

# In Andrew's Wake

For many days following Hurricane Andrew, radio amateurs provided crucial communications for a stricken southern Florida.

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**M**onday morning, August 24, 1992. Hurricane Andrew, the third most intense hurricane ever to hit the United States and the most costly natural disaster in US history, strikes before dawn.

Although hundreds of thousands of people in south Dade County Florida are left without communications—both long-distance and around the corner—1990s technology will render Amateur Radio unnecessary, won't it?

Commercial agencies' networks, cellular telephones and satellites will enable shell-shocked survivors to phone home, the sick and elderly to get help, incoming food and medicine to be distributed, the military and local police to coordinate, won't they? No.

Radio amateurs will do all these tasks, and more, on their own time, at their own expense, and for the most part unheralded. Hams from around Florida and from surrounding states will descend on southern Florida in record numbers.

Cold statistics don't do Hurricane Andrew justice. 137,000 homes were destroyed or severely damaged and a quarter of a million people were displaced. At one point, four million people were without electricity and water. 117,000 telephones were out of commission, and 50% of all the trees and foliage were destroyed, drastically altering the landscape of a bustling agricultural region.

Thousands of migrant workers and their families were displaced, with no hope of employment in the foreseeable future.

Hurricane Andrew was a local communications emergency. South Dade County, although almost totally cut off from the rest of the world for several days, had experienced only a few deaths and injuries. Quick word of this left people around the country concerned about their friends' and relatives' whereabouts, but not their fates.

And so, while thousands of health-and-welfare messages eventually flowed out of

southern Florida via Amateur Radio, the real heroes of this disaster were those hams—virtually all of them unaffected directly by

to expect when the doors once again opened.

The damage exceeded our worst nightmares. Although the EOC building, originally a 1950s nuclear shelter, withstood the assault, its antennas and towers did not. From a total of three VHF phone positions, one UHF position, two HF positions, and one VHF packet position manned, only one VHF antenna was still functional. A 150-foot steel monopole, an EOC fixture for many years, leaned precariously over the parking lot. It would be taken down by a crane the next day, and cut up.

A quick check around the VHF repeater frequencies added to the feeling of desolation. Of the many VHF repeaters in the affected area, only one seemed to still be on the air. Located in downtown Miami and outside of the severe damage area, it had good coverage into the affected area 35 miles away.

Without the surviving repeater, initial communications to the shelters would have been impossible. VHF antennas that the County, the Red Cross and the School Board were supposed to have installed long ago on the school shelters were the victims of dragging feet. Each organization looked to the other for the expenditures, and they were never made.

Simplex communications from the EOC to hand-held radios inside the shelters would have been impossible. We only hoped that the repeater would stay operational through the recovery period. Although plagued by intermodulation from damaged commercial communication systems, it did.

Here we learned our first of many lessons: To ensure that the authorities follow through on antennas and other equipment necessary for simplex communications to key facilities. We had not been adamant enough in our requests.

Another lesson was to count on the best designed, filtered, and protected repeater being subject to interference from damaged commercial systems spewing out hundreds of watts into bent or broken antennas.



Joel Kandel, KI4T, inspects what's left of a Dade County repeater following Andrew. The repeater took a 1000-foot fall when it came down during the storm along with the 2000-foot-high Channel 6 TV tower. (photo courtesy of KI4T)

Andrew—who provided vital short-range communications. That's what this (and the accompanying stories) are about.

## Hurricane Andrew Arrives

Sealed into the Dade County Emergency Operations Center (EOC) by steel, vault-like doors, Radio Amateur Civil Emergency Service (RACES) operators waited out the coming and passing of the hurricane, not knowing what

## Call in The Guard

The day before Hurricane Andrew was due to hit southern Florida, I started getting ready for communications work, just in case it was needed here in Brevard County. Then my National Guard unit was activated for the hurricane. As I packed my military gear for "Operation Andrew," I decided to throw in my Kenwood hand-held, a 12-V power pack and a J-pole antenna, just in case.

My military police unit was assigned to the Cleveland Indians spring training camp in Homestead, Florida, to assist the Homestead Police Department. Tuesday night, a high-ranking non-commissioned officer—also a ham—found out I had brought my ham gear and authorized me to set up a station and call myself the "Homestead Military Police Station." I was able to pass some traffic between the Dade County EOC and the Homestead and Florida City police departments.

At first, I could barely get out with my weak signal, but a better antenna provided by the Dade EOC made traffic handling easier. We also set up our military radio, an FM transceiver operating from 30 to 75 MHz. Our MPs downtown had Motorola hand-helds that operated just above the 2-meter amateur band.

We had a military net in the local area, so here I was operating two radios simultaneously using different radio procedures for each. Traffic was very heavy on the Dade EOC repeater—going 'round the clock—most of it to and from the shelters and food distribution centers and the EOC.

I will never forget one shelter manager begging for medical supplies. Then a nurse and a doctor got on the radio and read off a list of medical supplies that they needed. It

sounded like an inventory of a hospital emergency room. The shelters were in a desperate situation. We soon moved to another repeater, making our military traffic run a lot smoother, but the Dade EOC would still call me to handle emergency traffic.

I was on the air from 7 in the morning until 11 at night, but found time to teach a few of my fellow soldiers how to operate the radio and use the net while I slept.

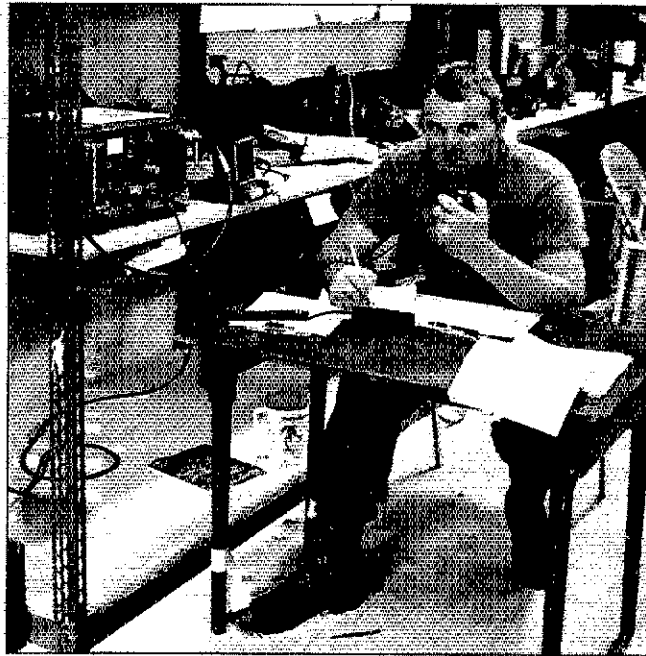
Soon some of my ham buddies from Brevard County brought me my Kenwood 2-meter mobile rig, a deep-cycle battery, a Ringo antenna, coax and a battery charger—I was really set up now.

Our unit's Motorola hand-helds had a range of only a few miles, much shorter than the range of our military patrols. So I did the MARS conversion on my Kenwood so I could talk to the Motorolas, since our MPs were dealing with life-threatening situations. I was now operating a high-power base station, relaying messages between National Guard units in the field and dispatching Homestead Police to our MPs when they made an arrest.

Everyone was coming by to see my ham station!

It was nearly two weeks until telephone service began to return to the area and our activity slowly tapered off.

—Clayton Bennett, KA4NHW



Clayton Bennett, KA4NHW, mans military and amateur radios from his National Guard communications center in Homestead, Florida. (photo courtesy of KA4NHW)

Clayton Bennett served in the Air Force in Vietnam and joined the National Guard in 1983. His unit was called to active duty in December 1990 and he spent the following six months in Saudi Arabia during Operation Desert Storm. He was "sure" that would be his last call-up.

## The Rebuilding Begins

We began reinstalling our amateur antennas on EOC as quickly as possible, given that the 80 or so agencies represented in the EOC situation room had their own communications restoration priorities. A dedicated cadre of amateurs kept maintenance watch over the equipment throughout the emergency. Antennas were repaired and continually improved wherever possible. Radios not working properly were checked and brought back on line.

Another lesson learned: A better system of antenna security and restoration is necessary at the EOC. Folding masts, back-up antennas and coax, and quick-lock roof mounts are indicated.

We soon learned that amateurs in the affected area south of Miami had suffered major damage to their homes, automobiles, radio towers and antennas. Preoccupied with putting their own lives back together, the all-important tactical communications burden

rested with an estimated 150 amateurs who came in from all over the state (and many parts of the country) to assist. We would not have had the critical Amateur Radio first response without them. We owe them everything.

HF links on 40- and 80-meter RACES frequencies kept us in constant contact with State of Florida EOC in Tallahassee, 500 miles away. Bob Moody, W4WSZ, kept the frequency open and the net together for days on end with a potent signal from Tallahassee. It helped us relay to State EOC, Palm Beach County EOC, Broward County EOC, and other counties around the state, which proved to be a real lifeline.

Northern Florida ARRL Section Emergency Coordinator (SEC) George Thurston, W4MLE, and Southern Florida SEC Manny Papandreas, W4SS, coordinated "jump teams" of amateurs outfitted with communications equipment, food and

water. These teams were staged in their respective areas, and were transferred to the Dade EOC to be deployed in the affected area.

## Death of an Amateur Volunteer

On Sunday, August 30, an Amateur Radio team arrived from Palm Beach County. The members received a quick briefing and were deployed to Homestead to supply communications for a critical food distribution site. Among these amateurs was Herbert Engelman, KD4OZY, of Lake Worth.

Only a few hours after arriving, Engelman, 55, was struck by lightning while unloading an Army helicopter. A witness told the *Palm Beach Post* that Engelman was "using a hand-held radio to relay information to a mobile ham-radio operator" when he ran out to meet the helicopter during a thunderstorm.

Herbert "Doc" Engelman never regained

consciousness and died on September 2, 1992.

Engelman, who moved to Florida from Missouri about 10 years ago, taught adult and disabled students. He was a medic and a Navy SEAL in Vietnam, and was past commander of a VFW post in Neosho, Missouri.

More than 120 people attended his funeral on September 4 at the First Congregational Church of Lake Worth, according to the *Post*. He left his wife, Bonnie; his mother, Helen Engelman; two adult daughters; and five grandchildren.

This loss of life was our costliest lesson. No amount of Field Days nor simulated emergencies could have prepared us for the emotional impact of what had occurred.

### Handling Traffic

Since the EOC was involved with tactical communications only, ARRL Southeastern Division Vice Director Evelyn Gauzens, W4WYR, assisted in the coordination of amateurs ready to handle health-and-welfare traffic. In doing so, she relieved that burden from us at the EOC.

During the storm we kept in touch with many of the shelters that had ham communicators. One of them, in the Miami Dade Community College gymnasium, reported that its roof was lifting five feet or more off of the building. The enterprising amateur there, Carlos Rodriguez Jr, KD4EUO, helped evacuate the shelterees to lower-floor locker rooms after breaking into the locked doors. The gymnasium roof was eventually lost.

We learned another lesson here: Quick evacuation of a shelter can make a permanent shelter communications installation unusable. Plan to use portable or easy-to-move equipment.

Southern Florida SEC W4SS has an apt description for shelter communicators:

"To say that his job is boring is an understatement. His assignment as communicator," W4SS said, "is to pass the information to and from the shelter manager. Many communicators feel that they must get involved in the managing of the shelter. Not so! Their job is to communicate and communicate only. If they handle only one or two important messages, it must be considered a job well done. Every message is important for the welfare and safety of the people."

Teams of volunteer amateurs navigated the gridlocked highways to south Dade County in vans, recreational vehicles, automobiles and in caravans. They were sent to the Dade County EOC, where they would be briefed, sometimes fed, and deployed to a strategic location.

We put together an information packet for these visiting communicators, with a small map of south Dade County, a list of critical communications locations and a standardized form with a list of the critical information needed from those areas. Paul Hunt, K1MJS, made up a quick location reference guide on a large street map so those unfamiliar with the area could get around. These measures saved valuable deployment time.



Kai Siwiak, KE4PT, and Yogi Pitman, KC4ZWK, operate from one of several relief sites in south Dade County manned by amateurs and led by Motorola employees from the Ft Lauderdale area. This station was the first activated by the Motorola club, at South Dade Senior High School in Homestead, Florida. Pitman had mobiled in from Georgia. The Motorola effort was organized and coordinated by Bruce Burke, WB4YUC. (photo by Greg Raven, KF5N)

### Simplicity is Best

Invariably, the first comments from volunteers as they arrived at EOC were descriptions of their communications capabilities. They all sounded like space shuttle backups. Some were mildly disappointed when told that we needed plain vanilla VHF voice links to the shelters, food distribution sites and field hospitals. High technology would not

be tested here. All the volunteers, however, performed admirably.

Lesson learned: Exotic communication modes or multiple modes may not be necessary to provide a solid communications network. Amateurs going into a disaster situation should be prepared for anything, but should understand that simplicity is often the key to effectiveness.



Jan Jubon, K2HJ (l), and Joe Peters, WB4WZZ, cover the night shift at the SKYWARN Amateur Radio station in the Washington, DC, forecast office of the National Weather Service. The time is early Monday morning, August 24, 1992, and Peters holds the latest printout of a GOES satellite image showing Hurricane Andrew as it begins to touch land in Florida. SKYWARN in Washington was activated to provide a backup radio link, if needed, between the National Hurricane Center in Coral Gables, Florida, and the backup hurricane center at the National Meteorological Center in Camp Springs, Maryland. The amateur HF rig was used to monitor hurricane nets while 2 meters was used to coordinate local amateur staffing for the SKYWARN backup station. (photo courtesy of SKYWARN Net Manager Dan Gropper, KC4OCG).

### Georgia "Jump Team" Helps in Southern Florida

Bill Jourdain, N4XOG, of Dalton, Georgia, was one of many amateurs who organized "jump teams" to relieve Florida hams in the aftermath of Andrew. Originally from the stricken region, he had a special interest in helping.

"I knew," Jourdain said, "that a trip to southern Florida by automobile would be difficult to plan. Tom Smith, K14IG, ARES district emergency coordinator for our area, and Sheila Kay, our Red Cross Chapter manager for Dalton-Whitfield County, Georgia, urged me on." (Jourdain is an ARES emergency coordinator and chairman for his Red Cross chapter.)

Organizing a team on short notice was no easy task. Mitch Mashburn, N4YYD, and Tracy Rice, KD4JBQ, agreed to go to provide operation and equipment support.

"I was concerned about getting credentials to be in the area," Jourdain said, "but with the assistance of Georgia SEC Dot Fennell, KA4HHE, and Northern Florida SEC George Thurston, W4MLE, and a number of other operators in the Miami area, I received instructions about how to proceed."

The three made up a packing checklist to ensure they would be able to survive in an area with no services or supplies. Members of the Dalton Amateur Radio Club pitched in with club coax, wire, rope and other items—especially Harold Jones, N4OTC, Mike Robinson, N4SLJ and Bert Coker, N4BZJ. They arrived in Lake City, Florida, five days after Andrew.

"I worked HF on the way down, including handling a situation in the Homestead area. We assisted Carroll Baker, AC4JP, stationed at a food distribution center in Homestead, by relaying phone numbers to allow him to contact various emergency officials in Miami.

"AC4JP was one of only three people at that location, and he needed assistance when a homeless family had come in seeking shelter from a violent thunderstorm. AC4JP's distribution center was not a shelter, and he did not know where to send them. Baker worked furiously to assist this family while we attempted to relay the needed information to him. He is a prime example of why Amateur Radio is so often praised in times of crisis."

The team was told on the Palm Beach repeater to look for a convoy led by the Florida Highway Patrol, to lead it to the Emergency Operations Center (EOC) in Miami. The travelers couldn't locate the convoy, but they were spotted by another amateur on a bumper-to-bumper freeway.

"As I looked to my right," Jourdain said, "I saw a person holding a handwritten note in the window of a van that said '146.52 SIMPLEX.'" After making contact, the ham led them to the Metropolitan Dade County EOC.

At the EOC, the team members received identification cards and were told they would be assigned to a location in the morning. Jourdain discussed the situation with the EOC packet station operator. "I also sat and watched with admiration as the various operators remained calm and professional, despite the large volume of traffic they were handling," he said.

After spending the night in Miami, a night filled with "the sound of generators and the very faint whine of mosquitoes," the team was assigned to a food distribution center on Krome

Avenue and SW 248th Street, near Homestead.

The team arrived at its assigned spot, a crossroads in a "somewhat isolated area," accompanied by Jourdain's brother Jim, from Bradenton, with his generator-equipped motorhome. National Guardsmen were on the scene to keep order and assist in the organization of the site.

"Our job was to provide the EOC with status reports regarding the availability and need for supplies and services in our area. We contacted the site supervisor in charge of the location and made our initial report to the EOC. We then set up our equipment, including a 2-meter voice station, a 2-meter packet station and an HF station. We also set up on 222-MHz simplex to communicate within the group. We operated all day out of the motorhome, averaging 80 families per hour through our site that day and into the night."

When team members Mashburn and Rice returned to Georgia, Jourdain was the only amateur left in the group. He, along with his brother, received word that the National Guard would not be able to secure the now-diminished team's operating area during the night. The two pulled camp.

"The next day, September 1, Jim and I proceeded to our next assignment, at a larger food distribution center at SW 154th Street and SW 137th Avenue, near the damaged Metro Zoo. We assumed that this was the area that the media was displaying on television, as many helicopters

circled this area during the day."

Jourdain and his brother helped to distribute ice, water, food and other items, and provided communications for up to 200 families per hour. A poll was taken by net control, WC4ACO (at the Miami-Dade EOC), concerning who could take additional supplies. "Because we had accumulated such a large surplus, we had to turn away additional supplies for that day, except for bleach and diapers, which were needed," Jourdain said.

"These net control operators did a tremendous job under extreme pressure."

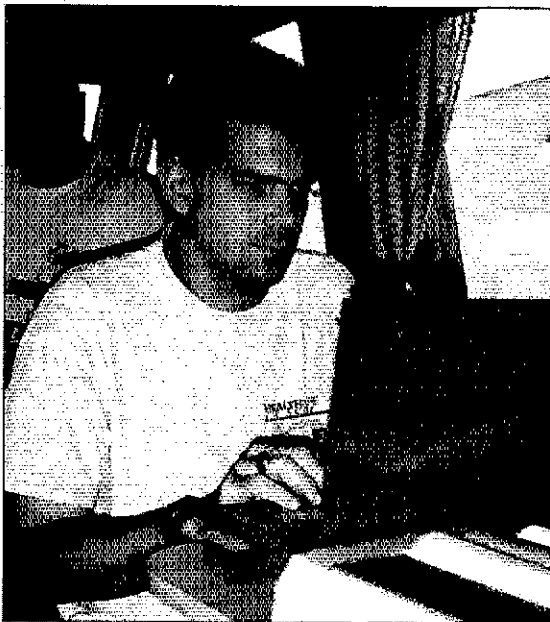
At 4:40 PM, WC4ACO came on the air and informed all stations that as of midnight, September 2, the Amateur Radio EOC net would be phased out by county, state and federal authorities who, after 10 days, had put an 800-MHz system in place to manage all food distribution and logistical services that had been provided by Amateur Radio.

Amateur operators on the net were then told that they could continue to operate after the conclusion of the net to assist with the large volume of health-and-welfare traffic expected to come in and out of the area.

The next day, Jourdain returned to Georgia, after monitoring the net until departing.

"When it appeared that there was no traffic to pass at that time, I proceeded on my long trek home, knowing that Amateur Radio had provided valuable assistance to many individuals in a time of extreme crisis," Jourdain said.—*Jim Cain, K1TN*

*Bill Jourdain, 31, is an Advanced class amateur, licensed since 1988. He's a lawyer and lives with his wife and child in Dalton, Georgia.*



Bill Jourdain, N4XOG, operates packet radio from the Country Walk food and water distribution center near Homestead, Florida.

Equally important as good communications, the jump teams had brought enough food and water to last for several days. Although there eventually was enough food and water for everyone, taxing the system early on with volunteer needs would have been unacceptable. -

Lesson learned: The time for "jump teams" has arrived. This long discussed idea should be instituted and planned for as an integral part of ARRL Amateur Radio Emergency Service policy, and we in Florida are proceeding with Amateur Radio mutual-aid plans among counties.

**A Place for Packet**

Although packet radio played a role, some interesting problems emerged which point to the need for better planning. The W7LUS BBS, north of the affected area and run by Peter Gross, had such an emergency plan in place. -

With a generator procured at the last minute, Peter was determined to keep his BBS on the air during the onslaught. The BBS was put into an emergency mode, allowing only selected call signs to access it. This eliminated a lot of unnecessary traffic that might have otherwise tied it up. KC4NMY, our RACES packet operator at the EOC, wrote a program to automatically pick up messages every 15 minutes from the BBS and print them out; but some stations deep in the affected area could not reach it and had to access us directly at the EOC.

Direct links for a small number of stations worked well, and packet was ideal for sending lists of needed supplies. But had all 17 food distribution points been using a direct packet connection to the EOC, it would have created a major log jam.

"Packet is a secondary means of communication," W4SS said, "and should not detract from voice circuits. Tactical messages must go by voice. If it is a question of packet or voice, there is no choice. Voice circuits come first."

There seem to be two solutions to this problem. First, assuming every packet station in the field has a personal mail system (PMS), mail to the EOC should be stored in the TNC's personal mailbox rather than being sent directly. The EOC can then poll all of its field locations on a regular basis and retrieve its mail.

A second solution may involve the use of a portable BBS set up in the affected area. PacComm is currently developing such a unit, with a built-in TNC on a computer motherboard. We look forward to testing a system like that in the future.

It was clear to us that the scope of the disaster was going to make federal assistance necessary, and after some political wrangling, 28,000 military troops were deployed. Some National Guard units were already assisting in security and the distribution of food and medicine. Amateur Radio operators were helping National Guard units with their communications as well as establishing amateur links.



Michael Cavalera, KB2MLY, of Titusville, Florida, didn't ride this bike, a 1979 Harley-Davidson Shovelhead, to south Florida! Rather, he and his wife, Robyn—who "both felt a deep need to do something"—joined a caravan to make the journey. They stowed HF gear, a 2-meter hand-held, a scanner and a borrowed generator in their van. Upon arrival, the two were assigned by the Miami EOC to Miami Community College, where they relayed information back to the EOC. Cavalera, an amateur for about two years, served in the Vietnam War with the 11th Armored Cavalry Division, where he lost a leg in combat. (photo courtesy of Robyn Cavalera)

When the federal troops arrived, they used some of the same low-band VHF frequencies already occupied by the National Guard (taking over TV Channel 3-60-66 MHz-frequencies in the process). Unfortunately, one military group was using

encrypted (COMSEC) communications, the other was not.

Lesson learned: The miscommunications lessons of the 1982 US invasion of Grenada have not yet been completely resolved by the military, reinforcing the need for amateur communications as a first response.

**There's a Role for HF, Too**

Early on, it was determined by the County Emergency Manager that at least 200 nurses would be needed to augment medical care in the shelters, especially among elderly and infirm evacuees. Communications between Paulette Newman, KD4MOK, at the State EOC in Tallahassee and the Dade County EOC was facilitated with HF SSB.

Although telephone lines were not out in either location, radio cut through the problem of jammed switches and central offices. Coordinating with the State EOC EMS desk, nurses flown in on the governor's airplane fleet were the first medical assistance to reach us.

After Hurricane Andrew passed on its way to the Gulf Coast, Southern Bell reported an increase of telephone activity from a normal 1.4 million phone calls per hour to more than 5 million! To its credit, the system was able to handle a 500% overload. After a media appeal to the public to curtail unnecessary phone calls, the hourly figure dropped to 2.5 million.

Getting calls into key command facilities like the EOC was extremely difficult.

Bell South Mobility (cellular telephone) reported 40 cell sites damaged, and repairs took an entire week. Cellular-1 reported 11 cell-sites down in the affected area. In the remaining areas where cellular access did not go out entirely, the overload was extreme. To a disaster worker having to place an urgent request for water, food, or medicine,



Bill Young, KA4VYH, uses solar back-up power for communications work near Miami Community College. (photo courtesy of Michael Cavalera, KB2MLY)



waiting 30 minutes was out of the question.

Lesson learned: Overloaded telephone trunks are almost as useless as no telephones at all. Amateur Radio allowed key command centers to maintain efficient contact for the most critical tactical traffic.

The state set up an "800" phone number for people to call for assistance of various sorts. The bank of operators fielding these calls was located in a Palm Beach County Fair Grounds command center 70 miles away. It was not unusual to receive a 911 call on the 800 number into the command center, relayed by hams to the Palm Beach County EOC 10 miles away on 2 meters, from there relayed to the Dade County EOC on 40

meters, and hand delivered to 911 dispatchers in an adjoining room. All were timely and no lives were lost.

Lesson learned: Amateur Radio is still the most flexible and adaptable of all communications services. Allow it to be flexible.

#### NDMS Proves its Worth

The National Disaster Medical System (NDMS), under the leadership of Captains Ellery Gray and John Wassel, flew in D-MAT (Disaster Medical Assistance Team) units from around the country to provide emergency medical treatment. Many of these teams included Amateur Radio operators. The Dade County EOC and the NDMS com-

mand center maintained 2-meter and 40-meter links with the deployed teams, often providing their only communications.

This was only the third time NDMS has been activated (St Croix in the US Virgin Islands after Hurricane Hugo in 1989 and Sail Boston being the others), and it made a great showing. Ten D-MAT teams (field hospitals) rotated their stays in southern Florida, with as many as nine teams in the field at any given time. RACES communications supported them for a number of days until the US Forest Service brought in commercial VHF repeaters.

The US Navy arrived in the form of a submarine tender, the USS *Honley*, and the

### The Antennas Were Big Enough!

Two of the thousands of people left homeless by Hurricane Andrew were Bob White, W1CW, and Ellen White, W1YL, QST's How's DX? columnist. Winds that approached 200 mi/h rendered their Homestead, Florida, house uninhabitable, although the Whites not only weathered the storm there, but stayed for two weeks before moving out.

In 1979, the Whites left Connecticut after 26 years of service to the League as Headquarters employees. Within a year they had purchased a home in the Redland area of Homestead, about 20 miles northwest of Homestead Air Force Base.

Their concrete-and-mortar house, built in Miami in the 1950s, had been relocated to a 3-foot-high above-ground foundation in Homestead in the late 1970s. How do you move a concrete house? "Very carefully," says Ellen, "but it's common practice in Florida."

The Whites chose not to evacuate before Andrew arrived in the belief that the greatest threat would be a "storm surge" of water and that their high foundation would be adequate. That surge never materialized.

Having decided to ride out the storm, Ellen and Bob piled cushions on the floor of their kitchen, in the center of the house, and used a mattress to protect themselves from falling debris.

"It was impossible to know the damage taking place outside because of the roar of the wind," Ellen says. "Only when we went outside at dawn did we know that all of our sheds, along with our new porch, had disappeared." Their 60- and 70-foot towers and their antennas were completely destroyed, too.

Bob's truck had a windshield smashed by a tree limb and Ellen's car was damaged but driveable. Both were under a carport, which was blown away.

"We stayed right there the first couple of days," Ellen said. "It was impossible even to get onto the street in front of our house, with it littered with debris. On Tuesday, we finally found a working pay telephone, 12 miles from home. I waited in line several hours to

finally get a call through to our son Jim, K1ZX, in Tampa."

During evening forays for water, the Whites listened to activity on 2 meters, but did not join in.

"We had our own agenda, mainly finding water and a phone, while most of the traffic on Amateur Radio was much more important and serious," Ellen said. "We listened with great pride to the work being done, but there was nothing we could do to help, so we just listened."

In their two weeks of "camping out," the Whites got food and water from military supply stations. They mostly stayed at the house, fearful of looters. Some of their neighbors were carrying guns to protect their property.

With the electricity out, Bob and Ellen hand-pumped water from a shallow back-up well. It wasn't drinkable, but it was suitable for sanitation and "showers."

Much of the damage to the Whites' house came from the rains that followed Andrew, pouring through holes in the roof. Their home office, with their computers, was the most heavily damaged room in the house, while the ham shack was the least.

Recently, the Whites had given themselves an early anniversary present—a complete, new Ten-Tec HF station. It was still in its boxes, undamaged.

The two moved out a couple of days before authorities declared their house unfit for habitation; with electric service not expected to be restored for some time, this was standard procedure throughout the area (on October 10, six weeks after Andrew, Florida Power and Light announced that electric lines were available to "everyone ready to hook up to them").

The Whites aren't planning on returning to Homestead. "We're going to stay in the Tampa area," they said, "where we already have plans for the next antenna farm." Meanwhile, Ellen and Bob, fixtures on 20-meter CW, are operating from their son's place.

"More ham radio friends than we can count came out of the woodwork to ask about our welfare, and we will never forget it," Ellen says.—*Jim Cain, K1TN*



Ellen White, W1YL, pumps water by hand from a shallow back-up well in her Homestead, Florida, yard. (W1CW photo)



LAWTON CHILES  
GOVERNOR

STATE OF FLORIDA  
**Office of the Governor**

THE CAPITOL  
TALLAHASSEE, FLORIDA 32399-0001

October 13, 1992

Mr. David Sumner  
Executive Vice President  
The American Radio Relay League  
225 Main Street  
Newington, Connecticut 06111

Dear Mr. Sumner:

On behalf of the state of Florida, I am writing to thank the many amateur radio operators who assisted in the Hurricane Andrew relief effort.

Scores of amateur radio operators rallied to South Florida from across the United States, helping to provide desperately needed communications to local, state, and federal agencies.

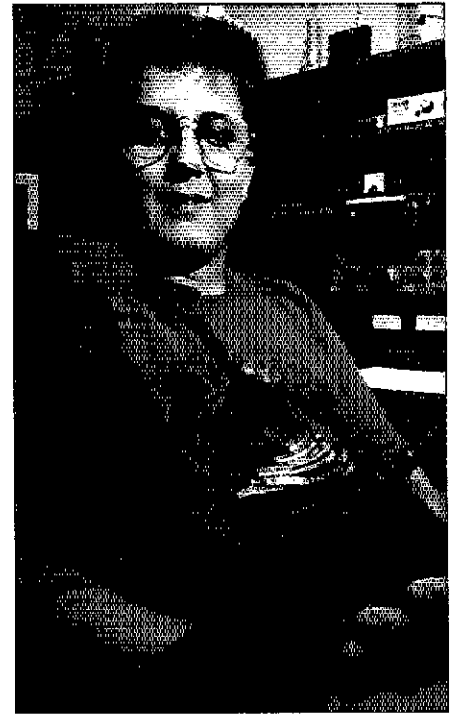
They provided moral and physical support to local amateur radio operators, many of whom had suffered severe damage to their homes, yet provided around-the-clock communications at emergency operation centers, food distribution centers, and field medical facilities.

Hundreds more assisted at their home stations around the country, passing health and welfare messages to concerned relatives of south Floridians.

The amateur radio service can be proud of its members, who time and time again serve the country unselfishly. The state of Florida owes them a debt of gratitude and thanks.

With kind regards, I am

Sincerely,  
  
LAWTON CHILES



"Cool in Crisis" said the headline in the New Orleans *Times Picayune* about 14-year-old Kevin Boudreaux, N5XMH, of Terrytown, Louisiana. The newspaper reported that Kevin spent 13 hours manning a station at Red Cross headquarters in New Orleans. Kevin volunteered when his father Denis, N5UGE, was asked but already had a communications assignment elsewhere. Kevin, who was licensed in November, 1991, through classes of the Westlake Amateur Radio Club, has a ham mom, too: Linda Boudreaux, N5VEF. "I'm sorry about all the devastation," Kevin told the *Times Picayune*, "but I enjoyed helping out and I'd definitely do it again." (photo by Steve Lasky of the *Times Picayune*)

USS *Sierra*. Their primary mission was to repair schools that were severely damaged by the hurricane (and indirectly as a result of being used as shelters). A Canadian Navy ship also assisted in the school clean-up.

Having an amateur on board one of the ships, these naval vessels took over the 145.43 repeater in Hialeah and used Amateur Radio for weeks as a major form of communications. Although not all personnel operating the radios were hams, it was an effective emergency communications measure. The crews did a magnificent job restoring the schools.

Lesson learned: In extreme situations, the ability of Amateur Radio to provide hardware to others can be as effective as providing a total network.

The Red Cross kept K4IWT on the air for many weeks from RC headquarters in Miami, long after WC4ACO at the Dade EOC closed down. The herculean job of feeding thousands continued long after commercial communications were reestablished. In southern Florida alone, the Red Cross will have served close to 4 million meals with the assistance of the Baptist Convention.

Former Dade County EC Andy Clark, W4IYT, and newly appointed EC Frank Ward, K4RBR, held down the fort at Red Cross operations HQ.

Mike Riley, KX1B, National Red Cross Disaster Communications Coordinator, came to assist the Red Cross with its communications efforts, but was later transferred to Kauai following Hurricane Iniki's visit there.

**Whatever Works, Use It!**

Many forms of emergency communications were established alongside Amateur Radio. Some were unusual and unexpected, but a credit to the ingenuity of those who thought of them. The Army established its own AM broadcast station, Radio Recovery, on 1610 kHz. It broadcast helpful information about shelters, medical and food sources, FEMA assistance and the like. The 400-watt station, located in a tent in a field, stayed on the air for three weeks, until more conventional sources of information were readily available. FEMA handed out thousands of battery-operated AM receivers for people to listen on.

The National Communications System

(NCS) brought in its new National Transportable Telecommunications Capability (NTTC). Two of the modules used by the NCS consisted of a Ku-band satellite telephone link and a portable, self-contained cellular telephone cell-site. The cell-site was linked by microwave to the Ku-band satellite uplink, providing remote cellular phone support and landlines for the Joint Task Force command center.

FEMA brought in two MRVs—Multi Radio Vans. These 35-foot-long diesel trucks are equipped for HF, VHF, UHF, microwave and Ku-band satellite communications. Accompanying the MRVs were trailers with 105-foot extendable aluminum towers sporting microwave dishes. Each satellite downlink provides 24 telephone lines, some of which were microwaved to provide emergency phone service for Homestead Hospital.

One of the MRVs was later transported by a military transport plane to Hawaii.

The NTTC and MRV phone lines were easy to access because they bypassed the local telephone trunks and central offices,

### Preparations Pay Off for Louisiana Amateurs

Hurricane Andrew did not stop in Florida, of course. Two days later he hit the coast of Louisiana, where millions of dollars in damage occurred. According to the Louisiana Red Cross, 187 shelters were open during and after the hurricane, 23,000 Louisiana citizens were displaced by the storm, and the Red Cross alone spent \$8 million.

Louisianans were not as severely affected by Andrew as were those in southern Florida for several reasons: The storm had weakened, coastal Louisiana is not as densely populated as Dade County, Florida, and native Louisianans are more hip to hurricanes than most. It's said that the two most popular topics of conversation in Louisiana are politics and hurricanes!

Louisiana Section Manager Lionel "Al" Oubre, K5DPG, reports:

The Iberia Parish ARES/RACES team manned the Iberia Parish EOC and several Red Cross Shelters. The EOC was manned by Oubre, Iberia Parish EC/LA SM. Everyone was in place by early afternoon on Tuesday, August 25, when Andrew came ashore. Ten stations provided communications during the storm.

On Thursday morning Disaster Relief Teams from the Baptist Mens Association, with units from Texas, Alabama, Arkansas and Louisiana, set up operations in the Iberia Parish EOC to provide and coordinate a massive feeding operation. On September 3, these units were still staffed with hams and in full operation, feeding people in Iberia and St Mary Parishes at several centers.

At Day Eight, the Texas Baptist Men's Disaster Relief Team was manning the Iberia Parish EOC to allow the local hams to return to their families and see to their homes.

One person of special note in Louisiana is Joe Boudreaux, KA5SDQ. He was assigned as shelter communicator for the Jeanerette Senior High School, where 1827 people were housed.

At the height of the storm, one person in the shelter

suffered a heart attack. Boudreaux notified the EOC of the situation and a rescue team was dispatched to the school to evacuate the patient. At this point, the winds were at hurricane force. The rescue team, consisting of two fire trucks, an ambulance, and a fire rescue unit, became isolated and had to ride out the storm for five hours. They used the fire trucks as a shield for the ambulance and the rescue unit.

Communications were maintained on the Emergency Management, Fire, and Ambulance frequencies at the EOC and the Iberia Parish Medical Center, where a cardiologist was in constant communication with the medic in the ambulance. While this was in progress, another person suffered a heart attack at the same shelter, the roof was coming apart, and the wall on one wing was damaged and taking on water. The nurse at the shelter was able to keep the patient stable. And before the winds would allow the second heart attack victim to be evacuated, a third person suffered a heart attack.

The shelter manager said that KA5SDQ was more than just a communicator during the ordeal. Without his radio links, the shelter would have been isolated and no one would have been able to make an early rescue and evacuation, he said. The EOC never lost contact with KA5SDQ during the duration of the storm.

ARES and RACES stations were manned in Vermillion, St Martin, St Mary, and Lafayette parishes, providing communications to EOCs, the Civil Air Patrol and other agencies.

In addition to brief operations by the ARRL Louisiana Traffic Net, several other nets were in session during and after Andrew: The 7290 Traffic Net, The Gulf Coast Hurricane Net, The Delta Sideband Net, The Gulf Coast Sideband Net, and the ARRL NTS Region 5 day and night cycles. Several other operations without official names also provided needed services.

but were very expensive to maintain because of satellite transponder fees. Eventually, they were phased out and replaced by lines supplied by Southern Bell.

The Goodyear Blimp was pressed into service as an aerial "electronic bulletin board." Flying over the affected area at night, it displayed messages in English and Spanish on its electronic message board.

And the Army brought in a battalion of translators to help the medical field units. The translators spoke English, Spanish and Haitian Creole.

Specially trained psychologists and psychiatrists used the media, in English and Spanish, to reassure the general population. This was a technique used by the Pan American Health Organization (PAHO) in Latin America in the aftermath of the Mexico City earthquake. The same people now employed their skills on their own soil.

FEMA used a few Inmarsat satellite "suitcase" telephones, but not nearly as many as we expected, given their invaluable service during Operation Desert Storm.

On August 28, four days after Hurricane Andrew arrived, Motorola set up a 7-channel 800-MHz SMR Trunking system in the affected area, with the help of a generator from Southern Bell and tower space from the state. The State of Florida also made available to all agencies new 800-MHz conventional repeaters on the 821-824 MHz public

### Northern Florida Amateurs Aid Coordination Effort

Amateurs in northern Florida, out of Hurricane Andrew's path, provided important communications links into the state capital, Tallahassee, and assisted amateur volunteers *en route* to southern Florida.

When a hurricane watch was issued for southern Florida, the state Division of Emergency Management in Tallahassee opened its Emergency Operations Center and the state RACES (Radio Amateur Civil Emergency Service) net, with Bob Moody, W4WSZ, controlling the net from his home in Tallahassee and a 2-meter link to the EOC. In the following six days, W4WSZ estimates he got a total of ten hours sleep—as he handled the net with extraordinary skill. Other EOCs in Palm Beach and Miami opened and maintained contact with Tallahassee.

I put the Northern Florida East Central District on a "Condition One" (minimum) alert Saturday evening—the night before the storm hit—with instructions to support all those agencies with communications. The Northern Florida Emergency Net was also alerted, although we used it mostly to link the Northern Florida ARES officials involved. East Central's real work was done on VHF and UHF, and on the Southern Florida ARES frequency of 3940 kHz.

Late Sunday, Southern Florida SEC Manny Papandreas, W4SS, asked me to send as many "jump teams" as possible to the affected area; Dade and Broward County ARES were simply overwhelmed with demands for communicators. Working with W4SS, I developed a memo outlining minimum needs to be completely self sustaining.

On Wednesday, September 2—a week and a half after the first alert—W4SS asked me to shut off the stream; Southern Florida ARES groups could handle the duties remaining after recovery efforts became better organized.

During that time, I coordinated three teams from Jacksonville, one from Orlando, and one from Tallahassee, in addition to two from South Carolina and two from northern Georgia (see the sidebar). Some teams were still en route when the cancellations began and some were about to start south when they were called off.

One South Carolina ham who was organizing a jump team told me, "I was in the area where Hugo struck in 1989. From what I've seen on TV, this is worse than Hugo. Much worse. At least we had a few buildings left to use for shelters and temporary headquarters. Those folks down there had NOTHING left!"—George Thurston, W4MLE, NFLA Section Emergency Coordinator



safety mutual-aid channels. Nearly 2000 hand-held radios were distributed by Motorola and General Electric, but the distribution process took many days to complete.

Finally, after verification with the vendors that the radios were in the hands of all agencies, and after a field test of the system by the State of Florida's Division of Emergency Management, RACES announced that it would secure as of midnight September 1.

### Securing Amateur Operations

For nine days Amateur Radio had been the prime provider of communications to most agencies. RACES secured with the blessings and thanks of the Emergency Manager, the County Manager, and Admiral

James O. Mason, Assistant Secretary of Health and Human Services, who was kind enough to visit the Miami EOC and convey his thanks personally.

Some amateurs chose to continue to assist their adopted agencies even in non-communications roles, and were encouraged to do so.

Lesson Learned: A weaning process may take place at the point that Amateur Radio is no longer needed as the "first responder." It is better to have a clean break and changeover to commercial means. Don't allow Amateur Radio to trickle away into inefficiency.

The Hurricane Andrew relief operation was a historic joint venture between civilian and military agencies, but the Amateur Radio

operators who traveled across the state and country to volunteer their services are the real heroes.

Amateur Radio held its ground and earned the gratitude of more than 80 city, county, state and federal agencies in the process. It also served as a lesson for rethinking preparation and training long neglected in a lethargic South Florida community not hit by a severe hurricane in more than 27 years.

*Joel Kandel, a professional communications consultant, also is a member of the ARRL Public Service Advisory Committee and is Southern Florida Section Technical Coordinator. Kandel, 49, was licensed in 1959 as WA2IYW. He lives near Miami.*

## New Products

### BURIABLE COAXIAL CABLE

□ A common misconception regarding coaxial cable is that a noncontaminating jacket means a cable is designed for direct burial. The noncontaminating jacket compound is distinctly better than regular Class I PVC, and under similar conditions will last twice as long, making it worth the small increase in cost. This, however, doesn't provide the additional protection necessary for direct burial. A truly buriable RG/8-type coaxial cable for amateur and professional applications is Flexi 4XL BURY-8.

The size (0.405 in) of familiar RG/8 coax, the new cable has a thick, tough, moisture-impermeable polyethylene jacket over a "flooding" compound that self-seals small penetrations and discourages more, such as rodents, soil and gravel abrasion, freeze-thaw cycling and so forth. The two shields are tinned-copper braid (95%) and aluminum-mylar foil (100%). The dielectric is sealed microcell polyethylene foam and the center conductor is 9.5 AWG 19-strand copper.

Loss ratings make it a "poor man's hardline"—it's rated 2.0 dB per 100 feet at 150 MHz; 3.8 dB at 450 MHz; 5.4 dB at 800 MHz; and 6.2 dB at 1 GHz. The velocity factor is 84%, 24 pF/foot. Retail \$0.82/foot for 100 feet.

For a comprehensive catalog of products, prices and information about cable, send \$1. The Wireman Inc, 261 Pittman Rd, Landrum, SC 29356; tel 800-727-WIRE. The company has an interesting approach to catalog making that will ensure that you never throw it away. [I've seen the catalog; it's worth the buck!—Ed Hare, KA1CV]

## Strays



### QST congratulates...

□ Elizabeth Anne "Beth" Wiatrowski, KB5AUH, on being selected the first female battalion commander in the 99-year history of the Texas Military Institute (TMI) in San Antonio. Wiatrowski, 17, was chosen for her academic performance, leadership and work she did in the past year as an assistant corps adjutant.

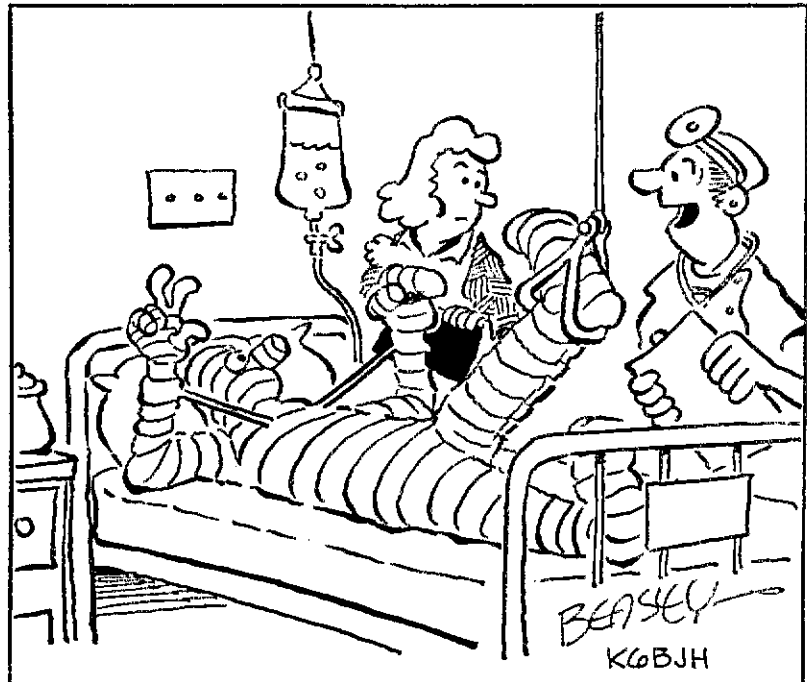
As commander, she's responsible for overseeing the activities of the JROTC Drill Team and Color Guard, and for organizing, train-

ing and directing the younger cadets. Wiatrowski is also editor of the school's yearbook, sings in the choir and is varsity tennis captain.

□ Bob Glenn, NØNSQ, of Branson, Missouri, on being named to the State Highway Safety Officers Hall of Fame. Glenn was Director of Safety Education for the Iowa State Patrol and retired in 1981 after 33 years' service.

### I would like to get in touch with...

□ anyone who served as a radio operator on a military or civilian aircraft in the 1930s or '40s. Ron Thomas, W8QYR, PO Box 347115, Atlanta, GA 30334.



LOOK ON THE BRIGHT SIDE ---- AT LEAST HE CAN WORK C.W.