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Forecasters Learn Lessons When Lili Lashes Louisiana

—By Ron Trumbla and Frank Lepore

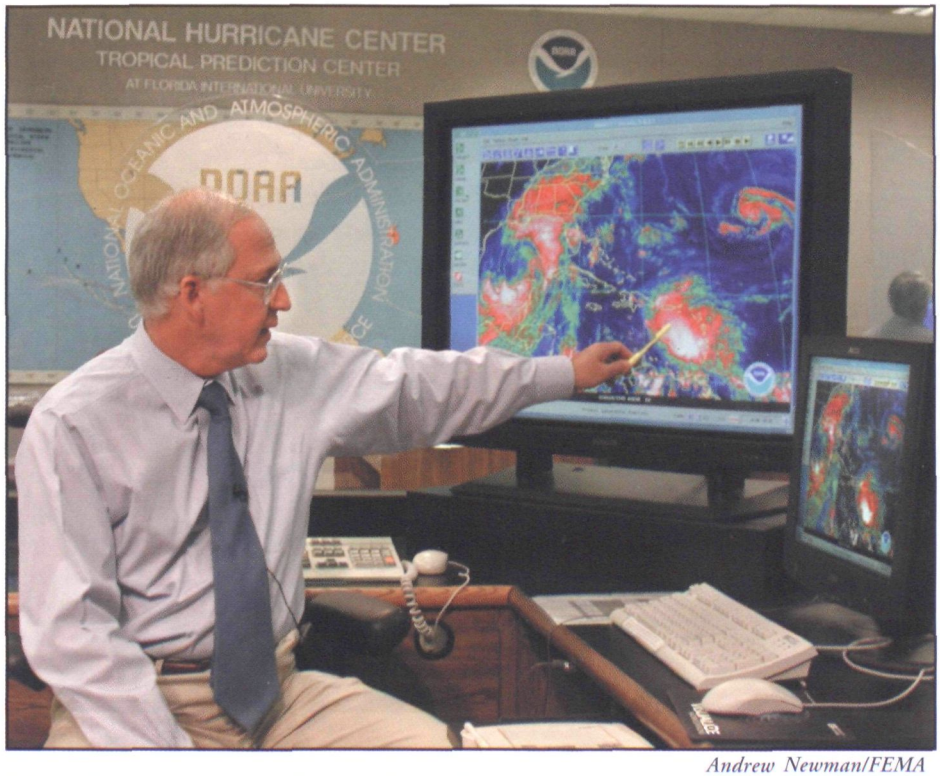
Lili, the first hurricane to make landfall in the United States since Hurricane Irene in 1999, was no killer. But it had surely fit the profile.

On Wednesday, Oct. 2, the day before coming ashore in Louisiana, Lili had posed a devasting threat, quickly intensifying to a strong, category four hurricane. Winds of 145 mph raked oil well platforms in the central Gulf of Mexico. At that strength, Lili could bring devastating winds and storm surges up to 25 feet above normal tides when it swept inland.

More than a million people were urged to evacuate coastal and low lying areas in Louisiana and Texas. Experts were comparing Lili with Hurricane Audrey, a category four storm that savaged Louisiana in 1957, killing nearly 400 people.

But because of a combination of good planning, clear communications, advanced emergency management procedures, accurate track forecasts and a fortuitous weakening of Lili's winds, the public

continued on page 6



Andrew Newman/FEMA

NOAA hurricane center director Max Mayfield points to a computerized image of the eye of Hurricane Lili as it approaches the U.S. coastline.

NOAA Lab Deploys Wireless Great Lakes Observatory

—By Michael Quigley

The late afternoon call brought good news: the system was up and running! Ron Muzzi, an engineer at NOAA's Great Lakes Environmental Research Laboratory in Ann Arbor, Mich., reported that data were coming into the lab's computers over the Internet.

Some 200 miles west on the shore of Lake Michigan, NOAA engineers and technicians breathed a collective sigh of relief. They had just finished deploying a prototype instrument on the Lake Michigan bottom, two miles offshore, and linked it to the laboratory.

The system is the first-ever Great Lakes wireless Internet environmental observatory consisting of an instrument package resting on the sand bottom 50 feet below Lake Michigan's surface.

In the initial test of the observatory, the package included a transmissometer, which measures the optical clarity of water, an acoustic Doppler current profiler for tracking speed and direction of lake currents from the bottom all the way to the lake's surface and a pressure sensor for measuring wave height.

Data from the instruments fed into a communications cable fastened alongside a mooring cable leading to a buoy on the surface. From there, a wireless transmitter relayed a signal to a receiver and then to an Internet connection

continued on page 2

Recycled Paper

Cospas-Sarsat: Saving Lives for Twenty Years

—By Patricia Viets

Thanks to the international humanitarian program known as Cospas-Sarsat, which celebrated its twentieth anniversary in October, more than 14,000 lives have been saved worldwide, including about 5,000 in the United States.

Cospas-Sarsat is a search and rescue system that uses satellites operated by NOAA and the Russian government to detect and locate emergency beacons carried by aircraft, ships or individuals in distress.

On Oct. 16, NOAA celebrated the program's twentieth anniversary at a reception at the State Department in Washington, D.C., during a week-long meeting of the International Cospas-Sarsat Council, with participants from around the world on hand to celebrate.

Deputy Undersecretary of Commerce for Oceans and Atmosphere Scott Gudes, serving as master of ceremonies, introduced Undersecretary of Commerce for Oceans and Atmosphere and NOAA Administrator Conrad C. Lautenbacher, Jr.

Lautenbacher said, "These numbers reveal to us that the Cospas-Sarsat System has truly been able to accomplish what our respective governments set out to do in the 1970's. That was to develop a single system that would provide the most efficient and effective means of detecting and locating persons in distress, a system that could detect a distress anywhere in the world, around the clock, in any condition.

"[This was] driven totally by the principal of non-discriminatory humanitarian service, free of charge

continued on page 7

NOAA Depolys Great Lakes Observatory

continued from page 1

onshore at the Great Lakes lab's Lake Michigan Field Station in Muskegon, Mich. Using the Internet, the engineer in Ann Arbor downloaded and stored the new data.

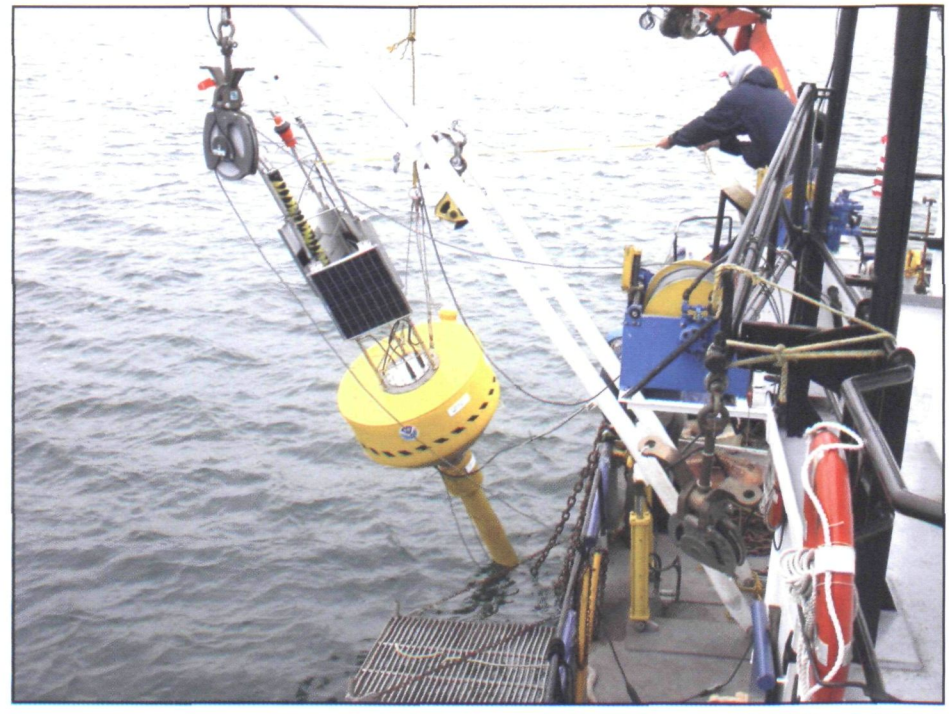
Muzzi, who coordinated the observatory's design and building, said that all of the objectives of the first deployment mission had been met. "Basically, we wanted to get all of the gear out there on the mooring, turn everything on and get a clear signal back to our receiver at the field station and take it onto the Internet. All of that has happened, and next week we will retrieve the equipment then, over the winter, evaluate how everything performed, while making any needed improvements."

Muzzi explained that in subsequent field seasons the system would be set up on an extended basis and that they would take full advantage to "plug in" a wider array of sensors and instruments.

"The electronics designed into the observatory rely largely on what's been developed for wireless network technology used extensively in today's computer systems," Muzzi said. He noted that a set of nodes set out on the bottom would feature multiple generic outlets where sensors and instrument could be easily connected.

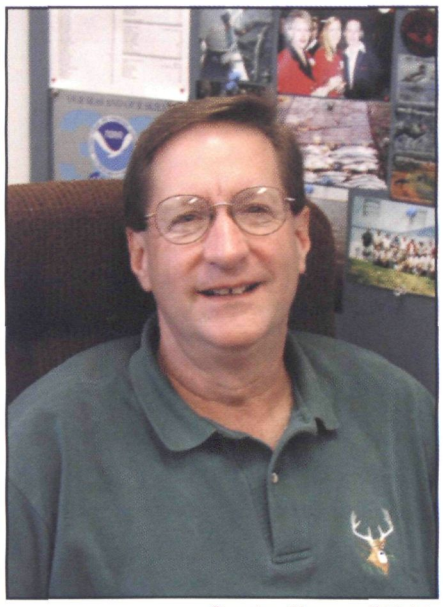
The generic nature of node outlets means that researchers outside the NOAA lab can also arrange to tap into the observatory with instruments of their choice and then access their data via the Internet.

Steve Brandt, director of the Great Lakes Environmental Research Laboratory, said, "There's been a high level of development of such integrated coastal observing systems by the ocean science community and we are looking forward to making similar systems available in the Great Lakes."



Michael Quigley/NOAA

Technicians aboard the research vessel Laurentian launch a buoy to relay signals from an environmental instrument package on the floor of Lake Michigan to NOAA's Great Lakes Environmental Research Laboratory in Ann Arbor, Mich.



Dominy Hataway/NOAA

John Watson.

John Watson Is November's Employee of the Month

—By Chris Smith

Whether it's designing and testing turtle excluder devices or bycatch reduction devices now used in most shrimp trawls, or modifying longline gear to minimize sea turtle deaths, John Watson, the November Employee of the Month, has been on the cutting edge of important technologies which have prevented the unnecessary deaths of sea creatures for over three decades.

"Today, with so many fisheries over-utilized and under severe pressure, we're trying to make fishing gear more selective," Watson said.

Watson joined the Harvesting Systems and Engineering Branch at NOAA Fisheries' Pascagoula, Miss., lab in 1969 as a co-op student from the University of West Florida. He's been there ever since, becoming branch chief in 1980.

During Watson's tenure, most western North Atlantic sea turtle populations have at least stabilized. Most notable is the rebound of the Kemp's ridley turtles, the most endangered sea turtle in the world.

In the mid 1980s, there were fewer than 1,000 documented Kemp's ridley nests. As a result of nest protection and TEDs use, nesting has been increasing exponentially. In 2001, there were over 5,000 nests documented.

"When I arrived here, our mission was primarily to work with fishermen to make gear more effective at capturing fish. That mission has evolved over the years to become more conservation oriented," Watson said. "At first, the industry was very cooperative because we helped increase capture rates. But when sea turtles were listed under the Endangered Species Act, industry relations became quite contentious. But as everyone came to realize that turtle conservation measures were here to stay, the level of cooperation improved and has continued to do so."

Watson is quick to cite the contributions his staff and the many partners in industry have made to the development of commercial fishing gear that reduces its impact on the creatures whose home is the sea.

"In recent years, we've become more aware of the need to tap into the vast amount of expertise that many people involved in the fishing industry possess and integrated their wisdom into our experiment planning and gear designs," Watson said.

Until mid-2000, most of Watson's focus was on the improvement of trawl net efficiency and bycatch reduction. But he was faced with a new challenge when he got a call in October from NOAA Fisheries director William Hogarth. Hogarth asked Watson to under-

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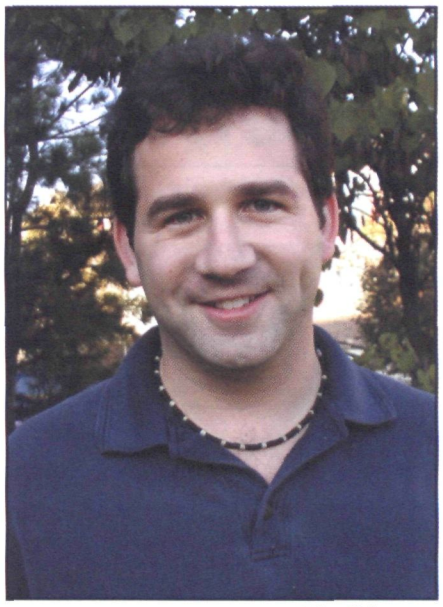


Ailyn Schwartz

Robert Schwartz.

Robert Schwartz Is November's Team Member of the Month

—By Dane Konop

Robert Schwartz, a producer/director in the NOAA Video Studio in Silver Spring, Md., and the November Team Member of the Month, bungled his first NOAA interview.

He had just finished videotaping my interview of former NOAA administrator Robert White for the NOAA thirtieth anniversary video, when he attempted to ask White some questions suggested by Marc Kagan, his boss in the video studio.

White, a cagey interview subject noted for his keen political skills as NOAA's founding administrator, got visibly perturbed when Schwartz asked him about walking the tightrope between politics and science.

"I was real nervous. I ended up 'umming and ahhing.' I kind of fell all over myself," Schwartz recalled.

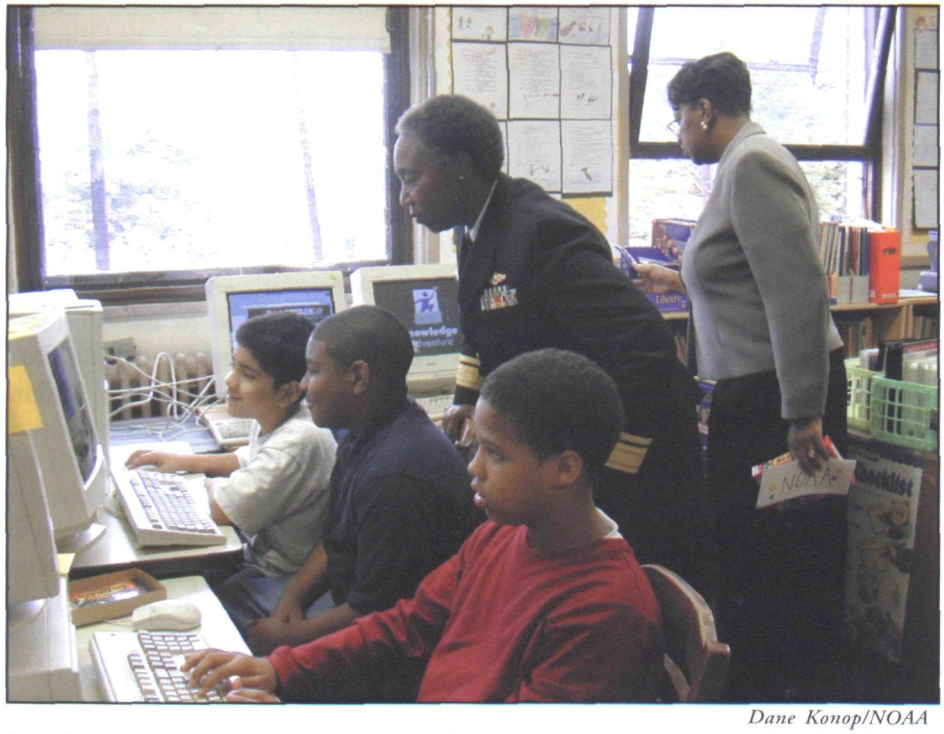
White dismissed the question,

continued on page 8

Focus On...

Dane Konop/NOAA

Shepherd Elementary School student Henry Hernandez presents a thank you letter to Rear Adm. Evelyn Fields for computers NOAA donated to his class.



Dane Konop/NOAA

Rear Adm. Evelyn Fields observes Shepherd Elementary School students (right to left) Antoine Tinner, Christopher McSwain and Henry Hernandez as they work on word and number games, while teacher LaShahn Booth looks on.

One Man Made a Difference

Lending a Helping Hand to an Adopted School

—By Jeanne Kouhestani

Though seeing young children excited about learning is always heartwarming, a visit on Oct. 17 to Shepherd Elementary School in Washington, D.C., was especially poignant for Rear Adm. Evelyn Fields, director of NOAA's Office of Marine and Aviation Operations and the NOAA Corps.

Fields went to the school to see how learning disabled students were using ten surplus NOAA computers to further their reading, writing and math skills. One of her staff members, James Martin, had made it his personal quest to find the computers and cut through the bureaucratic red tape to enable the school to accept them. He then delivered the computers the day before school ended last June.

Martin was very excited about the planned October visit to the school with Fields to see how the students were using the computers this school year. But he never made it. He was killed by a sniper's bullet on Oct. 2 while purchasing supplies for the visit.

"Jim was a visionary and saw how NOAA's surplus computers could be put to good use to help these kids master basic skills," Fields said. "When the Office of Marine and Aviation Operations adopted Shepherd Elementary, Jim

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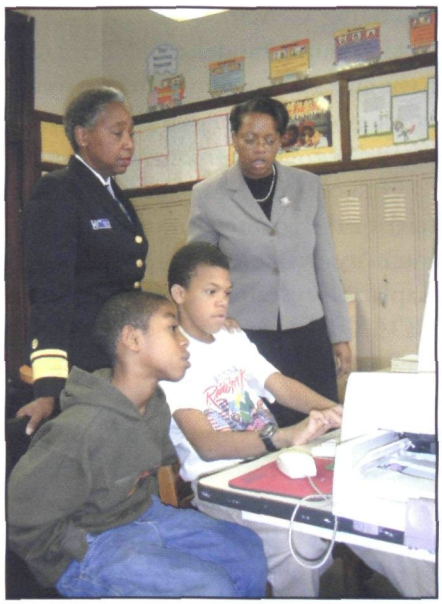


Dane Konop/NOAA

While students Tevin Montgomery (left) and Hector Bonilla work on their "new" computer, teacher LaShahn Booth explains to Rear Adm. Evelyn Fields the benefits of computers in overcoming learning disabilities.

continued from page 4

took the lead in arranging for OMAO personnel to talk to the students about NOAA and to serve as judges at their science fair. He saw that the resource room had only one working computer for 11 students, so he took on the task of seeing how NOAA could help out. I'm very proud of Jim and what he did for Shepherd on his own initiative."

Thanks to Martin's efforts, each child has a computer to work on every day, making rapid progress possible.

"Their writing skills have improved tremendously in the past month," said LaShahn Booth, the students' teacher. "Normally it would take months, probably until February or March, to get to this point because I only had one working computer and they had to take turns using it. I am just tickled by their progress."

Booth said that though the children are very bright, learning disabilities such as dyslexia and problems with visual perception can make it difficult to process information. "It helps them to see colors and moving numbers jumping around. They turn on the computers with color and animation, and the concepts I am trying to teach just click. They go 'Oh!'"

The children range in age from nine to 12. Some learn best through hearing, some through seeing and some through touch. The computers allow them to learn using their preferred method of intelligence, while working at their own pace. "It's an incredible tool to have," Booth said.

Katherine James, Shepherd's principal, agreed that computers have given children of varying ages and needs the means to progress individually, and added that this enables them to be more successful.

"Success gives them a feeling of confidence," James said. "They can see their progress. I believe Mr. Martin saw that aspect and recognized that he could contribute to these children's education."

"I wish Jim could have seen how thrilled these kids are with the computers," Fields said. "I could feel their excitement when I walked in the room. And the kids remember him, too. That was apparent from the thank you letters they wrote."

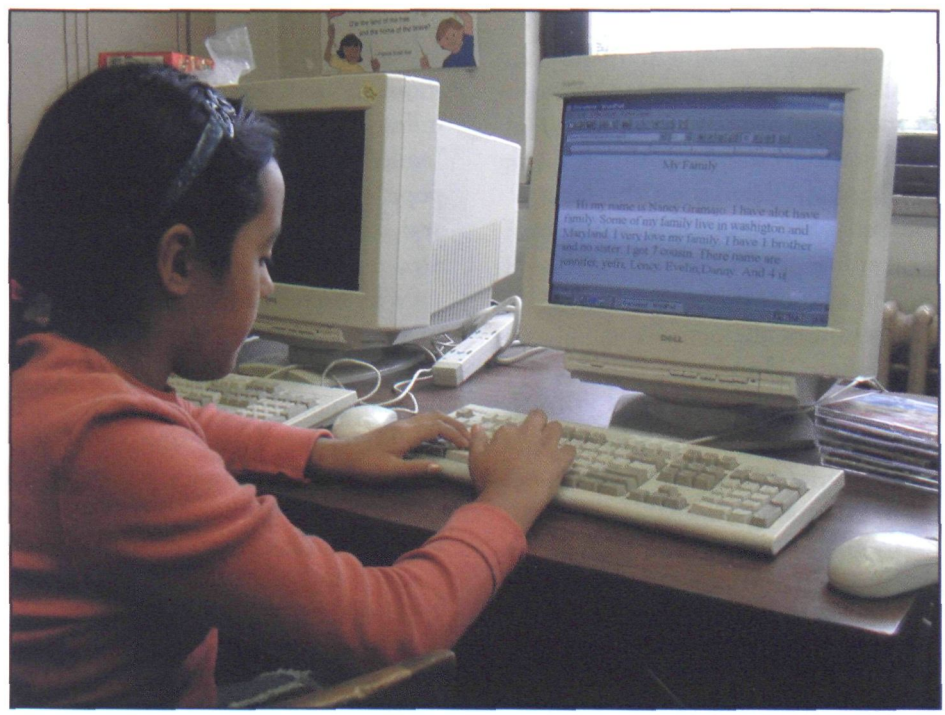
Booth said that the students work on one writing project a week. On Monday they create a web of ideas for their topic. By Friday they are ready to "publish" and illustrate their final story.

A recent project was to write thank you letters for the computers.

Tevin Montgomery wrote, "Thank you for sending us computers and I thank Jim Martin for giving us them. He carried them in his own truck to Shepherd and we had to carry them up to the class. I have done some typing on the computers and I have made very good progress. I like the computers very much."

On his letter Tevin drew a picture of a man with the words, "I love you James Martin."

Shepherd Elementary is naming its annual science fair the "James Martin Science Fair" in his honor.



Dane Konop/NOAA

Sixth grader Nancy Gramajo polishes her writing skills on her NOAA-surplus computer.

Hurricane Lili

continued from page 1

survived the storm without loss of life.

Following a sudden drop in intensity Thursday morning, Lili landed near the western edge of Vermilion Bay, La., as a category one hurricane with winds estimated near 90 mph, and a storm surge of six to 10 feet above normal. Rainfall of three to eight inches fell along the northern Gulf Coast.

Minor to moderate river flooding occurred in Louisiana and neighboring states as the storm moved quickly inland. High winds and more than a dozen tornadoes downed power lines, uprooted trees and tore off rooftops.

Insured losses were estimated at $700 million.

While Lili was clearly a serious storm, it was nothing like the monster that showed such devastating potential.

So what happened? Why did Hurricane Lili weaken as fast as it had intensified? Why were forecasters able to pinpoint where the storm was going, correctly forecasting Lili to reach major hurricane status, but did not foresee the storm's rapid demise in the last eight hours before landfall?

There are theories on the most difficult of the questions—sudden weakening.

The answers lie in part in the interaction of the ocean and atmosphere. Hurricanes thrive on warm water and warm air. Lili's deterioration may have been expedited by cooler water churned up near the northern Gulf coast, partly by Tropical Storm Isidore the previous week.

It may also have been affected by drier air pulled into the system from the northwest.

Winds aloft may have interrupted the hurricane's outflow and sheared the system's circulation.

Or, the near complete collapse of the fierce "eyewall" could have come from other, as yet undefined, internal processes.

According to forecaster Lixion Avila of NOAA's National Hurricane Center in Miami, Fla., "The truth is that nobody is currently able to predict these sudden changes in intensity. Some research on intensity change is already underway, and Hurricane Lili will likely lead to even greater efforts."

Max Mayfield, hurricane center director, cited Lili as an example of the state of the art for track and intensity forecasting.

In the late 1960's, the three-day forecast error for a hurricane's position, called "track error," averaged 475 miles. Today's averages are about 250 miles, nearly a 50-percent improvement.

National Hurricane Center director, Max Mayfield noted wryly that "a lot of Ph.D. dissertations will be written about Lili."

Preliminary estimates for Lili show an error of only about 150 miles. Forecasters had the track "nailed" and were able to exclude populated New Orleans to the east and Houston on the west from the area under warning.

Why were forecasters confident in their track forecasting?

NOAA's new Gulfstream-IV jet flew several days to better define the high altitude steering air currents.

National Weather Service forecasts offices from Texas to Georgia increased the tempo of weather balloons launches to 6-hour intervals.

Data from these two sources were fed to the improved track models of NOAA's Environmental Modeling Center.

Computer model enhancements have also been made in recent years in an effort to improve the storm intensity predictions.

One of the more promising is a statistical-dynamical model for intensity, co-developed by John Kaplan, a research scientist at NOAA's Hurricane Research Division, and Mark DeMaria, a research scientist at the NOAA-Colorado State University Cooperative Institute for Research in the Atmosphere.

Called SHIPS, for statistical hurricane intensity prediction scheme, the model utilizes a rapid intensification index based on data collected during Atlantic Basin storms from 1989 to present.

Kaplan says there are five basic predictors for a hurricane's rapid intensification, including the storm's rate of intensification during the previous 12-hour period.

Kaplan says a weakness in the current model limits its 24-hour intensity prediction success. He is hoping to improve it with additional data from the inner core of the storms, data gathered from the ocean and satellite imagery.

The 24-hour time frame was selected for an obvious reason. When hurricane warnings are issued, people in harm's way have 24 hours to take action.

From forecaster Avila's perspective, the difficulties with accurate intensity prediction are both practical and theoretical. Factors governing intensity occur on a much smaller scale than for track forecasts. Elements in the exchange of moisture and heat in the atmosphere-ocean system and the microphysics of clouds are not well understood.

National Hurricane Center director Max Mayfield noted wryly that "a lot of Ph.D. dissertations will be written about Lili."

Watson

continued from page 3

take the daunting task of leading a complex research effort to develop or modify gear technologies and fishing strategies to reduce capture rates of sea turtles throughout the Atlantic Ocean.

"When we began this project, we knew that several studies had been done on sea turtle interactions with longline gear, especially in the Pacific," Watson said. "We tested a theory that blue dyed squid could reduce sea turtle interactions because it reduces interactions with sea birds in the Pacific."

The team's primary findings of the 2001 experiment indicate that the use of blue dyed squid as bait did not reduce sea turtle interactions and that there may be some potential for reduction in turtle interactions based on the hooks' proximity to the buoys.

The 2002 experiment currently underway is far more multifaceted than the 2001 experiment.

"Our preliminary findings indicate that using mackerel rather than squid as bait probably reduces sea turtle interactions with longline gear. We've also found that using mackerel may increase swordfish landings," Watson said. "There is also a strong indication that the use of circle hooks appears to reduce the sea turtle interaction rate."

"John has been a remarkable leader and an exemplary representative of NOAA Fisheries throughout this project," said Southeast Fisheries Science Center director Nancy Thompson.

"He has provided highly professional, front-line services to our constituents while furthering our strategic goal of recovering listed sea turtle species," she said. "He has exhibited extraordinary flexibility, increased agency morale across several offices and inspires everyone who works with him."

Juan Tricoche/DOC

At the Cospas-Sarsat twentieth anniversary reception at the U.S. State Department Oct. 16, (left to right) NOAA Administrator Conrad C. Lautenbacher, Jr., poses with pilot Michael Ryan, who was rescued by the Cospas-Sarsat system, and Ajay Mehta, NOAA's Sarsat program manager.

Cospas-Sarsat

continued from page 2

for the victim in distress. What we created was a system that revolutionized search and rescue forever and brought it into the space age."

On June 30, 1982, Cospas-1 was launched from northern Russia. Within the first hundred days of the launch, seven people were rescued because of the system.

The following March, NASA launched the first Sarsat payload on the NOAA-8 satellite. Since then, many thousands of lives have been saved with the distress alerting and locating capabilities that the combined Cospas-Sarsat provides.

"The Cospas-Sarsat System has also proven itself as a unique model of international cooperation, one based on a common goal, achieved through the commitment of its member governments and the work of many dedicated people," Lautenbacher said.

"This cooperation is unique in that it is a space program implemented purely as a humanitarian endeavor, with open access to all. Even during the height of the Cold War, our nations were able to set aside differences and work together in this effort, ultimately committing themselves to the success of the system with the signing of the international Cospas-Sarsat agreement in 1988. Thus, what started as a small body of experts turned into an international organization that was and continues to be a model of efficiency and effectiveness," Lautenbacher said.

At the reception, Lautenbacher read a personal message from President George W. Bush.

"The Cospas-Sarsat system provides a tremendous resource for protecting the lives of aviators, mariners and wilderness travelers. I applaud the Department of Commerce's National Oceanic and Atmospheric Administration and the United States Mission Control Center for your work to make this system available throughout the world. Your inspiring efforts are helping make our world a safer and better place for all," the president wrote.

Schwartz

continued from page 3

brushed aside Schwartz's repeated attempts to continue, and ended the interview.

"I was like, 'Don't blame me.' I was trying to come up with a question, but I didn't know what I was asking," Schwartz said.

Schwartz packed up his camera, lights and sound equipment and left chagrined but not discouraged. In fact, he was determined to improve his interview skills.

"I've come a long way since then," Schwartz said. "I go with Marc on these location shoots. He is real good at drawing people out. And he's helped me a lot. He's been one hell of a mentor."

Schwartz learned his lessons well.

He was recently cited by his superiors in NOAA Public Affairs for video he shot, over a whirlwind three days, of a research flight by NOAA's P-3 hurricane hunter aircraft into Tropical Storm Isadore.

Schwartz said he was inspired by his interview subjects because he most enjoys "working with people who are really dedicated and devoted to what they do. It really rubs off on me," he said. "It's just another reason I love working for this agency."

Schwartz said he still finds interviewing a challenge, but an enjoyable one.

"When I'm interviewing, it's a game," he said. "The people I talk to start out nervous and all self-conscious. But if I can just make them forget about the camera and talk shop, pretty soon their eyes light up and they're giving me these great, sincere, genuine quotes. And I'm thinking, 'Yes. This is gold! Keep going.' That's a real high when I can get that from somebody."

It helps that he is no longer intimidated by his interview subjects.

"If I can read people, I can usually figure out what turns them on and how to get them to tell me what matters to them. It's a very personal kind of a dynamic," Schwartz said.

Despite an all-night flight on the P-3, the nearly total lack of sleep ("I was living on Cheetos and adrenaline.") and the rush to produce the video, the resulting footage of Isadore was shown on nearly 500 television stations.

His NOAA experiences have made him something of a "weather nerd" Schwartz said. "I've been known to take my personal video camera on vacations hoping for a lightning storm," Schwartz said. "If there is a storm, everything stops and I'm there with my camera trying to get the perfect 'money shot' of lightning."

Schwartz was introduced to videography by his late father, a chemist for Dupont and an amateur photographer.

He made his first video while still in high school—"a gift for my father for Father's Day," he said. "I had all these pictures of him growing up and all through his life. I put some piano music behind it. He loved it."

Schwartz found himself doing videos for friends and other members of his family.

He graduated from the University of Delaware in 1994 with a degree in communications, but did not set out to be a photographer.

"I wanted to be in advertising," he said. "I like the idea of conceptualizing stories, images. I wanted to do commercials, I guess."

Instead he took a job as a customer service representative at a bank in Wilmington, Del., his home town.

"It was a real dry job," he said.

Schwartz used the camera his father bought him as a college graduation gift to continue to make videos. But it was not enough to satisfying him creatively.

He ended up quitting the bank and moving to Washington, D.C., in search of studio work.

He landed a job for a company in Gaithersburg, Md., that substituted various foreign language narrations for English language sound tracks, mostly in industrial and training videos. "I call it Godzilla in reverse," Schwartz said.

He left that job in July 1998 for his current position in the NOAA Video Studio.

"This job is a dream job," Schwartz said, "because it's 'sciencey,' which I like. But I don't have to be a scientist to get into it."

Schwartz has become close friends with his mentor and co-worker Kagan, with similar likes and dislikes and matching senses of humor—a comfortable compatibility that shows in their work together.

"He's a talented guy. He doesn't need a lot of supervision," Kagan said. "We are simpatico, as far as the work ethic goes. Whatever it takes to get the job done."

Schwartz said, "I'm just proud to be here. I'm proud to be doing this. I really appreciate being noticed. I just love having a job where I enjoy getting up every day and coming to work."

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