

Space News Update – April 2015

By Pat Williams

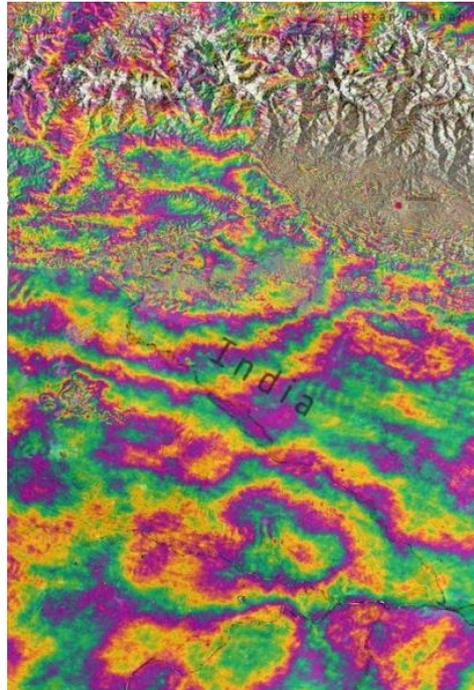
IN THIS EDITION:

- Nepal earthquake – satellite images help emergency organisations.
- Scotland's Clyde Space turns to ocean monitoring.
- MESSENGER completes mission with impact on Mercury's surface.
- New Horizons to encounter with Pluto on 14th July.
- Russian resupply ship to ISS is experiencing difficulties.
- Black holes don't erase information.
- Links to other space and astronomy news published in April 2015.

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

THIS EDITION AND ALL FUTURE EDITIONS WILL BE IN WORD FORMAT TO ENABLE READERS TO CUT AND PASTE ITEMS OF PERSONAL INTEREST.

NEPAL EARTHQUAKE – SATELLITE IMAGES HELP EMERGENCY ORGANISATIONS



*Combining two Sentinel-1A radar scans from 17 and 29 April 2015, this interferogram shows changes on the ground that occurred during the 25 April earthquake that struck Nepal. An overall area of 120x100 km has moved – half of that uplifted and the other half, north of Kathmandu subsided. Vertical accuracy is a few cm.
(Courtesy: Copernicus/ESA/Norut/PPO.labs/COMET-ESA SEOM INSARAP study)*

On 25 April, a 7.8-magnitude earthquake struck Nepal, claiming over 5000 lives and affecting millions of people. Satellite images are being used to support emergency aid organisations, while geo-scientists are using satellite measurements to analyse the effects of the earthquake on the land. Radar imagery from the Sentinel-1A satellite shows that the maximum land deformation is only 17 km from Nepal's capital, Kathmandu, which explains the extremely high damage experienced in this area. By combining Sentinel-1A imagery acquired before and after the quake, changes on the ground that occurred between the two acquisition dates lead to rainbow-coloured interference patterns in the combined image, known as an 'interferogram', enabling scientists to quantify the ground movement. [Nepal earthquake on the radar](#) (29 April 2015)

SCOTLAND'S CLYDE SPACE TURNS TO OCEAN MONITORING

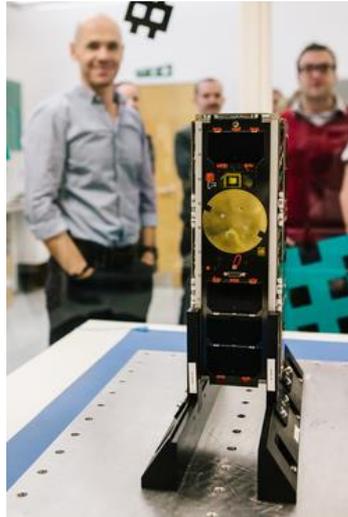
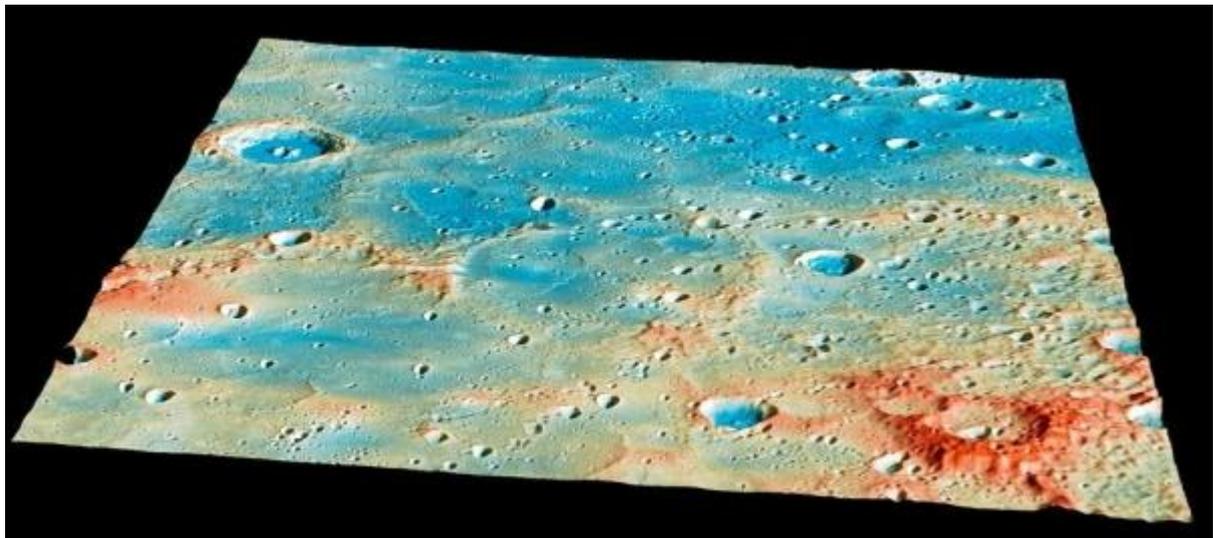


Image of 3U CubeSat UKUbe-1

CLYDE SPACE, the pioneering company which designed and manufactured Scotland's first satellite, is collaborating with a prestigious American university and a team of leading US-based scientists to develop a "game-changer" in vital new technology to study ocean biology. The Glasgow company announced today it is building CubeSats to observe the changing biology of the surface ocean and its implications for the marine food chain, climate scientists, fisheries and coastal resource managers, and a range of other experts from the military to oil spill responders. [Clyde Space links with top American university to produce "game-changing" ocean monitoring](#) (21 April 2015)

MESSENGER COMPLETES MISSION WITH IMPACT ON MERCURY'S SURFACE



The large, 400-kilometer-diameter (250-mile-diameter), impact basin "Shakespeare" where MESSENGER ended its mission when it crashed into the surface of Mercury, occupies the bottom left quarter of this image. (courtesy: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington)

After extraordinary science findings and technological innovations, a NASA spacecraft launched in 2004 to study Mercury impacted the planet's surface. The planetary exploration mission came to a planned, but nonetheless dramatic, end. The robotic spacecraft MESSENGER ran out of fuel. With no way to make major adjustments to its orbit around the planet Mercury, the probe smashed into the

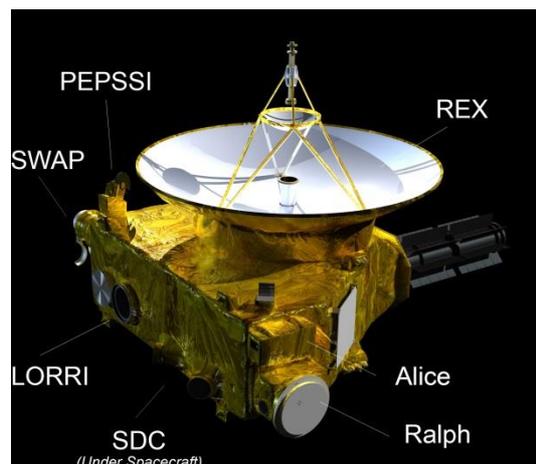
surface at more than 8,750 miles per hour (3.91 kilometers per second). The impact added a new crater to the planet's scarred face that engineers estimate was as wide as 52 feet (16 meters).

[MESSENGER completes mission with impact on Mercury's surface](#) (30 April 2015)

Although Mercury is one of Earth's nearest planetary neighbors, little was known about the planet prior to the MESSENGER mission. The spacecraft traveled more than six and a half years before it was inserted into orbit around Mercury on March 18, 2011. The prime mission was to orbit the planet and collect data for one Earth year. The spacecraft's healthy instruments, remaining fuel, and new questions raised by early findings resulted in two approved operations extensions, allowing the mission to continue for almost four years and resulting in more scientific firsts. One key science finding in 2012 provided compelling support for the hypothesis that Mercury harbors abundant frozen water and other volatile materials in its permanently shadowed polar craters. In addition to science discoveries, the mission provided many technological firsts, including the development of a vital heat-resistant and highly reflective ceramic cloth sunshade that isolated the spacecraft's instruments and electronics from direct solar radiation – vital to mission success given Mercury's proximity to the sun. The technology will help inform future designs for planetary missions within our solar system. The front side of the sunshade routinely experienced temperatures in excess of 300° Celsius (570° Fahrenheit), whereas the majority of components in its shadow routinely operated near room temperature (20°C or 68°F). This technology to protect the spacecraft's instruments was a key to mission success during its prime and extended operations.

[NASA spacecraft achieves unprecedented success studying Mercury](#) (16 April 2015)

[NEW HORIZONS TO ENCOUNTER WITH PLUTO ON 14TH JULY](#)



The New Horizons science payload consists of seven instruments – three optical instruments, two plasma instruments, a dust sensor and a radio science receiver/radiometer. This payload was designed to investigate the global geology, surface composition and temperature, and the atmospheric pressure, temperature and escape rate of Pluto and its moons. If an extended mission is approved, the instruments will probe additional Kuiper Belt Objects that the spacecraft can reach. The payload is incredibly power efficient – with the instruments collectively drawing less than 28 watts – and represents a degree of miniaturization that is unprecedented in planetary exploration. The instruments were designed specifically to handle the cold conditions and low light levels at Pluto and in the Kuiper Belt beyond.

Speeding toward a historic flyby on July 14 NASA's New Horizons spacecraft has moved into the second phase of its approach to Pluto and its moons, beginning a series of observations and activities that will bring these distant, icy worlds into sharper focus than humankind has ever seen.

[Inside 100 days to New Horizons encounter with Pluto](#) (6 April 2015)

RUSSIAN RESUPPLY SHIP TO ISS EXPERIENCING DIFFICULTIES

The ISS Progress 59 cargo spacecraft launched successfully from the Baikonur Cosmodrome at 3:09 a.m. (1:09 p.m. in Kazakhstan) Tuesday on a Soyuz rocket bound for the space station. Right after it separated from the Soyuz booster's third stage, an unspecified problem prevented Russian flight controllers from determining whether navigational antennas had deployed and whether fuel system manifolds had pressurized as planned. When flight controllers initially could not confirm deployment of the antennas in the minutes following its launch, they selected the backup rendezvous plan of two days and 34 orbits instead of the planned four-orbit, six-hour rendezvous. During the spacecraft's first four Earth orbits, the Russian flight control team made several unsuccessful attempts to confirm the status of the spacecraft's systems but were unable to receive telemetry from some spacecraft systems. As a result, ISS flight controllers informed the crew a docking attempt to the station has been postponed.

The spacecraft was not carrying any supplies critical for the United States Operating Segment (USOS) of the station. Both the Russian and USOS segments of the station continue to operate normally and are adequately supplied well beyond the next planned resupply flight. The next mission scheduled to deliver cargo to the station is the seventh SpaceX commercial resupply services mission targeted for launch no earlier than June 19. It will carry about 5,000 pounds of science investigations and supplies. The cargo of Progress 59 includes more than three tons of food, fuel, and supplies for the space station crew, including 1,940 pounds of propellant, 110 pounds of oxygen, 926 pounds of water, and 3,128 pounds of spare parts, supplies and scientific experiment hardware. Among the U.S. supplies on board are spare parts for the station's environmental control and life support system, backup spacewalk hardware, and crew clothing, all of which are replaceable.

[Russian resupply ship to ISS experiencing difficulties](#) (28 April 2015)

The six crew members of the International Space Station (ISS) are safe and continuing regular operations with sufficient supplies.

BLACK HOLES DON'T ERASE INFORMATION



An artist's impression shows the surroundings of a supermassive black hole at the heart of the active galaxy NGC 3783 in the southern constellation of Centaurus. A new University at Buffalo study finds that information is not lost once it has entered a black hole. Credit: ESO/M. Kornmesser

Send information into a black hole, and it's lost forever. That's what some physicists have argued for years that black holes are the ultimate vaults, entities that suck in information and then evaporate without leaving behind any clues as to what they once contained. Instead of looking only at the particles a black hole emits, the study also takes into account the subtle interactions between the particles. By doing so, the research finds that it is possible for an observer standing outside of a black hole to recover information about what lies within. Interactions between particles can range from gravitational attraction to the exchange of mediators like photons between particles. Such "correlations" have long been known to exist, but many scientists discounted them as unimportant in

the past. "These correlations were often ignored in related calculations since they were thought to be small and not capable of making a significant difference," Stojkovic says. "Our explicit calculations show that though the correlations start off very small, they grow in time and become large enough to change the outcome."

[Black holes don't erase information](#) (2 April 2015)

LINKS TO OTHER SPACE AND ASTRONOMY NEWS PUBLISHED IN APRIL 2015

ASTEROIDS

[Asteroid Juno seen traveling through space](#) (7 April 2015)

A series of images made with the Atacama Large Millimeter/submillimeter Array (ALMA) provides an unprecedented view of the surface of Juno, one of the largest members of our solar system's main asteroid belt.

[Design begins for ESA's asteroid impact mission](#) (15 April 2015)

European industry has begun work on dual concept studies to design an innovative Asteroid Impact Mission for ESA.

[Tracking Japan's asteroid impact mission](#) (29 April 2015)

ESA is set to support Japan's 'touch-and-go' Hayabusa-2 spacecraft, now en route to a little-known asteroid, helping to boost the scientific return from this audacious mission.

ASTROPHYSICS

[Examining Einstein – precise experiments using lasers in space](#) (23 April 2015)

Tests carried out in zero-gravity on board the FOKUS research rocket. Successful demonstration of technology for the QUANTUS mission.

[Water could have been abundant in the first billion years](#) (28 April 2015)

How soon after the Big Bang could water have existed? Not right away, because water molecules contain oxygen and oxygen had to be formed in the first stars.

BLACK HOLES

[Flip-flopping black holes spin to the end of the dance](#) (9 April 2015)

When black holes tango, one massive partner spins head over heels (or in this case heels over head) until the merger is complete, said researchers at Rochester Institute of Technology in a paper published in Physical Review Letters.

[ALMA reveals intense magnetic field close to supermassive black hole](#) (16 April 2015)

The Atacama Large Millimetre/submillimeter Array (ALMA) has revealed an extremely powerful magnetic field, beyond anything previously detected in the core of a galaxy, very close to the event horizon of a supermassive black hole.

[Black hole hunters tackle a cosmic conundrum](#) (20 April 2015)

Dartmouth astrophysicists and their colleagues have not only proven that a supermassive black hole exists in a place where it isn't supposed to be, but in doing so have opened a new door to what things were like in the early universe.

[Planet-sized 'virtual telescope' expands to the South Pole to observe black holes in detail](#)

(21 April 2015)

Astronomers building a globe-spanning virtual telescope capable of photographing the "event horizon" of the black hole at the centre of our Milky Way have extended their instrument to incorporate the South Pole Telescope (SPT), a 280-ton radio telescope located at the National Science Foundation's (NSF) Amundsen-Scott South Pole Station in Antarctica.

[Chandra suggests black holes gorging at excessive rates](#) (30 April 2015)

A group of unusual giant black holes may be consuming excessive amounts of matter, according to a new study using NASA's Chandra X-ray Observatory.

COMET

[Rosetta and Philae find comet not magnetised](#) (14 April 2015)

Measurements made by Rosetta and Philae during the probe's multiple landings on Comet 67P/Churyumov-Gerasimenko show that the comet's nucleus is not magnetised.

[Mysterious dust jet from Comet 67P/Churyumov-Gerasimenko](#) (20 April 2015)

Comets eject gas and dust into space. Primarily, this takes place on the areas of the comet's surface exposed to direct sunlight.

DARK MATTER

[Dark Energy Survey creates detailed guide to spotting dark matter](#) (13 April 2015)

Scientists on the Dark Energy Survey have released the first in a series of dark matter maps of the cosmos.

[First signs of self-interacting dark matter?](#) (15 April 2015)

For the first time dark matter may have been observed interacting with other dark matter in a way other than through the force of gravity

DWARF PLANETS

[Dawn in excellent shape one month after Ceres arrival](#) (6 April 2015)

Since its capture by the gravity of dwarf planet Ceres on March 6, NASA's Dawn spacecraft has performed flawlessly, continuing to thrust with its ion engine as planned.

[Ceres color map reveals surface diversity](#) (13 April 2015)

A new colour map of dwarf planet Ceres, which NASA's Dawn spacecraft has been orbiting since March, reveals the diversity of the surface of this planetary body.

[Vesta – Ceres' little sister](#) (20 April 2015)

Only around 60 million kilometres closer to the Sun than Ceres, another large rock is orbiting in the remote asteroid belt: Vesta.

EARTH

[Proba-2 looks typhoon Maysak in the eye](#) (2 April 2015)

Typhoon Maysak churning across the Pacific Ocean, as snapped from space by an experimental ESA camera smaller than an espresso cup.

[Heart of the black auroras revealed by Cluster](#) (9 April 2015)

Most people have heard of auroras - more commonly known as the Northern and Southern Lights - but, except on rare occasions, such as the recent widespread apparition on 17 March, they are not usually visible outside the Polar Regions.

[Fast access to Cryosat's arctic ice measurements now available](#) (17 April 2015)

ESA's ice mission has become the first satellite to provide information on Arctic sea-ice thickness in near-real time to aid maritime activities in the polar region.

[ISS-RapidScat wind data proving valuable for tropical cyclones](#) (21 April 2015)

The ISS-RapidScat instrument has been in orbit seven months, and forecasters are already finding this new eye-in-the-sky helpful as they keep watch on major storms around the globe.

[Soil moisture mission produces first global maps](#) (21 April 2015)

With its antenna now spinning at full speed, NASA's new Soil Moisture Active Passive (SMAP) observatory has successfully re-tested its science instruments and generated its first global maps, a key step to beginning routine science operations next month.

[Earthquake felt from space](#) (23 April 2015)

For the first time, a natural source of infrasonic waves of Earth has been measured directly from space—450 kilometres above the planet's surface.

[Four technologies enable ambitious MMS mission](#) (28 April 2015)

It was unprecedented developing a mission that could fly four identically equipped spacecraft in a tight formation and take measurements 100 times faster than any previous space mission — an achievement enabled in part by four NASA-developed technologies that in some cases took nearly 10 years to mature.

[Revealing mountains hiding under ice](#) (29 April 2015)

Results from a recent field campaign, which was organised to help investigate the potential of a new Earth observation mission concept, have provided a unique 3D glimpse of the peaks and troughs under the Mittelbergferner glacier in the Austrian Alps.

EXOPLANETS

[Small solar eruptions can have profound effects on unprotected planets](#) (9 April 2015)

While no one yet knows what's needed to build a habitable planet, it's clear that the interplay between the sun and Earth is crucial for making our planet liveable – a balance between a sun that provides energy and a planet that can protect itself from the harshest solar emissions.

[An exoplanet with an infernal atmosphere](#) (10 April 2015)

As part of the PlanetS National Centre of Competence in Research (NCCR), astronomers from the Universities of Geneva (UNIGE) and Bern, Switzerland, have come to measure the temperature of the atmosphere of an exoplanet with unequalled precision, by crossing two approaches

[Spitzer spots planet deep within our galaxy](#) (14 April 2015)

NASA's Spitzer Space Telescope has teamed up with a telescope on the ground to find a remote gas planet about 13,000 light-years away, making it one of the most distant planets known.

[Search for advanced civilisations beyond Earth finds nothing obvious in 100,000 galaxies](#)

(14 April 2015)

After searching 100,000 galaxies for signs of highly advanced extraterrestrial life, a team of scientists using observations from NASA's WISE orbiting observatory has found no evidence of advanced civilisations in them.

[Planet formation relied on sweeping up of small glassy beads](#) (17 April 2015)

New research proposes that chondrules, small glassy beads that make up the bulk of the most primitive meteorites, played a crucial role in the formation of planets.

[Astronomers probe young star and its planets](#) (20 April 2015)

Astronomers have probed deeper than before into a planetary system 130 light-years from Earth.

[NASA GISS to help lead search for habitable exoplanets](#) (21 April 2015)

NASA announced this week the creation of the Nexus for Exoplanet Systems Science (NExSS) network that will study planets beyond our solar system for habitability and other features tapping the expertise of researchers at NASA's Goddard Institute for Space Studies (GISS), Goddard Space Flight Centre and other locations.

[First exoplanet visible light spectrum](#) (22 April 2015)

Astronomers using the HARPS planet-hunting machine at ESO's La Silla Observatory in Chile have made the first-ever direct detection of the spectrum of visible light reflected off an exoplanet.

[Tau Ceti: The next Earth? Probably not](#) (22 April 2015)

As the search continues for Earth-size planets orbiting at just the right distance from their star, a region termed the habitable zone; the number of potentially life-supporting planets grows.

[Robotically discovering Earth's nearest neighbours](#) (28 April 2015)

A team of astronomers using ground-based telescopes in Hawai'i, California and Arizona recently discovered a planetary system orbiting a nearby star that is only 54 light-years away.

FUTURE MISSIONS

[Space missions taking account of fast-changing chemical world](#) (10 April 2015)

Future space missions being designed right now might require serious modifications as new limits are placed on commonly used chemicals.

[Astro Aerospace delivers James Webb Space Telescope Deployable Tower Assembly](#)

(14 April 2015)

Northrop Grumman Corporation reached another major milestone for NASA's James Webb Space Telescope this week, with the delivery of the Deployable Tower Assembly (DTA).

[LSST lays first stone](#) (14 April 2015)

A new ground-based telescope promises unprecedented information about distant galaxies, nearby asteroids and even the mysterious dark energy that is accelerating the expansion of our universe.

GALAXIES

[Dusty substructure in a galaxy far far away](#) (1 April 2015)

Scientists at the Max Planck Institute for Astrophysics (MPA) have combined high-resolution images from the ALMA telescopes with a new scheme for undoing the distorting effects of a powerful gravitational lens in order to provide the first detailed picture of a young and distant galaxy, over 11 billion light-years from Earth.

[Our Sun came late to the Milky Way's star-birth party](#) (9 April 2015)

In one of the most comprehensive multi-observatory galaxy surveys yet, astronomers find that galaxies like our Milky Way underwent a stellar "baby boom," churning out stars at a prodigious rate, about 30 times faster than today.

[Giant galaxies die from the inside out](#) (16 April 2015)

Astronomers have shown for the first time how star formation in "dead" galaxies sputtered out billions of years ago.

[Runaway galaxies](#) (23 April 2015)

We know of about two dozen runaway stars, and have even found one runaway star cluster escaping its galaxy forever.

[Giant cosmic tsunami wakes up comatose galaxies](#) (24 April 2015)

Galaxies are often found in clusters, with many 'red and dead' neighbours that stopped forming stars in the distant past.

[Riddle of galactic thin-thick disk solved](#) (24 April 2015)

A long-standing puzzle regarding the nature of disk galaxies has finally been solved by a team of astronomers led by Ivan Minchev from the Leibniz Institute for Astrophysics Potsdam (AIP), using state-of-the-art theoretical models.

[NuSTAR captures possible 'screams' from zombie stars](#) (29 April 2015)

Peering into the heart of the Milky Way galaxy, NASA's Nuclear Spectroscopic Telescope Array (NuSTAR) has spotted a mysterious glow of high-energy X-rays that, according to scientists, could be the "howls" of dead stars as they feed on stellar companions.

[Researcher's guide to the galaxy](#) (28 April 2015)

Using data on the motion of distant galaxies, a post-doctoral fellow at the University of Alberta has developed a new classification system for galaxies based on the movements of their stars.

GAMMA-RAY BURST

[Cosmic debris: Study looks inside the universe's most powerful explosions](#) (10 April 2015)

A new study provides an inside look at the most powerful explosions in the universe: gamma-ray bursts.

INTERNATIONAL SPACE STATION

[Ruptured discs in space](#) (2 April 2015)

For astronauts, being in outer space means adapting everyday tasks to a weightless environment. Once they return to earth, astronauts may find that they not only struggle to perform these same tasks, but they also face an increased risk of back pain and injury.

[Research for one-year space station mission among NASA cargo launched on SpaceX resupply flight](#)

(14 April 2015)

Research that will help prepare NASA astronauts and robotic explorers for future missions to Mars is among the two tons of cargo now on its way to the International Space Station (ISS) aboard SpaceX's Dragon spacecraft.

JUPITER AND MOONS

[Missing wave near Jupiter's equator identified](#) (17 April 2015)

In the clouds of Jupiter, scientists have found evidence of a type of atmospheric wave that had long been proposed but had not been identified in images before now.

[Giant telescope takes close look at Jupiter's moon](#) (30 April 2015)

With the first detailed observations through imaging interferometry of a lava lake on a moon of Jupiter, the Large Binocular Telescope Observatory places itself as the forerunner of the next generation of Extremely Large Telescopes.

MARS

[Curiosity eyes prominent mineral veins on Mars](#) (1 April 2015)

Two-tone mineral veins at a site NASA's Curiosity rover has reached by climbing a layered Martian mountain offer clues about multiple episodes of fluid movement.

[Mars has belts of glaciers consisting of frozen water](#) (7 April 2015)

Mars has distinct polar ice caps, but Mars also has belts of glaciers at its central latitudes in both the southern and northern hemispheres.

[Mars might have liquid water](#) (13 April 2015)

Researchers have long known that there was water in the form of ice on Mars.

MERCURY

[Altimeter assists in MESSENGER's low-altitude navigation](#) (13 April 2015)

As NASA's MESSENGER mission draws to a close, an on-board science instrument that mapped the surface of Mercury is helping the navigation team with the spacecraft's low-altitude passes.

[Rethinking how Mercury formed](#) (15 April 2015)

A versatile instrument developed by Lawrence Livermore National Laboratory (LLNL) scientists and riding on the first spacecraft to ever orbit Mercury is causing researchers to rethink their theories on the planet's formation.

[NASA spacecraft achieves unprecedented success studying Mercury](#) (16 April 2015)

After extraordinary science findings and technological innovations, a NASA spacecraft launched in 2004 to study Mercury will impact the planet's surface, most likely on April 30, after it runs out of propellant.

MOON

[A new view of the moon's formation](#) (8 April 2015)

Within the first 150 million years after our solar system formed, a giant body roughly the size of Mars struck and merged with Earth, blasting a huge cloud of rock and debris into space. This cloud would eventually coalesce and form the moon.

PLUTO

[New Horizons spacecraft nears July 14 encounter with Pluto](#) (14 April 2015)

NASA's New Horizons spacecraft is three months from returning to humanity the first-ever close up images and scientific observations of distant Pluto and its system of large and small moons.

[New Horizons detects surface features, possible polar cap on Pluto](#) (29 April 2015)

For the first time, images from NASA's New Horizons spacecraft are revealing bright and dark regions on the surface of faraway Pluto – the primary target of the New Horizons close flyby in mid-July.

QUASARS

[Hubble finds phantom objects near dead quasars](#) (2 April 2015)

NASA's Hubble Space Telescope has photographed a set of wispy, goblin-green objects that are the ephemeral ghosts of quasars that flickered to life and then faded.

SATURN AND MOONS

[Saturn's epic tantrums](#) (13 April 2015)

The long-standing mystery of why Saturn seethes with enormous storms every 30 years may have been solved by scientists working with data from NASA's Cassini mission.

[Violent methane storms on Titan may solve dune direction mystery](#) (13 April 2015)

With its thick, hazy atmosphere and surface rivers, mountains, lakes and dunes, Titan, Saturn's largest moon, is one of the most Earth-like places in the solar system.

[Icy tendrils reaching into Saturn ring traced to their source](#) (14 April 2015)

Long, sinuous, tendril-like structures seen in the vicinity of Saturn's icy moon Enceladus originate directly from geysers erupting from its surface, according to scientists studying images from NASA's Cassini spacecraft.

STARS AND STAR CLUSTERS

[Astronomers solve decades-long mystery of the "lonely old stars"](#) (1 April 2015)

Many, perhaps most, stars in the Universe live their lives with companions by their sides – in so-called binary systems.

[Astronomers watch unfolding saga of massive star formation](#) (2 April 2015)

A pair of images of a young star, made 18 years apart, has revealed a dramatic difference that is providing astronomers with a unique, "real-time" look at how massive stars develop in the earliest stages of their formation.

[Complex organic molecules discovered in infant star system](#) (8 April 2015)

For the first time, astronomers have detected the presence of complex organic molecules, the building blocks of life, in a protoplanetary disc surrounding a young star.

[First real-time observation of onset of stellar jets during formation of a massive protostar](#)

(8 April 2015)

An international team of astronomers, in which some UB researchers collaborate, has first observed the moment in which a massive protostar begins to develop jets of matter and energy, crucial for star formation.

[Stars with the chemical clock on hold](#) (10 April 2015)

An international team of astrophysicists, led by Cristina Chiappini from the Leibniz Institute for Astrophysics Potsdam, has discovered a group of red giant stars for which the 'chemical clock' does not work: according to their chemical signature, these stars should be old.

[Protosuns teeming with prebiotic molecules](#) (15 April 2015)

Complex organic molecules such as formamide, from which sugars, amino acids and even nucleic acids essential for life can be made, already appear in the regions where stars similar to our Sun are born.

[New details about star formation in ancient galaxy protoclusters](#) (20 April 2015)

Ongoing studies of distant galaxy protoclusters using the Multi-Object Infrared Camera and Spectrograph (MOIRCS) instrument on the Subaru Telescope is giving astronomers a closer look at the characteristics of star-forming regions in galaxies in the early universe.

SUN

[Sun experiences seasonal changes](#) (7 April 2015)

The Sun undergoes a type of seasonal variability, with its activity waxing and waning over the course of nearly two years, according to a new study by a team of researchers led by the National Center for Atmospheric Research (NCAR).

[Seasonal, year-long cycles seen on the Sun](#) (8 April 2015)

Our sun is constantly changing. It goes through cycles of activity – swinging between times of relative calm and times when frequent explosions on its surface can fling light, particles and energy out into space.

[Small solar eruptions can have profound effects on unprotected planets](#) (9 April 2015)

While no one yet knows what's needed to build a habitable planet, it's clear that the interplay between the sun and Earth is crucial for making our planet liveable – a balance between a sun that provides energy and a planet that can protect itself from the harshest solar emissions.

[Solar Orbiter launch moved to 2018](#) (13 April 2015)

The launch of Solar Orbiter, an ESA mission to explore the Sun in unprecedented detail, is now planned to take place in October 2018. The launch was previously targeted for July 2017.

[Strong for coronal heating theory](#) (28 April 2015)

The sun's surface is blisteringly hot at 10,340 degrees Fahrenheit -- but its atmosphere is another 300 times hotter.

[Peering deep into the Sun to track the origins of space weather](#) (28 April 2015)

Scientists at NJIT's Big Bear Solar Observatory (BBSO) have captured the first high-resolution images of the flaring magnetic structures known as solar flux ropes at their point of origin in the Sun's chromosphere.

[Complex dynamics of sunspots' dark cores](#) (29 April 2015)

Groundbreaking images of the Sun captured by scientists at NJIT's Big Bear Solar Observatory (BBSO) give a first-ever detailed view of the interior structure of umbrae – the dark patches in the center of sunspots – revealing dynamic magnetic fields responsible for the plumes of plasma that emerge as bright dots interrupting their darkness.

SUPERNOVA

[Computer simulation confirms supernova mechanism in three dimensions](#) (1 April 2015)

Massive stars explode as supernovae at the end of their lives, but how exactly does the explosion begin and what is the role of different physical processes?

[Accelerating universe? Not so fast](#) (10 April 2015)

A UA-led team of astronomers found that the type of supernovae commonly used to measure distances in the universe fall into distinct populations not recognised before.

[Strange supernova is "missing link" in gamma-ray burst connection](#) (27 April 2015)

Astronomers using the National Science Foundation's Very Large Array (VLA) have found a long-sought "missing link" between supernova explosions that generate gamma-ray bursts (GRBs) and those that don't.

TECHNOLOGY

[Glitter cloud may serve as space mirror](#) (15 April 2015)

Space telescopes may one day make use of glitter-like materials to help take images of new worlds, according to researchers at NASA's Jet Propulsion Laboratory in Pasadena, California.

[New satellite payload ensures safe and efficient air travel](#) (21 April 2015)

Thanks to a newly awarded \$103 million Federal Aviation Administration contract, Raytheon Company will field the newest element in a space-based system which makes air travel safer and more efficient for millions of travellers.

[Deep Space Atomic Clock](#) (27 April 2015)

As the saying goes, timing is everything. More so in 21st-century space exploration where navigating spacecraft precisely to far-flung destinations -- say, to Mars or even more distant Europa, a moon of Jupiter -- is critical.

UNIVERSE

[Cold cosmic mystery solved](#) (20 April 2015)

In 2004, astronomers examining a map of the radiation leftover from the Big Bang (the cosmic microwave background, or CMB) discovered the Cold Spot, a larger-than-expected unusually cold area of the sky.

[Clusters of monster stars lit up the early universe](#) (22 April 2015)

The first stars in the Universe were born several hundred million years after the Big Bang, ending a period known as the cosmological 'dark ages' – when atoms of hydrogen and helium had formed, but nothing shone in visible light.

[Astrophysicists create 3D master map of the universe](#) (24 April 2015)

University of Waterloo astrophysicists have created a 3D master map of the universe spanning nearly two billion light years that is the most complete picture of our cosmic neighbourhood to date.

VENUS

[Can sound help us detect 'earthquakes' on Venus?](#) (23 April 2015)

Detecting an "earthquake" on Venus would seem to be an impossible task

WHITE DWARF

[Suzaku studies supernova 'crime scene,' shows a single white dwarf to blame](#) (2 April 2015)

Using archival data from the Japan-led Suzaku X-ray satellite, astronomers have determined the pre-explosion mass of a white dwarf star that blew up thousands of years ago.

Pat Williams. April 2015