
YOUNG ASTRONOMERS NEWSLETTER

NASA SPACE LAUNCH SYSTEM ENGINES UNDERGO MAX TEST FIRING

On Feb. 21, NASA performed the most stringent test yet on the RS-25 engines that will push the Space Launch System (SLS) to the Moon and Mars. The test reached the highest power ever achieved by the engines which were revved up to 113 percent thrust level.

The test was conducted at the Stennis Space Center in southern Mississippi. Meanwhile, the main SLS rocket fuselage is being built at NASA's Michoud Assembly Facility in New Orleans.

The RS-25 engines are former space shuttle engines that have been modified to perform more powerfully than before. When four RS-25's are fully configured with the SLS and a pair of booster rockets added, the total combined thrust should reach a whopping 8 million pounds at lift-off. This would allow the SLS to carry 26 metric tons of load to the Moon. Future modifications could allow it to lift 45 metric tons (99,208 pounds). Trips to Mars are in the plans.

The first space journey for the SLS, designated as Exploration Mission-1 (EM-1) is scheduled to fly sometime at the end of 2019. The actual spacecraft will be the Orion crew module, without human passengers. [space.com, Feb. 25, 2018 and NASA.gov]

AMATEUR ASTRONOMER CAPTURES RARE FIRST LIGHT FROM EXPLODING STAR

Victor Buso of Argentina has given the world of astronomy its first images of a supernova. While testing his new tele-camera on September 20, 2016, Mr. Buso had the good luck to capture images of an exploding star. This occurred in the spiral galaxy, NGC613, some 80 light years away in the southern constellation Sculptor. Until now, no one has

been able to capture the initial burst from a supernova.

The event is now labeled SN2016gkg and has been cataloged as a Type IIb supernova.

Follow-up studies by observatories around the world have led to calculations that give the original star a mass 20 times that of our Sun. Further study will lead to a positive leap in our understanding of supernovae.

[<https://phys.org/news/2018-02-amateur...>].

NEW HORIZONS' NEXT KUIPER BELT OBJECTIVE MAY HAVE A MOON

NASA's space probe, New Horizons is chugging along through the Kuiper Belt, after its amazing success in its fly-by of Pluto in 2015. The next N.H. Kuiper Belt target is 2014 MU69, another dwarf planet, which should be reached in January, 2019. Planetary scientists have discovered that MU69 is actually a binary planetary pair. And now, there is evidence that a moon is also part of the system. If the presence of a moon is confirmed, this will be an interesting triplet system. This news was reported at the American Geophysical Union meeting in New Orleans.

We won't know more details until sometime after the fly-by and the following delay in processing data and broadcasting back to Earth.

New Horizons is projected to continue its travels and explore as many as 30 other Kuiper Belt objects. [Sky and Tel., April, 2018].

IS IT POSSIBLE TO EXPLORE VENUS?

Due to its extremely high surface temperature, high atmospheric pressure created by heavy clouds of carbon dioxide and sulfuric acid, Venus has put up a formidable barrier to its exploration. The corrosive

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atmosphere with pressures around 90 times that on Earth and a temperature hot enough to melt lead (900° F), means that ordinary instruments would give up the ghost in a very short time of exposure to such conditions.

This was revealed by the Soviet Union's Venera probes sent to the planet in the 1970's and 80's. Typical on-surface lifetimes were about an hour. The record of two hours and seven minutes was set by Venera 13 in 1982.

NASA and world-wide scientists have been working on techniques and materials that may withstand the harsh conditions on our sister planet.

For example, studies by the European Space Agency's Venus Express showed that there are some wavelengths that are not totally blocked by the soupy atmosphere. This would allow some degree of visibility. Also, a vision technique being developed at the NASA Goddard Space Center in Maryland, called Structure from Motion may allow a landing craft to analyze the surface as it descends and looks for a safe landing spot.

Meanwhile, a NASA team at the Glenn Research Center in Cleveland is studying materials and instruments that can withstand Venusian conditions. For example, electronic circuits based on silicon carbide show promise toward thermal stability.

So, far, NASA has not approved any proposal for Venus exploration. In 2017, five proposals that were submitted were not approved by NASA's selection process. But, reworking the systems so that they may be a bit less ambitious and thus, lower in cost, might open the door to a fruitful mission. [Sci. News, Mar. 3, 2017].

THE SOLAR SYSTEM PASSAGE THROUGH THE MILKY WAY DISK MAY TRIGGER BOMBARDMENT BY COMETS

Astronomers have determined that the Sun and the solar system travel around the center of the Milky Way Galaxy at a speed resulting in one circuit in about 230 million years. That means that the Solar System has made about 21 round trips over its five billion year lifetime.

However, Michael Rampino explains in the April issue of Astronomy magazine that the Sun and Solar System bob up and down as they make their circuit about our galaxy. This compares to the motion of a horse on a carousel. The solar system dives down through and then back up through the outer thin disk of the Milky on an approximate 30 million year frequency. This curiously coincides with the frequency of mass extinctions of life forms on the Earth. Is there a connection?

There seems to be increasing support for such a connection, especially when one realizes that ordinary gravity and dark matter gravity are concentrated in the outer regions of that thin disk. It could be that the combined gravities exert their forces on the outer Oort Cloud of the Solar System and dislodge matter that becomes a cascade of comets that plunge in toward the center of the Solar System. This produces destruction of life as well geological imprints (e.g. craters) on the Earth surface. Geologic dating of rocks in the impact areas of craters has also matched the 30 million year cycle.

Where are we now in the up and down cycle? Celestial measurements indicate that we have just crossed from "below" the disk and still reside close to it. It takes about a million years for comets to travel from the Oort cloud to the solar system. Are they on their way? [Astronomy, April, 2018].

