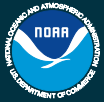


NSSL Briefings

Summer 2007
Volume 7 Number 2



<http://www.nssl.noaa.gov>



In this issue:

Hazardous Weather research
NSSL Development Laboratory
2

Hydrometeorology Research
Debris Flow 2007
3

Weather radar research
PAR's rapid scan capabilities
4

Employee Spotlight
Joan O'Bannon
5

Outreach
National Weather Festival a success
7

Celebrations
NSSL's Web site gets a face lift
8

Since 1995, NSSL Briefings has been published from the National Severe Storms Laboratory to provide federal managers, staff, and other colleagues in the meteorological community with timely information on our activities. This newsletter also contains information about NSSL's scientific collaborations with the OU Cooperative Institute for Mesoscale Meteorological Studies (CIMMS). To receive NSSL Briefings by mail, e-mail, or to change your address, please forward requests by e-mail to susan.cobb@noaa.gov.

NSSL STAFF

Director.....Jeff Kimpel
Deputy Director.....Kevin Kelleher
Administrative Officer.....Linda Skaggs
Chief, Forecast R&D/FOFS.....Dave Rust
Chief, Radar R&D.....Doug Forsyth
Chief, Warning R&D.....Dave Jorgensen
Information & Technology.....Jeff Horn
CIMMS/NOAA Relations.....Randy Pepler
Public Affairs.....Keli Tarp
NEWSLETTER
Writer/Editor.....Susan Cobb



Photo by Robert Coggins

"Research capital of the plains"

The National Weather Center, a facility that partners NOAA research and operations and the University of Oklahoma, officially opened its doors on September 29, 2006 in a dedication ceremony attended by state and national officials. Oklahoma's Governor Brad Henry proclaimed, "We are set on making Oklahoma the research capital of the plains. The National Weather Center is the anchor of this plan."

The NWC, situated on 22 acres as part of OU's South Research Campus, is the largest center of its kind in the world. The 250,000 square foot building houses over a dozen prestigious organizations and was designed to encourage synergistic relationships between NOAA staff and OU's faculty, researchers and students. By combining expertise in all areas of weather, it is anticipated that work done in the NWC will be crucial towards helping federal, state and local government agencies reduce loss of life and property due to hazardous weather.

Deputy Secretary of Commerce David A. Sampson, a featured speaker at the ceremony, said, "The National Weather Center affords the type of collaboration between government, academia and the private sector that offers the best opportunity to advance our understanding and prediction of weather phenomena to save lives and property as well as promote economic development."

Hundreds of people attended the opening festivities. Following the dedication, a luncheon panel for the meteorological community featured The Weather Channel on-camera meteorologist Jim Cantore and Oklahoma City KWTW News 9 chief meteorologist Gary England. ♦



NSSL's Travis Smith shows off the new NSSL Development Lab.



NSSL's Doug Forsyth leads a tour through the National Weather Center.

NSSL Development Lab invites collaboration

NSSL researchers are making the most of a new high-tech lab space at the National Weather Center. Run by NSSL's Warning Research and Development Division, the "NSSL Development Lab" includes four wall-mounted plasma screen displays and enough space for at least 10 workstations. A large round table occupies the middle of the room for lunchtime "brown bag" discussions and other meetings. The new lab invites collaboration.

Researchers, forecasters and developers are using the development lab to evaluate new platforms and techniques in real-time as a team, thanks to modern computing power and greater bandwidth capabilities. Collaboration among these diverse groups provides valuable feedback that can immediately be applied to



The new high-tech NSSL Development Lab at the National Weather Center

the research and development process, streamlining technology transfer.

Current projects being evaluated in the lab include a multi-radar/multi-sensor hail algorithm under development. The algorithm is being run continuously using real-time data from over 100 WSR-88D radars and a numerical model. The output from the algorithm can be evaluated whenever storms are occurring anywhere within the 48 contiguous states. NSSL is also working to develop new platforms for phased-array and dual-polarized radars. The workstations in the lab can quickly be adapted for visualization and incorporation of these unique data sources. ♦

Public helps support field projects with observations

Thousands of volunteer observations have been submitted

An invitation to be a part of NSSL's science and research first went out to the public at the end of November, 2006. The **Winter Hydrometeor Classification Ground Truth Program (WHCGTP)** requested reports of winter precipitation occurring at any location within 90 miles of Norman, OK. Local broadcast meteorologists and newspapers spread information about the need for volunteers, and the Norman National Weather Service Forecast Office (NWSFO) provided announcements on NOAA weather radio and a link to the project Web site from their home page. The information provided by the residents of central Oklahoma during Winter 2006-7 was so valuable, NSSL again called on them to be a part of their science and research in the **Hail Size Discrimination Experiment (HaSDEx)**.

HaSDEx requested hail observations throughout the duration of thunderstorm events occurring within 90 miles of Norman, OK from as many people in as many places as possible. Volunteers were asked to check NSSL's home page (<http://www.nssl.noaa.gov>) for the "Project Status." If the project was "Active," they were invited to make as many observations as they wanted. Hourly observations were ideal. The Norman NWSFO again assisted by providing a link to the project on their web site.

Volunteer observations from the 2006-2007 WHCGTP and 2007 HaSDEx will be merged with data from the dual-polarized KOUN radar to investigate the relationship of polarimetric variables to different types of precipitation. The projects will help NSSL researchers refine and develop radar techniques, algorithms, and products to diagnose precipitation characteristics and intensity and improve warnings hazardous weather.

WHCGTP and HaSDEx are different from other public cooperative observation programs because the volunteers remain anonymous and make no long-term commitments. Both are also narrowly focused on type of winter precipitation and hail, while other programs require more information such as measuring precipitation amounts or temperature. ♦

Hail piles up on a road in northern Colorado



NSSL wraps up HMT-West and USGS Debris Flow project collaborations

NSSL's Shared Mobile Atmospheric and Teaching Radars (SMART-R) crews recently wrapped up two major projects in the western U.S. One NSSL SMART-R operated in Foresthill, CA as part of the NOAA Hydrometeorology Testbed (HMT-West 2007). The other SMART-R crew was part of the NOAA/USGS Demonstration Flash-Flood and Debris Flow Early Warning System project and collected data near Pyramid Lake, CA during the winter of 2006-2007.

HMT-West 2007

HMT-West 2007 was a full-scale field operation in the California American River Basin to collect data that will improve precipitation estimates and flash flood forecasts and warnings. The new technologies, models, and scientific results from the research community will be applied to daily forecasting operations of the National Weather Service and its River Forecast Centers.

NSSL's SMART-R Doppler C-band radar supplemented ground-based observations to determine if gap-filling radars had value in improving precipitation estimates. Forecasts, crew deployments and storm debriefings were discussed in daily conference calls among the National Weather Service (NWS), Earth Systems Research Laboratory (ESRL), and NSSL participants of HMT-West 2007.

The HMT project began in California in 2004 and will spread to other regions of the U.S. in the coming years to address hydrometeorology problems that are unique to those locations. The HMT will ultimately improve forecasts of floods, flash floods, and debris flows by determining the most useful tools for improving precipitation and runoff forecasting methods, saving lives and protecting property.

NOAA/USGS Demonstration Flash Flood and Debris Flow Early Warning System

The NOAA/USGS Demonstration Flash-Flood and Debris Flow Early Warning System project was focused on helping forecasters improve flash flood and debris flow warnings in areas damaged by wildfires. These areas, known as burn scars, are particularly susceptible to flash floods and debris flows during rainstorms. Rainfall that is normally absorbed by vegetation can run off almost instantly, causing creeks and drainage areas to flood much earlier and with higher magnitude than normal.

NSSL's SMART-R crew collected data near Pyramid Lake, CA, the site of the Day Fire burn area. The



The Day Fire burn scar in Southern California. Burn scars are very susceptible to flash floods and debris flows during rainstorms.



NSSL's SMART-R Doppler C-band radar collected data to help improve debris flow outlooks, watches and warnings.

Day Fire was one of the biggest (162,702 acres burned) and longest (September 4 – October 2, 2006) burning brush fires in California history.

The objective of NSSL's SMART-R deployment to southern California was to gather very high-resolution rainfall data sets to be used by USGS to refine their thresholds for debris flows. This capability will allow NWS forecasters together with the USGS to issue debris flow outlooks, watches and warnings to better serve society's need for weather and water information. ♦

For more information: <http://www.nssl.noaa.gov/research/hydromet/>

NSSL's SMART-R's were used to collect data that will improve precipitation estimates, and flash flood and debris flow forecasts and warnings



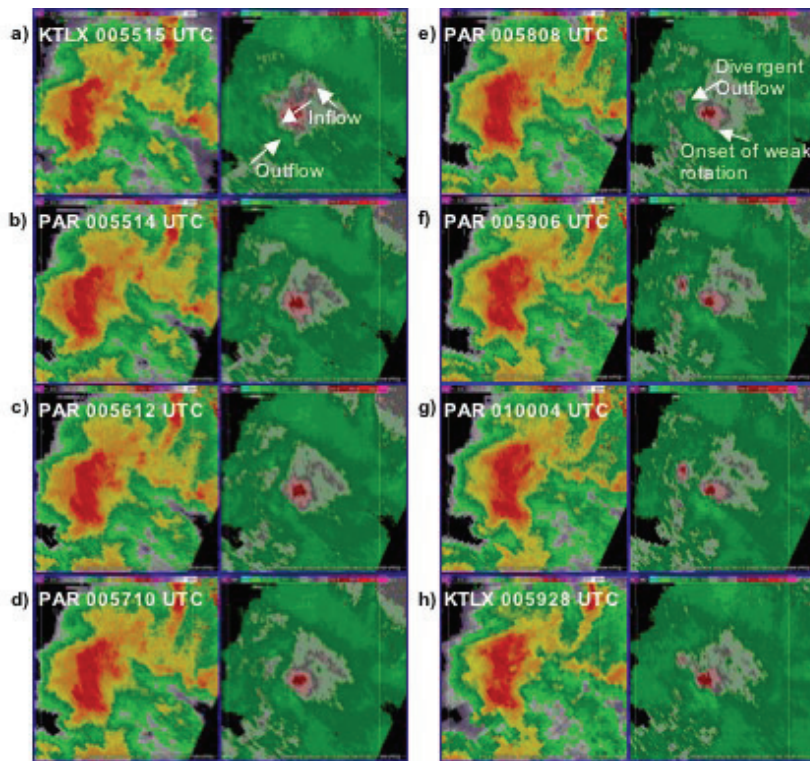
2007 National Weather Radar Testbed Demonstration

Storms across Oklahoma this spring have provided NOAA NSSL scientists an unprecedented opportunity to research rapidly evolving weather phenomena using the phased array radar (PAR). PAR, part of the National Weather Radar Testbed (NWRT) has the potential to extend warning lead-times for severe weather.

The NWRT demonstration was conducted from April through mid-June, 2007. Designated National Weather Service Forecasters from forecast offices across the U.S. participated in coordination with NOAA and University of Oklahoma research meteorologists.

This demonstration will yield information about the benefits and challenges of using PAR data in warning decision-making situations by introducing real-time PAR data to a simulated operational warning environment. Other 2007 NWRT interrelated experiments will investigate the utility of PAR data in forecasting, modeling, and identifying characteristics of deep convection. The demonstration will also gather high-density verification information for the PAR to support the development of scientifically sound severe storm guidance applications and techniques.

The NWRT PAR became functional in September 2003 and collected data in 2004 and 2005 for engineering tests, weather observations, and system checks. To demonstrate the rapid-scan capability of the PAR antenna, data were collected in 2006 on a variety of severe convective storms using various scanning strategies. ♦



Development of low-level convergence and rotation within a severe thunderstorm near Norge, OK (approximately 50 km from PAR) on 25 April 2006. The top left and bottom right panels are consecutive 0.5° elevation scans from KTLX. The panels in between are consecutive 0.5° elevation scans from PAR. There are 213 seconds between KTLX scans and 58 seconds between PAR scans.

Phased-array radar provides early detection of hazards

NOAA's NSSL researchers have confirmed the Phased-Array Radar (PAR), under evaluation at NSSL, can detect rotation, hail, microbursts and gust fronts well ahead of other radars due to its rapid volume scan capability. During the summer of 2006 the PAR, WSR-88D, and Terminal Doppler Weather Radar (TDWR) scanned four thunderstorm cases in central Oklahoma. NSSL researchers compared the data and found the PAR detected severe weather hazards several minutes in advance of the other radars. In one case the PAR captured storm evolution features that were not sampled by the WSR-88D. This was the first investigation of the meteorological advantages of the PAR.

In one case, researchers found over an eight-minute period the PAR captured the continuing evolution of storms in great detail including the development of a new cell that formed before the end of the first KTLX volume scan, a cell merger, and signs of dissipation. Another case observed by the PAR was a rapidly evolving severe storm with reflectivities exceeding 70dBZ and a TBSS (Three-body Scatter Spike - an indicator of hail) that would have been visible in only a few WSR-88D volumes, and its descent through the storm's life cycle would not have been as evident.

Damage-producing severe microburst events were also sampled by the PAR a total of 23 times from the first detection of the core aloft to the outflow time. In comparison, the KTLX completed only three volume scans in the same period of time and did not sample the peak outflow.

PAR's rapid volume scan update time identified the evolution of hazardous severe weather features well ahead of the current capabilities of the WSR-88D radar. This timing provides a critical advantage for future forecasters and aviation users. ♦



Employee Spotlight: Joan O'Bannon

*God gives all men all earth to love,
But, since man's heart is small,
Ordains for each one spot shall prove
Beloved over all. - Rudyard Kipling*

Joan O'Bannon's home on the edge of Norman is her sanctuary. This "one spot beloved over all" is a summer night on her deck, listening to the din of cicadas and frogs and watching the fireflies. It is a peaceful and friendly neighborhood where everyone has a little space, and the squirrels seem to have the upper-paw. They eat the bedding plants and container plants, bang the dog's aluminum water dish around when it's empty and help themselves to birdseed (sometimes while it's still in the bag). The indigo and painted buntings are a rare treat at the feeders, while the woodpeckers, cardinals and goldfinches are regulars who seem to be content with their nuisance neighbors. Deer and wild turkeys occasionally make appearances, but it is the pesky armadillos that are most destructive and least welcome. Her indoor pets, a Catahoula-Doberman named Shiloh and a calico cat were both rescue animals. Shiloh escorts her on a perfect two mile walk

where they are frequently joined by any number of neighborhood dogs.

Before desktop publishing, almost every NSSL graphic, published in papers and otherwise, came from Joan's designer eye and skilled fingers. From the days of Leroy lettering (a manual lettering set consisting of templates, a scribe, and a set of pens) to designing and managing Web sites now, Joan's career has evolved with technology. She learned how to draft figures after college and did freelance work at the OU School of Meteorology. It was the perfect niche, and the need was there. NSSL hired Joan in 1979. She remembers when the journals limited color graphics. "Each color had to be drafted separately, a negative made, colored transparencies overlaid, then a picture taken of each 'color' with a pin registered camera." Once the digital age arrived, "computers drastically changed everything." NSSL researchers now do all of their own graphics and posters. "It was evolutionary for everyone," she says.

Joan has enjoyed taking her career and shaping it in a direction that is meaningful to NSSL. She currently manages the OAR Web site and co-manages NSSL's Web site, which recently received a major face-lift. "I like the freedom to create, to showcase the lab." She describes her work in terms of projects and appreciates that they have a beginning and an end. The biggest and longest project for Joan was the NSSL self-guided tour - a series of large posters displayed in the halls of NSSL that described severe weather and NSSL's severe weather research. An old project she is proud of is "VORTEX: Unraveling the Secrets" on the NOAA Story web site. Co-authored with former NSSL employee Ann McCarthy and named the "Best WWW Page of OAR," this work led directly to assuming responsibility for the design and upkeep of the OAR Web site. NSSL, BAMEX and IPEX logos, displays for conferences, the Doppler radar paperweight, NSSL brochures -- all have come from Joan.

Joan retired quietly at the beginning of 2006, but continues to work part-time from her west-facing NWC office under contract. She plans to keep working as long as she is enjoying herself. "My life is full," she says. Baking her own bread, reading voraciously, playing twice a month in her bridge group of 30 years, OU theater, OU Women's Basketball, and her grandchildren keep her plenty busy. When Joan does actually choose to retire, she wants to spend more time visiting her kids, go on a sailboat cruise off the Northeast U.S. coast, take a walking tour of Italy, and work at keeping her home and sanctuary a natural and welcome place for all the critters. ♦



Notables:

Born: Ohio

Specialty: Graphics and web design

Current position: Graphic Designer (contract with INDUS)

Hobbies: Gardening, reading, Sunday New York Times crossword puzzles, grandkids and pets

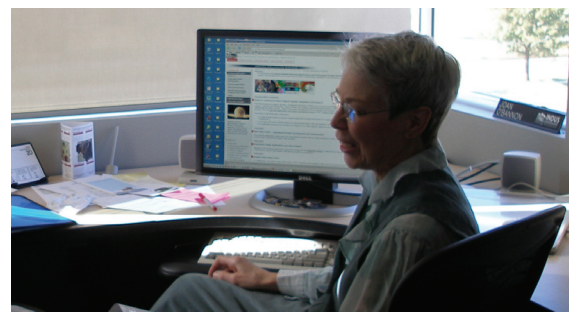




Photo by Robert Coggins

NSSL's NOAA "Postcard from the Field"

NOAA Weather Partners gathered in front of the National Weather Center in Norman for the NOAA 200th Anniversary "Postcards from the Field." NOAA is posting these photos to showcase the breadth and span of NOAA's work.

Team resolves Doppler Dilemma

Researchers and engineers from NSSL and the National Center for Atmospheric Research (NCAR) have successfully developed an algorithm that deals with range and velocity ambiguities in WSR-88D measurements.

Weather radars have long been plagued by what is known as the "Doppler Dilemma." Since ambiguities in range and Doppler velocity measurements are connected, trying to alleviate one worsens the other. Proper censoring of contaminated or invalid data is essential for the WSR-88D to be useful for forecasters and automated algorithms.

The Radar Operations Center of the National Weather Service sponsored NSSL and NCAR to find methods to deal with this problem. A phase coding algorithm, SZ-2 (named for NSSL developers Sachidananda and Zrnica) is the result. NSSL's Sebastian Torres solved the issues of integration into the surveillance and Doppler scanning modes and incorporated ground clutter filtering and estimation of spectral moments.

SZ-2 is now undergoing beta testing on the NWS operational radar in Oklahoma City, and will soon be implemented on the national network of WSR-88D radars. ♦

The algorithm successfully deals with range and velocity ambiguities

Comings and goings

Dave Schultz will spend a year in Finland as the Professor of Experimental Meteorology at the Finnish Meteorological Institute (FMI) and the Division of Atmospheric Sciences at the University of Helsinki. Dave will develop a program in synoptic and mesoscale meteorology, co-teach an intensive short course on the Helsinki Testbed, and organize a summer course for graduate students from around the world on mesoscale meteorology. He will also help bridge the gap between forecasters and scientists at FMI and initiate research projects that benefit operational forecasting.

Christopher (Chris) Emersic is the new NRC postdoctoral research associate at NSSL from Great Britain. Chris will study how lightning relates to the microphysics and kinematics of storms by using three-dimensional lightning mapping data from the OK-LMA and polarimetric radar data from KOUN.

Carl Hane, NSSL scientist, has retired from federal service after 35 years. Carl's research began with the development of a two-dimensional numerical thunderstorm model. He also worked on thunderstorm development along the dryline and the evolution of mesoscale convective systems.

Awards and honors

NSSL scientist Alexander Ryzhkov received the 2007 American Meteorological Society's Editor Award for the *Journal of Applied Meteorology and Climatology* "for outstanding and insightful reviews related to polarization diversity radars and radar technology."

NSSL to host MPAR symposium

NSSL will host a symposium on the latest developments in Multifunction Phased Array Radar (MPAR) October 10-12, 2007 at the National Weather Center in Norman, OK. The symposium, "Leveraging Technology for a Next-Generation Radar System" will include formal presentations, senior-level panel discussions, and exhibits of the latest phased array radar technology. The event is sponsored by the Office of the Federal Coordinator for Meteorology. Go to <http://www.ofcm.gov/mpar-symposium/index.htm> for more information.

National Weather Festival a success

The third annual National Weather Festival was held at the new National Weather Center in Norman, OK on November 4, 2006. An estimated 3,000 people turned out for the free festival sponsored by the Norman Chamber of Commerce Weather Committee and the NOAA Weather Partners. Organizers declared the event a complete success.

The festival featured tours, displays by local weather organizations, and the inaugural Storm Chaser Car Show.

A children's tent included activities such as "Weather Jingo," a water cycle game, pressure puzzles, a cloud spotter wheel and a reading area featuring "Cloudy with a Chance of Meatballs" and other favorites. Weather balloons were launched every hour during the festival, and the National Weather Center was open to the public.

Broadcast meteorologists from all four Oklahoma City television stations participated in the balloon launches, and one even broadcast live from the festival. ♦

Photos:

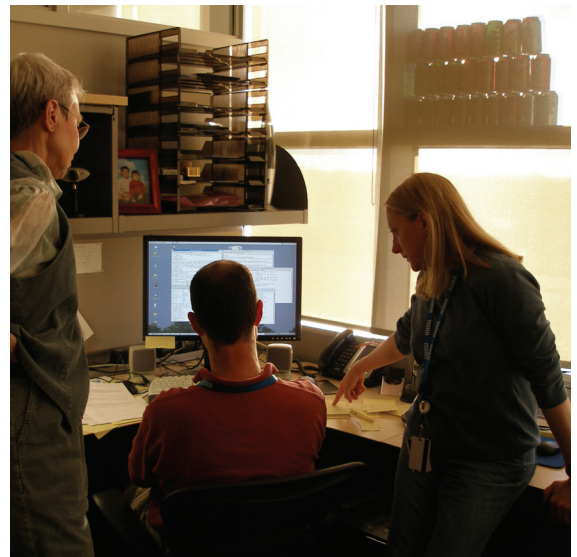
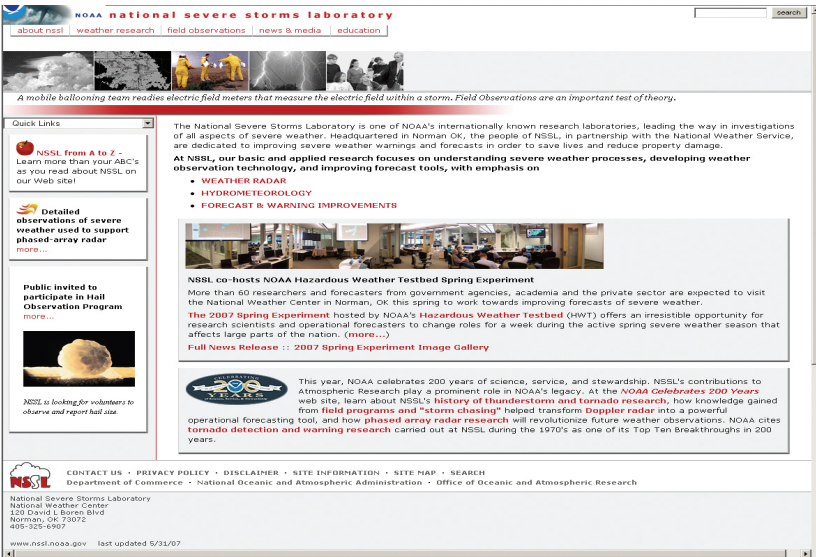
Upper right: Crowds gather for the balloon launch

Center right: Visitors explore booths in the atrium

Lower right: NSSL's Terry Schuur and Pam Heinselman demonstrate the latest NSSL technology

Left: Balloon launches occurred every hour





Web site designers Joan O'Bannon and Vicki Farmer patiently wait for Doug Kennedy, NSSL ITS, to move files and make the site go live.

Science that promotes action: NSSL's new Web site

NSSL revealed a completely new Web site at the end of November, 2006. The new look better serves all who are interested in NSSL's NOAA research in severe and hazardous weather and forecasting tools.

NSSL's Web site receives up to 70 million hits each week. Who looks at our information? Apparently lots of people! From the 400 queries each year to our Outreach team, we know some are children seeking answers to basic weather questions or working on a science project, others are students looking for advice on colleges and careers, still others want information on weather safety, explanations of how weather works, or opportunities to share their ideas. Then there are colleagues who want to know what NSSL is doing, those providing funding to make sure NSSL is doing something, and the NOAA leadership who want to know NSSL is doing something useful.

Current research, past research, research divisions, and field observations are all areas that have received attention. There are links for news and media folks, and an education site that boasts a severe weather primer, severe weather safety information, information on why storm chasing is not a career, and what careers you CAN have, and how to pursue them. There is also a list of FAQ's compiled from actual e-mails sent to NSSL.

Joan O'Bannon and Vicki Farmer worked for over a year to redesign the Web site and update its content. Web sites are dynamic, and so is this one. New stories are posted weekly and information about active research projects are on the home page. Check back frequently to find our most recent updates. ♦

**NSSL's Web site
receives up to 70
million hits each week**

