



NEWSLETTER

# RITTENHOUSE ASTRONOMICAL SOCIETY

Founded 1888 WWW.RITTENHOUSEASTRONOMICALSOCIETY.ORG

October 2010

OPEN TO PUBLIC AND STUDENTS  
Upcoming Meeting on October 13th at  
7:15 PM  
The Franklin  
20th Street and Benjamin Franklin Parkway

## October's Meeting

Dr. Ken Kremer

NASA Ambassador & The Planetary Society

"The Space Shuttle, The Space Station, and

What's Beyond for NASA with Orion & Falcon 9"

(See article Below)



Ken Kremer with Discovery for rollout from OPF to VAB (left).

Credit: Larry Sullivan

## STS 133 Preview: Rolling and Bolting Discovery to Fuel Tank for Final Flight

Dr. Ken Kremer

Launch preparations for what is truly the final scheduled flight of Space Shuttle Discovery kicked into high gear in the early morning hours of 9 Sept. 2010 when NASA's oldest orbiter was rolled a few hundred meters from Orbiter Processing Facility 3 (OPF-3) to the Vehicle Assembly Building (VAB) at the Kennedy Space Center (KSC) – an awesome sight to behold !

Beyond the possible addition of the STS 135 mission there are no NASA plans or US government funds for any additional shuttle flights to be added to the manifest.

Later that evening, a multi day process began to hoist and mate Discovery for the very last time to an external fuel tank (ET) and twin solid rocket boosters (SRB's) which will power the majestic orbiter skywards for her final journey to space on the STS -133 mission. Thereafter upon landing at the conclusion of the STS 133 assembly flight to the International Space Station (ISS), Discovery will be retired from active duty service and relegated to a museum display.

These events are simultaneously joyous and "bittersweet" for all the NASA shuttle workers and managers at KSC and elsewhere across the US. From top to bottom, there is a palpable and overwhelming sense of both great pride – in magnificent accomplishments - and utter sadness, at a premature program termination.

For this final flight of Discovery, NASA relaxed the standard employee spectator and media restrictions just a bit. I was exceedingly privileged to attend all these breathtakingly beautiful events representing Spaceflight magazine, The Planetary Society, NASA Watch and RAS.

Along with literally just a handful of other very fortunate media representatives, NASA granted me extraordinary and ultra rare access to the highly restricted inner workings of shuttle launch processing activities inside the VAB to document the finale of the shuttle program. I was present to observe and photograph the carefully choreographed "lift and mate" operations up close from multiple angles and levels inside the VAB.

The unforgettable sequence began with Discovery's short distance trip atop a long yellow 76 wheeled transporter at 6:55 AM (Sept. 9) as she was backed tail first out of the hanger - known as Orbiter Processing Facility 3 (OPF-3).

### Visible Planets 10/13/2010

	Rises	Transit	Sets
Mercury	06:55 am	12:39 pm	06:22 pm
Venus	09:22 am	02:03 pm	06:43 pm
Mars	09:40 am	02:40 pm	07:39 pm
Jupiter	05:25 pm	11:16 pm	05:07 am
Saturn	06:13 am	12:09 pm	06:06 pm





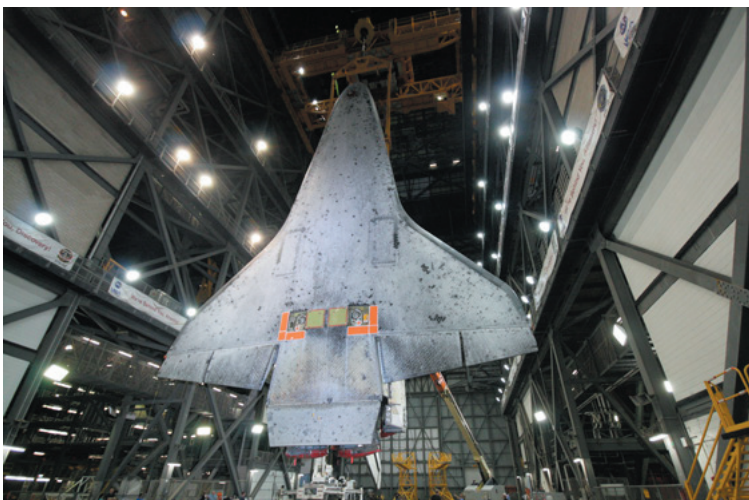
*Close-up of nose and crew cabin of Discovery, NASA oldest orbiter. Credit: Ken Kremer*

The trip from OPF-3 to the VAB is dubbed a ‘rollover’ in NASA parlance and marks the start of the final stage of launch preparations for STS 133.

‘Rollover’ is usually a quick 30 minute affair not generally open to the media. On this extraordinary occasion the trip lasted over 4 hours.

Hundreds of KSC and contractor employees who actively processed Discovery for flight were invited to gather and observe the event along with journalists and photographers like myself who documented the entire course of the stunning proceedings. Most KSC employees never get the chance to glimpse the orbiters up close.

Roughly half way through the trip the orbiter was parked so revolving groups of the employees could pose for photo ops with Discovery. Some carried signs and unfurled a long banner which read – We’re Behind You Discovery – signed by all who worked on this particular mission.



*Full belly view of Space ship Discovery coated with thousands of protective heat shield tiles. Note two rectangular attach points holding left and right side main separation bolts. Credit: Ken Kremer*

Discovery finally reached the VAB at about 11 AM and was hauled inside. I was thrilled to be on hand witnessing these historic events for the first time, and this was just the start of an unforgettable space adventure.

Then Discovery was hoisted and “hard mated” to the ET/SRB shuttle components already waiting inside VAB High Bay 3 on top of the Mobile Launch Platform (MLP) to complete the stack which will be launched to orbit. The process took all day and continued all through the night on 9 Sept 2010.

At a snail’s pace, Discovery was then hoisted by crane operators towards the 52 story VAB roof and then moved laterally over walkways on the 16th level into High Bay 3 where the ET and SRB’s had already been assembled and stacked to await the arrival of the Discovery orbiter. Our media group and NASA escorts watched this entire operation in total awe from the 16th level and some 100 meters high, as Discovery passed by us just meters away.



*Ken Kremer and Discovery inside Vehicle Assembly Building at the Kennedy Space Center. Credit: Ken Kremer*



Discovery was then lowered into place beside the rocket stack and vertically bolted to the huge ET and twin SRB's. The final process known as "hard mate" was complete at 9:27 AM EDT on Sept. 11.

STS 133 is slated for a Nov. 1 launch at 4:40 PM EDT from the Kennedy Space Center with a crew of six astronauts. STS 133 is the 39th flight of Discovery. During the 11-day STS 133 mission, Discovery will take the 'Leonardo' Permanent Multipurpose Module (PMM) packed with supplies and critical spare parts, as well as Robonaut 2 (R2) to the station.

Check out my online articles at NASA Watch, The Planetary Society and my website below. For complete details with numerous pictures, please read my online reports here:

<http://www.spaceref.com/news/viewnews.html?id=1435>

<http://www.spaceref.com/news/viewnews.html?id=1436>

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## Astronomy Outreach:

*Dr. Ken Kremer*

Please contact me for more info or science outreach presentations by email. My upcoming Astronomy talks include:

- **Stella Della Valley Star Party & Bucks-Mont Astronomical Association (BMAA): Ottsville, PA, Oct 9, Sat, 3 PM.** "The Space Shuttle, The Space Station and Whats Beyond for NASA with Orion & Falcon 9."

Website: <http://www.bma2.org/Sdv.html>

- **Rittenhouse Astronomical Society (RAS) at the Franklin Institute: Philadelphia, PA, Oct 13, Wed, 8 PM.** "The Space Shuttle, The Space Station and Whats Beyond for NASA with Orion & Falcon 9."

Website: <http://www.rittenhouseastronomicalsociety.org>

- **Plantation Astronomy Club: Leesburg, Florida, Oct 18, 7 PM.** "What's Beyond for NASA with Orion, Falcon 9 & Heavy Lift"

Website: <http://www.palhoa.com/id103.html>

- **Washington Crossing State Park: Titusville NJ, Nov 21, Sun 1 PM.** "6 Years of Mars Rovers and the Search for Life (in 3-D)"

- **Gloucester County College Astronomy Club: Sewell, NJ, Dec 7, 7:30 PM.** "6 Years of Mars Rovers and the Search for Life (in 3-D)"

Website: [http://www.gccnj.edu/news\\_and\\_alerts/rotating\\_ads/ken\\_kremer.cfm](http://www.gccnj.edu/news_and_alerts/rotating_ads/ken_kremer.cfm)

- **Rittenhouse Astronomical Society (RAS) at the Franklin Institute: Philadelphia, PA, Dec 8, Wed, 8 PM.** "6 Years of Mars Rovers: Update."

Website: <http://www.rittenhouseastronomicalsociety.org>

- **Amateur Astronomers Association of Princeton: Princeton, NJ, Jan 11, Tue, 8 PM.** "What's Beyond for NASA with Orion, Falcon 9 & Heavy Lift"

Website: <http://www.princetonastronomy.org/>

**Dr. Ken Kremer Email: [kremerken@yahoo.com](mailto:kremerken@yahoo.com)**  
**NASA JPL Solar System Ambassador & The Planetary Society**

**Web site:**

<http://www.rittenhouseastronomicalsociety.org/Dr.Kremer/K.htm>

<http://www.universetoday.com/author/ken-kremer/>



## President's Message

*Dr. Milton Friedman*

This past September, we saw a beautiful Harvest Moon 6 hours after autumn began at 11:09 p.m. DST on September 22. Farmers have benefitted from a Harvest Moon because the full moon closest to the autumnal equinox rises 25 to 30 minutes after moon rise of the previous night giving early moonlight that enables farmers to harvest their crops before total darkness.

Early American Indians of the East and Northeast had given names to the full moons of each month that gives insight into what was going on back then. January was known as the Wolf Moon because wolves howled in January. February was the Snow Moon, March the Worm Moon because worm remains indicated that robins were back and spring was coming. April the Pink Moon because wild flowers were blooming. May was the Flower Moon, June the Strawberry Moon, the month when strawberries were harvested. June was also known as the Rose Moon. July the Buck or Thunder Moon because new antlers begin to develop on the heads of young deer and it rains often. August the Sturgeon or Green Corn Moon. October the Hunter's Moon unless the nearest date for a full moon that was closest to the autumn equinox occurred in October (approximately once ever three months). November the Beaver Moon a time to set beaver traps. December the Cold Moon.

People around the globe have always seen our moon. It was the only one seen until Galileo looked through

his telescope in 1610 and saw four moons of Jupiter: Io, Europa, Ganymede and Callisto. In 1655, Huygens discovered Titan, a moon of Saturn. Four more moons of Saturn were discovered by the end of the 1600s. Many more moons of our solar system were discovered in the next centuries including Titania and Oberon of Uranus in 1787 and Deimos and Phobos of Mars in 1877. In 2005, two new moons of Pluto were found in 2005 making its total three.

In 1952, the Rittenhouse Astronomical Society gave its Silver Medal to Gerard Kuiper who at that time was the Director of the Yerkes Observatory. Kuiper had discovered Miranda a moon of the planet Uranus and Nereid a moon orbiting Neptune.

As of October, 2009, a total of 190 moons had been discovered in our solar system and 63 known as trans-Neptunian moons out in the Kuiper Belt (named after Silver Medal recipient Gerard Kuiper)

## Fall Officer's Meeting

*Submitted by Ted Williams, Secretary*

Our President (Milt Friedman), Vice-President (Alan Daroff), Secretary (Ted Williams), Treasurer (Ruth List) and members-at-large (Derrick Pitts, Joe Stieber, Mike Mountjoy) met at The Franklin Institute on 9/23. It is interesting to note that Derrick Pitts, Alan Daroff, and President Milt Friedman measure their involvement in the Rittenhouse Astronomical Society by decades rather than years. When these guys talk about the amazing history of Rittenhouse and its involvement with The Franklin Institute one can only be enraptured. After sharing some favored memories about our biggest events over the past decades, the exemplary speakers, and having a few laughs over some of the most challenging events to coordinate, we all became inspired as to how we might bring our efforts together to generate an even greater appreciation of astronomy.

It was noted that interest in astronomy is again growing in Philadelphia. It may be attributable to the recent success of the Galileo exhibit at The Franklin Institute along with the raised public awareness generated by the recent International Year of Astronomy. Derrick reported that attendance for the Night Skies at the Observatory program is on a steady increase. Rittenhouse is also growing in membership, and we are now regularly contacted by area experts as a speaking venue for Astronomy. Weekly hits on our website are constantly on the increase and our Facebook presence which started off with 18 midsummer, just topped 100 in the past two months (thanks to Denise

Vacca's active assistance.)

Ideas were bounced about as to how we might capitalize on this increased awareness. Derrick shared some exciting activities that The Franklin Institute is coordinating and wanted to extend a few opportunities for Rittenhouse to team with The Franklin Institute. The citywide Science Carnival news was on the order of a Supernova eruption. To have an opportunity for Rittenhouse to combine with The Franklin Institute to put together a Parkway exhibit on Astronomy was probably the most exciting idea discussed. (Read the article posted on the Internet written for The Philadelphia Inquirer at [http://www.philly.com/inquirer/health\\_science/daily/20100927\\_Scientists\\_will\\_be\\_taking\\_it\\_to\\_the\\_streets\\_in\\_spring.html](http://www.philly.com/inquirer/health_science/daily/20100927_Scientists_will_be_taking_it_to_the_streets_in_spring.html) .

Other ideas centered on some of our past efforts. Astronomy lectures, telescope workshops, table top interactive displays on astronomy or PowerPoint enhanced presentations were all batted about in the discussion. We even thought we might want to have an event or special Saturday that is not necessarily held with some astronomical event in the night sky. Telescope workshops could be conducted at any time, and not necessarily the night of a lunar eclipse.

Officers ended the meeting excited with the opportunities that were presented and wish to collect some feedback from our membership as to how our group and The Franklin Institute can increase astronomy awareness and education to a new generation of observers. Astronomy has gained a lot of attention with the recent astronomical successes at The Franklin Institute and internationally around the globe, so now let's create a vision of where to run with it!

We thought that throwing the discussion open to our membership to find if there are new areas of interest, displays or activities they have in mind, might be a good way to proceed. We will post information as we receive it on our Members Networking site and website. Please make sure you are signed up to our members network, it is a membership benefit! It is on the member's network where we can communicate, and the public website is where we can put the results. Please know we look forward to sharing our ideas on-line and at upcoming meetings.

Our Mailing Address:

**Rittenhouse Astronomical Society**  
**P.O. box 283**  
**Feasterville, PA 19053-0283**