

SPECTRUM

Northern Cross Science Foundation Newsletter

April 2016

Looking Up

April 7, Thursday

General Meeting

7:00 p.m. - Astronomy 101

7:30 p.m. - Main Program

Business Meeting to follow

April 21, Thursday

Board Meeting

7:30 p.m.

Home of Jeff Setzer

May 29, Sunday

Port Washington

Street Festival

Noon - 5:00 p.m.

Downtown Port Washington

May 29, Sunday

Astronomy Day

Dusk - 11:00 p.m.

Harrington Beach

June 4, Saturday

Discovery Day

9:00 a.m. - 1:00 p.m.

Pike Lake State Forest

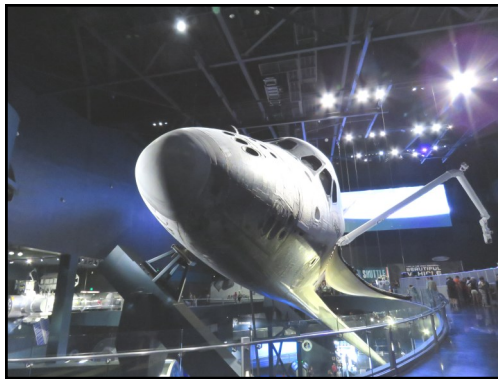
June 10 and 11, Fri & Sat

Public Viewing Night

9:00 p.m. - 11:00 p.m.

Harrington Beach

SHUTTLE ATLANTIS (OUR VISIT)...By Rick K. Photos by Mickey K.



Shuttle Atlantis - Kennedy Space Center

As many of our NCSF members do, we decided to take a vacation down to Florida, for a couple weeks, but what a couple of weeks it was! One of the places we anticipated seeing was the Kennedy Space Center. We had been there once before while participating at the Winter Star Party in the Florida Keys, but that was before the shuttle Atlantis was retired to the Center.

Atlantis had flown 33 missions while active and delivered three of the four space telescopes to orbit. Astronauts on the Atlantis also performed major maintenance on the Hubble telescope, installing two new instruments on the Hubble during servicing Mission 4: Wide Field Camera3

(WFC3) and the Cosmic Origins Spectrograph (COS). Atlantis was a workhorse.

We arrived on March 17 and immediately walked to the **Space Shuttle Atlantis Exhibit**. Outside the building stood a full-scale, upright, replica space shuttle stack, including external tank and two solid rocket boosters. The 184-foot-tall assembly was breathtaking. I had never appreciated the size and scope of this fuel system. Upon entering the building, there was a short 10-minute wait, then ushered into a huge room facing a 50-foot curtain. Projected 360 degrees around the room, a movie detailed the history of the shuttle program from its first inception to the end of the program. Then, as the music built, the curtain slowly raised revealing Atlantis in a way few but the space walking astronauts have seen it. Suspended in air, as if floating in space, Atlantis rotated 43 degrees with payload doors open and its robotic arm extended, as if it had just undocked from the International Space Station. This moment held me spellbound.

There were multiple ways in which to view Atlantis. On the second level, we entered the viewing area; this gave a vantage point, suspended in space and at eye level. There were dozens of exhibits and high-tech simulators throughout the building that brought to life the complex systems and components

Continued on Pg 2

Pathfinder Operations Will Pave Way for Space Launch System Processing

By Linda Herridge NASA's John F. Kennedy Space Center

NASA's Space Launch System, or SLS, rocket will be the most powerful in the world, and is the vehicle that will launch humans beyond low-Earth orbit and on to deep space destinations as the agency continues its journey to Mars. The Ground Systems Development and Operations Program at Kennedy Space Center in Florida is preparing its workforce, facilities and ground support equipment to handle the processing requirements of the SLS rocket and Orion spacecraft for its first launch.

A team of NASA engineers and Jacobs Engineering technicians and crane operators on the Test and Operations Support Contract are preparing for Exploration Mission-1 (EM-1) processing activities. During EM-1, SLS will launch the Orion crew capsule that will travel thousands of miles beyond the moon over the course of about a

three-week mission. No humans will be aboard, but it will pave the way for future missions with astronauts. Ultimately, it will help NASA prepare for missions to the Red Planet.

Experienced personnel are leading the preparation effort using pathfinders, or test versions, of an aft skirt and two inert segments of a solid rocket booster (SRB) inside the Rotation, Processing and Surge Facility (RPSF). The aft skirt and booster segments are similar to those that will be used on the SLS rocket. At launch, the twin SRBs will provide more than 75 percent of the total SLS thrust and operate for about two minutes before separating from the core stage. The aft skirt is at the base of the booster and contains the system that will steer the booster nozzles.

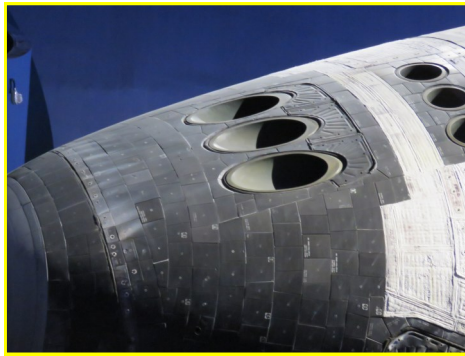
Continued on Pg 3

Shuttle Atlantis Continued from Pg 1

behind this incredible feat of engineering.

One of many interesting observations we made was fact that the exterior of the shuttle bore the scars of re-entry. The scorch marked nose and missing tiles. The tiles made an interesting first impression, like wall or kitchen tiles. Upon closer inspection each individual tile was numbered differently. An exhibit nearby explained they were made from silica fibers, which were produced from high-grade sand, withstanding re-entry temperatures of 2,300 degrees to keep the orbiter's aluminum skin at 350 degrees or less.

Even though the group we entered with dispersed, we were able to remain on the second level for as long as we liked. After three or four additional groups had passed through, we finally decided to proceed to the 1st level. On the 1st level, you walked under the belly of the orbiter as if it were flying over your head. It was massive!



Tiles visible on nose of shuttle.

Identification Number

Each tile has an ID number which tells the batch and location. This number can be fed into a computer to produce an identical tile.

Coating

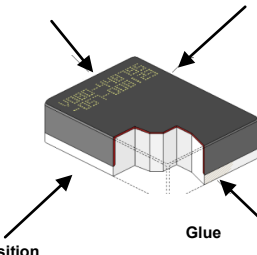
A black-glass coating of borosilicate covers the tile. These tiles do most of the coating job by shedding about 95% of heat encountered. The remaining 5% is absorbed by the tile's interior, preventing it from reaching the orbiter's aluminum skin.

Composition

90% air, 10% silica fibers a few millimeters thick. The tiles feels similar to plastic foam. The silica fibers are derived from high-quality sand.

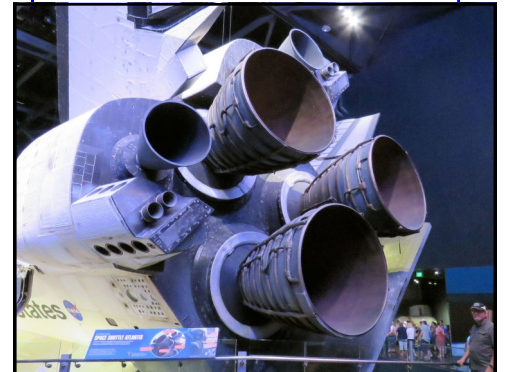
Glue

A silicon-rubber glue similar to common bathtub caulking, bonds a tile to a felt pad, that is in turn bonded to the orbiter's skin. The felt absorbs the stresses of airframe bending that could damage the tiles.



Full Scale Model of the Shuttles Solid Rocket Boosters and Fuel Tank. Including Rick...see him on the left!

Below - The Main Rocket Propulsion System



Imagers Report...By Ernie Mastroianni

Home brew dew solution, galaxies through light pollution, polar alignment

Thanks to Northern Cross member Chad Andrist, dew issues during observing sessions with the club's 5-inch refractor now have a fix. Andrist made three heating bands for each objective and the control box to run the system. "The heater bands are sized accordingly, said Andrist in an email to the imaging committee. "The large one is for the ES127, the medium one is for the AT72ED, and the small one is for the 50mm finder. They are insulated on the outer side to keep heat trapped as best as can be without being too thick. They wrap around the OTAs red side in/black side out and fasten with Velcro." The dew controller



Dew Heater and Bands

will be mounted onto the telescope in order to minimize the number of wires that dangle from the tube. The system requires about 3 amps of 12-volt power, and the committee is now pursuing power source options.



M81 and M82 by Chad Andrist

Andrist also took this remarkable image of the galaxy pair M81 and M82 from a light-polluted Milwaukee location in mid-March. Using only an 80mm refractor and a QSI 660 monochrome camera equipped with a 6 megapixel chip, he managed to get some remarkable detail in both galaxies, with only a series of 3x120-second exposures in



Alignment Night

luminance, red, green, blue and hydrogen alpha. And the moon was 95 percent full at the time.

This is clear evidence that imaging need not be limited to dark skies or moonless nights.

Finally, I spent a mid-March evening under a nearly full moon fine tuning the refractor's polar

alignment. The inevitable bumps and jarring from public viewing nights had displaced the polar alignment by more than one degree in azimuth. Using the built-in digital polar aligning program that comes with the CGE-Pro, I was able to refine the alignment to within three arc minutes of true north. Clouds rolled in before I could test the results using drift alignment, but the mount was able to bring targets into the field of a 12mm reticle eyepiece.

April General Meeting

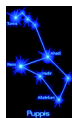
101 Program ...by Kevin Bert

“Telescope Focal Length”

Telescope optics are an important part in the enjoyment of our hobby. One property of optics is the focal length. We will focus on the simple reflecting telescope and how to determine it.

Constellation of the month:

Puppis



Main Program... by Jack Stehli

Corona Borealis

This month's main program will be presented by Jack Stehli. Among other talents, Jack is a photographer of atmospheric phenomenon, including auroras. Jack lives in Hartford and has taken remarkable Aurora pictures. He will be sharing this passion with us at the meeting.

RELATED INFO

Leaders for Public Viewing

May 29

Port Washington

Kevin Bert

May 29

Astronomy Day

Jeff Setzer

June 4

Discovery Day

Gene & Charlotte DuPree

June 10 & 11

Harrington Beach

Leaders Needed

Star Parties!

NCRAL 2016

Bloomington-Normal

April 29 - 30th

Registration is now online at:

<http://www.ncral2016.org>

Check out the entire program with full-description of speakers, off-site activities, astro-photo contest and more!

WOW

June 2nd through 5th
Hartman Creek State Park
www.new-star.org
Registration later February

NORTHWOODS STARFEST 2016

Hobbs Observatory
Beaver Creek Reserve
Fall Creek, Wisconsin
August 5-7, 2016

www.cvastro.org

Not receiving a digital copy of the Spectrum by e-mail? Then we probably don't have your correct e-mail address. Send corrections to ricketkaz@charter.net.

Pathfinder Continued from Pg 1

“The RPSF was used for space shuttle booster segments,” said acting NASA Integrated Operations Flow Manager David Diaz. “Upgrades and modifications to the heritage test stands and work platforms recently were completed to accommodate the new aft booster assembly, and particularly the longer nozzle.”

The SLS will use two, five-segment solid rocket boosters. Each is 177 feet long and 12 feet in diameter, with upgraded avionics and control systems. They each will provide 3.6 million pounds of thrust at launch.

The aft skirt Pathfinder was transported from the Booster Fabrication Facility, or BFF, to the RPSF on Jan. 20. The BFF is operated by Orbital ATK for NASA's Marshall Space Flight Center in Huntsville, Alabama. The two booster Pathfinder segments arrived by train, at Kennedy's Jay Jay railroad yard Feb. 2 from Orbital ATK in Promontory, Utah. The segments were transferred by rail to the RPSF on Feb. 23.

Technicians removed the covers from the boosters and performed a simulated grain inspection of the interiors. Crane operators used the facility's two cranes in tandem to lift the booster segments off of the railcars, raise them to the vertical position and lower them onto test stands. Engineers then hoisted the pathfinder aft segment to the build-up stand and mated with the aft skirt. Next, the team used a modified dolly and elevator platform to lift and mate the aft exit cone to the aft skirt.

Engineers will next lift the entire aft booster assembly to check for interferences as it is moved to a pallet and then back onto the work platform. The aft assembly will be used to check for interferences with modified ground support equipment. Installation of the Core Stage Adapter ring and struts will be performed before the aft assembly is transported to the Vehicle Assembly Building for additional verification and validation.

“After we've completed pathfinder operations in the RPSF we will continue with additional testing operations in the Vehicle Assembly Building,” said Kerry Christ, project flow manager with Jacobs. “The crane operators in the RPSF will operate the cranes in both facilities.”

These pathfinder operations are performed to help verify that the upgrades and modifications



completed in the RPSF will support processing requirements for the aft skirt, SRB segments and the integrated aft booster assembly, to ensure a smooth liftoff at launch.

First of two solid rocket booster system for testing raised upward onto the test platform
Photo 2/25/16 B Smelgelsky

NCSF Fundraiser Event!

Germantown Pick N Save

N112 W16200 Mequon Rd.

Saturday, July 2, 2016

10 a.m. to 3 p.m.

Hello NCSF Members!

Jaime Hanson has come up with a great idea for our club to raise funds; a **BRAT FRY**. Jaime said traditionally this particular Germantown Pick N Save is extremely busy on that day. Here is an opportunity for our club, one and done. Not the every week-end commitment for a brat fry. Bring your Solar Scopes!

From Jaime:

“We will be serving burgers, brats, hot dogs, soda and chips.

We need as many volunteers as we can get and bring Solar Scopes if you have them.

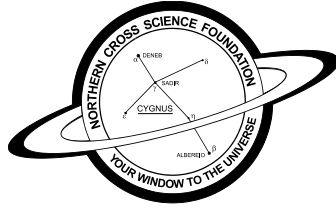
Some long folding tables too

And for yourself, bring water, sweat towels, hats, sunscreen, sunglasses, fatigue mats, portable fans anything that will make you comfortable!”

Rick and I are already signed up! I get to wear my “Failure is not an Option” apron!



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Jim & Gwen Plunkett
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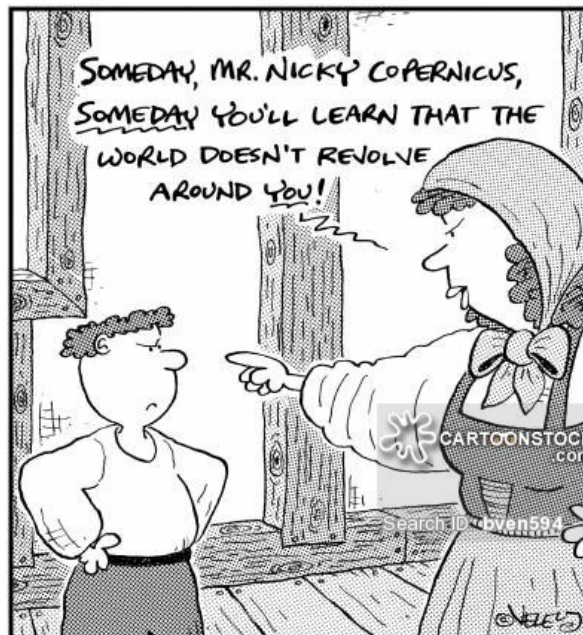
SSAS - The 9th Annual Swap 'N' Sell Sponsored by Sheboygan Astronomical Society

Saturday, April 9, 2016 - 9:00 am

Aviation Heritage Center

Sheboygan Airport

N6191 Resource Drive, Sheboygan Falls, WI
53085



SPECTRUM

Published by the Northern Cross Science Foundation, Inc. A non-profit organization based in South-eastern Wisconsin.

NCSF is a member of the North-Central Region of the Astronomical League.



NCSF supports the *International Dark Sky Association*

This Issue, along with back Issues of SPECTRUM, can be found on the NCSF Web Site.

<http://www.ncsf.info>

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Please send your Questions, Suggestions, Articles, and photos to:
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Newsletter Editor & Publisher
- Rick & Mickey Kazmierski

Monthly Meeting Information

7:00 p.m. Astronomy 101
7:30 Main Program
Unitarian Church North
13800 N. Port Wash. Rd.
Mequon, WI 53097