



National Aeronautics and Space Administration  
Goddard Space Flight Center

Wallops Flight Facility, Wallops Island, Virginia

# Inside Wallops

Volume XIX-99

Number 38

October 4, 1999

## **Chandra Discovers X-Ray Ring Around Cosmic Powerhouse In Crab Nebula**

After barely two months in space, NASA's Chandra X-ray Observatory has taken a stunning image of the Crab Nebula, the spectacular remains of a stellar explosion and has revealed something never seen before: a brilliant ring around the nebula's heart.

Combined with observations from the Hubble Space Telescope, the image provides important clues to the puzzle of how the cosmic "generator," a pulsing neutron star, energizes the nebula, which still glows brightly almost 1,000 years after the explosion.



*Chandra X-ray Observatory*

"The inner ring is unique," said Professor Jeff Hester of Arizona State University, Tempe, AZ. "It has never been seen before, and it should tell us a lot about how the energy from the pulsar gets into the nebula. It's like finding the transmission lines between the power plant and the light bulb."

The image shows tilted rings or waves of high-energy particles that appear to have been flung outward over the distance of a light year from the central star and high-energy jets of particles blasting away from the neutron star in a direction perpendicular to the spiral.

Hubble images have shown moving knots and wisps around the neutron star, and previous X-ray images have shown the outer parts of the jet and hinted at the ring structure. With Chandra's exceptional resolution, the jet can be traced all the way in to the neutron star, and the ring pattern clearly appears. The image was made with Chandra's Advanced CCD Imaging Spectrometer and High Energy Transmission Grating.

The Crab Nebula, easily the most intensively studied object beyond our solar system, is the remnant of a star that was observed to explode in 1054 A.D. Chinese astronomers in that year reported a "guest star" that appeared

suddenly and remained visible for weeks, even during daytime. From gamma-ray telescopes to radio telescopes, the Crab has been observed using virtually every astronomical instrument that could see that part of the sky.

Unraveling the mysteries of the Crab has proven to be the door to insight after insight into the workings of the universe. The Crab convincingly tied the origin of enigmatic "pulsars" to the stellar cataclysms known as supernovae.

Observations of the expanding cloud of filaments in the Crab were instrumental in confirming the cosmic origin of the chemical elements from which planets (and people) are made.

The nebula is located 6,000 light years from Earth in the constellation Taurus. The Crab pulsar, which was discovered by radio astronomers in 1968, is a neutron star rotating 30 times per second. Neutron stars are formed in the seconds before a supernova explosion when gravity crushes the central core of the star to densities 50 trillion times that of lead and a diameter of 12 miles.

Another consequence of the dramatic collapse is that neutron stars are rapidly rotating and highly magnetized. Like a gigantic cosmic generator, the rotating magnet generates 10 quadrillion volts of electricity, 30 million times that of a typical lightning bolt.

NASA's Marshall Space Flight Center manages the Chandra program. TRW, Inc., Redondo Beach, CA, is the prime contractor for the spacecraft. The Smithsonian's Chandra X-ray Center controls science and flight operations from Cambridge, MA.

Chandra images are posted to the Internet at: <http://chandra.nasa.gov> and <http://chandra.harvard.edu>

## **Wallops Shorts..... Sounding Rocket Launch**

A NASA Terrier-Black Brant sounding rocket was successfully launched and recovered from the White Sands Missile Range, Sept. 27. The vehicle carried a Galactic Astronomy experiment and was the first test flight of the new DS-19 boost control system which performed successfully. Dr. Erik Wilkinson of the University of Colorado was the principal investigator.

## **Goddard Team:**

As promised, I want to keep you posted on the status of the Appropriations Bill that funds NASA.

On Sept. 24, by voice vote in the Senate, the bill passed and is now in route to conference with members from House and Senate committees to debate the differences between the House and Senate versions. Maryland Senators Barbara Mikulski and Paul Sarbanes continue to demonstrate their support for NASA and GSFC in recent votes, and I am pleased to see their steadfast dedication to deliver a budget that enables a viable space program for the country.

On another note, the recent Safety In-Service Day was very impressive. Thank you for participating and acting on safety as a core value of the Center. As I walked around the Greenbelt campus and Bill Townsend visited the Wallops facility, we were reminded how fortunate we are to have one of the best jobs possible because of the work and care the workforce, civil servant and contractor alike, contribute to the Goddard Space Flight Center. Thank you and please keep you, your family and friends safe.



*Center Deputy Director, Bill Townsend talks to employees about safety issues during his visit to Wallops.*

*Digital photo by Rick Huey.*

One thing I would like to re-emphasize is the importance of not leaving your safe behaviors at the office. Avoid behaviors at home that may be hazardous or for which you are not trained. These could be as simple as climbing a utility ladder to change a bulb or as complex as getting on the roof to modify or repair something.

It might not impact our current safety metrics here at work but in the end the loss may be the same... the loss of your valued contribution here at work. So act

**A. V. Diaz**

## **Fire Prevention Week Oct. 3 - Oct. 9, 1999**

Fire Prevention Week is the result of the Great Chicago Fire, which occurred on Oct. 9, 1871. The fire killed 300 people, left 100,000 homeless and destroyed more than 17,000 structures.



The origin of the fire has generated considerable speculation. One popular legend has it that Catherine O'Leary was milking her cow when the animal kicked over a lamp, setting the barn on fire and starting the spectacular blaze.

However the massive fire began, it swiftly took its toll, burning more than 2000 acres in 27 hours. The City of Chicago quickly rebuilt and residents began celebrating their successful restoration by remembering the anniversary of the fire with festivities.

The Fire Marshals Association of North America (FMANA), now called the International Fire Marshals Association, the oldest membership section of the National Fire Protection Association (NFPA), felt the 40th anniversary of the Great Chicago Fire should be observed not with festivities but in a way that would keep the public informed about the importance of fire prevention. As a result FMANA sponsored the first National Fire Prevention Day on Oct. 9, 1911, and in 1920, President Woodrow Wilson issued the first national Fire Prevention Day proclamation.

The NFPA officially sponsors and selects the theme for the national commemoration of Fire Prevention Week, honoring the anniversary of the Great Chicago Fire using events to increase awareness of the dangers of fire.

Every year since 1925, the President of the United States has signed a proclamation pronouncing the Sunday-through-Saturday period in which October 9 falls a national observance.

When President Calvin Coolidge proclaimed the first Fire Prevention Week, Oct. 4-10, 1925, he noted that in the previous year 15,000 lives were lost to fire in the United States. Calling the loss "startling," President Coolidge's proclamation stated, "This waste results from conditions which justify a sense of shame and horror; for the greater part of it could and ought to be prevented... It is highly desirable that every effort be made to reform the conditions, which have made possible so vast a destruction of the national wealth."

NFPA continues to make Fire Prevention Week a priority and counts on the participation of tens of thousands of fire and safety professionals, American Red Cross volunteers and individuals.

For more information on fire prevention call the Wallops Fire Department, x1300.

## **Attention Deficit Hyperactivity Disorder in Children (ADHD) Workshop**

When: Oct. 6, 1999  
9 a.m.

Where: Bldg. F-160, Room C164

Led by Dr. Chris Garner, an Employee Assistance Program affiliate counselor, this workshop will focus on identifying the different types of ADHD, characteristics of children who are most likely to be effected and how to differentiate between typical childhood behavior and behavior that may indicate a problem.

Information about the treatment options currently being used as well as resources and a recommended reading list will be available. For information call the EAP, x66-4600.

## **From FedWeek Sept. 29 Issue**

### **FEHB Rates 'Unacceptable'**

Office of Personnel Management director Janice R. Lachance has declared the 2000 Federal Employees Health Benefits average premium hike of 9.3% "unacceptable" and has pledged to do something about future rates. The increases will be the third in a row.

"It's clear that competition in the marketplace has not effectively slowed the growth in FEHB premiums," said Lachance. "We must consider new and bold approaches so we can continue providing affordable, high-quality health care to our employees, retirees and their families. The increases of the last several years are unacceptable."

The 2000 average rate increase follows a 9.5% increase in 1999 and a 7.2% increase in 1998. OPM administers the health insurance program for federal employees and retirees.

### **FEHB 2000 Dropouts**

Some 43 plans dropped out of the Federal Employees Health Benefits program for 2000. To find out if your plan is among them, visit the FedWeek website: <http://www.fedweek.com>

About 43,000 individuals must select a new health plan because of the plan withdrawals. Health plans that leave the program must notify each of their members that they need to select a new plan during the open season, Nov. 8 to Dec. 13.



## **Scheduling Use of Annual Leave**

Civil service employees with use or lose balances should begin to think about planning for the use of that leave during the remainder of this year and discuss these plans with their supervisor as soon as possible. The last day of Leave Year 1999 will be Jan. 1, 2000.

Review and approval of leave plans that satisfy employees personal schedules while assuring that required work is accomplished may be challenging. Supervisors need as much advanced notice as possible to plan for meeting the organizations' obligations.

In some cases, work scheduling may make it impossible for an employee to be away on leave at the requested time or at all. In these cases, the organization may request Center Management to declare an "exigency of the public business," which if done, permits the supervisor to deny the employee's leave request and meets one of the requirements for restoration of that leave when forfeited.

The most significant requirement that must be met for restoration of forfeited leave is that the leave must have been requested by the employee in writing and approved for use by the supervisor in writing no later than Nov. 20. Although you may expect no problem using all of your 1999 use or lose leave before Jan. 1, 2000, employees should take the precaution of submitting a written leave request.

If you have a restored leave account from prior year(s) and are not sure when the time period to use that leave expires, contact the payroll office in Code 151.5 as soon as possible.

*Inside Wallops* is an official publication of Goddard Space Flight Center and is published by the Wallops Office of Public Affairs, Extension 1584, in the interest of Wallops employees.

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