SATERN IN THE 21rst CENTURY

GAREC 2014 Presentation – 14 August 2014- Huntsville, AL

ALM EMERGENCY DISASTER SERVICES

1.	**SATERN stands for The Salvation Army Team Emergency Radio Network. It is the amateur radio group that provides emergency communications for The Salvation Army. <Adv>**
2.	**SATERN is a part of The Salvation Army Emergency Disaster Services or EDS program. Its' purpose is to support The Salvation Army during times of emergency or disaster.** **<Adv> SATERN provides The Salvation Army with Health & Welfare message support,** **<Adv> tactical communications support at all levels and** **<Adv> technical support. <Adv>**
3.	**SATERN as we know it today was developed in 1988 by Maj. Pat McPherson to support The Salvation Army with emergency communications through amateur radio. <Adv>**
4.	**Throughout the majority of the last 10 years of the 20th Century, SATERN' focused on two primary modes of communication to accomplish its' mission. The first is the use of HF, mostly on SSB, for long range communications – primarily to pass Health & Welfare messages in and out of disaster-affected areas. This was never so apparent as during and immediately following the landfall of Hurricane Katrina on 29 August 2005. SATERN handled some 61,000 pieces of Health & Welfare message traffic. The picture on the right is two SATERN operators operating from my office in the first week after Hurricane Katrina. <Adv>**

DIVISIONAL HEADQUARTERS for ALABAMA – LOUISIANA - MISSISSIPPI
1450 Riverside Drive – P.O. Box 4857 – Jackson, MS 39296-4857 – Telephone (601) 969-7560 – Fax (601) 969-9077

5.	**SATERN has a number of HF SSB Nets. There is** **<Adv> An International SATERN Net that meets every day except Sunday at 1500 Z on 14.265.0 MHz. Each of five Salvation Army Territories in North America** **<Adv> - Eastern,** **<Adv> Southern,** **<Adv> Central,** **<Adv> Western USA and** **<Adv> Canada-Bermuda to our north – have a weekly Territorial SATERN Net. In addition,** **<Adv> Alaska has its own SATERN net due to its' distance from everyone else.** **<Adv> And even the four Territories in Australia have a single Australian SATERN Net. <Adv>**
6.	**The second primary mode used by SATERN throughout the final decade of the 20th Century is FM on VHF and UHF – primarily to provide local units or Incident Commands with tactical communications. There has also likely been some use of packet radio by SATERN in some local areas, but not on a large scale.** **<Adv>**
7.	**A number of local Corps, Area Commands and Divisions have established VHF or UHF nets, some of which use repeaters linked by either a UHF radio or internet backbone. <Adv>**
8.	**In addition to Emergency and Disaster communications, SATERN has also provided** **<Adv> communications and other support for Canteen operations including operating and driving the Canteens. In fact, about a fourth of my Twin Cities EDS Team was made up of SATERN members who took our three Canteens out to fires, SWAT Team actions, hazardous materials incidents, and natural disasters.** **<Adv> Some SATERN members also become involved in some of the non-disaster work of The Salvation Army including bell-ringing. <Adv>**

9.	**But as SATERN moved into the 21rst Century, it began to feel a need to add to its' capacity by beginning to embrace some of the new technology that is available. In fact, it is my personal belief that SATERN must embrace and use this technology if it wants to remain relevant to the increasingly advanced and complex emergency communications needs of The Salvation Army in the 21rst Century. <Adv>**
10.	**Understand clearly, this does NOT mean that the earlier modes of communications will no longer be used. By no means.** **<Adv> Long-range Health & Welfare SSB traffic on HF and** **<Adv> short-range FM tactical communications and** **<Adv> the many and varied nets that support those modes of communication will continue to exist and be an important part of SATERN's emergency communications "tool box". <Adv>**
11.	**But just a cursory glance at the technological advances made in equipment that we use on a daily basis tells us that we must keep up with the those advances or be left behind.** **<Adv> Look at cell phones that in just the 25 years of SATERN's existence have gone from simple flip phones to smartphone with more computing power than the personal PC's of 25 years ago.** **<Adv> Think about difference between your HF rig of 25 years ago which generally did the basics on the 5 major bands and compare that to the all-mode, all band radios of today.** **<Adv> Not to mention the glaring difference between the FM handheld "brick" of 1990 that used a thumbwheel to change frequencies on only one band and compare that to handhelds of today that have two and three bands and sometimes different modes.** **<Adv> And the internet. It barely existed 25 years ago and today we can't hardly live without it. <Adv>**
12.	**So lets' take a look at what SATERN is doing with the new technology of the 21rst Century. <Adv>**

13.	**IRLP developed in Canada in 1997. EchoLink was first released in 2002. Today EchoLink is one of the most popular linking protocols on the air with over 200,000 validated users in 151 countries worldwide.** **<Adv> SATERN does not have any IRLP or EchoLink systems of its own.** **<Adv> However, as mentioned previously, SATERN does use existing IRLP and EchoLink systems in some areas for its' work. For example, the SATERN group in Ontario, Canada, has an IRLP Net on Monday nights. There are several other groups that use EchoLink throughout the U.S. <Adv>**
14.	**I am personally fascinated by the possibilities that WinLink and WinMor present for SATERN and The Salvation Army. <Adv>**
15.	**I first saw WinLink in action during our response to Hurricane Katrina in 2005.** **<Adv> A ham from Texas came to me and offered to provide situation awareness from areas of the Mississippi Gulf Coast in which there were no communications whatsoever. I agreed and very quickly began to receive e-mails in my office on my computer telling me about the needs he was seeing in some of the most devastated areas; areas where entire towns had been completely wiped away by the storm surge. It was extremely impressive. <Adv>**
16.	**That experience convinced me that there is a place for WinLink and now WinMor in SATERN's emergency communications tool box.** **<Adv> Not only can it be used to provide situational awareness to our Incident Command teams in the field and our Emergency Operations Center in Jackson, but** **<Adv> it can also be used to very quickly provide simple e-mail support for a small Incident Command team in areas where communications have been disrupted.**

17.	**D-STAR has a lot of potential, but it also has some drawbacks.** **<Adv> D-STAR has the potential to provide linked communications between local repeaters via the internet. This allows our Technician Class licensees who do not have HF privileges to better participate and provide service. Through programs such as D-RATS, it also has the potential to for the passing of forms and other formal tactical and Health & Welfare communications. And that traffic can be passed at least semi-privately in that people with ordinary scanners cannot see the traffic; only others with both D-STAR and the appropriate software. Finally, I am intrigued by the possibilities presented by being able to access the internet through the 1.2 GHZ D-STAR system.** **<Adv> The drawback is that it is not very widely used throughout the country although there quite a few systems in my three state Division of Alabama, Louisiana and Mississippi. However, the equipment is expensive – particularly the 1.2 GHZ equipment and all of it requires higher-than average knowledge and expertise to program the system. It also requires a local infrastructure that can be disrupted during a disaster. <Adv>**
18.	**The digital modes also have potential, especially for Health & Welfare and Incident Command support. There is also some potential to assist with situation awareness. And like many of the other digital modes we've already discussed, the messages can be printed out, passed on to the addressee and saved for future reference. It also leads to less error in the reception of traffic.** **<Adv> The Southern Territory has established a SATERN Digi-net on 20 meters that is quickly becoming nationally recognized and used throughout the country. <Adv>**
19.	**The most common forms of communication within The Salvation Army are telephones – both landline and, increasingly more common, cell phones – and e-mail – whether it is from one's office or home computer or nowadays, by smart phone. Hurricane Katrina was very much a "wake up" call for The Salvation Army about the need for redundant communications, including satellite-based internet & VoIP telephones. <Adv>**

ALM EMERGENCY DISASTER SERVICES

20.	**As mentioned previously, the Southern Territory has 3 Satellite Tech Packs.** **<Adv> They are assigned to our Divisional Headquarters in North Carolina, Florida and Oklahoma.** **<Adv> They are a very basic unit consisting of a 0.95 meter dish, a satellite receiver, a small 2 KW generator, and a tropos unit on a pole. There are not any radios involved – just a satellite dish to** **<Adv> provide satellite-based internet and VoIP telephone service** **<Adv> to a small Incident Command Team deployed to an area where communications are poor or non-existent. In fact, the last use of one of these Tech Packs was in rural Alabama following the April 27 2011 tornado outbreak to support a small IMAT for just that purpose.** **<Adv> Although they each come with a trailer, the entire package can easily be shipped via a common carrier such as UPS or FedEx or bus if necessary. <Adv>**
21.	**In 2006 Raytheon donated 2 Emergency Communications Vehicles to The Salvation Army. The Western Territory received 1 and the Southern Territory received the other. The vehicle was initially designed to be used as a short-term emergency communications vehicle that would provide interoperability amongst a variety of communications modes and equipment with the ACU-1000 installed in the vehicle. A number of EDS Directors, two of whom were also Divisional SATERN Coordinators were invited to be trained on the use of the vehicle. <Adv>**
22.	**During the training, it was decided that, although the vehicle was adequate for its' original purpose, it was inadequate for our use. With only a small space for one person in the area where the back seat once was, plus standing room under the rear hatch door, it would be too uncomfortable and impractical for the long-term events The Salvation Army is normally called upon to respond to in the Southern Territory. <Adv>**

ALM EMERGENCY DISASTER SERVICES

23.	**As a result, the Southern Territory decided to design a Satellite / Radio Communications Trailer that utilized the vehicle's communications equipment as well as additional equipment, including amateur radio and business band equipment. A committee of EDS Directors and SATERN representatives spent several months discussing and designing the trailer's capabilities. <Adv>**
24.	**Additional new features included an easy-to-operate self-deploying 1.2 meter satellite dish capable of providing what amounts to the equivalent of a T-1 line to support a large Incident Command Team** **<Adv> with 10 or more computers and 10 or more VoIP telephones simultaneously. To accomplish this,** **<Adv> satellite equipment in the donated Suburban was removed and installed in the Communications Trailer. <Adv>**
25.	**The design team also included a 30 foot pneumatic mast to hold** **<Adv> a Tropos WiFi unit capable of broadcasting a WiFi signal for up to a quarter mile,** **<Adv> several VHF and UHF antennas, including** **<Adv> an antenna for the UHF business band repeater used to provide communications for our mobile feeding units and command staff.** **<Adv> It can also serve as a center pole for a variety of different kinds of HF long-wire antennas such as a dipole or G5RV. <Adv>**
26.	**<Adv> The design committee also had two 25 foot telescoping poles installed to** **<Adv> support a HF vertical and** **<Adv> other antennas or equipment as needed. <Adv>**

ALM EMERGENCY DISASTER SERVICES

27.	**In addition to the satellite receiver rack, the vehicle had a radio rack containing four VHF and UHF public safety radios and an ACU-1000 with its' power supply and rack-mounted computer. <Adv> The radio rack was also moved from the Suburban to the Communications Trailer.** **<Adv> The design committee then added a VHF / UHF dual-band transceiver and a D-STAR transceiver,** **<Adv> an antenna patch panel giving the operator the flexibility of patching any antenna position on the trailer into any radio** **<Adv> a TS-2000 and Rigblaster to provide HF SSB and digital communications. <Adv>**
28.	**The entire unit is powered by a 20 KW diesel generator with 90 gallons of fuel capable of keeping the trailer operating 24 hours a day for a full week. In fact, on its' very first deployment for Hurricane Ike in 2008, it was necessary for the trailer to be operated at just that kind of a schedule.** **<Adv> However, the generator provides much more power than the trailer needs, making it possible to power other units. Several times, we have connected an office trailer to the generator. This allowed the trailer to provide both communications – telephone and internet / e-mail - as well as power to the office trailer being used as a Command Post or Social services station.** **<Adv> As a result, the Communications Trailer has become one of the most deployed and versatile communications packages in the Southern Territory. <Adv>**
29.	**During Hurricane Katrina, it was difficult finding operators who could be at our HQ to operate a SATERN station. Most hams in our area were already committed to other communications work or busy helping their own families recover. However, there were plenty of operators from outside of the affected area. But to help, they had to travel to us which took several days to organize and accomplish. And they had to be housed and fed by us – at great expense. The operators shown above came from Ohio to help at HQ. Others came from New York, Texas, Alabama and other places from around the country. All at great time and expense. <Adv>**

ALM EMERGENCY DISASTER SERVICES

30.	**SATERN in the Southern Territory has grown since Hurricane Katrina.** **<Adv> As mentioned earlier, SATERN has its' own HF SSB Net and HF Digi-Net on Saturdays.** **<Adv> And there are SATERN operators willing to be Net Control Operators, but** **<Adv> they are scattered across 15 states,** **<Adv> often with very small stations** **<Adv> and weak signals. <Adv>**
31.	**The solution: A state-of-the-art, high-power amateur radio station – now with the call sign of WB5ALM - that can be completely remotely controlled over the internet. <Adv>**
32.	**There were 4 primary goals in building the station.** **1. To support The Salvation Army with emergency communications** **2. To compliment the capabilities of the Southern Territory Communications Trailer** **3. To provide a station likely to remain "on-the-air" in spite of a catastrophic event. <Adv>**
33.	**4. To provide a completely remotely controllable state-of-the-art amateur radio station that would:** **a. Relieve the need of being dependent upon only local amateur radio operators for emergency operations** **b. Relieve the need for on-site station control.** **c. Support SATERN Net Control Operators throughout the Southern Territory who have low-powered and / or distant stations with a high-power, state-of-the-art station that is centrally located in both the Southern Territory and Alabama-Louisiana-Mississippi or ALM Division. <Adv>**

ALM EMERGENCY DISASTER SERVICES

34.	**The station is located at the ALM Divisional Emergency Disaster Services Center in Jackson, MS. It is centrally located for both <Adv> the Southern Territory and <Adv> the Alabama-Louisiana-Mississippi or ALM Division. <Adv>**
35.	**The entire 6 acre complex has emergency back-up power provided by an 80 KW natural gas generator. <Adv>**
36.	**The station itself consists of a <Adv> TS-2000 HF / VHF / UHF transceiver that <Adv> provides 100 watts on HF and VHF and 50 watts on UHF. <Adv> It is totally remotely controllable and <Adv> was provide to us by a generous business donor. <Adv>**
37.	**We wanted to insure that we would be heard even under the most difficult conditions, so we included <Adv> an RF Concepts Alpha 9500 amplifier <Adv> capable of delivering 1,500 watts on HF. <Adv> Yes, it is expensive, but <Adv> it was the only amplifier on the market at that time that could be completely remotely controlled. <Adv> It also provided us with remotely controlled antenna switching capabilities for up to four antennas. <Adv>**
38.	**As a bonus, the Alpha 9500 amplifier came with <Adv> a FREE RF Concepts Alpha 2000 dummy load <Adv> capable of handling up to 6,000 watts. <Adv> Did I mention it was FREE? <Adv> It was an unexpected bonus addition to the station that has proven to be very useful at times. <Adv>**

39.	**Because we have beam antennas, which we'll discuss in just a moment, we needed a rotor and rotor controller that was capable of being remotely controlled.** **<Adv> We chose the Yaesu G-1000DXA and** **<Adv> its companion Yaesu GS-232B remote control unit. <Adv>**
40.	**Each week the Southern Territory SATERN Digi-Net is controlled from this station. For digital communications we use** **<Adv> the West Mountain Radio Rigblaster Advantage which not only provides us the necessary capabilities for all forms of digital communications,** **<Adv> but also provides a handy path for remotely controlling the Yaesu TS-2000. <Adv>**
41.	**For our D-STAR communications we installed** **<Adv> an ICOM ID-800H** **<Adv> with 50 watts of power on VHF/ UHF.** **<Adv> It also gives us redundant VHF and UHF capabilities.** **<Adv> This is the only radio is that is not remotely controlled. <Adv>**
42.	**Most radio stations are only as good as their antennas. For antennas, we installed** **<Adv> a 30 foot Universal tower with** **<Adv> a Force 12 Tri-Band beam for 20, 15 and 10 meters.** **<Adv> For the lower 75 and 40 meter bands we have separate home-brewed dipoles and** **<Adv> 11 element beams for both 2 meters and 70 cms.** **<Adv> We also have a Hy-Gain AT-680 All-Band Vertical as a backup antenna.** **<Adv> All of these antennas can be accessed remotely through the Alpha 9500's antenna switch. <Adv>**

43.	**You can't do digital communications or remote control without a computer and software.** **<Adv> The computer is an older Hp laptop that was purchased shortly after Hurricane Katrina. As I designed this station I quickly realized that I didn't need, and couldn't justify the expense of, a new state-of-the-art computer.** **<Adv> I use the Ham Radio Deluxe program to control the TS-2000 transceiver.** **<Adv> The Alpha 9500 amplifier has its' own manufacturer specific control program that works very well.** **<Adv> All of the digital modes except WinMore are provided by fldigi . We use RMS Express for WinMor.** **<Adv> To access the entire system remotely, we use TeamViewer. <Adv>**
44.	**The WB5ALM remote control station has become a critical part of our emergency communications infrastructure. It is being used to not only support our weekly Territorial SSB and Digi-Net, but is also being used to occasionally support the International SATERN Net as an as-needed Net Control station as well as some of the local 75 meter traffic nets in the ALM Division including a weekly stint as Net Control for the Mississippi Phone Net on Tuesday evenings. <Adv>**
45.	**In summary, SATERN has begun to embrace some of the new technology available to it in the 21rst Century. But, particularly in the realm of the newer digital modes, SATERN has only just begun to utilize those capabilities. It will take time, work and an increased number of dedicated and knowledgeable SATERN volunteers to implement all of this new technology. However, I believe that it will become increasingly important to The Salvation Army' as more SATERN members take a lead in developing better ways of using these modes to meet the emergency communications needs of The Salvation Army.<Adv>**

46.	**If you want a copy of this program, it is downloadable from my dropbox at** **https://www.dropbox.com/s/4fj8ryoutjfnsxw/GAREC%20-%202014.ppt** **The script can be downloaded at:** **https://www.dropbox.com/s/hxj6kqa3b0rqbmq/GAREC%20-%202014%20-%20Script.doc** **I can also be reached by phone or e-mail as shown.**

ALM EMERGENCY DISASTER SERVICES