Space News Update – November 2014

By Pat Williams

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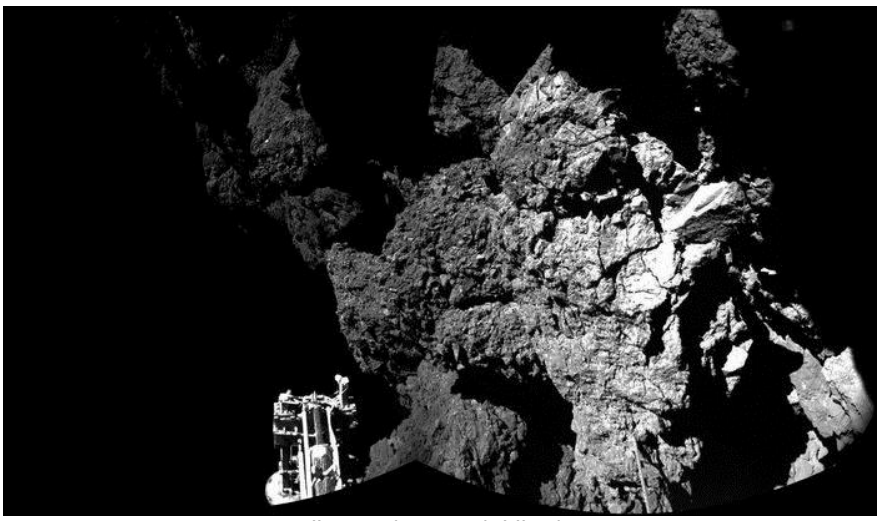
Disclaimer - I claim no authorship for the printed material; except where noted.

ROSSETA'S RENDEZVOUS WITH COMET 67P/CHURYUMOV-GERASIMENKO



Credit: ESA/Rosetta/Philae/CIVA

Rosetta's Philae probe lands on comet (12 November 2014)
ESA's Rosetta mission has soft-landed its Philae probe on a comet, the first time in history that such an extraordinary feat has been achieved.

Three touchdowns for Rosetta's lander (14 November 2014)
After achieving touchdown on a comet for the first time in history, scientists and engineers are busy analysing this new world and the nature of the landing.

Pioneering Philae completes main mission before hibernation (15 November 2014)
Rosetta's lander has completed its primary science mission after nearly 57 hours on Comet 67P/Churyumov–Gerasimenko.

Churyumov-Gerasimenko – hard ice and organic molecules (17 November 2014)
Before going into hibernation at 01:36 CET on 15 November 2014, the Philae lander was able to conduct some work using power supplied by its primary battery.

Philae on 67P – MUPUS experiment hammers probe into comet (18 November 2014)
The MUPUS instrument, one of 10 experiments on the Philae lander that touched down on comet 67P/Churyumov-Gerasimenko encountered very hard material with a temperature of about minus 170 degrees Celsius – probably rich in ice.

Rosetta continues into its full science phase (19 November 2014)
With the Philae lander's mission complete, Rosetta will now continue its own extraordinary exploration, orbiting Comet 67P/Churyumov–Gerasimenko during the coming year as the enigmatic body arcs ever closer to our Sun.

Philae's landing sounds (20 November 2014)
A short but significant 'thud' was heard by the Cometary Acoustic Surface Sounding Experiment (CASSE) as Philae made its first touchdown on Comet 67P/Churyumov-Gerasimenko.

SCIENCE ABOARD THE INTERNATIONAL SPACE STATION

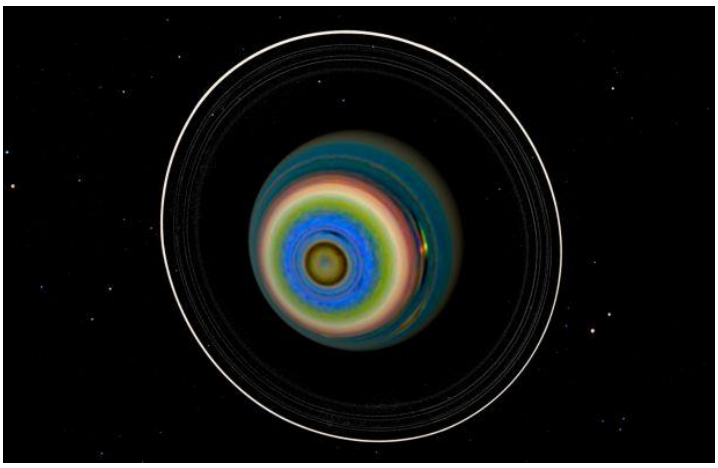
New crew arrives at space station (23 November 2014)
Three new crew members representing the United States, Russia and Italy are at the International Space Station (ISS).

The Soyuz TMA-15M rocket launches from the Baikonur Cosmodrome in Kazakhstan on Monday, Nov. 24, 2014 carrying Expedition 42 Soyuz Commander Anton Shkaplerov of the Russian Federal Space Agency (Roscosmos), Flight Engineer Terry Virts of NASA, and Flight Engineer Samantha Cristoforetti of ESA. Image Credit: NASA/Aubrey Gemignani

The crew members will be working off the Earth, for the Earth conducting hundreds of scientific investigations and technology demonstrations during their six-month sojourn on the orbiting laboratory. These include observations of the genetic makeup of roundworms, examining aerosols in the atmosphere and levitating cooling liquid metals. The International Space Station is a convergence of science, technology and human innovation that demonstrates new technologies and makes research breakthroughs not possible on Earth. The space station has had continuous human occupation since November 2000. In that time, it has received more than 200 visitors and a variety of international and commercial spacecraft. The space station remains the springboard to NASA's next great leap in human space exploration.

1986 IMAGES OF URANUS IN 2014 REVEAL NEW PHENOMENA

Uranus's hidden interior (12 November 2014)
Long believed to be one of the blandest regions of any of the giant gas planets, the southern hemisphere of Uranus revealed a flurry of previously unknown atmospheric phenomena, possibly hinting at an unusual feature in the interior of the pale blue planet.



By enhancing contrast and teasing out previously hidden information in images taken by the Voyager-2 spacecraft, LPL scientist Erich Karkoschka discovered that Uranus' southern hemisphere is anything but bland. (Image: Erich Karkoschka)

A gas giant's observable atmosphere extends less than one percent of the planet's radius. Knowledge is limited about the more than 99 percent beneath it. In the absence of a visible surface, scientists rely on atmospheric features to

determine the rotation periods of gas giants. The picture is complicated by atmospheric circulation patterns that vary with latitude and may or may not be in sync with the planet's core rotation rate. "All previous observations of the giant planets indicated that these planets rotate in a regular way, meaning the rotational rates in their respective southern and northern latitudes are about the same," Karkoschka said. "My analysis suggests rotational rates in the high latitudes of Uranus are highly asymmetrical, with some southern latitudes possibly rotating as much as 15 percent faster than their northern counterparts." "The unusual rotation of high southern latitudes of Uranus is probably due to an unusual feature in the interior of Uranus," he said. "While the nature of the feature and its interaction with the atmosphere are not yet known, the fact that I found this unusual rotation offers new possibilities to learn about the interior of a giant planet."

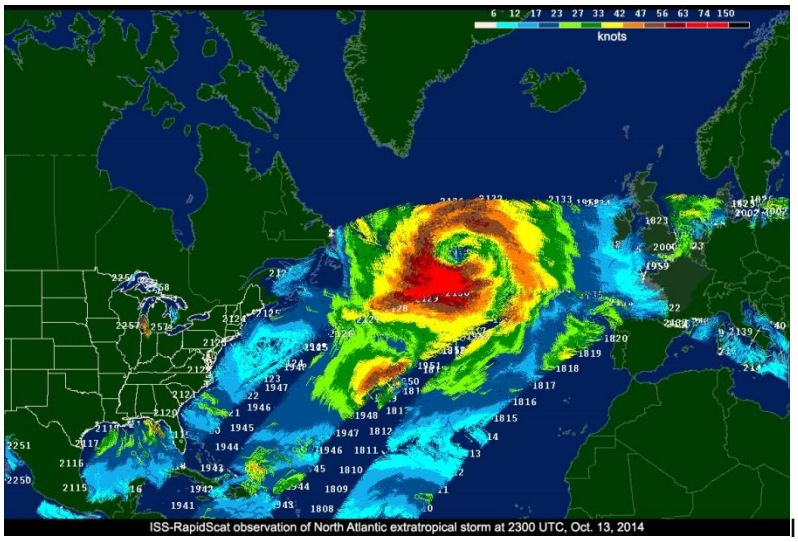


Image Credit: NASA/JPL-Caltech/NOA

NASA's new wind watcher ready for weather forecasters (10 November 2014)
In an early holiday gift to the world's weather and marine forecasting agencies, ocean-winds data from NASA's newest Earth-observing mission, the International Space Station-Rapid Scatterometer (ISS-RapidScat), are being released two months ahead of schedule. RapidScat launched to the International Space Station on Sept. 21 on a two-year mission to boost global monitoring of ocean winds for improved weather forecasting and climate studies. The JPL-developed space-based scatterometer is a remote-sensing instrument that uses radar pulses reflected from the ocean's surface at different angles to calculate surface wind speed and direction. This information will improve weather and marine forecasting and hurricane monitoring.

EYE-CATCHING SPACE TECHNOLOGY RESTORING SIGHT


Thomas Reiter with tracking device

Eye-catching space technology restoring sight (3 November 2014)
Laser surgery to correct eyesight is common practice, but did you know that technology developed for use in space is now commonly used to track the patient’s eye and precisely direct the laser scalpel? If you look at a fixed point while tilting or shaking your head, your eyes automatically hold steady, allowing you to see clearly even while moving around. This neat trick of nature is a reflex and we are usually unaware that it even happens. Your brain is constantly interpreting information from the inner ear to maintain balance and stable vision. An essential feature of this sensory system is the use of gravity as a reference. But how do astronauts in space cope when the inner ear can no longer

rely on gravity? How well do astronauts focus on a computer screen when floating by, and how do they judge speed? To investigate these questions, a team led by Professor Andrew Clarke based in Berlin, Germany, designed a series of experiments to measure astronauts' eye movements as they worked on the International Space Station. Researchers needed a robust method to track the eyes without interfering with the astronaut's normal work. The answer came in the form of a helmet feeding high-performance image-processing chips similar to those found in consumer cameras. In parallel with its use on the Space Station, the engineers realised the device had potential for applications on Earth. Tracking the eye's position without interfering with the surgeon's work is essential in laser surgery. The space technology proved ideal.

LINKS TO OTHER SPACE AND ASTRONOMY NEWS PUBLISHED IN NOVEMBER 2014

ASTEROIDS

Asteroid's size revealed for first time (10 November 2014)
When the double asteroid Patroclus-Menoetius passed directly in front of a star on the night of Oct. 20, a team of volunteer astronomers across the U.S. was waiting.

Tail discovered on long-known asteroid (11 November 2014)
A two-person team of Carnegie's Scott Sheppard and Chadwick Trujillo of the Gemini Observatory has discovered a new active asteroid, called 62412, in the Solar System's main asteroid belt between Mars and Jupiter.

Vesta is not an intact protoplanet (12 November 2014)
Nearly forty years ago, Guy Consolmagno was young graduate student at the University of Arizona's Department of Planetary Sciences; his work there with the late Michael Drake first proposed that asteroid Vesta was the parent body of the Howardite-Eucrite-Diogenite (HED) clan of basaltic meteorites.

New map shows frequency of small asteroid impacts (14 November 2014)
A map released today by NASA's Near Earth Object (NEO) Program reveals that small asteroids frequently enter and disintegrate in the Earth's atmosphere with random distribution around the globe.

Geologic maps of Vesta from NASA's Dawn mission published (17 November 2014)
Images from NASA's Dawn Mission have been used to create a series of high-resolution geological maps of the large asteroid Vesta, revealing the variety of surface features in unprecedented detail.

BLACK HOLES

First flashes of lightning from a black hole (10 November 2014)
An international group of researchers with the participation of the Astronomic Observatory of the Universitat de València has discovered the first lightning bolts from a black hole by eruption with the strongest brightness variations in an extragalactic object ever observed.

Black hole may be a neutrino factory (13 November 2014)
The giant black hole at the centre of the Milky Way may be producing neutrinos. If confirmed, this would be the first time that scientists have traced neutrinos back to a black hole.

Cardiff scientists help unlock secrets of the Universe (13 November 2014)
A team of Cardiff University researchers have made a breakthrough in helping scientists discover hundreds of black holes throughout the universe.

COMET

Mars spacecraft reveal comet flyby effects on Martian atmosphere (7 November 2014)
Two NASA and one European spacecraft that obtained the first up-close observations of a comet flyby of Mars on Oct. 19, have gathered new information about the basic properties of the comet's nucleus and directly detected the effects on the Martian atmosphere.

DARK MATTER

Dark matter may be massive (4 November 2014)
The physics community has spent three decades searching for and finding no evidence that dark matter is made of tiny exotic particles. http://arxiv.org/pdf/1410.2236.pdf

Elusive dark matter may be detected with GPS satellites (17 November 2014)
Andrei Derevianko, of the University of Nevada, Reno, and his colleague Maxim Pospelov, of the University of Victoria and the Perimeter Institute for Theoretical Physics in Canada, have proposed a method for a dark-matter search with GPS satellites and other atomic clock networks that compares times from the clocks and looks for discrepancies.

EARTH

Studying the interaction of the solar wind and Earth's atmosphere from Norway (18 November 2014)
NASA sounding rocket teams and university scientists are conduct experiments to increase the understanding of the interaction of the solar wind with Earth's upper atmosphere.

Van Allen probes spot an impenetrable barrier in space (26 November 2014)
Two donuts of seething radiation that surround Earth, called the Van Allen radiation belts, have been found to contain a nearly impenetrable barrier that prevents the fastest, most energetic electrons from reaching Earth.

EXOPLANETS

Gaia could discover thousands of planets (5 November 2014)
A recently launched European satellite could reveal tens of thousands of new planets within the next few years, and provide scientists with a far better understanding of the number, variety and distribution of planets in our galaxy, according to research published today.

Revolutionary ALMA image reveals planetary genesis (6 November 2014)
An image from ALMA, the Atacama Large Millimeter/submillimeter Array, reveals extraordinarily fine detail that has never been seen before in the planet-forming disc around a young star.

Hubble surveys debris-strewn exoplanetary construction yards (6 November 2014)
Astronomers using NASA's Hubble Space Telescope have completed the largest and most sensitive visible-light imaging survey of dusty debris disks around other stars.

Can Binary Terrestrial Planets Exist? (12 November 2014)
Two bodies, each of mass similar to Earth, can form a closely orbiting pair under certain conditions present during the formation of planetary systems.

How to estimate the magnetic field of an exoplanet? (20 November 2014)
Scientists have developed a new method which allows them to estimate the magnetic field of a distant exoplanet.

GALAXIES

Peering into distant galaxies' star-forming centres (6 November 2014)
Astronomers working to estimate the rate of star formation inside murky distant galaxies, those shrouded in dust clouds that make it very difficult to study them, have published data from a brand new instrument, providing the most precise picture yet of what happened 4 billion years ago at their hidden centres. Link to article

MUSE reveals true story behind galactic crash (10 November 2014)
The new MUSE instrument on ESO's Very Large Telescope (VLT) has provided researchers with the best view yet of a spectacular cosmic crash.

ALMA finds best evidence yet for galactic merger in distant protocluster (10 November 2014)
Nestled among a triplet of young galaxies more than 12.5 billion light-years away is a cosmic powerhouse: a galaxy that is producing stars nearly 1,000 times faster than our own Milky Way.

Primordial galaxy bursts with starry births (12 November 2014)
Peering deep into time with one of the world's newest, most sophisticated telescopes, astronomers have found a galaxy - AzTEC-3 - that gives birth annually to 500 times the number of suns as the Milky Way galaxy, according to a new Cornell University-led study published Nov. 10 in the Astrophysical Journal.

Star making over for these youthful compact galaxies (13 November 2014)
Researchers using NASA's Hubble Space Telescope and Chandra X-ray Observatory have uncovered young, massive, compact galaxies whose star-making is ending early.

The answer is blowing in the intergalactic wind (13 November 2014)
Astronomers from the University of Toronto and the University of Arizona have provided the first direct evidence that an intergalactic "wind" is stripping galaxies of star-forming gas as they fall into clusters of galaxies.

Swift mission probes an exotic object: 'kicked' black hole or mega star? (19 November 2014)
An international team of researchers analysing decades of observations from many facilities, including NASA's Swift satellite, has discovered an unusual source of light in a galaxy some 90 million light-years away.

Sudden appearance of galaxies in the early universe (18 November 2014)
A team of astronomers using the Subaru Telescope's Suprime-Cam to perform the Subaru Ultra-Deep Survey for

Lyman-alpha Emitters have looked back more than 13 billion years to find 7 early galaxies that appeared quite suddenly within 700 million years of the Big Bang.

It's filamentary: how galaxies evolve in the cosmic web (20 November 2014)
How do galaxies like our Milky Way form, and just how do they evolve?

Gas cloud in the galactic centre is part of a larger gas streamer (24 November 2014)
In November, astronomers at the Max Planck Institute for Extraterrestrial Physics presented new observations of the gas cloud G2 in the galactic centre originally discovered in 2011.

New way of measuring distances to galaxies (26 November 2014)
A team of scientists, led by Dr Sebastian Hoenig from the University of Southampton, have developed a new way of measuring precise distances to galaxies tens of millions of light years away, using the W. M. Keck Observatory near the summit of Mauna Kea in Hawaii.

GAMMA-RAY BURST

Unravelling the mystery of gamma-ray bursts (20 November 2014)
A team of scientists hope to trace the origins of gamma-ray bursts with the aid of giant space 'microphones'.

INTERNATIONAL SPACE STATION

Space station crew returns to Earth, lands safely in Kazakhstan (9 November 2014)
Three International Space Station (ISS) crew members returned to Earth Sunday after a 165-day mission that included hundreds of scientific experiments and several spacewalks.

Europe's 3D printer set for space station (13 November 2014)
Europe's very first 3D printer in space is scheduled for installation aboard the ISS next year.

3-D printer powered up on the International Space Station (24 November 2014)
This week, NASA took a big step toward changing the way we plan for long-duration space voyages when astronaut Barry "Butch" Wilmore successfully installed and prepared the first 3-D printer for upcoming manufacturing operations on the International Space Station.

Espresso in space (24 November 2014)
A new cup has been designed specifically to defy the low-gravity environments encountered aboard the International Space Station (ISS).

Assessing the impact of long duration spaceflights on astronauts' brain function (26 November 2014)
Space is one of the most demanding and unforgiving environments. Human exploration of space requires astronauts to maintain consistently high levels of cognitive performance to ensure mission safety and success, and prevent potential errors and accidents.

JUPITER AND MOONS

Jupiter's Red Spot is likely a sunburn, not a blush (11 November 2014)
The ruddy colour of Jupiter's Great Red Spot is likely a product of simple chemicals being broken apart by sunlight in the planet's upper atmosphere, according to a new analysis of data from NASA's Cassini mission.

MANNED SPACE

Synthetic biology for space exploration (5 November 2014)
Does synthetic biology hold the key to manned space exploration of the Moon and Mars?

MARS

Mars has macroweather (13 November 2014)
Weather, which changes day-to-day due to constant fluctuations in the atmosphere, and climate, which varies over decades, is familiar.

Warmth and flowing water on early Mars were episodic (17 November 2014)
Ample evidence of ancient rivers, streams, and lakes make it clear that Mars was at some point warm enough for liquid water to flow on its surface.

Second time through, Mars rover examines chosen rocks (18 November 2014)
NASA's Curiosity Mars rover has completed a reconnaissance "walkabout" of the first outcrop it reached at the base of

the mission's destination mountain and has begun a second pass examining selected rocks in the outcrop in more detail.

METEORITES

Meteorite's magnetic fields reveal how planets formed (13 November 2014)
The most accurate laboratory measurements yet made of magnetic fields trapped in grains within a primitive meteorite are providing important clues to how the early solar system evolved.

MISCELLANEOUS

NASA opens Cube Quest Challenge (24 November 2014)
Registration now is open for NASA's Cube Quest Challenge, the agency's first in-space competition that offers the agency's largest-ever prize purse.

DNA survives critical entry into Earth's atmosphere (26 November 2014)
The genetic material DNA can survive a flight through space and re-entry into the earth's atmosphere – and still pass on genetic information. A team of scientists from UZH obtained these astonishing results during an experiment on the TEXUS-49 research rocket mission.

OORT CLOUD

First observations of the surfaces of objects from the Oort Cloud (10 November 2014)
Astronomers are announcing today the discovery of two unusual objects in comet-like orbits that originate in the Oort cloud but with almost no activity, giving scientists a first look at their surfaces.

PLUTO

New Horizons set to wake up for Pluto encounter (13 November 2014)
NASA's New Horizons spacecraft comes out of hibernation for the last time on Dec. 6.

QUASARS

Alignment of quasars across billions of light-years (19 November 2014)
New observations with ESO's Very Large Telescope (VLT) in Chile have revealed alignments over the largest structures ever discovered in the Universe.

SATURN AND MOONS

Cassini sails into new ocean adventures on Titan (10 November 2014)
NASA's Cassini mission continues its adventures in extraterrestrial oceanography with new findings about the hydrocarbon seas on Saturn's moon Titan.

SOLAR SYSTEM

Baby photos of a scaled-up solar system (10 November 2014)
Scientists at the University of Arizona have discovered what might be the closest thing to "baby photos" of our solar system.

SPACE MISSIONS

Working life extensions for ESA's science missions (20 November 2014)
Continuing operations of ten space science missions have been extended by ESA's Science Programme Committee (SPC).

DSCOVR to observe space weather and Earth from afar (24 November 2014)
The Deep Space Climate Observatory, known as DSCOVR, is a mission lead by the National Oceanic and Atmospheric Administration, or NOAA, in partnership with NASA and the U.S. Air Force, with a primary task to collect measurements to enable space weather forecasting by NOAA.

JUICE mission gets green light for next stage of development (27 November 2014)
Jupiter's icy moons are the focus of Europe's next large science mission, ESA announced today.

STARS AND STAR CLUSTERS

Age of star nursery precisely determined for the first time (17 November 2014)
The precise age of a star-forming cloud has now been determined by a team under the leadership of scientists at the University of Cologne using the GREAT spectrometer on board the SOFIA airborne observatory.

Hubble observations cast further doubt on how globular clusters formed (20 November 2014)
Thanks to the NASA/ESA Hubble Space Telescope, some of the most mysterious cosmic residents have just become even more puzzling.

SUB ORBITAL SPACE

NTSB update on crash of Virgin Galactic SpaceShipTwo (12 November 2014)
The National Transportation Safety Board issued an investigative update today into the crash of SpaceShip Two on Oct. 31, 2014, in Mojave, Calif.

SUPERNOVA

Astronomers dissect the aftermath of a supernova (10 November 2014)
In research published today in the Astrophysical Journal, an Australian led team of astronomers has used radio telescopes in Australia and Chile to see inside the remains of a supernova.

TECHNOLOGY AND TECHNOLOGY TRANSFER

NASA announces early stage innovations space tech research grants (18 November 2014)
NASA has selected 11 university-led proposals for the study of innovative, early stage technologies that address high priority needs of America's space program.

UNIVERSE

Rocket experiment finds the universe brighter than we thought (6 November 2014)
A NASA sounding rocket experiment has detected a surprising surplus of infrared light in the dark space between galaxies, a diffuse cosmic glow as bright as all known galaxies combined.

ASU joins pathbreaking radio telescope project to study early universe (24 November 2014)
Arizona State University has joined with 14 other institutions in Australia, India, New Zealand and the United States in a radio telescope project that focuses on the early universe and the birth and formation of the first galaxies.

VENUS

Venus Express will raise orbit and keep going (26 November 2014)
Between 23 and 30 November the operations team at ESOC will conduct manoeuvres to raise the pericentre of the Venus Express (VEX) orbit again, in an effort to keep the spacecraft in productive orbit around Venus.

Pat Williams. November 2014