

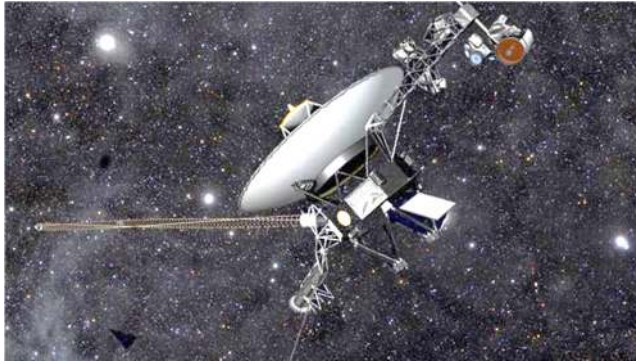
NEWSLETTER OF THE DELTA ASTRONOMICAL SOCIETY, DAS

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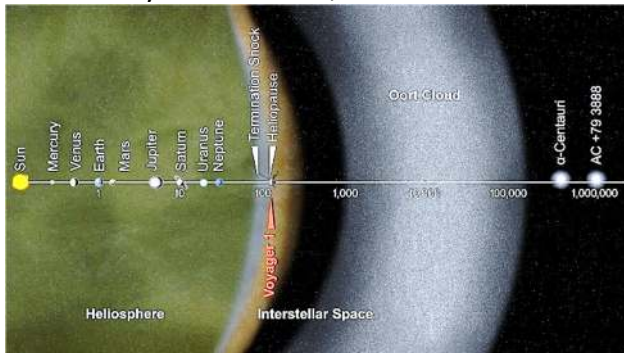
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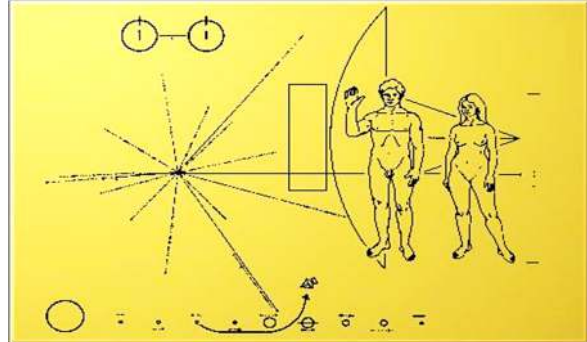
Voyager 1 in Interstellar Space, NASA Illustration, 2013

On September 12 Ed Stone, NASA's Voyager Mission Director announced that analysis of high energy particle data from the Voyager 1 probe makes it clear that the probe has left the Heliosphere and has entered interstellar space. With this announcement, Voyager officially became the first human-made object to leave the Solar System. *Or, did it?*



That depends upon how you define the Solar System's boundaries. If one considers the outer boundary of the Solar System to be the point where the Solar Wind is no longer dominant, and the flux of energetic particles from interstellar space predominates, then it appears that Voyager 1 entered interstellar space on or about August 25, 2012—a little over a year ago. At that point, the craft was 122 times the Earth-Sun distance (the Astronomical Unit, AU) of 93 million miles, or about 11.3 billion miles from the Sun. However, if one assumes that the Solar

System is defined by the sphere of influence of the Sun's gravity, then Voyager has barely begun its journey.



Voyager, Ambassador to the Galaxy; the Gold Plaque, 1977.

Launched in 1977 the twin Voyagers took advantage of a fortunate alignment of the planets to make a "Grand Tour" of the outer Solar System. Both Voyagers flew by Jupiter and Saturn, and Voyager 2 continued on to explore the outer gas giants, Uranus and Neptune—the only spacecraft ever to do so. Voyager 1 was flung outward by Jupiter's gravity and continues to coast away from the Sun at nearly 39,000 mph-- over 800,000 miles per day! Until the New Horizons probe was launched toward Pluto in January 2006, it was the fastest human made object. Even at this breakneck pace, it will probably take 300 years for Voyager 1 to reach the inner edge of the Oort Cloud, the reservoir of millions of comets that scientists believe reaches almost halfway to the closest star. But long before that, it will have fallen silent, its Radio Isotopic Generator no longer providing enough power to operate its transmitters. After around 30,000 years, the cold and silent craft should exit the far side of the Oort Cloud and leave the Solar System behind. Perhaps our descendants will then celebrate "Voyager Day, 8-25-2012" as we now do Columbus Day? For more information on Voyager's journey go to: www.nasa.gov/mission_pages/voyager



Comet Ison Finder Chart, Oct-Dec. 2013, Mark'sAstro.com

Beginning in late September, if you're willing to get up around 3 to 4 am and set up your telescope, you might be able to spot Comet ISON, C2012-R1 floating among the star fields between Cancer and Leo. Comet ISON is believed to be a new comet, making its first journey into the inner Solar System, where it will pass through the Sun's Corona as it reaches perihelion on November 28. Studies this summer with the Hubble and Spitzer space telescopes suggest that ISON's nucleus is much smaller than originally thought; only $\frac{1}{4}$ to 2 miles wide. Some early predictions that it would be "brighter than the Full Moon," at perihelion were based upon its brightness when still beyond the orbit of Jupiter, that suggested the nucleus was as large as 5 or 6 miles in diameter. Comet McNaught, 2008



Coma and bright Gas Tail, dominated by CO₂.

Scientists theorize that new comets from the Oort Cloud may have a coating of carbon ices, such as carbon dioxide, that sublimate at much lower temperatures than water. This causes them to brighten and sprout gas tails further away from the Sun than do periodic comets, like Halley or Swift-Tuttle. In June, Spitzer found that ISON was outgassing carbon dioxide at the rate of 2.2 million pounds per day! It also sported a gas tail over 186,000 miles long. Dust and water production is still far lower, and consequently, ISON has little or no dust tail.

Frozen water ices, and dust, trapped beneath a layer of tarry organic compounds probably won't be released until it gets much closer to the Sun, perhaps in mid-October or November.



Comet West, 1976

All this suggests that Comet ISON might *not* become "The Comet of the Century."

Nevertheless,

because of its Sun-grazing trajectory and favorable position in the skies, it should still put on a very good show. If the tiny nucleus survives its close encounter with El Sol, it may even brighten to naked eye visibility in the days after it passes perihelion. This isn't without precedent. Another tiny Sun-grazer, Comet Lovejoy had a nucleus only about 400 feet wide, yet it survived its perihelion dive in 2011, and produced a spectacular tail.

Comet Lovejoy, 12-22-2011.

Dan Burbank, from the ISS, NASA.



Lovejoy's orbit brought it from the Oort Cloud to within 87,000 miles of the surface of the Sun, where temperatures in the Corona reach 2 million degrees, and the tidal forces from the Sun's immense gravity were expected to rip the tiny nucleus apart. But somehow, it survived.

Which brings us to our final thought: Comets are unpredictable, especially new ones, like ISON. So, while it is still only a smudge at about 12th to 14th magnitude, it's a good idea to tune up your observing skills and set your alarm for very early in the morning, this fall. As one who slept-in back in the spring of 1976 and missed Comet West, I'm planning to see it, whatever it does.

As Always. "Keep Looking Up!" Dan

More information on Comet ISON can be found at these and other sites: Astronomy.com, CometISONNews.com, Heavensabove.com, Skyhound.com, WaitingforISON.com, and Isoncampaign.org (NASA's official ISON site)

Sky Stories / North Country Dreamland: A Dark Sky Exposition



An important facet of our purpose as an Astronomy Club is to help popularize astronomy and educate the public about the night skies, and the wonders they contain. To this end, we hold free public viewings, utilizing our personal and club's telescopes and equipment. For related reasons, we also conceived, designed, built and maintain the "Walk of the Planets," on Ludington Street. This autumn we are trying something new, collaborating with the Wm. Bonifas Fine Arts Center to offer a multi-media experience that combines art and technology to bring the mystery, awe and folklore of the skies to the public.

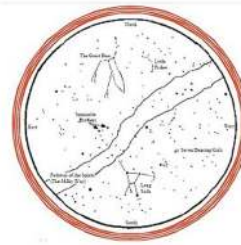


Detail, Fairy Tale Moons,
P. DeLisa/ M.S. Adams.

Beginning Thursday, Sep't. 26 at 7pm and running until Oct 30th, The Bonifas Galleries will host the works of three prominent Northern Michigan artists. Mary Stewart Adams, the Program Director for Emmet County's Headlands International Dark Sky Park will share her avocation as a "Sky Lore Historian" and Story-teller, illustrated with the art of Patricia DeLisa. Jointly, in the Upper Gallery, the Astro-photography of internationally renowned UP nature photographer, Shawn Malone will be displayed.

But that's only the tip of the Auroral bow. Over the course of the month-long exposition there will be classes in Intermediate to Advanced Astro-photography taught by Shawn Malone, free "Brown Bag" Lunch hour events led by DAS members, John Burroughs and Dan Young, and a Gala Closing Night, October 30, featuring Star Lore and Scary Storytelling by Mary Stewart Adams and an Introduction to the constellations as seen through Native American traditions. Facilitated by DAS utilizing the ISD's inflatable indoor planetarium dome.

Native American Sky Map.



Milky Way, the "Path of the Souls," The Great Bear and the Thunderbird...Etc.

Got these dates down on your calendar or enter them in your smart

phone/ google calendar:

Astrophotography Workshops: Wed. Oct 2nd, 6:30- 10pm with Shawn Malone. **SOLD OUT**

Wed. Nov 2nd, 6:30-10, Space still available.

Wed. Oct 9th, Brown Bag Lunch, 12 noon, DAS. John Burroughs will show what a telescope is, does and how to use one. Info on Comet ISON, where it is how to see it, etc. Free Sky Maps.

Wed. Oct 23rd, Take a walk through the Solar System with DAS. Gather at the Bonifas 11:45. Dan Young will guide you on a walking tour from the Sun to Saturn, ending at H &H for lunch. (Dress for the weather).

Wed. Oct 30th, 4pm: Devil's Night at the Gallery. Mary Stewart Adams will share scary stories and star lore. DAS will show you the stars as Native Americans saw them in the inflatable Planetarium. Dress casually, you sit on cushions on the floor in the dome.

Wed. Nov 2nd, 6:30-10pm. Shawn Malone will reprise her Astrophotography workshop for intermediate & advanced photographers. SLR Camera, wide angle lens and tripod required.

Contact the Bonifas Arts Center for more information, or to register: 906-786-3833.

Newsletter of the **Delta** **Astronomical** **Society**

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Dr. Daniel M. Young, Editor.

ADDRESS CORRECTION REQUESTED



FIRST CLASS

Aurora, Upper Michigan. c. Shawn Malone, 10-24-11

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See **DAS Newsletter In Full Color** on the Web at: <http://deltaastro.info>

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Comet ISON,

Will it be “The Comet Of the Century”— or Fizzle?

The Skies as Art, DAS Collaborates

With The Bonifas Fine Arts Center.

Next Meeting: Tues. Sep’t 24, 2013

7pm, Bay College, Rm. **901** Note Room Change



Patricia DeLisa, Cover Art, “Fairy Tale Moons,” by Mary Stewart Adams.

DAS relies on your Annual membership dues to publish & print a regular newsletter, pay for members’ subscriptions to the Abrams’ Planetarium “Sky Calendar,” maintain, improve and insure our telescopes and equipment, and work with our city, schools and Library to inform and educate the public about the science and hobby of Astronomy. If you have already paid your dues, please consider making a **tax-deductible gift to DAS**, c/o: Marsha Burroughs, Treas. 330 South 16th St. Escanaba, MI 49829. 906-789-1414. Thank You.