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# YOUNG ASTRONOMERS NEWSLETTER

## SPACEX CREW DRAGON CAPSULE GOES TO ISS AND RETURNS

The privately operated Space X program is now inching closer to when it can send humans to space. The Elon Musk led company has been using its spacecraft Freighter Dragon to haul supplies to the International Space Station since 2012. A recently developed spacecraft, called Crew Dragon was launched from Cape Canaveral on March second and delivered a 450 pound load of supplies to the ISS. Also on board was an instrument package, called Ripley, whose human-like sensors monitored environmental factors within the craft.

After safely docking and unloading of cargo, the Crew Dragon unhitched and returned to splash down in the Atlantic on March 10. Ripley seemed to take the ride very well.

The next phase will be to test escape systems this summer. These tests will perfect systems that allow for a jettison and safe landing of the crew capsule if there is a malfunction during liftoff. If these tests are successful, a Crew Dragon flight will take humans to the ISS. Eventually, Crew Dragon will ferry four astronauts to and from the ISS. This is something that the U.S. has not been able to do since the cessation of the Space Shuttle program in 2011.

An economic bonus that comes from the SpaceX program is the ability to recover their launching rockets and re-use them for additional flights.

Meanwhile, a second privately run space program is being put together by Boeing. They call their capsule Starliner and the first, uncrewed test missions to the ISS should take place in a month or two. [Space.Com, Mar. 10, 2019].

## MARS INSIGHT LANDER'S "MOLE" DIGGER HITS A HARD PLACE

The NASA Mars lander, InSight began geological study of the Martian surface and subsurface in February. The hammering digger was intended to reach a depth of 16 feet (5 meters) while measuring the thermal properties of the Martian interior.

The Mole began digging on February 28, but it soon stopped after hitting a very hard obstacle. Digging was resumed on March 2, but there was little or no progress. Scientists have decided to cease further attempts and study the situation for at least two weeks in order to come up with a plan to circumvent the problem.

The digging probe was built by the German Aerospace Center (DLR). Pre-flight tests on the device included strategies for overcoming hard obstacles.

InSight was launched on May 5, 2018 and landed on the Red Planet on November 26. [https://mars.nasa.gov/news ].

## ASTRONOMERS SPOT THE MOST DISTANT DWARF PLANET YET

Using the Japanese Subaru telescope in Hawaii, astronomers have discovered a very distant dwarf planet. The body is so distant that the observers have nicknamed it "Farout". The discovery was announced on December 17 of last year by the International Astr. Union Minor Planet Center.

Farout is about 120 astronomical units away. (One a.u. is the average Earth-Sun distance of 93 million miles.) That puts the dwarf planet over three and a half times farther than Pluto. [Astronomy, April, 2019]. Farout is about 20

percent the size of Pluto. Astronomers have not yet reported the details of its orbit.

Out there somewhere lurks Planet X. Based on the motion of the distant Kuiper Belt objects, Planet X is expected to be comparable in size to the Solar System's gas giants. [Astronomy, April, 2019].

**ALL ABOUT GALAXIES (Continuation of last Month's Newsletter and based on the March issue of Astronomy magazine)**

- Our Milky Way is classified as a barred spiral galaxy. Overall, it has the general shape of a flat disk. The diameter of the disk is estimated to be around 150 thousand light-years. The central region has a bar-shaped collection of millions of reddish old stars imbedded in a bulge of more old stars. Extending from this region and originating at the ends of the bar, are spiral arms that consist of young, white or blue-white stars.
- The abundant dust and gas in the spiral arms gives rise to active new star formation.
- The outer disk thickness is estimated to be about 900 light-years.
- The Sun and Solar System are located about 26 thousand light-years out from the central bulge. When we look at the night sky in the summer, we see the constellations Sagittarius and Scorpius low in the south. The center of the Milky Way is located between them.
- The center of the Milky Way is believed to be anchored by a massive black hole having the mass of several million suns.
- The Milky Way is a member of the Local Group of galaxies that includes Andromeda and the Small and Large Magellanic Clouds.
- There are over 50 galaxies in the Local Group.
- Groups of galaxies, numbering around 50 to 100 can accumulate in larger assemblies called clusters.
- Galaxy clusters consist of many groups and harbor thousands of galaxies.
- Huge assemblies of clusters give rise to Super Clusters. The Milky Way is located at the outer edge of the Virgo Super Cluster. The Virgo Super Cluster is part of the gargantuan structure called Laniakea. It is about 520 million light-years across and consists of more than 100,000 galaxies.
- Quasars are very distant galaxies that are the source of incredible amounts of radio and other electromagnetic radiation. The energy is believed to originate in the galaxy's core where we find the central black hole. The output of energy from the quasar nucleus far exceeds all the energy of all the stars contained in the galaxy.
- Astronomers have examined the movement of the Milky Way in its super cluster and determined that it is moving toward a specific region in the cosmos called "The Great Attractor".
- Much of the movement of galaxies and stars within galaxies is believed to be influenced by Dark Matter.

**STUDYING OUR NEAREST STARS**

The nearest star to us earthlings is at a distance of 4.3 light-years and it's called Proxima Centauri. It is visible by telescope viewers located in the southern hemisphere. It is the smallest member of a triple system. The two larger stars are a binary named Alpha Centauri A and Alpha Centauri B. Proxima orbits A and B at a distance of 13,000 astronomical units (1.2 trillion miles). All three stars are located in the constellation Centaurus.

The alpha Cent. A - B binary is the brightest star in the southern hemisphere. Alpha Cent. A is in a similar spectral class as our Sun (yellow star). Alpha Cent. B is an orange K class star. Proxima is a red dwarf. It is currently on the Earth side of A and B, and so it is closer than the binary. A planet was discovered orbiting Proxima in 2016. It is labeled Proxima Centauri b. Until now, no planets have been found around A or B. [Sky & Telescope, April, 2019]

**BIRTHDAYS IN APRIL:** Arno Allan Penzias (Ger.-Amer.), b. April 26, 1933, Co-discovered cosmic microwave background radiation. Nobel Prize, 1978 (with Robert Wilson).

Christian Huygens (Dutch), b. April 14, 1629, d. July 8, 1695. Discovered the rings of Saturn, Saturn's moon Titan; is credited for the invention of the pendulum clock.

Jan Hendrik Oort, (Dutch) b. April 28, 1900, d. Nov. 5, 1992. Studied the rotation of the Milky Way.

**MOON PHASES IN APRIL:** New: Fri. the 5th; First Qtr.: Fri. the 12th; Full: Fri. the 19th; Last Qtr.: Fri. the 26th.

**THE PLANETS IN APRIL: Mars** is high in the west after sunset at magnitude 1.5. It is located between Taurus the Bull and the Pleiades. The red planet will set after 11 p.m. **Jupiter** rises shortly after 1:30 a.m. in early April and two hours earlier by month's end. (mag. -2.30) On the morning of April 23, a waning gibbous Moon passes within 2 degrees of Jupiter. **Saturn** rises shortly after 3 a.m. on April 11. By month's end, it rises at 1:15 a.m. (mag. 0.5) in Sagittarius. The rings are tilted favorably for a beautiful view. **Venus** rises around 5:30 a.m. on the first of the month, which means it is bathed in the Sun's twilight glow. But it still gives a decent view at magnitude -3.9. **Mercury** appears very briefly a half hour before sunrise.

**LYRID METEOR SHOWER:** The Lyrid meteor display is to peak around April 22,/23. However, this is just two days after the full Moon, so the sky will be bleached out by moonglow, and so this is not the best year for viewing.

**THE FORSYTH ASTRONOMICAL SOCIETY.** Meets the second Wednesday of the month at Kaleideum North (formerly SciWorks) at 7:30 p.m. Visitors are welcome. For club activities and special events, see the FAS web site at www.fas37.org . You can also get information about FAS at the Kaleideum North front desk: 336-767-6730 ext. 1000. The April meeting will be on Wednesday, the 10th. There will be club-sponsored observations on the evenings of Friday the 12th at Kaleideum North, and on Saturday the 13th at Pilot Mountain state park. The public observation on Saturday the 13th will be preceded by the annual North Carolina Statewide Star Party to be held at Kaleideum North from 1 to 5 p. m. Many, astronomy-related fascinating demonstrations and activities will be presented. The evening Pilot Mountain observation event from 7:00 to 10:30 p.m. will be a continuation of the Star Party activities. Also, there will be observation at Stone Mountain State Park on Saturday the 27th. The public is invited to these events. Club members will have several telescopes set up for viewing. However, the outside events could be cancelled if weather is not favorable for sky viewing. If the weather appears questionable, check the FAS website to be sure the event is not cancelled. The Kaleideum front desk may have event information. Call 336-767-6730; front desk extension 1000.

Enjoy the wonderful spring season, even if clouds block out the sky. Bob Patsiga, editor