

Oceans vital for possibility for alien life (21 July 2014)
Researchers at the University of East Anglia have made an important step in the race to discover whether other planets could develop and sustain life.

Transiting exoplanet with longest known year (21 July 2014)
Astronomers have discovered a transiting exoplanet with the longest known year. Kepler-421b circles its star once every 704 days.

Most precise measurement of an alien world's size (23 July 2014)
Thanks to NASA's Kepler and Spitzer Space Telescopes, scientists have made the most precise measurement ever of the radius of a planet outside our solar system.

Hubble finds three surprisingly dry exoplanets (24 July 2014)
Astronomers using NASA's Hubble Space Telescope have gone looking for water vapour in the atmospheres of three planets orbiting stars similar to the Sun — and have come up nearly dry.

ALMA finds double star with weird and wild planet-forming discs (30 July 2014)
Astronomers using the Atacama Large Millimeter/submillimeter Array (ALMA) have found wildly misaligned planet-forming gas discs around the two young stars in the binary system HK Tauri.

Companion planets can increase old worlds' chance at life (31 July 2014)
Having a companion in old age is good for people — and, it turns out, might extend the chance for life on certain Earth-sized planets in the cosmos as well.

FUTURE MISSIONS AND SPACE EVENTS

Mission Principia: Tim Peake picks name for his 6-month mission to ISS

Columbus laboratory

What's on the menu for British ESA astronaut Tim Peake?Children were asked to design a British-inspired meal for Tim to eat in space, taking account of good nutritional principles as well as the constraints of space (such as handling, packaging and preservation).

Hubble to proceed with full search for New Horizons targets (1 July 2014)
NASA's Hubble Space Telescope has been given the go-ahead to conduct an intensive search for a suitable outer solar system object that the New Horizons (NH) spacecraft could visit after the probe streaks though the Pluto system in July 2015.

NASA team lays plans to observe new worlds (23 July 2014)
It can take decades to mature an astrophysics flagship mission from concept to launch pad.

NASA Mars spacecraft prepare for close comet flyby (25 July 2014)
NASA is taking steps to protect its Mars orbiters, while preserving opportunities to gather valuable scientific data, as Comet C/2013 A1 Siding Spring heads toward a close flyby of Mars on Oct. 19

NASA selects instruments to track climate impact on vegetation (30 July 2014)
NASA has selected proposals for two new instruments that will observe changes in global vegetation from the International Space Station.

NASA announces Mars 2020 rover payload to explore the Red Planet as never before (31 July 2014)
The next rover NASA will send to Mars in 2020 will carry seven carefully-selected instruments to conduct unprecedented science and exploration technology investigations on the Red Planet.

Mars 2020 rover's PIXL to focus X-rays on tiny targets (31 July 2014)
One of seven instruments selected for a Mars rover that NASA is developing for launch in 2020 would be able to identify chemical elements in target spots as small as a grain of table salt.

SHERLOC to micro-map Mars minerals and carbon rings (31 July 2014)
An ultraviolet-light instrument on the robotic arm of NASA's Mars 2020 rover will use two types of ultraviolet-light spectroscopy, plus a versatile camera, to help meet the mission's ambitious goals, including a search for signs of past life on Mars and selection of rock samples for possible return to Earth.

GALAXIES

Carbon monoxide predicts 'red and dead' future of gas guzzler galaxy (9 July 2014)
Astronomers have studied the carbon monoxide in a galaxy over 12 billion light years from Earth and discovered that it's running out of gas, quite literally, and headed for a 'red and dead' future.

Seven dwarf galaxies discovered with new telescope (10 July 2014)
Yale University astronomers, using a new type of telescope made by stitching together telephoto lenses, recently discovered seven celestial surprises while probing a nearby spiral galaxy.

Silhouettes of early galaxies reveal few seeds for new stars (15 July 2014)
An international team of astronomers has discovered that gas around young galaxies is almost barren, devoid of the seeds from which new stars are thought to form – molecules of hydrogen.

International team to use Hubble Space Telescope for early galaxy hunt (15 July 2014)
An international team led by the Kavli Institute for Cosmology at the University of Cambridge and involving the University of Colorado Boulder has a new tool to look for the oldest galaxies in the universe: 32 days of observing time with the Hubble Space Telescope.

Mysterious dance of dwarfs galaxies may force a cosmic rethink (18 July 2014)
The discovery that many small galaxies throughout the universe do not 'swarm' around larger ones like bees do but 'dance' in orderly disc-shaped orbits is a challenge to our understanding of how the universe formed and evolved.

Hubble traces the halo of a galaxy more accurately than ever before (21 July 2014)
Astronomers using the NASA/ESA Hubble Space Telescope have probed the extreme outskirts of the stunning elliptical galaxy Centaurus A.

Glow in space is evidence of a hot bubble in our galaxy (27 July 2014)
When we look up to the heavens on a clear night, we see an immense dark sky with uncountable stars.

Weighing the Milky Way (29 July 2014)
It turns out the way some astrophysicists have been studying our galaxy made it appear that the Milky Way might be more massive than its neighbour down the street, Andromeda.

Hubble shows farthest lensing galaxy yields clues to early universe (31 July 2014)
Astronomers using NASA's Hubble Space Telescope have unexpectedly discovered the most distant cosmic magnifying glass, produced by a monster elliptical galaxy.

INTERNATIONAL SPACE STATION

Antares rocket rolls out for mission to ISS (10 July 2014)
Today, Orbital Sciences Corporation's operations team rolled out the Antares rocket carrying the Cygnus cargo logistics resupply vehicle for its launch to the International Space Station.

Orbital launches Antares rocket carrying Cygnus cargo resupply spacecraft to ISS (13 July 2014)
Orbital Sciences Corporation has successfully launched its Antares medium-class rocket carrying a Cygnus cargo logistics spacecraft, beginning the company's second operational cargo resupply mission to the International Space Station (ISS).

NASA cargo launches to Space Station aboard Orbital Sciences resupply mission (13 July 2014)
A multitude of NASA research investigations, crew provisions, hardware and science experiments from across the country is headed to the International Space Station aboard Orbital Sciences Corp.'s Cygnus spacecraft.

Third Flock of Dove CubeSats launched with Cygnus Orb-2 mission (15 July 2014)
Spaceflight Inc. and NanoRacks announced today that an additional 28 Planet Labs Dove CubeSats are en route to the International Space Station on the Orbital Sciences Cygnus Orb-2 Mission.

Orbital's Cygnus spacecraft successfully berths with ISS (16 July 2014)
Orbital Sciences Corporation today announced that its Cygnus cargo logistics spacecraft successfully completed its rendezvous and approach manoeuvres with the International Space Station (ISS) and was grappled and berthed with the Station by the Expedition 40 astronaut crew earlier this morning.

UrtheCast and NanoRacks to install Earth observation cameras on NASA segment of space station (16 July 2014)
UrtheCast plans to dramatically expand its Earth Observation data stream by operating state-of-the-art sensors on the NASA segment of the International Space Station (ISS).

ATV's fiery break-up to be seen from inside (17 July 2014)
As ESA's remaining supply ferry to the International Space Station burns up in the atmosphere, its final moments as its hull disintegrates will be recorded from the inside by a unique infrared camera.

Astronauts to test free-flying "housekeeper" robots (17 July 2014)
Inspired by science fiction, three bowling ball-size free-flying Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES) have been flying inside the International Space Station since 2006.

The heart of an astronaut, five years on (22 July 2014)
The heart of an astronaut is a much-studied thing. Scientists have analysed its blood flow, rhythms, atrophy and, through journal studies, even matters of the heart.

Survivalists ready for journey to the ISS (22 July 2014)
Tough, resilient and able to survive in the most inhospitable regions on Earth –now, they are being asked to show their strength in a space environment as well; blue-green algae (cyanobacteria of the genus Nostoc) and biofilms (deinococcus geothermalis) will depart for the International Space Station (ISS) at 23:44 CEST on 23 July 2014 on board a Progress spacecraft.

ATV-5: loaded and locked (23 July 2014)
ESA's fifth Automated Transfer Vehicle is now scheduled for launch to the International Space Station at

23:44 GMT on 29 July (01:44 CEST 30 July) on an Ariane 5 rocket from Europe's Spaceport in Kourou, French Guiana.

Timely arrival of Pharao space clock (25 July 2014)
ESA has welcomed the arrival of Pharao, an important part of ESA's atomic clock experiment that will be attached to the International Space Station in 2016.

Last ATV lifts off to supply the space station (29 July 2014)
The fifth and final mission of ESA's Automated Transfer Vehicle got off to a flying start today with its launch from Europe's Spaceport in Kourou, French Guiana, heading for the International Space Station.

INTERSTELLAR SPACE

Sun sends more "tsunami waves" to Voyager 1 (7 July 2014)
NASA's Voyager 1 spacecraft has experienced a new "tsunami wave" from the sun as it sails through interstellar space.

X-ray instrument settles interstellar debate (28 July 2014)
New findings from a NASA-funded instrument have resolved a decades-old puzzle about a fog of low-energy X-rays observed over the entire sky.

Silicon-capped hydrocarbons possible source of mysterious "diffuse interstellar bands" (29 July 2014)
Over the vast, empty reaches of interstellar space, countless small molecules tumble quietly though the cold vacuum.

JUPITER AND MOONS

Laboratory models suggest that stretching forces shaped Jupiter Moon's surface (8 July 2014)
Processes that shaped the ridges and troughs on the surface of Jupiter's icy moon Ganymede are likely similar to tectonic processes seen on Earth, according to a team of researchers led by Southwest Research Institute (SwRI).

MARS

Martian salts must touch ice to make liquid water, study shows (2 July 2014)
In chambers that mimic Mars' conditions, University of Michigan researchers have shown how small amounts of liquid water could form on the planet despite its below-freezing temperatures.

Further evidence of dry ice gullies on Mars (10 July 2014)
Repeated high-resolution observations made by NASA's Mars Reconnaissance Orbiter (MRO) indicate the gullies on Mars' surface are primarily formed by the seasonal freezing of carbon dioxide, not liquid water.

Sharpest map of Mars' surface properties (15 July 2014)
A heat-sensing camera designed at Arizona State University has provided data to create the most detailed global map yet made of Martian surface properties.

Earth-like fossilized soils on Mars (17 July 2014)
Soil deep in a crater dating to some 3.7 billion years ago contains evidence that Mars was once much warmer and wetter, says University of Oregon geologist Gregory Retallack, based on images and data captured by the rover Curiosity.

Opportunity rover sets off-world driving record (28 July 2014)
NASA's Opportunity Mars rover, which landed on the Red Planet in 2004, now holds the off-Earth roving distance record after accruing 25 miles (40 kilometers) of driving.

MERCURY

Mercury result of early hit-and-run collisions (6 July 2014)
Planet Mercury's unusual metal-rich composition has been a longstanding puzzle in planetary science.

RUAG delivers telescope for mapping Mercury in 3D (15 July 2014)
The planet Mercury is to be 3D mapped by a European laser altimeter.

Mercury's magnetic field tells how its interior is different from Earth's (29 July 2014)
Earth and Mercury are both rocky planets with iron cores, but Mercury's interior differs from Earth's in a way that explains why the planet has such a bizarre magnetic field, UCLA planetary physicists and colleagues report.

METEORITES

Young sun's violent history solves meteorite mystery (1 July 2014)
Astronomers using ESA's Herschel space observatory to probe the turbulent beginnings of a Sun-like star have found evidence of mighty stellar winds that could solve a puzzling meteorite mystery in our own back yard. (Mystery is the origins of Berylium-10 ^{10}Be within meteorites.) **Spallation** is a process in which fragments of material (spall) are ejected from a body due to impact or stress.

MISCELLANEOUS

Peering into giant planets from in and out of this world (14 July 2014)
Lawrence Livermore scientists for the first time have experimentally re-created the conditions that exist deep inside giant planets, such as Jupiter, Uranus and many of the planets recently discovered outside our solar system.

MOON

Landsat looks to the Moon (11 July 2014)
Every full moon, Landsat 8 turns its back on Earth. As the satellite's orbit takes it to the night-time side of the planet, Landsat 8 pivots to point at the moon.

Lunar pits could shelter astronauts (17 July 2014)
While the moon's surface is battered by millions of craters, it also has over 200 holes – steep-walled pits that in some cases might lead to caves that future astronauts could explore and use for shelter, according to new observations from NASA's Lunar Reconnaissance Orbiter (LRO) spacecraft.

Tidal forces gave moon its shape (30 July 2014)
The shape of the moon deviates from a simple sphere in ways that scientists have struggled to explain.

PLANETARY NEBULA

Bringing the third dimension to a doomed star's outburst (8 July 2014)
In the middle of the 19th century, the massive binary system Eta Carinae underwent an eruption that ejected at least 10 times the sun's mass and made it the second-brightest star in the sky.

SATURN AND ITS MOONS

Ocean on Saturn Moon could be as salty as the Dead Sea (2 July 2014)
Scientists analysing data from NASA's Cassini mission have firm evidence the ocean inside Saturn's largest moon, Titan, might be as salty as the Earth's Dead Sea.

MIPT-based researcher models Titan's atmosphere (21 July 2014)
A researcher from MIPT, Prof. Vladimir Krasnopolsky, who heads the Laboratory of High Resolution Infrared Spectroscopy of Planetary Atmospheres, has published the results of the comparison of his model of Titan's atmosphere with the latest data. http://www.scopus.com/record/display.url?eid=2-s2.0-63949083400&origin=inward&txGid=A67BBC699552BBA3D93EF96F475F9FE4.N5T5nM1aaTEF8rE6yKCR3A%3a2

Cassini spacecraft reveals 101 geysers and more on icy Saturn moon Enceladus (28 July 2014)
Scientists using mission data from NASA's Cassini spacecraft have identified 101 distinct geysers erupting on Saturn's icy moon Enceladus.

SPACE ECONOMY – GLOBAL

Government funding for space on the road to recovery (9 July 2014)
According to Euroconsult's newly released executive report, Government Space Programs: Strategic Outlook, Benchmarks & Forecasts, government funding for space is expected to progressively recover as public finances regain their comfort zone and programs enter a new growth cycle.

Lockheed Martin opens space technology office in United Kingdom (15 July 2014)
Lockheed Martin is opening a space technology office in Great Britain to explore partnership opportunities with UK businesses and universities to support the UK's goal of maintaining and growing its national capabilities in space.

STARS AND STAR CLUSTERS

New satellite data like an ultrasound for baby stars (3 July 2014)
An international team of researchers have been monitoring the “heartbeats” of baby stars to test theories of how the Sun was born 4.5 billion years ago.

Sun-like stars reveal their ages (10 July 2014)
Defining what makes a star "Sun-like" is as difficult as defining what makes a planet "Earth-like." A new technique for measuring the age of a star using its spin - gyrochronology - is coming into its own. Today astronomers are presenting the gyrochronological ages of 22 Sun-like stars. Before this, only two Sun-like stars had measured spins and ages.

Bizarre nearby blast mimics universe's most ancient stars (11 July 2014)
ESA’s XMM-Newton observatory has helped to uncover how the Universe’s first stars ended their lives in giant explosions.

Modelling the formation of the oldest known star in the Milky Way (22 July 2014)
Scientists from the Universities of Göttingen and Copenhagen have modelled the formation of the oldest known star in the Milky Way using high-resolution computer simulations.

Fermi finds a 'transformer' pulsar (22 July 2014)
In late June 2013, an exceptional binary containing a rapidly spinning neutron star underwent a dramatic change in behaviour never before observed.

Research finds numerous unknown jets from young stars and planetary nebulae (31 July 2014)
For many years astronomers have known that young 'protostars' drive supersonic jets of gas from their north and south poles. However, this is the first time that so many of them have been detected at once.

SUN

Stereo entering new stage of operations (3 July 2014)
Since February 2011, the two spacecraft of NASA's STEREO mission have been providing scientists with unprecedented views of the far side of the sun.

MESSENGER and STEREO measurements open new window into high- energy processes on the Sun (9 July 2014)
Understanding the sun from afar isn't easy. How do you figure out what powers solar flares – the intense bursts of radiation coming from the release of magnetic energy associated with sunspots – when you must rely on observing only the light and particles that make their way to near-Earth’s orbit? The MESSENGER data showed an increase in the number of – not electrically charged -- neutrons at Mercury’s orbit hours before the large number of charged particles reached the spacecraft. This indicated that the neutrons were most likely produced by accelerated flare particles striking the lower solar atmosphere, releasing neutrons as a result of high-energy collisions. So, together, the MESSENGER and STEREO data can provide new information about how particles are accelerated in solar flares.

SUPERNOVA

Iron fingerprints point astronomers to supernova suspects (2 July 2014)
An international team of astronomers using data from the Japan-led Suzaku X-ray observatory has developed a powerful technique for analysing supernova remnants, the expanding clouds of debris left behind when stars explode.

New observations reveal how stardust forms around a supernova (9 July 2014)
A group of astronomers has been able to follow stardust being made in real time — during the aftermath of a supernova explosion.

Fermi space telescope reveals new source of gamma rays (31 July 2014)
Observations by NASA's Fermi Gamma-ray Space Telescope of several stellar eruptions, called novae, firmly establish these relatively common outbursts almost always produce gamma rays, the most energetic form of light.

TECHNOLOGY

New technology illuminates colder objects in deep space (8 July 2014)
Too cool and faint, many objects in the universe are impossible to detect with visible light.

ESA's spaceplane set for flight (16 July 2014)
All eyes are on ESA’s spaceplane to showcase re-entry technologies after its unconventional launch on a Vega rocket this November.

Webb sunshield stacks up to test (24 July 2014)
The Sunshield on NASA's James Webb Space Telescope is the largest part of the observatory—five layers of thin membrane that must unfurl reliably in space to precise tolerances.

Researchers discover cool-burning flames in space (28 July 2014)
A team of international researchers has discovered a new type of cool burning flames that could lead to cleaner, more efficient engines for cars.

Next-generation Thirty Meter Telescope begins construction in Hawaii (28 July 2014)
Following the approval of a sublease on July 25 by the Hawaii Board of Land and Natural Resources, the Thirty Meter Telescope (TMT) announces the beginning of the construction phase on Hawaii Island and around the world throughout the TMT international partnership.

Printing the metals of the future (28 July 2014)
3-D printers can create all kinds of things, from eyeglasses to implantable medical devices, straight from a computer model and without the need for molds.

UNIVERSE

Small, but plentiful: how the faintest galaxies illuminated the early universe (7 July 2014)
Astronomers investigating behaviour of the universe shortly after the Big Bang have made a surprising discovery: the properties of the early universe are determined by the smallest galaxies.

Cosmic accounting reveals missing light crisis (8 July 2014)
Something is amiss in the Universe. There appears to be an enormous deficit of ultraviolet light in the cosmic budget.

Radio-burst discovery deepens astrophysics mystery (10 July 2014)
The discovery of a split-second burst of radio waves by scientists using the Arecibo radio telescope in Puerto Rico provides important new evidence of mysterious pulses that appear to come from deep in outer space.

Gaia: "go" for science (29 July 2014)
Following extensive in-orbit commissioning and several unexpected challenges, ESA's billion-star surveyor, Gaia, is now ready to begin its science mission.

VENUS

Venus Express rises again (11 July 2014)
After a month surfing in and out of the atmosphere of Venus down to just 130 km from the planet's surface, ESA's Venus Express is about to embark on a 15 day climb up to the lofty heights of 460 km.

Venus Express: up above the clouds so high (28 July 2014)
ESA's Venus Express spacecraft has climbed to a new orbit following its daring aerobraking experiment, and will now resume observations of this fascinating planet for at least a few more months.

AND FINALLY

- **Appearance of Night-Shining (Noctilucent) Clouds Has Increased**

For amateur astronomers July has been a great month to observe noctilucent clouds.

NLC links http://www.nasa.gov/mission_pages/aim/index.html

Pat Williams. July 2014