public service

BY BOB JOSUWEIT,* WA3PZO

High-Level Recognition for Hams

Three natural disasters—a tsunami in Southeast Asia, an earthquake in Pakistan, and hurricanes in the United States—touched the human race in 2005 in a way we cannot forget. Unexpectedly, they killed hundreds of thousands of people; destroyed houses, property, sources of income; and created uncertainty among nations. "We cannot any longer think: It happened somewhere—far enough," said Dr. Pekka Tarjanne, former Secretary General of the International Telecommunications Union. "In the global environment the concept of geographical distance is different. We all are in one way or another touched by these disasters."

Photo A– Nearly 3-million telephone lines were knocked out as a result of Hurricane Katrina. (FEMA photo by Marvin Nauman)

Communications—Key Tool

Tarjanne continued, "The organizing of effective rescue and relief operations is impossible without knowing exactly what has happened. That is why communication is an essential tool in these operations." FCC Chairman Kevin Martin told members of the FCC's Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks that "Katrina caused extraordinary destruction to facilities in the region and disrupted the communications services upon which citizens rely."

He continued, "Nearly three-million telephone lines were knocked down in Louisiana, Mississippi, and Alabama. Significant damage was inflicted both on the wireline switching centers that route calls and on the lines used to connect buildings and customers to the network. Thirty-eight 9-1-1 call centers went down. Local wireless networks also sustained considerable damage, with more than one-thousand cell sites out of service. Over 20-million telephone calls did not go through the day after the hurricane hit. An estimated 100 broadcast stations were knocked off the air."

Some is Better than None

Many communities are now reevaluating their disaster plans and drills. They are starting from the ground up by asking what we would do if we had no communications. Julliette Saussy, director of Emergency Medical Service of New Orleans, said communications eroded as the waters rose and only got worse. She told the panel, "We had no way to communicate except by line of sight. Our radios were not operable, most land lines and cell phones were useless, and our communications

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centers were under water. When help arrived we could not communicate with them either."

"Usually what happens is you have other resources surrounding where the incident occurred to come to the aid of those who are in need," said Harlin McEwen, chairman of the Communications and Technology Committee of the International Association of Police Chiefs. "When you have an issue such as Katrina that affects three states and where much of the public safety infrastructure is wiped out . . . that's a different issue."

Amateur Radio Was There

Recent reports by the U.S. House of Representatives and the White House commented on the positive role amateur radio served during the hurricanes. The Select Bipartisan Committee report, "A Failure of Initiative," mentions the Amateur Radio Emergency Service (ARES), the Military Affiliate Radio System (MARS), and the HF digital e-mail system Winlink 2000.

The National Communications System coordinated the frequencies used by the nearly 1000 Amateur Radio Emergency Service (ARES) volunteers across the nation who served in the Katrina-stricken area providing communications for government agencies, the Red Cross, and The Salvation Army. The report continued, "Emergency communications were conducted not only by voice, but also by high-speed data transmissions using state-of-the-art digital communications software known as *Winlink*."

The report said, "In Mississippi, FEMA dispatched amateur radio operators to hospitals, evacuation centers, and county EOCs to send emergency messaging 24 hours per day." It further
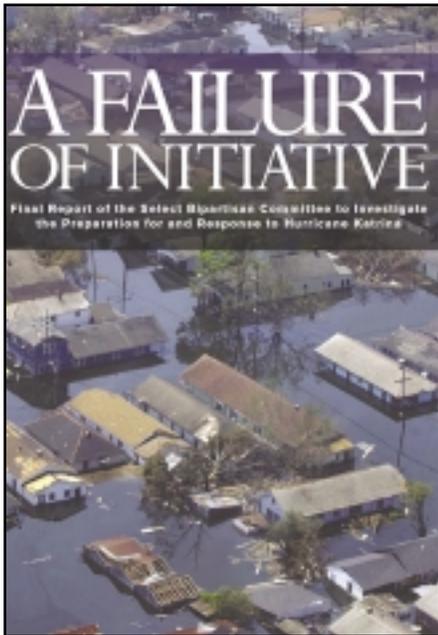
Photo B– A Congressional committee recognized the role of amateur radio during Hurricane Katrina.
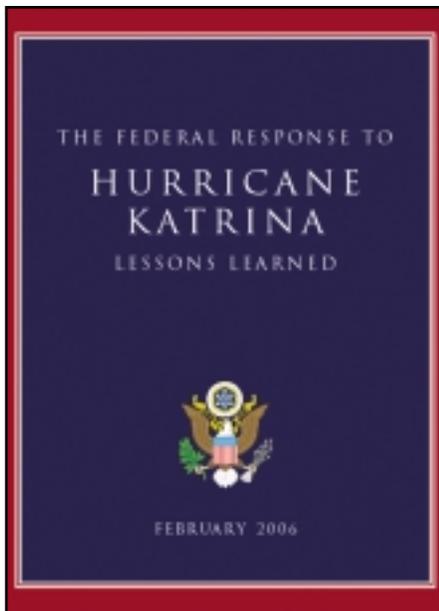

Photo C– The White House also recognized amateur radio as one resource that worked in the aftermath of Katrina.

cited comments from Bay St Louis Mayor Edward A. "Eddie" Favre that amateur radio operators "were especially helpful in maintaining situational awareness and relaying Red Cross messages to and from the Hancock County (Mississippi) EOC."

According to the report, radio amateurs at airports in Texas and Louisiana "tracked evacuees and notified families of their whereabouts," while the Red Cross "deployed amateur radio volunteers at its 250 shelters and feeding stations, principally in Mississippi, Alabama, and Florida."

The Salvation Army operated its own system of amateur radio volunteers known as the Salvation Army Team Emergency Radio Network (SATERN). "During the Hurricane Katrina response and recovery effort, SATERN joined forces with the SHARES program and received over 48,000 requests for emergency communications assistance utilizing federal frequencies made available via the SHARES program," the report noted.

"The extent of destruction and damage to the communications infrastructure and services caused by Katrina exceeded that of any other natural disaster experienced by the Gulf Coast states," the report concluded. "Simply put, Katrina's devastation overwhelmed government resources at all levels."

"A Failure of Initiative" said that the loss of power and the failure at various levels of government "to adequately prepare for the ensuing and inevitable loss of communications" hindered the hurricane response "by compromising situational awareness and command and control operations."

White House Recognition

The White House issued a report of Lessons Learned from Hurricane Katrina. Part of the report addressed what went right. It singled out amateur radio operators for particular praise:

Other organizations worked tirelessly to assist emergency responders who, due to the storm, did not have the equipment and means to effectively carry out their duties. Amateur radio operators from both the Amateur Radio Emergency Service and the American Radio Relay League monitored distress calls and rerouted emergency requests for assistance throughout the U.S. until messages were received by emergency response personnel. A distress call made from a cell phone on a rooftop in New Orleans to Baton Rouge was relayed, via ham radio, from Louisiana to Oregon, then Utah, and finally back to emergency personnel in Louisiana, who rescued the 15 stranded victims. Ham radio operators voluntarily manned the amateur radio stations at sites such as the National Hurricane Center, Hurricane Watch Net, Waterway Net, Skywarn, and the Salvation Army Team Emergency Radio Network.

The report identified three immediate priorities:

1. Implementing a comprehensive National Preparedness System "to make certain that we have a fully national system that ensures unity of effort in preparing for and responding to natural and man-made disasters";

2. Creating a "Culture of Preparedness" that "emphasizes that the entire Nation—at all levels of government, the private sector, communities, and individual citizens—shares common goals and responsibilities for homeland security"; and

3. Implementing corrective actions "to ensure we do not repeat the problems encountered during Hurricane Katrina."

"Part of the Solution"

Addressing the FCC independent panel reviewing Hurricane Katrina's impact on communication networks, ARRL Alabama Section Manager Greg Sarratt, W4OZK, said amateur radio operators were part of the solution, providing experienced communications operators to replace and supplement local public-service communications personnel in the devastated area. These systems of equipment and operators were very effective, not only for amateur purposes, but in support of emergency management, Red Cross, Southern Baptist, Salvation Army, and many other organizations."

According to the ARRL, Sarratt told the FCC panel that his operation ultimately was able to process and deploy more than 200 amateur radio volun-

teers from 35 states and Canada to devastated communities in Mississippi. Volunteers set up communication facilities at kitchens, shelters, emergency operations centers, distribution centers, warehouses, and various command and control centers.

"In each town we set up a high-frequency (HF) amateur radio station to communicate out of the area to Montgomery and the outside world," Sarratt explained. "We also set up a communications network connecting every Red Cross facility in a town on a local short-range radio frequency. Our network included fixed and mobile disaster vehicle stations."

Sarratt said that interoperability is the most important thing amateur radio can bring to the table in emergency and disaster communications. "Amateurs demonstrated their adaptability by communicating successfully with a multitude of amateur, commercial, public service, EMA, Salvation Army, and Red Cross radio systems and personnel." He summed up by saying, "Radio amateurs bring a wealth of resources to the public service and emergency communications table."

Broadcaster Praises Hams

Biloxi, Mississippi's WLOX-TV station manager, Dave Vincent, spoke before the FCC panel and included words of praise for amateur radio:

"Communication was non-existent immediately following the storm. Cell phones and regular phone service did not work for the first couple of days," Vincent said. "WLOX was lucky to have a ham operator stationed at our studio. The Harrison County EOC office sent the person to work with us."

Vincent said that without the help of amateur radio, "it probably would have been a couple of days before we knew whether the persons in our two bureaus had survived the storm." He also said ham radio enabled the station to contact EOCs in the three hardest-hit coastal counties and get information they were able to air.

"The ham operator was able to transmit vital information between agencies located at the EOC centers and WLOX," Vincent said. "Without this link we would not have had any way to communicate with officials along the coast." Broadcasters testified that they should be a member of the first responder community in that they can get information to the general public.

Even the Private Sector

Dominic F. Tusa, a Radio Communications Consultant, told the FCC panel what he thought went wrong with New Orleans Public Safety Communications. Tusa said that radios given to a policeman or fireman are a tool for the responder. They know that if they push a button they will be able to talk to the dispatch center or other location. However, when that system breaks down, they are at a loss as to what to do. Tusa believes "a basic lack of training contributed to the confusion in adapting to the degraded radio conditions that existed post Katrina."

"The advantage the Amateur Radio Service brings to our community is its vast network of self-funded, self-equipped, and self-trained radio communication experts. Often, messages are relayed, amateur to amateur, without the need for sophisticated high-capacity infrastructures," said Tusa. "In normal operations the city's Tier-I radio network (New Orleans first responders) processes over 3.5-million radio transmissions *each month.* Emergency-response amateur

BEARS-1: Grant-Funded Ham Command Post

Photo 1a (left) and 1b (above)– BEARS-1, the new mobile command post of Brevard Emergency Amateur Radio Services (BEARS) of Brevard County, Florida, built with a $95,000 state grant. The tower at the rear folds onto the roof for travel.

Members of Brevard Emergency Amateur Radio Services, Inc. (BEARS) proudly displayed their just-delivered mobile command post, BEARS-1, at this past February's Orlando Hamcation® hamfest. The van (photo 1) was custom-built to their specifications, as a joint effort of the manufacturer and the groups' members. It was financed by a $95,000 grant from the State of Florida.

According to Ernie Baldini, K4RBD, a BEARS board member and vice chairman of the project team (photo 2), the van is the culmination of a multi-year process. The group applied for the state grant several years ago, and it slowly worked its way to the top in 2004. With the grant in hand, the group's leaders discovered in their own back yard a company that builds mobile command centers, North American Catastrophe Services of Melbourne, Florida <http://www.nacs1.com/>. They worked out a deal in which North American would build the van to their specs—which included a minimum of 72 hours of "sustainability" or complete self-sufficiency—while BEARS members pulled cable, soldered the terminations, and provided the radios and other electronic equipment. The project then took two years to complete, with the first year spent discussing and deciding on systems to include, then planning and drawing, followed by another year of actual construction (with a hurricane interruption), with hams working for six months at the North American plant on their part of the project.

The van is equipped with:
• HF, VHF, and UHF ham rigs
• GMRS, CB, Marine, Fire, and Red Cross radios
• Amateur Television (there is already an active ATV repeater in the county), including monitors at one operating position, a video patch panel, and a large monitor in the front of the van (photo 3). The ATV operator can control the front monitor to show local camera output, repeater output, or broadcast TV video.
• Two 5$1/2$-kW generators and two complete 12-VDC systems, each with two batteries.

Each operating position has access to AC and DC power as well as an Ethernet connection to a wired interior network (to avoid potential RFI issues), plus a Heil noise-canceling headset and a switch that allows the operator to quickly select which radio is on the air at a given time. Video, data, and RF are all patchable via a rack behind the main operating positions (photo 4). Next to that rack is a DC distribution closet. The rear conference room is also equipped with AC and DC power and a network connection, plus, it can be converted into four bunks.

This is the group's third comm van. The first (COMM-1) was an over-the-top RV donated by a member of the Indian River ARC; the second (COMM-2) was a mobile classroom bought for $1 from the local school board. According to the group's brochure, both "have begun to succumb to the ravages of time and ocean air." According to Baldini, lessons learned from the first two vehicles were applied

Photo 2– BEARS member Ernie Baldini, K4RBD, at one of COMM-1's four operating positions. In an actual deployment, a microphone and noise-canceling headset would be plugged into the customized switching unit that allows an operator to quickly switch between different radios. A laptop computer can also be plugged into the van's internal network.

Photo 3– A large monitor in the front of the van allows operators to watch local video from ATV cameras, the output of the local ATV repeater, or commercial broadcasts, such as news bulletins or weather reports.

to the design and construction of the new one (BEARS-1), which was delivered just days before it went on display at the Orlando hamfest. The $95,000 state grant was supplemented by local fund-raising which, so far, has garnered an additional $15,000 which will be used for maintenance and upkeep.

According to Baldini, the new command center resulted from a combination of good things happening:

• Persistence in getting the grant

• Finding a compatible (and nearby) manufacturer. [Baldini notes that Winnebago also has a division for working with public safety agencies, so it is a potential manufacturer along with North American.]

• Finding the right people, including the necessary ham talent, to design, build, and run the equipment, and tight management to assure that everything got done to spec and on schedule.

BEARS is now organizing a Communications Assistance Team (CAT) which will primarily be responsible for operating and maintaining the van, which will be made available as needed locally for emergency and non-emergency events, as well as emergencies statewide or regionally. The CAT team will also primarily be responsible for training operators from all of the member radio clubs.   —W2VU

Photo 4– Video, data, and RF all are switchable from a variety of sources to a variety of destinations via this patch panel behind the main operating positions.

radio communications cannot sustain anywhere near that level of radio traffic, but the very small numbers of communications supported each are of vital interest, and limited communications is always preferred to *zero* communications."

He continued, "The city's Tier-I network, just like our partnered amateur radio enthusiasts, has the capability to support unit-to-unit transmissions absent of radio infrastructure. But, few city radio users understand either how to best use this feature or how to group users into ad-hoc frequency nets similar to trunked talk groups. Public-safety radio users, for the most part, are not radio enthusiasts. The radio, for them, is simply a tool having a specific fixed purpose. If that tool's ability is suddenly diminished, and there is no familiarity with how it could be used differently, then the tool becomes ineffective and useless."

Army MARS Adopts WinLink

After a thorough study of security and connectivity issues, Army MARS has launched the final phase of implementing Winlink 2000 as a system-wide communications tool. A global MARS-Winlink 2000 network is expected to be in service by summer 2006.

Grant Hays (AAA9E/WB6OTS), MARS Eastern Area Coordinator, announced the new undertaking. He said Winlink 2000 will provide rapid and reliable interconnection between government entities served by the Military Affiliate Radio System and the broad range of local and regional agencies accessed by amateur radio in general. Army MARS is an organization of some 2500 amateur radio operators specially trained and licensed for military communications. The Air Force and Navy-Marine Corps field similar volunteer teams. Their shared mission is providing emergency communications to the Department of Defense and other government departments.

Winlink and a companion software program, Airmail, got extensive use during last year's hurricane season. In past emergencies, ARES and RACES have informally linked with MARS through members whose stations participate in multiple systems. With Winlink 2000, Hays said, the different networks will continue to operate separately and independently, but the new software will automatically move messages between them as needed. It will also switch traffic to the internet, where available and appropriate, to bridge any radio gaps or to deliver addressed e-mail.

Winlink is augmented by Airmail, another program developed within the ham community, for file management. Like Winlink, Airmail is free and can be downloaded from the internet. MARS implementation will utilize both.

Army MARS has long operated its own MMCS (MARS Message Center System) utilizing shortwave radio to deliver messages throughout the U.S. as well as to military installations overseas. Before the advent of e-mail, keeping servicemen in touch with their families and friends was a major function. Disaster readiness has overtaken that function in the last decade and continues to expand.

During the catastrophic 2005 hurricane season, amateur operators provided indispensable backup when normal messaging systems failed. Like the telephone system, internet service is also vulnerable during disasters: computers depend on electric power. That had been a significant concern for MARS management, but WL2K has the capability to automatically establish alternative routes utilizing its large number of participating amateur stations.

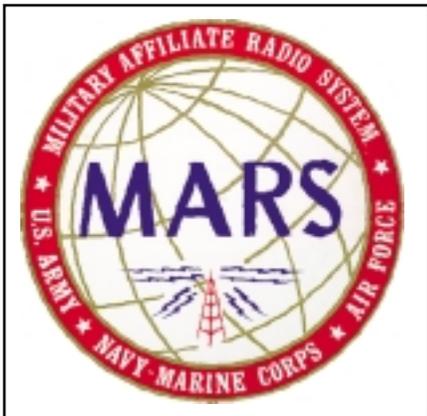Steve Waterman, (AAR4WU/K4CJX) of Nashville, Tennessee, the Winlink 2000 Network Administrator and a mem-

Photo D– Army MARS recently adopted Winlink 2000 for its digital messaging network.

ber of the Winlink Development Team, is the MARS team leader for the Winlink 2000 implementation.

Waterman said, "The amount of redundancy built into the system is really substantial. Among other things, where appropriate, internet accessibility will take the load off the limited number of frequencies that are available for the MARS service."

The Winlink 2000 network augmentation is one of two innovative technology projects currently under way in Army MARS, according to Coordinator Hays. In conjunction with Air Force and Navy-Marine Corps MARS, members are also testing an advanced implementation of ALE (Automatic Link Establishment). This is the HF radio technology already widely used by military units and government agencies for moving traffic in large volume. MARS volunteers developed the software, Hays said. Winlink 2000 and ALE can work in tandem to speed delivery of messages.

MARS members utilize military frequencies allocated by the Department of Defense. Only MARS members can directly access the MARS WL2K system, Hays said. Messages to and from the amateur participants outside MARS would be interchanged automatically at designated PMBO (Participating Mailbox Operation) stations.

"While only designated members are authorized to use ALE, all MARS members may use the Winlink 2000 system after registering their callsigns and passwords at one of the MARS participating stations. Four Winlink 2000 participating stations were fully operational for the start of system testing. Others will be added as needed," Hays said.

Early versions of Winlink and its predecessor, Aplink, have a long history in MARS going back to the early 1980s. However, concern for communications security delayed adoption of the advanced Winlink 2000 facility until recently.

Working with team leader Steve Waterman on the MARS-WL2K project are Paul Drothler (AAA4TN/WO4U), Crossville, TN; Laurence Collins (AAA9NV/ K7DMB), Las Vegas; Don Nutt (AAR7JG/N6TDM) Greater Kansas City area, MO; and John Scoggin, (AAA9AC/W3JKS) Newark, DE. Scoggin is the MARS National Automation Coordinator. Drothler and Collins are state MARS Directors, and Nutt is a National Coordinator for SHARES, the Shared HF Resources network linking federal agencies including MARS. All are experienced engineers.

"Army MARS identified a real need to provide digital messaging to complement the existing voice and digital systems," said Waterman. "It becomes a critical need as the demand for more and more capacity approaches. And, there's a tremendous amount of interoperability built in," he added.

High Visibility

Amateur radio continues to get positive exposure from government agencies, the private sector, broadcasters, and the general news media. There is an increased demand for amateur radio support in times of emergency. As part of the increased demand, amateur radio operators may be asked to help support or train others in communications techniques. The increased demand means we need more to bring more people into the hobby.

"The disasters of 2005 have proven the worth of the Amateur Radio Service and its selfless cadre of operators; we were tested as never before," Sarratt told the FCC panel, adding, "we must assume the next 'big one' is just around the corner."

Hurricane Season officially starts next month. In the June column we'll take a look at the upcoming season and ask whether history will repeat itself. Until next month . . . 73, Bob, WA3PZO