



The Custer Comment

★ For The Curious ★

January, 2005

Volume XXXV, Issue 1

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Cassini Ends 2004 With Flyby Of Icy Moon Iapetus



Image, courtesy NASA/JPL

This image of Iapetus was captured by the Cassini orbiter on January 1, 2005 at a distance of approximately 55,307 kilometers and received on Earth January 1, 2005. One-way travel time for the signal, traveling at the speed of light, is 1hr, 15 minutes. Enigmatic Iapetus, with its dramatic change in albedo between one hemisphere and the other, is finally giving up its secrets to the prying eyes of Cassini. Its diameter is about one third that of our own moon at 1,436 kilometers. During Cassini's four-year tour, the spacecraft will continue to image Iapetus and conduct two close encounters. One of those encounters, several years from now, will be at a mere 1,000 kilometers (622 miles) from the surface. Planetary scientists aren't sure why Iapetus is a world of such stark contrasts. The leading hemisphere of the satellite is as dark and opaque as the soot generated by a coal fired power plant but they are fairly certain that the almost 50% reflection (albedo of .5) of the trailing hemisphere is due to water ice.

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Announcements & General Interest

January 2005 Custer Board Meeting, Saturday, Jan. 15 At 4:00 P.M.

Broadband Internet through DirecWay on Order

Through the generosity and business contacts of lifetime member and benefactor, Charles Cardona, Custer will have a fully-funded subscription to broadband internet service via Satellite. The 1 meter elliptical dish will be placed on the roof, atop Custer's main meeting room and will provide both an uplink and downlink signal to and from a dedicated satellite in geosynchronous orbit 22,300 miles (36,000 km) above the equator. The service is provided by DirecWay, a subsidiary of Hughes Communications and sister service to DirecTV, the popular satellite television service provider, which will also be included as part of the package soon to be provided to Custer. The order has been placed and the dish is scheduled to be installed within the next month.

Editor's Column

Tom Madigan, Editor

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Cutoff for submissions is the 15th of the month preceding publication

Visit the new Custer Website at
<http://www.custerobservatory.org>

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With winter in full swing, Orion is prominently placed high in the Southeast during mid-evening with Canis Major and Sirius in prominent accompaniment. It is my sincerest wish that everyone is having a safe and memorable holiday season.

Please send me your email address so that you can receive the Custer Comment electronically. There are many benefits to receiving the electronic edition. These benefits include:

1. Immediate delivery to your inbox;
2. No lost or damaged copies;
3. Color images and active hyperlinks to related content and images;
4. Print only what you want;
5. Immediate cost savings for Custer with the saved revenue to be put towards our observatory class 25" telescope, currently in the optical fabrication phase;
6. Frequent alerts and updates sent out to the electronic distribution list.

A warm welcome to our new or returning members; Welcome one and all!

Custer now has a presence on Yahoo! If you would like to be "in the loop" on all the daily happenings at Custer such as last minute schedule changes, telescope maintenance, observers reports from the eyepiece and more, browse to <http://groups.yahoo.com/group/custerobservers> and sign up!

Best regards for the New Year,
Tom Madigan, Editor

Gift Corner & Classifieds

<p>We have meteorites.</p> <p>Great sets mounted in beautiful display cases. Perfect for gifts.</p>	<p>The Gift Shop still has a dwindling number of copies of ASTRONOMY FOR ALL AGES, by Philip Harrington & Edward Pascuzzi, just \$20. As an added bonus, copies are signed by Ed Pascuzzi. We also have copies of <i>PARALLAX</i> by Alan W. Hirshfeld, guest speaker at the 2003 Jamboree. Quantities are limited so hurry and add this well-written and informative volume to your collection while supplies last.</p> <p>50% OFF SALE: THE EXCLUSIVE 2004 CUSTER ASTRONOMICAL POCKET DIARY, BASED ON CUSTER'S COORDINATES. NOW JUST \$4.50 + TAX.</p>	<p>Back by popular demand</p> <p>We again have the <i>exclusive, 2004 Custer</i> Astronomical Pocket Diary, based on Custer's coordinates. The price is still just \$9 and quantities are limited.</p> <p>New</p> <p>Custer logo coffee cups</p> <p>ONLY \$4 EACH</p>
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Classified Post

I have too many astro toys and need to find new homes for them. Please look over the list and if you can use some items, please email me.

I'm pooling my disposable income for a new goto GEM and special built refractor. All items are in great working condition and optics are excellent.

1. 1.5 year old Celestron Nexstar (GOTO System) 8I with GPS, Celestron visual back diagonal, 2 celestron ep's, \$250 dollar "JMI" rolling case(never used it), tripod and batteries for instant use. Wonderful views and easily transportable in the JMI case. Works great with a power tank optional battery system. Everything for \$1100. dollars. (I paid over \$1700 for this package).
 2. Vixen A80SS OTA with Vixen red dot finder, collapsing dew shield. (Unscrew it, turn it backward and screw it back on - it saves around 4 inches of length in closed position). Amazing space saving design. Includes: End cap, dual 1.25 diagonal ep flip mirror system for visual and photographic use. Can use your 2" diagonal and eps on this baby also. (I'll throw in an ep if being used as a starter scope.)GREAT Grab-n-Go fully coated achromat doublet. About 14 inches long with dew shield "tucked in". Very Sharp views. Includes both standard mount and camera tripod mount bracket. Looks and works like new. About 5 months old. Well worth the asking price of \$320. dollars. After all, it is a Vixen quality scope.
 3. Burgess 8x42 rubber armored nitrogen purged, waterproof, APOchromatic objective roof prism binos. Only 3 months old. Used them briefly during our First Light Celebration and a couple of times during the day to test them out. Top quality all purpose binos. Wonderful FOV for celestial viewing. Sharp Views. Comes with carry pouch, end caps for ep's and objectives. Originally \$200. Asking only \$175. dollars. I can bring to our next meeting for you to check them out. Burgess Optical web site shows them.
- If interested please email me at saarmason@earthlink.net (phone: 516-593-2490).
I will accept personal checks or money orders.

Courtesy, Sue Rose for George Saar

HEAVENLY EVENTS TO WATCH FOR January, 2005

” ... An astral eye-feast,
gift of the night,
light that left its source
before there were eyes to see. “

- Lucille Ruga

As the new year begins all six planets known to the ancients (Earth included) can be seen one hour before sunrise (about 6:20 AM) if you have a clear view down to the southeast horizon, such as at a beach location. But this offer won't last! MERCURY and VENUS huddle together there all month, slowly dropping, but both fade into the glow of dawn after mid-January. Between the 5th and the 17th our two inner planets are less than 1 degree apart! MARS is well above them and to their right. Sliding eastward through southern Ophiuchus through most of January, the 1.5 magnitude Mars rises in the southeast barely one hour before daybreak - a situation which won't improve until June. Within the constellation Virgo all year, JUPITER rises around midnight at midmonth and is due south around 5:30 AM. In Gemini for the first half of 2005, SATURN is at opposition on January 13 and claims the evening sky for itself. For those who are greeting Venus and Mercury early in the month, Saturn will still be low in the west-northwest, so just turn around and find it. Then there's Comet MACHHOLZ!

- 1 The Earth is at perihelion, closest to the Sun tonight - a distance of about 91.35 million miles.
- 3 Look for Quadrantid meteors streaking out of the northeast during the early morning hours. You'll have to cope with the third quarter Moon's light, however. Note Jupiter to the Moon's left.
- 3 Algol, β (Beta) Persei, is in mid-eclipse at 11:29 PM, and again at 8:18 PM on the 6th.
- 5 Latest sunrise comes around this date, at about 7:20 AM.
- 7 The waning crescent Moon forms a fine triangle with red Mars and the red star Antares, α (Alpha) Scorpii. (Note that Mars is somewhat dimmer than Antares; it can be much brighter than the star when it is near opposition.) As the 18-year revolution of its nodes has brought the Moon well south of the ecliptic in Scorpius, it begins a long series of occultations of Antares which will extend into 2010. The one occultation we'll be able to see here this year will be in March. *A special treat* for January is Comet C/2004 Q2 (Machholz), which could be at 4th magnitude, perhaps brighter. To find it tonight, examine M45, the Pleiades of Taurus with binoculars. The head of Machholz should be a couple degrees west of the Pleiades. This is the time Machholz is closest to us - about 32½ million miles away.
- 8 Find the slim waning crescent Moon rising to the right of Venus and Mercury this morning. Also today, Saturn crosses the ecliptic in its 29½-year orbit, heading north (ascending node.)
- 10 Today's New Moon occurs at perigee, raising the possibility of extreme tides if there's a storm.
- 13 Venus and Mercury are closest together this morning, about 20 arcminutes apart, over the southeast horizon before sunrise. Also, today Saturn is at opposition as we pass between it and the Sun. (Since Saturn crossed the ecliptic only 5 days ago, maybe hypothetical "residents" of Saturn's moons might see a Transit of Earth across the face of the Sun.) Anyway, Saturn is about 750 million miles from us and can be seen in the sky all night at -0.4 magnitude.
- 14 Approaching its 4th flyby of Saturn's satellite Titan today, our Cassini spacecraft releases its Huygens probe. As the late Bob Murphy used to say: "Fasten your seat belts!"
- 16 Look for Comet Machholz just to the east of Algol.
- 19 Around 12:36 AM this morning the 4.5 magnitude star δ (Delta) Arietis will suddenly disappear behind the unlit upper left edge of the waxing gibbous Moon.
- 21 Now look for Comet Machholz just west of Mirfak, α (Alpha) Persei.
- 23 Nearly full Moon rises above Saturn this evening. The stars Pollux and Castor are to their right.
- 24 Full Wolf Moon tonight.
- 25 Comet Machholz is at perihelion, 112 million miles from the Sun. Look for it just north of the star γ (Gamma) Persei.
- 26 Algol is in mid-eclipse at 10:03 PM, and again at 6:52 PM on the 29th.
- 30 Around 2:15 AM this morning the 4.0 magnitude star η (Eta) Virginis pops out from behind the dark upper right edge of the waning gibbous Moon. *Watch Jupiter* and the Moon rise together shortly before midnight tonight.

Prepared by Robert Chapin

News and Noteworthy

East Hampton light conversion

Press Release

MONTAUK MAIN STREET'S POST TOP STREET LIGHTS ARE RETROFITTED TO A "DARK SKY FRIENDLY" DESIGN. MONTAUK, NY.

December 7, 2004
East Hampton, NY

CONTACT: John Keeshan, Montauk, (631)-668-2000
Susan Harder, Dark Sky Society, (631)-329-0456
Anita Greene, Magniflood Manufacturers: (631)-226-1000

Due to concerns about glare and "up" lighting, the Town of East Hampton has just completed the retrofit installation of over 80 new post top "carriage style" street lamp fixtures. These fixtures are identical in daytime appearance to those they replaced. However, at night, improved optics produce more light on the ground and lessened glare, because the light bulb is recessed into the opaque cap. The previous style, a "traditional" post top, had the bulb in the center of the globe, which produce glare and "up" light. The manufacturer of the original lights (The Montauk Carriage Light), Magniflood of Long Island, produced the new design to meet the Town's desire to see their star filled night sky, clear of "light pollution" from fixtures which emitted too much light above the fixture. This project was initiated by concerns about the night sky, and facilitated by Alec Torkos, Magniflood's distributor at Revco Electric in Southampton.

Among the positive comments from:

1. *a member of Montauk Citizens Advisory Committee*: "EVERYONE loves the new lights.... -- Richard Kahn."
2. *Dark Sky advocate*: "Montauk is now safer from glare, more beautiful at night, and our stars can shine through"; Susan Harder.
3. *the Long Island light manufacturer*: "We were delighted that we could help the community of Montauk reach their goal of reduced glare and sky glow with a new design." Anita and Ken Greene., Magniflood
4. *the Town electrician*: "We also like the fixtures, they have made some improvements that make it easier to work on and maintain."
5. *Long Island Astronomer*: "The astronomical community is thrilled that Montauk is committed to restoring and protecting the pristine night sky over the East End. Montauk can be an astro-tourism destination, particularly during the long, clear and dark nights of the winter.". Gary Citro.

Susan Harder
Dark Sky Society
<http://www.darksksociety.org/>

Montauk is now Dark Sky Friendly

By Tom Madigan

As a follow-up to this exciting press release, where East Hampton township has just completed the retrofit installation of 88 new post top "carriage style" street lamp fixtures on Main Street in Montauk, Dark Sky Society founder Susan Harder was interviewed by Suffolk Life's James Montalto.

According to Susan "The manufacturers did a great job creating the new lights." "They look the same but the whole interior optics have been reworked with refractors and reflectors to minimize sky glow". The improvements will be noticed at night because the light bulbs are recessed into an opaque cap and, because of additional internal design improvements, the focusing of the light is on the ground where it's needed.



Image, courtesy Susan Harder

One of Montauk's newly retrofitted "Carriage" Lights

Said Ken Greene, co-owner of Long Island's Magniflood, the manufacturer of the original lights (Montauk Carriage Lights): "We were delighted that we could help the community of Montauk reach their goal of reduced glare and sky glow with a new design". Susan went on to say that "Montauk is now safer from glare and more beautiful at night. Our stars can now shine through" and that "the final dark sky friendly streetlights have been installed, just in time for sky-watchers to enjoy clear, brisk winter skies."

SELENE-NY's Gary Citro, a teacher and avid amateur, noted that "The astronomical community is thrilled that Montauk is committed to restoring and protecting the pristine night sky over the East End. Montauk can be an astro-tourism destination, particularly during the long, clear and dark nights of the winter."

News source: Suffolk Life Newspapers

Environmentally Friendly Lighting Design Possible for New World Trade Towers

For those of you who submitted comments to the committee overseeing the reconstruction site of the World Trade Towers, our messages were heard concerning the exterior lighting.

A few months ago, the architecture critic for the NY Times, Paul Goldberger, gave a lecture here in East Hampton. At that time I asked him if they were taking into consideration the concerns of the NYC Audubon Society about the exterior lighting, and he said they were.

Last Saturday, I had the opportunity to ask Daniel Libeskind (master plan architect for the World Trade Center reconstruction site) if he had received messages concerning the exterior lighting and light pollution. He said they had received many, and were adjusting the design accordingly. I didn't have time to follow up, but thought people should know that our messages did get through to the decision makers.

Let's hope, anyway.

Susan Harder, East Hampton

NASA Finishes Redesigned Shuttle Fuel Tank

NASA has finished building a redesigned space shuttle fuel tank that was reconfigured to eliminate the debris problem that doomed the shuttle Columbia and its seven astronauts, agency officials said on Tuesday.

The changes are aimed at preventing chunks of insulating foam from breaking off the tank during launch and damaging the shuttle.

A suitcase-sized chunk of foam broke off the tank and hit the edge of Columbia's left wing when it was launched on Jan. 16, 2003. The damage went undetected during Columbia's 16-day mission, but caused the spacecraft to break apart under the stress of re-entering the Earth's atmosphere, killing the astronauts.

The insulating foam prevents ice from forming on the tank when it is filled with 500,000 gallons (1.9 million liters) of supercold liquid hydrogen and liquid oxygen before liftoff.

The external fuel tanks, comprised of a half-million pieces, are built by Lockheed Martin at NASA's Michoud Assembly Facility near New Orleans. NASA had 11 of them ready for flight prior to the Columbia accident.

Workers there will attach the external tank and the booster rockets to Discovery, then test the tank in March by filling it with fuel and checking for ice formation.

Coleman said NASA could never completely eliminate the problem of foam breaking off the tank, but was confident the changes would prevent the type of damage that doomed Columbia.

Each tank cost about \$40 million to build originally, but NASA could not provide a cost estimate for the post-Columbia modifications.

Discovery is scheduled to take off in May or early June with a seven-member crew on a mission to the International Space Station ([news](#) - [web sites](#)). NASA's shuttles have been grounded since the Columbia accident, and the crews aboard the Space Station have been resupplied by Russian Soyuz and Progress spacecraft. NASA hopes to fly three shuttle missions in 2005.

Compiled, in part, from various Reuters sources

One Year On The Red Planet And Mars Rovers Continue To Set Records!

<http://marsrovers.jpl.nasa.gov/gallery/press/opportunity/20041227a.html>

Opportunity's Trek Across the Plains of Meridiani

Opportunity Rover Traverse Map (Sol 324)

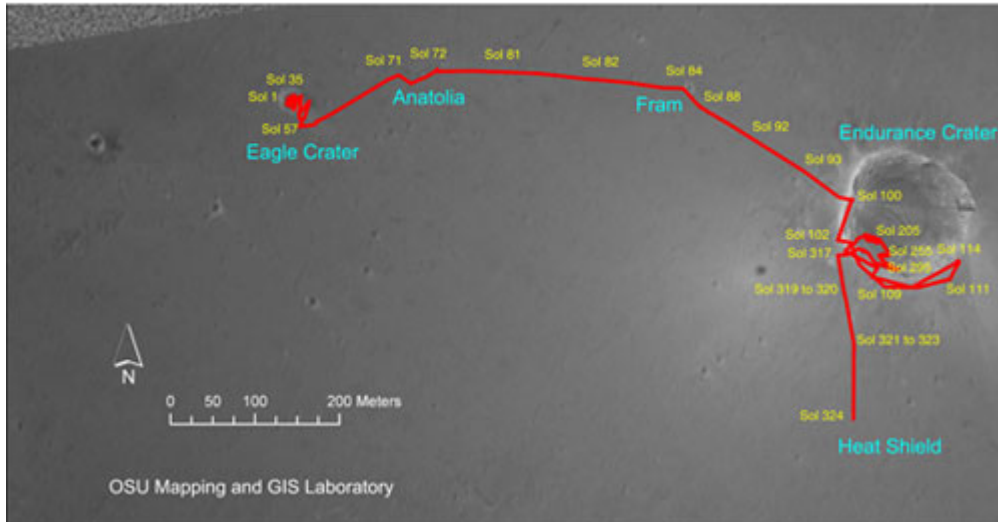


Image credit: NASA/JPL/MSS/OSU

Opportunity is approaching the heat shield that protected the rover from frictional high temperatures during descent through the martian atmosphere in January 2004. The spacecraft carrying the rover jettisoned the heat shield just prior to landing. This orbital view shows the course the rover drove from its landing to its 324th martian day, or sol (Dec. 21, 2004), including the historic path of Opportunity's six months of exploration inside Endurance Crater. Opportunity drove 90.9 meters (298 feet) on sol 324, bringing its total odometry to 1,997.8 meters (1.24 miles).

Heat Shield Impact Site

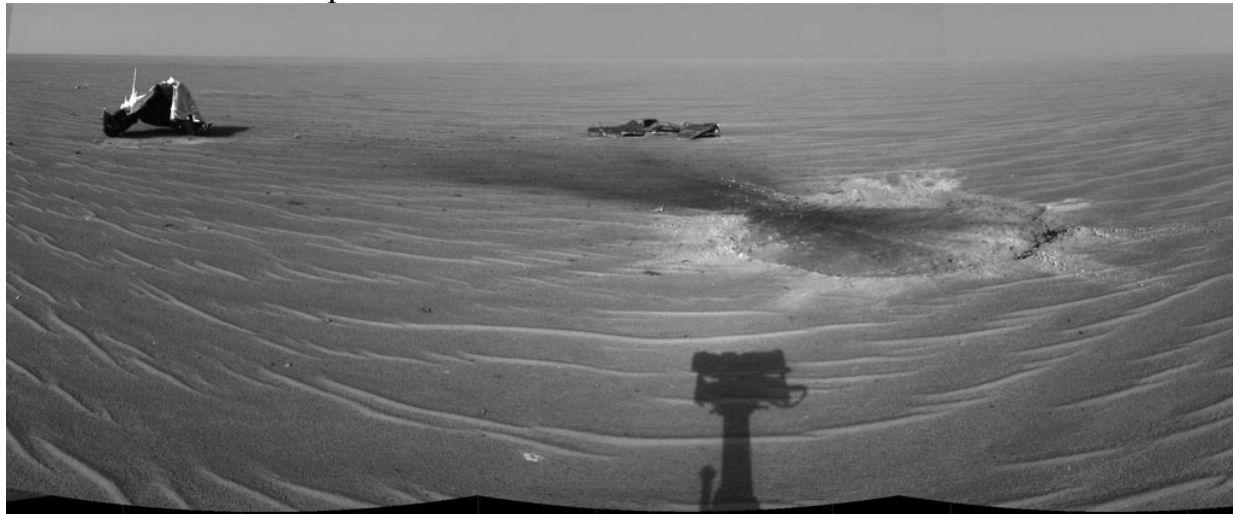
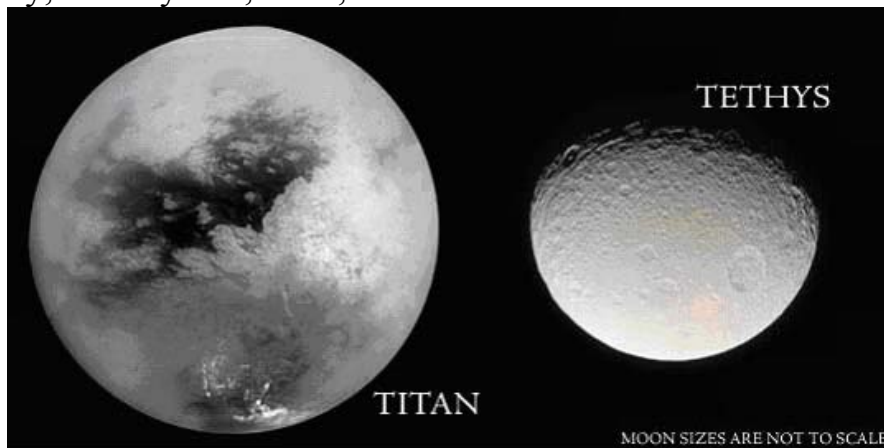


Image credit: NASA/JPL

NASA's Mars Exploration Rover Opportunity gained this view of its own heat shield during the rover's 325th Martian day (Dec. 22, 2004). The main structure from the successfully used shield is to the far left. Additional fragments of the heat shield lie in the upper center of the image. The heat shield's impact mark is visible just above and to the right of the foreground shadow of Opportunity's camera mast. This view is a mosaic of three images taken with the rover's navigation camera.

Huygens Mission to Titan, a Landmark in Unmanned Space Exploration

Saturday, January 15th, 2005, 7:30 PM



Images, courtesy NASA, JPL

New views of two of Saturn's moons, Titan and Tethys, represent the most detailed look at these moons to date and show a sharp contrast between them -- one is foggy and one is cratered. (Nov. 23)

Join us at Custer as we witness this momentous event in space exploration. On January, 14th, 2005, at 6:04 AM, EST (11:04 UTC), the Huygens probe will enter Titan's upper atmosphere traveling at 6 Km/second. Depending on factors still to be determined exactly, the decent of the probe and the concurrent execution of a full compliment of experiments, data and image capture will last between 2 and 2 ½ hours.

Since Custer has access to the live feed from NASA TV, we will be presenting a program entitled ***Huygens Mission to Titan, a Landmark in Unmanned Space Exploration*** the following evening, Saturday, January 15th at 7:30 PM. Since it is unlikely that anyone would turn out at 6:04 AM on Friday morning, a workday, we'll be presenting the recorded event as part of a full-featured program the following evening.

NASA's official site for the Huygens mission is:

<http://saturn.jpl.nasa.gov/operations/huygens-mission.cfm> . The probe was manufactured by the European Space Agency (<http://www.esa.int>) with their corresponding Cassini-Huygens site located at <http://www.esa.int/SPECIALS/Cassini-Huygens/index.html> .

Saturday, January 15th, 7:30 PM; Mark your calendars!

For those of you who wish to follow this momentous event prior to the program or if you wish to follow the event on your own, the following is NASA's scheduled coverage for NASA TV, available via Satellite Television (DirecTV, DishNetwork, etc) or Streaming Video over IP (http://www.nasa.gov/multimedia/nasatv/MM_NTV_Breaking.html):

January 14, Friday

3 a.m. - 3:30 a.m. - Live Coverage and Commentary "Cassini Turns Towards Titan - Interruption of Radio Contact" - JPL/ESA

5 a.m. - 6 a.m. - Live Coverage and Commentary "The Huygens Probe Enters the Atmosphere of Titan" - JPL/ESA

7:30 a.m. - 8 a.m. - ESA News Briefing "Mission Status" - JPL/ESA

8:30 a.m. - 9 a.m. - ESA Commentary on Huygens Probe Mission - JPL/ESA

10 a.m. - 10:30 a.m. - ESA Commentary "Cassini Turns Back to Earth - Data Transmission Begins" - JPL/ESA

11:15 a.m. - 12:15 p.m. - Huygens Probe News Briefing (will confirm if we are receiving data from Huygens via relay by Cassini)

5 p.m. - 6 p.m. - ESA Commentary and "Presentation of First Triplet Image of/data from Titan" - JPL/ESA

January 15, Saturday

12 p.m. - 1 p.m. - ESA News Briefing "Early Look at Science Results" - JPL/ESA

Titan-Bound Huygens Probe Detaches From Cassini

Huygens Probe Release, December 23, 2004

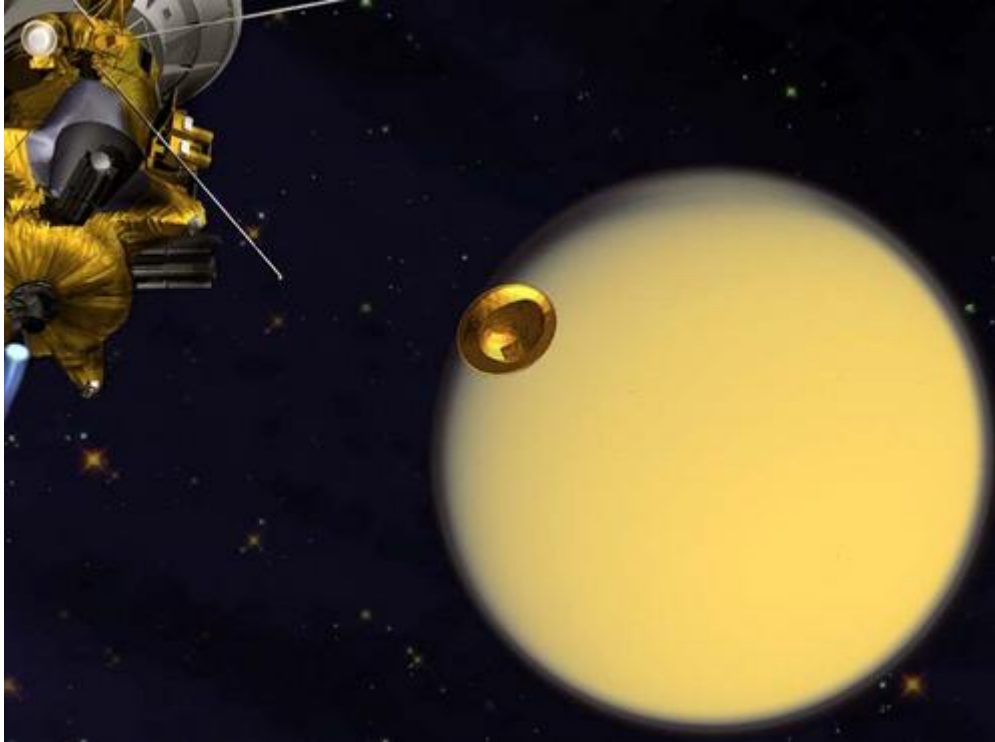


Image Credit: NASA/JPL

An artist's concept of the European Space Agency's Huygens Probe en route to Titan after release from the NASA Cassini orbiter.

The European Space Agency's Huygens probe was successfully released from the Cassini spacecraft on December 23rd to rendezvous with the enigmatic and mysterious Titan. Once released from Cassini, the Huygens probe has no way to correct its trajectory so it was critical that Cassini launch the probe on a precise intercept course with Titan. If all goes as planned, that intercept will occur in the early morning hours (EST) of January 14th and will be the subject of a full-featured program at Custer the following day, Saturday, January 15th at 7:30 PM. After release, the probe was closely followed by Cassini until December 27th, at which time a critical course correction was applied to the Cassini spacecraft, lest it follow Huygens into Titan! Huygens onboard science and imaging systems will remain dormant until the onboard timer wakes it up just before the probe reaches Titan's upper atmosphere.

The full press release can be found at

<http://saturn.jpl.nasa.gov/news/press-release-details.cfm?newsID=519>

Gift of a Star is no Gift at All

An Editorial

By Tom Madigan

Here we are again at the close of another year. With the winter constellations and familiar bright stars that accompany the merriment that is so much a part and parcel of the season, we, as did the ancient Romans during their celebration of Saturnalia, give pause, rest and look forward to the coming year with anticipation and the prospect of continued health and prosperity. Gifts are exchanged and well wishes are universally extended to all.

The beauty and splendor of the winter sky and the concurrent celebration of the holidays with the associated gift giving has been linked for some time in a way that has very little to do with the sincerity and altruistic sentiments so often exchanged during the season. ***Caveat Emptor!*** Enter “The Universal Star Council” (<http://www.universalstarcouncil.com>). This organization prays on the ignorance and naiveté of so many and purports to be able to ***sell*** a star, literally. The following quote was culled directly from their website: “*Naming a star makes a marvelous, eternal gift for anyone. From parents to spouses to top employees — everyone appreciates the unique present of **their very own star** to look to in the sky.*” I recently received a SPAM email from them. When you visit their web site, you’re presented with a means to ‘give the gift of a star’. Think of it, you’re driving home on a clear, cold winter’s night with Orion and Sirius blazing before you. As you make your way along that dark, country road with your sweetheart close by your side, you’re thinking, “Oh, how I would love to give her **that** star instead of the diamond ring that awaits her under the Christmas tree.” Well that’s exactly what the folks at USC have done. You can now buy a star, not Sirius, Rigel or Aldebaran, but a star and, according to their web site, a star of *their* choosing in a constellation of *your* choosing, as “it’s not technically feasible to buy a specific star”.

Another organization that has been around longer and is bolder than the USC, (if that’s possible) is The International Star Registry (<http://www.starregistry.com>). According to their website, they’ve named over 1,000,000 stars. Read differently, they’ve conned over 1,000,000 people into thinking that their \$54.00 (current price for the deluxe package, as listed on their website) has actually secured their name in the cosmos. That’s \$54,000,000 at today’s price that they’ve bilked from the naive and foolish. Several years back I read an article by Sky and Telescope Editor-in-chief Richard Tresch Fienberg concerning this notion of being able to name or buy a star and his interaction with The International Star Registry. You would think that a publication with the world standing and prestige of Sky and Telescope would have some sway with them. Not so. They threatened legal action if S & T continued to expose them for who and what they are.

There are other, unrelated ‘Star Registry Companies’. Those discussed here are two of the more popular ones. It goes without saying, that no one outside these star registry companies will ever recognize the “new” name of the star. No astronomer will *ever* refer to one of these stars as “Sarah Smith”, for example. The eminent astronomer Patrick Moore has denounced them in the UK magazine *Astronomy Now* as frauds. These companies have no more authority to name a star than I have to name a crater on Iapetus or Triton.

This notion that you could actually lay claim to a star by deed or decree is just the latest in man's arrogant, self-centered view of himself. Whether you're a Christian, a Jew, a Muslim or an Atheist, this season is about humility. Instead of continuing on our prideful course of ruinous excess, thinking that the universe is ours for the taking, we ought to strive to live in harmony with it, not strive to own or conquer it. It's out of a spirit of humility that we'll be able to truly realize our place in this vast and wonderful cosmos and, in turn, be better able to live in peace and harmony with our neighbors, fellow travelers on this fragile, pale-blue dot.

Since I had written this piece, the poor people of India and Asia have suffered a tragedy of epic proportions and I have delayed publication of this month's issue of the Custer Comment to include this addendum to my editorial. This event has brought into sharp focus just how vulnerable we all are and how fragile our environment is. How ironic that this tragedy occurred during a season in which the west and much of the world exchanges gifts and celebrates rebirth and new life. The *megathrust* earthquake that produced the deadly Asian tsunamis was a 9.0 on the Richter scale (http://en.wikipedia.org/wiki/2004_Indian_Ocean_earthquake) and caused a micro-wobble in the Earth's orbit. Out of a true spirit of the season and in solidarity with the survivors of this calamity and, in some, small way, to honor their myriad, nameless dead, please do what you can to help. To date, the death toll exceeds 120,000 with relief efforts strained to the breaking point. Aid is desperately needed. The following agencies are providing the much needed assistance and relief:

AmeriCares	http://www.americares.org
Action Against Hunger	http://www.actionagainsthunger.org
ADRA International	http://www.adra.org
American Jewish Joint Distribution Committee, Inc.	http://www.jdc.org
Association for India's Development	http://www.aidindia.org
CARE	http://www.careusa.org
Catholic Relief Services	http://www.catholicrelief.org
Christian Children's Fund	http://www.christianchildrensfund.org
Church World Service	http://www.churchworldservice.org
Direct Relief International	http://www.directrelief.org
Doctors Without Borders	http://www.doctorswithoutborders.org
Food for the Hungry, Inc.	http://www.fh.org
International Aid	http://www.gospelcom.net/ia
International Federation of Red Cross and Red Crescent Societies	http://www.donate.ifrc.org
International Medical Corps	http://www.imcworldwide.org
Mercy Corps	http://www.mercycorps.org
Save the Children USA	http://www.savethechildren.org
UNICEF	http://www.unicef.org
UN World Food Programme	http://www.wfp.org

In addition to these, a more complete list can be found at <http://www.cnn.com/2004/WORLD/asiapcf/12/27/quake.aidsites>

The views expressed in this editorial are those of this editor and my not reflect the official position of Custer Institute or its Board of Directors.

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Any staff on hand will be more than glad to assist in the operation of the telescope.

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Public observing every Saturday night, weather permitting.

The Custer Comment

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CUSTER COMMENT

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