

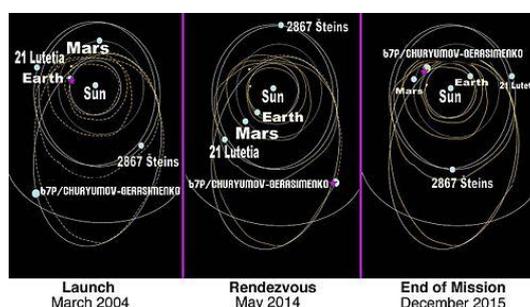
# Space News Update – January 2014

By Pat Williams

## In January's Space News Update:

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## Going Up, Going Down or Going Around – A Preview to Space 2014.



27 February 2014. The first NASA Earth science mission of 2014 is the Global Precipitation Measurement (GPM) Core Observatory, a joint satellite project with the Japan Aerospace Exploration Agency (JAXA). The mission inaugurates an unprecedented international satellite constellation that will produce the first nearly global observations of rainfall and snowfall. This new information will help answer questions about our planet's life-sustaining water cycle, and improve water resource management and weather forecasting. For the first time in more than a decade, **five NASA Earth science missions** will be launched into space in the same year, opening new and improved remote eyes to monitor our changing planet. For details of this and the other launches please visit:

<http://www.nasa.gov/press/2014/january/nasa-set-for-a-big-year-in-earth-science-with-five-new-missions-0/>

August 2014. The European Space Agency's comet interceptor **Rosetta** will rendezvous with *Comet 67P/Churyumov-Gerasimenko* just inside the orbit of Jupiter. Launched in 2004, the [Rosetta probe](#) will catch up with its target comet at long last. Scientists woke Rosetta from its deep hibernation on Jan. 20, 2014 to prepare it for the next phase of its \$1.4 billion mission. When the probe is less than 1.2 million miles (2 million kilometers) away from the comet, it will start to image more detailed photos of the comet, gathering further information for the spacecraft's eventual rendezvous.

September 2014. Both [India's Mars orbiter Mangalyaan](#) and NASA's **MAVEN** mission <http://www.nasa.gov/content/maven-seeks-to-solve-another-mars-riddle/> are expected to get into their orbits around *Mars*. **Mangalyaan**, India's first Mars probe, is designed to beam back images of **Mars'** surface and hunt for methane in the planet's atmosphere. MAVEN is going to investigate the Martian atmosphere and help piece together the history of how the Red Planet lost its atmosphere.

September 2014. NASA is planning on launching a test flight of their [Orion spacecraft](#) - a new crew-carrying capsule expected to bring astronauts to **Mars** and other deep space destinations. For the test flight, **Orion** will plunge through the atmosphere so that engineers can assess the capsule's heat shield. Orion is also expected to make a parachute-aided splashdown in the Pacific Ocean. This unpowered test flight will be launched atop a Delta IV Heavy rocket from Florida's Cape Canaveral Air Force Station. Eventually, the capsule will be boosted into space by NASA's Space Launch System rocket, a heavy-lifting booster in development now.

November 2014. The Rosetta probe is scheduled to deploy the **Philae lander** to the surface of the *comet*. The lander is expected to beam back unprecedented views from its position on the 2.4-mile diameter (4 km) comet.

2014. At the end of 2013 China became the third country to make a soft landing on the *Moon* with their [Chang'e 3 lander](#), so its science operations should start gearing up this year. The **Yutu** (Jade Rabbit) rover deployed by the

lander will use a robotic arm to collect lunar dust samples for analysis, and it will beam back photos of the Moon's surface to Earth.

2014. A NASA spacecraft set to continue its mission was already orbiting the *Moon* as Chang'e 3 touched down. The Lunar Atmosphere and Dust Environment Explorer mission (**LADEE**) is tasked with investigating the Moon's extremely thin atmosphere and probing the dust environment of the natural satellite.

[http://www.nasa.gov/mission\\_pages/ladee/main/](http://www.nasa.gov/mission_pages/ladee/main/) It will continue its science operations into 2014.

2014. Other probes like the **Lunar Reconnaissance Orbiter** <http://lro.gsfc.nasa.gov/> and the twin **Artemis probes** are still circling the *Moon* and sending back data to Earth as well. <http://www.nasa.gov/content/chinas-lunar-lander-may-provide-additional-science-for-nasa-spacecraft/>

2014. The recently launched **Gaia** <http://sci.esa.int/gaia/> might change the way scientists look at the *universe*. The European Space Agency probe is tasked with creating the most precise 3D map of the *Milky Way* ever produced. The twin telescopes on the spacecraft are expected to map 1 billion stars in the galaxy and even map smaller objects like alien planets circling those stars. The \$1 billion mission will enter into its five year science mission after a four month commissioning phase.

2014. **Space Tourism**. Virgin Galactic made huge strides in 2013 with supersonic rocket-powered test flights of its commercial [SpaceShipTwo spacecraft](#), which promises to fly passengers on *suborbital spaceflights* for \$250,000 a ticket. The company is expected to build on that success in 2014, potentially with its first flights into space. Several other companies, such as XCOR Aerospace, Sierra Nevada Corp., Blue Origin and Boeing, are developing commercial spacecraft for various uses, and should also make more progress in 2014.

## GETTING READY FOR THE ASTEROIDS

With a mandate from the UN, ESA and other space agencies from around the world are about to establish a high-level group to help coordinate global response should a threatening asteroid ever be found heading towards Earth. Dramatic proof that these can strike Earth came on 15 February 2013, when an unknown object thought to be 17–20 m in diameter arrived at 66 000 km/h and exploded high above Chelyabinsk, Russia, with 20–30 times the energy of the Hiroshima atomic bomb.



[http://www.esa.int/Our\\_Activities/Operations/Space\\_Situational\\_Awareness/Getting\\_ready\\_for\\_asteroids/](http://www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/Getting_ready_for_asteroids/)

31 January 2014 – Source: ESA

## HERSCHEL DISCOVERS WATER AROUND THE DWARF PLANET CERES

ESA's Herschel space observatory has discovered water vapour around Ceres, the first unambiguous detection of water vapour around an object in the asteroid belt. With a diameter of 950 km, Ceres is the largest object in the asteroid belt, which lies between the orbits of Mars and Jupiter. But unlike most asteroids, Ceres is almost spherical and belongs to the category of 'dwarf planets', which also includes Pluto. It is the only dwarf planet in the inner Solar System.

[http://www.esa.int/Our\\_Activities/Space\\_Science/Herschel/Herschel\\_discovers\\_water\\_vapour\\_around\\_dwarf\\_planet\\_Ceres](http://www.esa.int/Our_Activities/Space_Science/Herschel/Herschel_discovers_water_vapour_around_dwarf_planet_Ceres)

22 January 2014 – Source: ESA

## SUPERNOVA DUST FACTORY

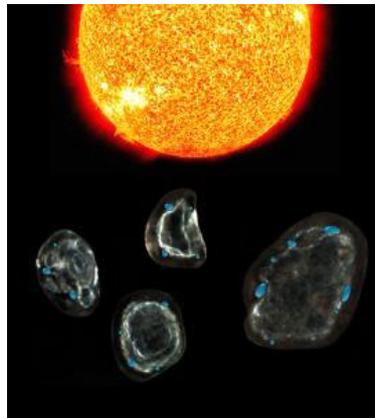
The Atacama Large Millimetre/sub millimetre Array (ALMA) telescope captured, for the first time, the remains of a recent supernova brimming with freshly formed dust. Galaxies can be remarkably dusty places and supernovae are thought to be a primary source of that dust, especially in the early Universe. But direct evidence of a supernova's dust-making capabilities has been slim up to now, and could not account for the copious amount of dust detected in young, distant galaxies. But now observations with ALMA are changing that.

<http://www.eso.org/public/unitedkingdom/news/eso1401/>

06 January 2014 – Source: ESO

## INTERPLANETARY DUST PARTICLES COULD DELIVER WATER AND ORGANICS TO EARTH

Interplanetary dust, dust that has come from comets, asteroids, and leftover debris from the birth of the solar system, continually rains down on the Earth and other Solar System bodies. These particles are bombarded by solar wind, predominately hydrogen ions. This ion bombardment knocks the atoms out of order in the silicate mineral crystal and leaves behind oxygen that is more available to react with hydrogen, for example, to create water molecules.



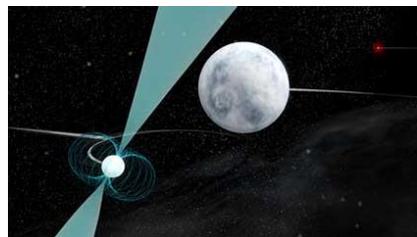
Interplanetary dust particles carry water generated with hydrogen solar wind. Credit: John Bradley

<http://www.hawaii.edu/news/article.php?ald=6249>

24 January 2014 – Source: The University of Hawaii

## PULSAR IN A STELLAR TRIPLE SYSTEM MAKES A UNIQUE GRAVITATIONAL LABORATORY

The true nature of gravity is one of the outstanding problems of fundamental physics. Astronomers using the National Science Foundation's Green Bank Telescope (GBT) have discovered a unique stellar system of two white dwarf stars and a superdense neutron star, all packed within a space smaller than Earth's orbit around the Sun. The closeness of the stars, combined with their nature, has allowed the scientists to make the best measurements yet of the complex gravitational interactions in such a system.



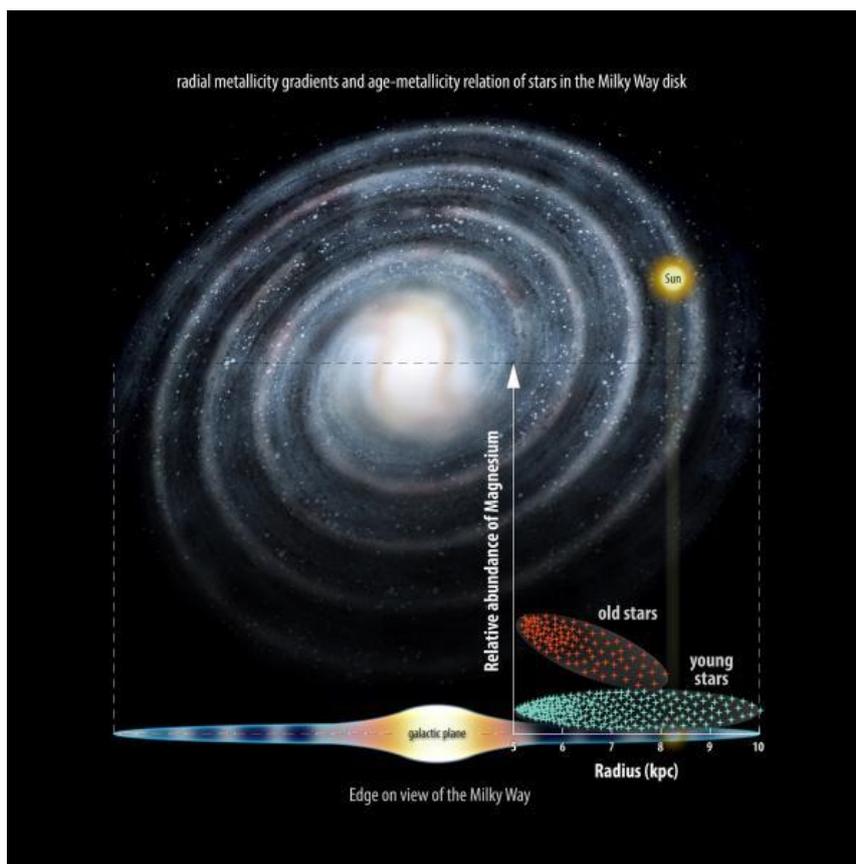
Millisecond pulsar, left foreground, is orbited by a hot white dwarf star, centre, both of which are orbited by another, more-distant and cooler white dwarf, top right. (Courtesy: Bill Saxton; NRAO/AUI/NSF)

<https://public.nrao.edu/news/pressreleases/pulsar-in-stellar-triple-system>

05 January 2014 – Source: NRAO

## THE MILKY WAY – DID IT FORM INSIDE-OUT?

Research on first data release from Gaia-ESO project suggests the Milky Way formed by expanding out from the centre, and reveals new insights into the way our Galaxy was assembled.



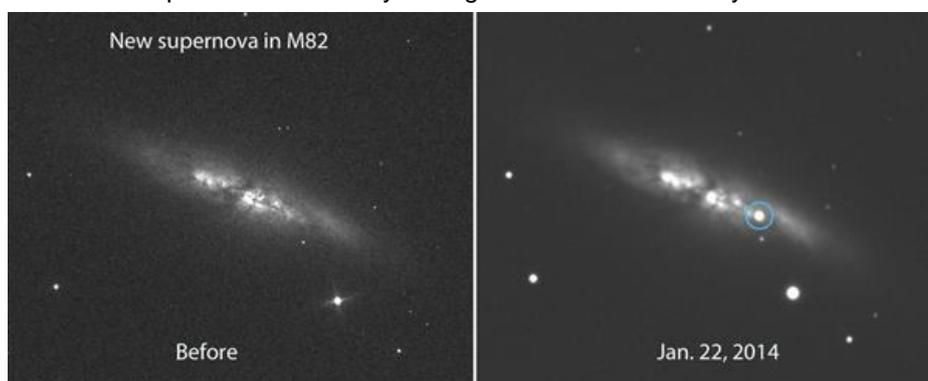
Radial metallicity gradients and age-metallicity relation of stars in the Milky Way (courtesy: University of Cambridge)

<http://www.cam.ac.uk/research/news/gaia-eso-data-show-milky-way-may-have-formed-inside-out-and-provide-new-insight-into-galactic>

20 January 2014 – Source: NRAO

## NEW SUPERNOVA IN M82

Supernova 2014J was spotted by four undergraduate students observing galaxy M82 while astronomer Steve Fossey taught them how to use a telescope at the University College London Observatory on Jan. 21.



Before and after photos of the galaxy M82 showing the appearance of a brand new 11.7 magnitude supernova. The object is located in the galaxy's plane 54" west and 21" south of its centre.

E. Guido, N. Howes, M. Nicolini

<http://www.astronomy.com/observing/sky-events/2014/01/bright-new-supernova-blows-up-in-the-cigar-galaxy-m82>

<http://www.cbat.eps.harvard.edu/lists/RecentSupernovae.html>

<http://www.cbat.eps.harvard.edu/unconf/followups/J09554214+6940260.html>