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# YOUNG ASTRONOMERS NEWSLETTER

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## **CASSINI WILL DIVE INTO SATURN**

Goodbye, Cassini. You have been an exemplary space explorer. The Cassini-Huygens probe was an outstanding success in revealing the marvels of Saturn and its moons. The double package reached the ringed planet in 2004, at which time, it released the Huygens instrument that made a slow decent onto the moon, Titan.

Cassini has been photographing and analyzing Saturn, its moons and rings ever since. The reader can go to NASA web sites as well as Space.com for details of its accomplishments. Now, from its close-in orbit it will make a suicidal dive into the gas giant. It is already skimming the tops of the atmosphere. The nose dive is scheduled to take place on September 15. Even during its death dive, Cassini will be monitoring Saturn's atmosphere and relaying the information back to NASA base, about 900 million miles away. Great work by NASA and the European Space agency.

## **AN ASTEROID FLYBY IN OCTOBER WILL GIVE TRACKING SCIENTISTS A GOOD EXERCISE**

The asteroid, 2012 TC4, thought to be between 33 feet and 100 feet wide will give Earth a buzz cut on October 12. It could possibly come as close as 4,200 miles (6,800 km) of us. All experts are saying that there is no danger of impact.

However, those scientists involved with tracking space debris will make use of the close flyby as an opportunity to hone their skills and fine-tune their equipment.

2012 TC4 was discovered in 2012 by the Panoramic Survey Telescope and Rapid Response System (Pan-STARRS) in Hawaii. Some estimates put its passing as far away as

170,000 miles (270,000km). The Moon lies about 239,000 miles from Earth.

2012 TC4 is about the same size as the unnamed object that exploded over the Russian city of Chelyabinsk in February 2013. This event injured more than 1,200 people. [space.com].

## **THE VOYAGER PROBES ARE CELEBRATING FORTY YEARS OF SPACE EXPLORATION**

Voyager 1 and Voyager 2 were launched in 1977. Voy-2 was launched first, on August 20 and Voy-1 was sent up two weeks later, on September 5. Their mission was to explore the outer planets. The two probes were sent on different paths so that Voy-1 reached Jupiter and Saturn ahead of Voy-2. Because of a fortuitous alignment, Voy-2 was also able to visit Uranus and Neptune.

The two probes are now considered to be located in interstellar space. It was announced on August 25, 2012 that Voy-1 had punched beyond the Solar System as it experienced a sudden rise in its detection of high energy particles. It was the first man-made object to travel beyond the Solar System.

The accomplishments and discoveries by these two instruments can (and does) fill volumes. Our knowledge of the gas giants and their moons has expanded beyond our wildest expectations. The reader is encouraged to review writings and electronic postings by NASA as well as other space news publishers (like Space.com).

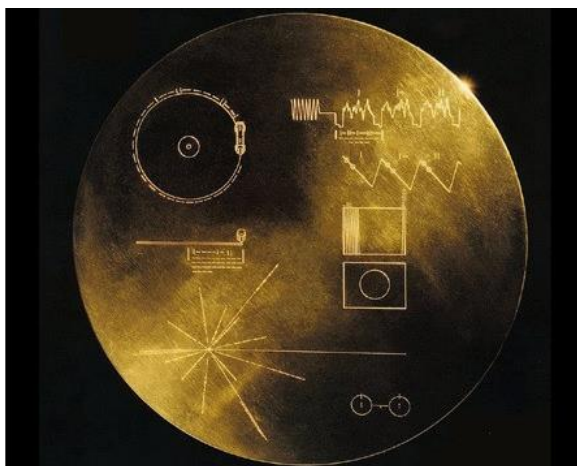
The thermal, electromagnetic, geological and geometric peculiarities of the outer bodies of our Solar System were revealed for the first time. The missions for the probes was extended

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three times. They continue to collect and relay useful scientific data as they race through the interstellar vacuum. Over four decades, Voy-1 has travelled more than 12 billion miles, while Voy-2 has covered more than 10 billion miles. Their speed is on the order of 300 million miles per year. They are powered by a thermoelectric generator which uses plutonium-238 as its power source. This should keep the probes ticking to at least 2020, but beyond 2025, there may not be enough power to operate the instruments.

The earth-bound scientists that were involved in the planning and launching of the voyagers are now at middle age, or older. Ed Stone, chief NASA scientist for the missions is now 81 years old. He was associated with the missions since their design and construction in 1972 (45 years).

An interesting side-light to the missions is the incorporation of the golden records (one in each probe) designed by astronomer, Carl Sagan and associates. The phonograph records contain various types of information that might help their discoverer (presumably from an alien planet or space ship) get an idea about what Earth is like: human voices speaking 55 languages, animal sounds and music selections.



**The Golden Record on the Voyager Probes**  
(NASA)

## NEW HORIZONS UPDATE

The September issue of Astronomy magazine has an article by Alan Stern, Principal Investigator on the New Horizons mission to Pluto. The article summarizes some of the discoveries that NH has made about the dwarf planet and its moons. NH was launched in 2006 and reached the dwarf planet, at 3.4 billion miles distance, in July, 2015.

NH is now continuing out into the Kuiper Belt, the band of ice, pebbles, boulders and dwarf planets that rings the Solar System beyond Neptune. The next KB object should be reached on January 1, 2019. It is identified as 2014 MU69. Various technologies (including the Hubble telescope) have been applied to be sure that the pathway to MU69 is clear for NH.

The Stern article describes the extensive presence of water ice on Pluto, its major moon, Charon, and the minor moons, Nix, Hydra, Kerberos and Styx. The frozen water and methane ice act as the geologic bedrock and mountain ranges, while solid and liquid forms of nitrogen push and flow about. In addition, there are mysterious reddish areas that might be complex organic compounds.

As NH flew by the moons, it was possible to count the surface craters and judge their ages. The tentative conclusion is that all the moons of Pluto are of the same age. Thus, it can be speculated that they all were formed by the same event.

It is now proposed that both Pluto and Charon contain an interior frozen ocean, just like Europa and Enceladus, respectively moons of Jupiter and Saturn.

## SEPTEMBER BIRTHDAY: James Van Allen

(Amer.); b. Sept. 7, 1914; d. Aug. 9, 2006.

Astrophysicist. Discovered the radiation belts that circle the Earth, now called the Van Allen belts.

**MOON PHASES IN SEPTEMBER:** Full: Wed. the 6<sup>th</sup>; Last Qtr.: Wed. the 13<sup>th</sup> ; New: Wed. the 20<sup>th</sup> First Qtr.: Wed. the 27<sup>th</sup>.

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**PLANETS IN SEPTEMBER:** See **Mercury** before dawn in the early morning. Climbs highest in the east on the 12<sup>th</sup>. For a great show, it joins Venus, Mars, the crescent Moon and Regulus (in Leo) on the 18<sup>th</sup>, 45 minutes before sunrise. **Venus** is in the predawn sky, joins the crowd on the 18<sup>th</sup> (see Mercury). **Mars**, on the 16<sup>th</sup> is very close to Mercury. **Jupiter** is still bright, but dropping in the southwest, to set 2 hours after sunset. It will soon dip below the horizon. **Saturn** is about half way up from the southern horizon, in Ophiuchus. It is showing us a beautiful angle view of its rings. **Neptune** is up all night in Aquarius (see sky chart). It can be seen with binoculars (magnitude of 7.8).

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If you have a decent telescope, you might be lucky to spot a nearby asteroid: **3122 Florence** during the first week of the month. It comes within 4.4 million miles of Earth and appears in the background of stars in Delphinus and continues toward Cygnus. (see the sky chart).

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On September 22<sup>nd</sup> we experience the **Autumnal Equinox**. That is the time of the year when the Sun's angle in the sky drops southward and is located directly overhead at noon for people living on the Equator. We call that the first day of autumn. But in the southern hemisphere, for example in Australia, it would be the first day of their spring season. If you made an alidade (see the June 2016 issue of the Newsletter) you can measure the Sun's angle relative to the southern horizon. You can also predict the noon Sun angle by a calculation discussed in the June, 2017 Newsletter (go to the FAS website for previous issues).

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**See the Fall Sky Chart on the next page**

**ASTRO FACTS:**

The magnitude of a star represents its brightness. But we need to realize that a higher magnitude represents a fainter star. The limit of unaided human eye detection of a star is at sixth magnitude. An increase in one magnitude means that the star is 2.5 times dimmer. The brightest star in the sky is Sirius, located in the constellation Canis Major (winter sky constellation). Sirius has a magnitude of minus 1.4. The North Star is not too bright. It has a magnitude of 2. The Hubble telescope can see stars that are thirtieth magnitude.

The Andromeda Galaxy is visible in the fall season. It is located in the constellation Andromeda, which is located about half way between the great square of Pegasus and Cassiopeia. Scan your binoculars between the corner star of Pegasus that is closest to Cassiopeia. About half way between, you should see a fuzzy spot, which is Andromeda. If you are in a dark location, and you have good eyes, you can see Andromeda by eyesight. It is a spiral galaxy, just like the Milky Way. But when we see it with binoculars, it looks just like a fuzzy spot. It is about 2.5 million light years away. That means the light we see from Andromeda left the galaxy 2.5 million years ago.

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**Forsyth Astronomical Society website:** <http://www.fas37.org>

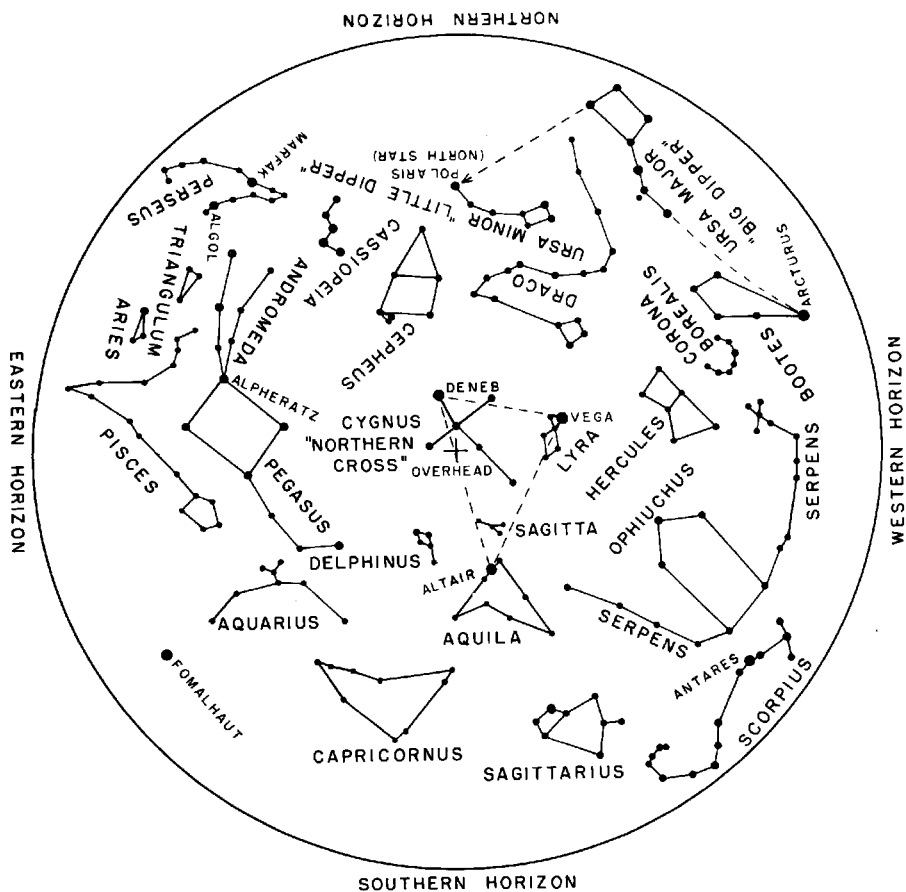
**Kaleideum phone:** 336-767-6730

Ext. 1000

Look for news about Cassini's plunge into Saturn on the 15<sup>th</sup> of Sept. Bob Patsiga, editor

## THE FALL SKY

In the fall, our angle of view of the sky is away from the cross section of the Milky Way, so, we see fewer stars than in the summer or winter. The best way to get oriented is to look high overhead, even slightly toward the northern sky. There, you'll see the big W of Cassiopeia (queen of Ethiopia). From Cassiopeia, drop down a little toward the south and you'll see a rather open space, but with four stars making up the corners of a giant square. The stars are not very bright (second mag.) but there's not much else in the area to confuse you. This is the Great Square of Pegasus, the flying (winged) horse. Remember that the horse is upside down and the rump of the horse is missing. If you trace from the corner Peg. star closest to Cass. and stop roughly half way, you can see our neighbor galaxy, Andromeda. And. can be seen with the naked eye only by people with good vision and in an ideal (dark) location. It is next to the Andromeda constellation. You will probably have to use binoculars. Andromeda shows up as fuzzy spot. It is a spiral galaxy, like the Milky Way, and it is about two million light years away. The Milky Way is running diagonally from Scorpius through Cygnus and through Cassiopeia. In September, Cass. is a bit off to the northeast and you can still see Cygnus and the summer triangle. Later in the fall, Cass. and Peg. will be straight up.



THE NIGHT SKY IN SEPTEMBER