



Applied Coursework

Technology for Homeland Security Course Paper

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Case Study

HAM Radio and Hospitals

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Technology Class

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Introduction: Problem or Issue Statement

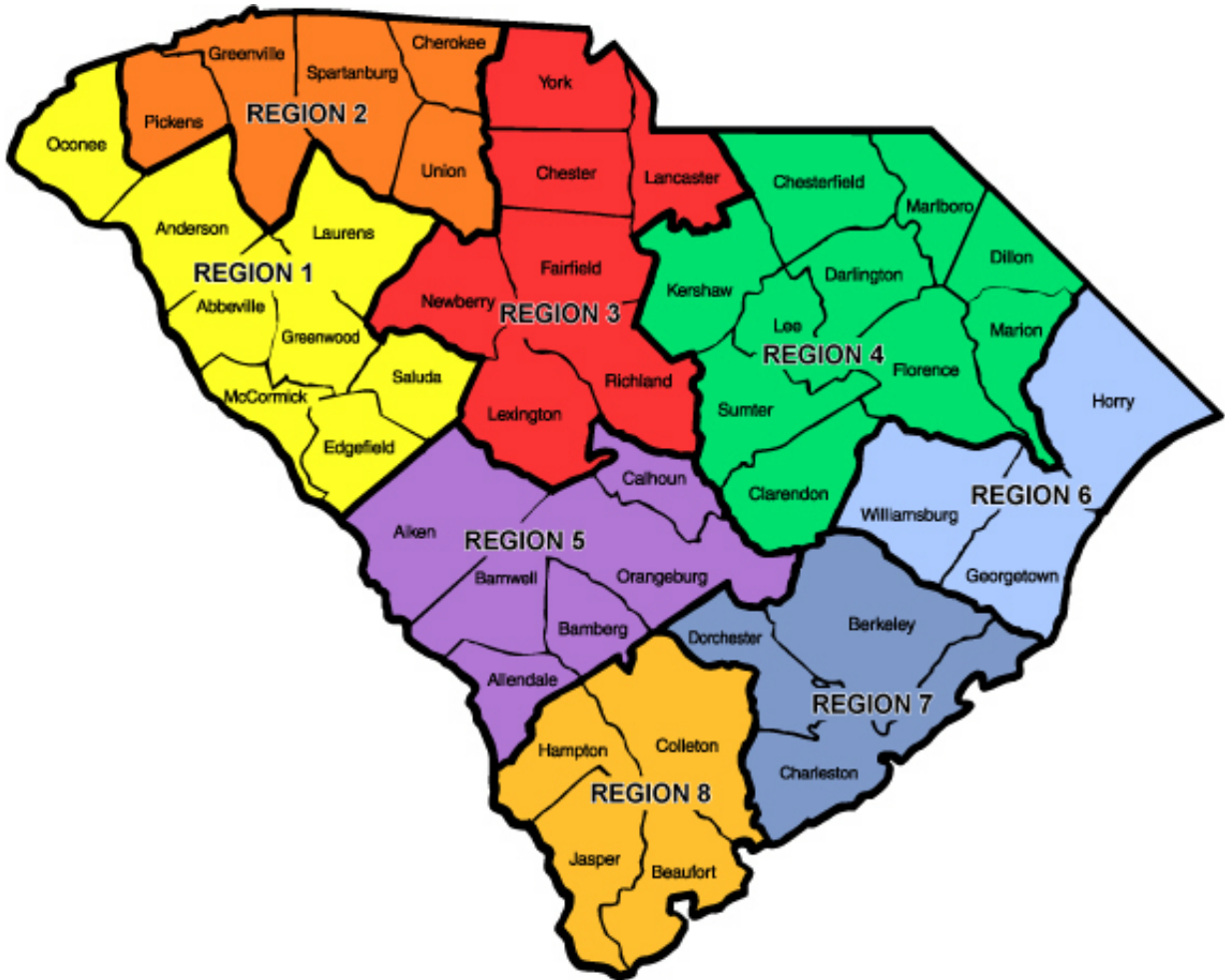
South Carolina hospitals could not talk among themselves in the time of a disaster, so a system had to be established as a redundant communication system using Amateur (HAM) Radio to support hospitals statewide. The initiative described in this case study began in 2004, when the South Carolina Emergency Management Division approached the University of South Carolina-Center for Public Health Preparedness to help bridge a gap in preparedness communications by collaborating with the state Amateur Radio Emergency Service (ARES) to facilitate statewide recognition and acceptance of ham radio as a critical partner in redundant communication systems in the state. The SC HEART (South Carolina Healthcare Emergency Amateur Radio Team) was formed in 2004 and is currently in Phase III of expansion. The goal of the project is to create a communication system to support hospitals, shelters, healthcare facilities, and ESF-8 responders during major disasters and public health emergencies. The mission of SC HEART is: To strengthen the statewide communication infrastructure using HAM radio as a source for communicating redundancy during public health emergencies. This system is designed to be the backup communication system to the current 800 MHz radio

system already established throughout the state with hospitals, first responders and public health.

Analysis:

Facts about South Carolina demographics: The US Census Bureau estimated in 2006 that the population of the state is 4,321,249, with 68.5% white, 29% black, 3.5% Hispanic, 1.1% Asian and the other races listed less than 1%. These demographics indicate that there is a diverse culture in the state, but HAM radio operators transcend any racial barriers, and therefore come together for one joint mission of helping get the message across in the time of an emergency. In 2006, the state was estimated to have 30,109 square miles, ranging in four distinct areas: Low Country or Beach ranging from Beaufort SC up through the Grand Strand to the border with North Carolina (Regions 6, 7, 8 of state map), Midlands which is centered by the capitol of the state (Regions 3, 5 of state map), Piedmont (Region 4) and the Upstate, which surrounds the mountains of North Carolina (Regions 1, 2 of the state map). The various topography of the state from an elevation of Sea Level to the highest elevation of 3,560 ft at Sassafras Mountain. This range of elevation has presented unique challenges in the past with communication being one of the more difficult issues to deal with during emergencies or disasters. Below is the state map, indicating the eight Public Health Regions that define the state of South Carolina.

Figure 1. Map of State of South Carolina



When the project began in 2004, 63 hospitals were listed as acute facilities with emergency departments and participated in the Federal Grant known as the Hospital

Preparedness Program, formerly known as HRSA (Health Resources Services Administration). The program was restructured in 2007, and now sits under the ASPR (Assistant Secretary of Preparedness and Response). The goal of this grant program is to improve surge capacity and enhance community and hospital preparedness for public health emergencies in South Carolina.

Each year, priorities are set by the Feds and states need to follow these critical benchmarks, capabilities, or now called Level I and Level II capabilities. Funding is allocated for these priorities for states to facilitate hospitals to purchase equipment, attend trainings and workshops and participate and manage exercises in their facility along with the their response partners which include public health, fire, EMS, police and Emergency Management. The last two years, the top priority for this grant has been the subject of Interoperable Communication. This Level I Capability has been a good partner with the SC HEART project, since its inception in 2004.

On January 6, 2005 , a Norfolk Southern Railway freight train struck a parked train on the spur leading to Avondale's Stevens Steam Plant. One of two train cars that were carrying liquid chlorine ruptured, releasing a poisonous chlorine cloud. Nine people were killed, more than 250 injured, and more than five thousand were displaced from their homes for more than a week. Emergency Alert Network was in place by the SC Emergency Management Division and then the National Weather Service activated the weather band radio system , and 360 residents were notified by the Reverse 911 system to shelter in place and immediate turn off A/C and heating systems in place. For residents within a one mile radius of the accident, the reverse 911 system was also activated telling them to

evacuate immediately. The HAM radio system was not listed as one of the communication devices used during this emergency, but could have been easily. In January 2005, the local area hospital did not have HAM equipment at their facility, nor were the HAM repeaters installed throughout the state, but since then, there has been significant progress in this area. At first, the number of patients nor the seriousness of the injuries was not known, so this caused even more panic for the one hospital that was receiving patients in the immediate area. This is just one example of why the need for redundant communication between healthcare facilities is needed and why it became an immediate priority for the state after this incident.

The SC HEART project started with Phase I in Fiscal Year 2004, which runs from September 1 of each year to August 31 the following year. This phase involved having a contract in place for SC ETV to purchase equipment necessary to install 7 repeaters across the state. The repeaters could reach the majority of 63 hospitals. The funding came from the Hospital Preparedness Program through our contracting partner, SC Educational Television (SC ETV). These installations were in the following cities or geographic areas: Beaufort (Whitehall), Charleston (CHS), Conway, Columbia (Conference Main), Florence, Greenville (GSP) and Orangeburg. Additional funding then allowed two additional UHF hub repeaters to be installed at Caesars Head and Charleston/Awandaw (SCHEART, 2008)

Figure 2. HAM repeaters installed in state.



Phase II of the SC HEART initiative was to expand the project by adding the second network of linked repeaters and the addition of a VHF radio based email network (Winlink 2000) and two additional repeater sites (Beech Island and Rock Hill) to fill in the gaps in the statewide coverage area.(SCHEART, 2008)

Phase III funding provides for wide area high-speed internet capability centered in metropolitan Charleston. The wireless data network will use the same amateur radio frequencies wireless internet communications during emergencies. The system will use a V-Sat data repeater operating on a 1.2 Ghz (128kb each) and will cover Charleston and the surrounding areas. When this phase is completed, the linked repeater system will have two analog voice channels, one on UHF to support Healthcare and hospitals, a VHF voice channel that can be used to link from Charleston to Columbia, and Greenville, a wide area high speed internet radio based email system to handle email messages.(SCHEART, 2008). These systems will give trained Amateur Radio Operators the ability to communicate in an emergency using proven technologies and will insure maximum equipment interoperability. This phase of the project was delayed due to conflicts with our contractor SC ETV, but will be finished by August 2009.

The Hospital Preparedness Program has also contracted with USC-CPHP to provide training for hospital personnel and public health personnel who are interested in becoming licensed HAM operators, and to use them in the time of emergencies. We have also contracted with the University to provide one on one assessment with the hospitals across the state to provide a list of equipment and installation needs for ham radio equipment. HAMS are also available to provide communication during drills, exercises, and real life incidents across the state. Each Sunday night, SCHEART provides an on air practice for any licensed HAM operator in the state to participate. This is intended to keep the skills of hospital employees, public health employees and first responders who normally do not operate or use HAM equipment, to stay current and practice using their equipment.

Conclusion:

Amateur Radio, often called “HAM radio,” works. It has been the one of the most reliable means of communication in emergencies when other systems failed or were overloaded. Most reliable is defined as the system that can withstand down power lines, no electricity, availability of equipment and volunteers who can respond during emergencies. Ham radio has been around since the late 1800’s, so it is not only reliable, but tested internationally. The National Hurricane Center in Florida relies on ham radio station, WX4NHC to receive reports in affected areas, and the National Weather Service also uses their “SKYWARN” program to get ground level reports of events that are missed by Doppler radar. Within minutes of September 11, 2001, ham radio operators communicated from emergency operation centers as other systems failed. The ham radio operations continued for weeks as the amateurs handled emergency and other important messages for disaster and government agencies as well as for displaced families. My state has also used HAM operators in several disasters throughout the years, especially during our hurricane season, which runs May 10 to November 1 each calendar year.

Our state has trained over 250 individuals from hospitals, public health, and first responders that have joined the 7,000 individuals in South Carolina who are already licensed HAM operators. Our state has invested over \$500,000 in funding for USC, SC ETV, and hospital contracts to purchase, install and train individuals and install repeaters across the state for the security of knowing they are linked by a statewide network that they can depend on even through the infrastructure can fail or be overloaded.

Our project is becoming popular and sought after nationally. In February 2008, a group of us were asked to speak at two breakout sessions at the National Public Health Preparedness Summit in Atlanta, GA. During these sessions, we described the role of each of our agencies and how the collaboration primarily came together to form an interoperable communication system primarily designed for hospitals, but has expanded to others now. This project has been a result of cooperation from ARES, Radio Amateur Civil Emergency System, Carolina Amateur Radio Emergency Services, City of Charleston, Medical University of South Carolina, National Weather Services, SC Educational Television, SC Emergency Management Division, SC Hospital Association, SC National Guard, USC-CPHP, York Technical College, SC Department of Health and Environmental Control and other local and state agencies and organizations.

As a result of the national exposure this project has had, recently the MECC (Metropolitan Emergency Communications Council) in Kansas City, Missouri has asked that we participate in a Simulate Emergency Test full scale exercise that is designed to exercise emergency communications. The exercise plan was designed by the Kansas City Metro Region with many partners. The exercise was originally scheduled for October 11, 2008, but has been rescheduled to December 2008. This exposure to utilizing HAM radio capability via multi state regions will showcase the ability of the HAM radio system to participate from states away, and still provide valuable input into the exercise. We are very excited about the possibility of being included in this full scale exercise. The advantages to HAM radio are endless, and now that the infrastructure is in place with equipment for individual hospitals, newly licensed operators, and repeaters, the system can operate as the mission intended: To strengthen the statewide

communication infrastructure using HAM radio as a source for communicating redundancy during public health emergencies.

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