



LOUISIANA TOTALLY
INTEROPERABLE
ENVIRONMENT

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Interoperability Overview

Communications interoperability refers to the ability of emergency service agencies to communicate across disciplines and jurisdictions via wireless networks to exchange real time voice and data information. Initial widespread attention was given to communications interoperability after the terrorist attacks in 2001. The Louisiana State Police (LSP) has been working diligently over the past several years to assemble a statewide interoperable communications system, but our efforts continue to be hampered by the lack of funding. The importance of interoperable communications in Louisiana was reinforced during disaster mitigation efforts following Hurricanes Katrina and Rita. A vast number of federal, state and local agencies responded to this disaster; however, their efforts were hindered by inadequate and impaired communication infrastructure.

The *National Strategy for Homeland Security* and the *Louisiana Homeland Security Strategy* identify Emergency Preparedness and Response as a critical mission area. A major initiative in both strategies is to “enable seamless communication among all responders” and improve “information sharing and systems.” As we witnessed during the recent events, these initiatives are critical for the safety of the people in Louisiana, and for the safety of those emergency service personnel responding to critical incidents.

Expansion Limitations

The Louisiana State Police presently operates a statewide analog wireless communications system which was initially installed for voice communications (last upgraded in 1996). This system is presently used by approximately 70 agencies with over 10,000 subscriber users. The system’s infrastructure consists of 46 tower sites and 28 dispatch consoles. Continued use of the current system is limited by four major factors:

1. Expansion of Sites – The technology used on the present system does not allow for additional tower sites due to port limitations. The zone controller is at maximum site capacity, thus eliminating the possibility of improvement in coverage. The system’s capacity is maximized at forty six (46) tower sites without expansion capability.
2. System Capacity – The state’s current 800 MHz communication system was initially designed to be utilized only by state users. The system is currently operating at maximum capacity and now accommodates 70 state and local agencies. The addition of any other agencies would overburden the state’s communication system which would result in unreliable performance.
3. The current system was designed and built for mobile radio coverage. This severely limits adequate hand-held portable and in-building coverage for users.
4. The state’s communication system is near the end of its service life. Motorola is no longer offering upgraded technology or repeaters, and will discontinue technical support in approximately one year.

Technological advances in the law enforcement field have progressed rapidly since September 11, 2001. These advancements make the need for reliable data communication just as vital as the need for voice communication. The Louisiana State Police patrol units are currently equipped with mobile data computers and video cameras. Receiving data imagery from the patrol units over a wireless network is restricted because of the current bandwidth limitations. Computer modem and infrastructure limitations make it virtually impossible for officers in the field to exchange information such as images, fingerprints and databases. Currently, there is no means of increasing the bandwidth capacity in the 800 MHz range; however, the Federal Communications Commission (FCC) has allocated high capacity bandwidth in the 700 MHz range for emergency services use.

Communications Failures During Hurricane Katrina

The devastation caused by Hurricane Katrina severely hampered the ability of emergency responders operating on the state system to communicate with other emergency services personnel. In addition, communications systems maintained by local governments also suffered severe and debilitating damage. This further restricted communications between emergency responders; however, the state's communication system did provide limited communication between responders through the use of mutual aid channels.

In the current system, the state communication towers are linked by T-1 lines (land telephone lines). Several of these T-1 lines were damaged by water and wind, limiting the communications range of the tower. When a tower loses its T-1 connection, communications are limited specifically to personnel only within that tower's coverage area. When T-1 lines were lost during Hurricane Katrina, first responders were only able to communicate with other first responders within that tower area. Additionally, these emergency responders were unable to communicate with others outside of the tower's coverage area.

The equipment located at the communications towers is dependent on electricity. During Hurricane Katrina, the power supply was lost and emergency power was supplied to the towers by generators. Although a substantial supply of fuel was available at each tower site to operate the generators, re-fueling efforts were hampered by debris and flood waters. Most often, loss of power at these towers resulted in a loss in the ability to communicate in that area.

Many of the commercial communications towers were also damaged or destroyed by Hurricane Katrina, which limited the use of cellular telephones for communication. Repair of the commercial tower sites was arduous, rendering this back-up option unfeasible in the days immediately following Hurricane Katrina. As repairs were made to the commercial tower sites, cellular telephone communications was slowly restored.

Portable satellite telephones were delivered to several troop headquarters in the effected area; however, heavy cloud coverage and system inundation limited their effectiveness. Internet service was also interrupted in the effected area because of damage to the hardware supporting this service and loss of power.

The communication infrastructures in Jefferson, Plaquemines, St. Bernard and Orleans Parishes were some of the most severely damaged. Many first responders in these areas relied on mutual aid channels to communicate. Additionally, the State Police mobile transmitter site was deployed in New Orleans to provide an additional communications capability.

Connectivity between the state system and the New Orleans system is currently being provided by the use of an ACU1000. While this does allow voice communications between state and local emergency responders, it does not provide true interoperability.

The Plaquemines Parish tower location in Buras, which is utilized by the state system, suffered damage from both wind and water. State personnel restored communications in this area by installing temporary communications repeaters. State personnel restored communications in St. Bernard Parish through the installation of a temporary transmitter site along with 330 portable radios for local use.

State Police technicians programmed and enabled hundreds of radios for various agencies to aid in the restoration of communications. Over 800 of these radios were added in the first week alone. In particular, this significantly expanded the National Guard's and Coast Guard's communications capabilities in the effected areas.

Department of Public Safety personnel also provided assistance to a large number of local agencies in the effected area to assist in the restoration of their communication systems. This support included deploying radios and installing temporary repeaters. In addition, DPS provided parts and accessories, emergency microwave connectivity, cellular telephones and satellite telephones.

Communications Failures During Hurricane Rita

Assets such as satellite network links, supplemental radios, cellular telephones and generators were deployed with necessary personnel in numerous southwest parishes. Cameron Parish communications was affected drastically due to wind and flooding. The Hackberry and Rockefeller tower sites suffered severe damage. The Rockefeller tower site sustained heavy damage to the guy wires and antenna structure. The Hackberry site was flooded and inaccessible. The Rockefeller site was repaired and re-connected to the state network using spread spectrum microwave dishes while the Hackberry site required six days to access, remove flooded equipment, provide temporary generator power and install repeaters.

The LSP worked closely with other agencies, specifically Cameron Parish, to provide programming assistance for their emergency personnel.

Re-banding of 800 MHz Spectrum and 700 MHz Communication System Overview

The FCC has mandated a realignment (rebanding) of the 800 MHz band to keep Nextel and other cellular operations from interfering with public safety radio transmissions. Interference in the public safety 800 MHz spectrum generally occurs because public safety channels are intermingled with commercial channels such as those used for cell telephones. The FCC rebanding project affects all users of 800 MHz equipment. In the FCC ruling, the FCC mandated that all 800 MHz licensees move to an alternate frequency in the event their current communications operate between 806.00 / 851.00 to 809.00 / 854.75 MHz and 821 / 866 to 824 / 869 MHz. LSP currently operates in the 806 and 821 MHz frequencies and will be required to undergo re-banding.

The FCC re-banding agreement with Nextel is designed to provide an effective and equitable solution with minimum disruptions to first responders utilizing 800 MHz networks. Nextel has agreed to reimburse responder entities throughout the country a maximum of 2.5 billion dollars for the following:

1. Inventorying Subscriber Equipment and Infrastructure Facilities
2. Evaluating Proposed Frequencies to be Re-banded
3. Defining the Interoperability Environment as it Relates to Re-banding
4. Equipment Costs Required for Reconfiguration, Including Returning, Reprogramming, and Replacement (where necessary)
5. Filing FCC Applications
6. Installation, Testing, and Engineering Associated with Reconfiguration
7. Legal Fees Associated with Negotiating Reconfiguration Contracts with Nextel
8. Preparing a Cost Estimate and a Statement of Work (when necessary) for Reconfiguration Implementation
9. Activities of Licensee Personnel Performing Reconfiguration and Associated Planning Activities

The expenses associated with re-banding could be several million dollars for LSP alone, and tens of millions for other local responders statewide utilizing 800 MHz spectrum.

In addition, the FCC has designated a portion of the 700 MHz spectrum be set aside specifically for use by the public safety community. This designation will ultimately eliminate the competition for frequencies between the emergency services community and the commercial users that is currently occurring on the 800 MHz system. Upgrading the State's current communication system to the 700 MHz spectrum will alleviate the congestion that plagued us during the Hurricanes.

The FCC rules for the 700 MHz band also ensure that all radios operating within the 700 MHz band will include designated interoperability channels and a common digital interoperability standard (Project 25). Project 25 (P25) is the standard for interoperable digital two-way wireless communications products and systems. Developed under state, local and federal government guidance and Telecommunications Industry Association (TIA) governance, P25 is gaining worldwide acceptance for public safety, security, public service, and commercial applications. The published P25 standards suite is administered by the TIA in their Mobile and Personal Private Radio Standards

Committee. Equipment that demonstrates compliance with P25 is able to meet a set of minimum requirements to fit the needs of public safety. These include the ability to interoperate with other P25 equipment so that users on different systems can talk via direct radio contact.

Upgrading the statewide communication system to the 700 MHz frequency will deliver a wireless network with much greater bandwidth that will support full voice, data, and imagery interoperability. This upgrade will benefit all of Louisiana's emergency services agencies including EMS, Police and Sheriff's Departments, Fire Departments, 911/Communication Operators, Public Health and Hospitals, Public Works, Federal Agencies, Louisiana National Guard, and Key State Government Executive Staff.

Interim Interoperability Solutions

LSP has purchased five ACU1000 devices to aid in the state's interoperability endeavor. These devices have been installed at the LSP Troops located in Shreveport, New Orleans, Lake Charles, and Covington and will allow multiple agencies to communicate with each other on a common channel. The ACU-1000 has 12 ports, which means 12 radios can be connected together, utilizing a common channel. In theory, this would allow 12 different agencies to be connected simultaneously to the same channel.

Immediately following Hurricane Katrina, LSP officials met with FEMA in an effort to coordinate the emergency implementation of a 700 MHz communications network. In response to requests by LSP officials, FEMA issued a purchase order to Motorola for \$15.9 million to repair and augment the current infrastructure in the effected area. This included the construction and upgrade of 19 communications tower sites in southeast Louisiana. Currently, 13 of these sites are fully operational, with work and funding still pending on the remainder. Further enhancement of the statewide network is needed to move all first responders to a statewide 700 MHz system.

In addition, FEMA has funded a \$5 million purchase of mobile and portable radios for St. Bernard and Plaquemines Parishes which will utilize the state's 700 MHz communications system. Orleans Parish has applied to FEMA for \$20 million to purchase mobile and portable radios, also for use on the 700 MHz network.

Although Nextel telephones were utilized during the hurricanes, they have limited capabilities and are less reliable than conventional public safety networks. The commercial cellular telephone providers concentrate their infrastructure in the metropolitan areas and are unlikely to expand to the rural areas because of the limited population base. Because commercial companies are profit driven, statewide cellular coverage is unlikely. Like all the land mobile systems, these telephones rely on the public network which leaves us at the mercy of the commercial vendor's coverage areas.

Permanent Interoperability Solutions

Louisiana State Police initiated an attempt at full state wide interoperability for all emergency service users in early 2004. This effort is named Louisiana Totally Interoperable Environment, or LATIE, and is an attempt to create a single statewide architecture to support all state, local, federal, and military emergency service personnel, providing sufficient bandwidth to facilitate voice, data, and imagery interoperability for each user. The statewide network would support all users by regions with user autonomy in each region while providing an open standard, open architecture to permit statewide interoperability for each user. The need for this was proven in the recent hurricane season when emergency responders from all over the state and nation poured into the affected areas and were unable to communicate over local communication systems which were not only disable, but were incompatible with systems other than their own.

Using the newly allocated 700MHz and 4.9GHz spectrums, Louisiana's emergency services community can achieve full interoperability within a secured and assured robust network with sufficient and expandable coverage and capacity. Once implemented, the network, and user capabilities can be upgraded in small parts as technology advances provide new capabilities.

Conclusion

To achieve the foregoing interoperable environment, all emergency service agencies must set aside their desires for duplicitous, expensive, and diverse stand alone systems and become part of a single emergency response communications system. The acquisition of a statewide system will be expensive, but much more cost effective over time in terms of operation costs and delivery of public safety services. In the post 911 and post Katrina environment which has been thrust upon us, we can do nothing less than pool our resources for a common solution.

**OFFICE OF STATE POLICE
NEW STATEWIDE COMMUNICATIONS PROJECT
ESTIMATED EXPENDITURES**

INITIAL ACQUISITION COST			
Upgrade from 800 MHz to 700 MHz (113 sites)			\$ 92,619,927
Towers and Buildings (45 Sites)			\$ 18,600,000
Microwave Connection (113 Connections)			\$ 22,600,000
Consoles (200 two position consoles)			<u>\$ 52,517,200</u>
		Total Voice Infrastructure	\$186,337,127
Broadband coverage for metropolitan areas (Hotspots)			\$ 4,700,000
Mobile Data Applications (Central Hardware and Software)			\$ 3,000,000
In Building enhancement coverage (Superdome, State Capitol etc.)			\$ 3,000,000
Installation of T-1 lines			\$ 500,000
Three tactical emergency command posts to support all agencies during critical incidents			\$ 2,000,000
Contingency, Testing, and Training			<u>\$ 5,500,000</u>
		Total DATA and other Misc.	\$18,700,000
State Subscriber Units	Units	Unit Price	
Portables	6136	\$5,372	\$32,962,592
Mobiles	2912	\$5,044	\$14,688,128
Data Modems	810	\$2,250	\$ 1,822,500
Mobile Data Computers	810	\$4,500	\$ 3,645,000
Control Stations	50	\$4,000	<u>\$ 200,000</u>
		Total State Units	\$ 53,318,220
Local Subscriber Units	Units	Unit Price	
Portables	37266	\$5,372	\$200,192,952
Mobiles	16446	\$5,044	\$ 82,953,624
Data Modems	1380	\$2,250	\$ 3,105,000
Mobile Data Computers	835	\$4,500	\$ 3,757,500
Control Stations	1079	\$4,000	<u>\$ 4,316,000</u>
		Total Local Units	\$294,325,076
TOTAL ACQUISITION COST			\$552,680,423

RECURRING EXPENDITURES

Salaries (five additional employees)	<u>\$ 250,000</u>
TOTAL Salaries	\$ 250,000
O/C - Operating Services	
Utilities	\$ 400,000
Site Maintenance	\$ 60,000
Rent for Tower Site	\$ 250,000
UPS Battery Backup	<u>\$ 40,000</u>
TOTAL O/C - Operating Services	\$ 750,000
O/C - Supplies	
Fuel for Generators	<u>\$ 100,000</u>
TOTAL O/C - Supplies	\$ 100,000
O/C - Professional Services	
Maintenance service agreement	<u>\$ 5,000,000</u>
TOTAL O/C - Professional Services	\$ 5,000,000
O/C - IAT	
OTM (Rental of T-1 and Fiber Lines)	<u>\$ 3,000,000</u>
TOTAL O/C - IAT	\$ 3,000,000
Major Repairs and Tower Enhancement	
Buildings	\$ 50,000
Tower Enhancement	<u>\$ 1,000,000</u>
TOTAL Major Repairs	\$ 1,050,000
TOTAL RECURRING OPERATING COSTS	\$10,150,000
**TOTAL STATEWIDE COMMUNICATION EXPENDITURES	\$562,830,423

****Total expenditures does not include FEMA funding for 700 MHz system and subscriber units for St. Bernard and Plaquemine Parishes.**

Interoperability Funding Initiatives

COPS Grant – (the State of Louisiana is not eligible to receive this funding)

The City of New Orleans received a FY03 Federal COPS Interoperable Communications Technology Grant with an award amount of \$5,510,412 and a local cash match of \$1,836,804 to support the Louisiana Department of Homeland Security Urban Area Security Initiative (UASI) Louisiana Region 1 area (Orleans, Jefferson, Plaquemines and St. Bernard Parishes). This funding will support a communication system in that area; however, that system will not support the state's infrastructure. This plan will satisfy the daily operational communications requirements through resolution of coverage area and equipment obsolescence issues and establish an 800 MHz network that is upgradeable to the Association of Public-Safety Communications Officials (APCO) Project 25 standard. The interoperability achieved by this proposal meets the needs of the region at this time. The Communications Interoperability Committee understands that migration to federal standard APCO compliancy will bring interoperability on a national level.

Due to Hurricane Katrina, it is questionable whether the cash match can be funded to secure the grant. Therefore, the region is requesting that the cash match be waived and additional funds be awarded to make the grant whole. Furthermore, if the City of New Orleans receives additional funds from FEMA to purchase radios compatible with the 700 MHz system, UASI Region 1 will consider utilizing grant funds to integrate into the current 700 MHz radio system.

In addition to the Region 1 COPS Grant received by New Orleans, Baton Rouge has received a Region 2 COPS Grant of \$5,999,184 and a local cash match of \$1,999,728 to be used for interoperability.

Department of Homeland Security – Office for Domestic Preparedness Grants

The Department of Homeland Security through the Office for Domestic Preparedness (ODP) awarded the State of Louisiana the following homeland security grants for the prevention and response to terrorism.

Eligible categories include management and administration, training, planning, exercises, and equipment procurement. The focus for Louisiana has been upon enhancing the capabilities of state and local first responders to prevent and respond to Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) related incidents.

Also a priority, interoperable communications has received \$15,906,999 of ODP funding in Louisiana.

ODP Grant Dollars Awarded to Louisiana and Expended on Interoperability

ODP Grant Name	Total Funding Amount	Interoperability Expenditures To Date	Percent Interoperability Expenditures
FY 1999	904,000	198,156	21.9%
FY 2000	1,175,000	308,526	26.3%
FY 2001	1,228,000	182,009	14.8%
FY 2002	5,331,000	1,289,581	24.2%
FY 2003 I	9,451,000	2,177,141	23.0%
FY 2003 II	21,698,692	5,803,437	26.7%
FY 2003 UASI NO	6,228,661	2,599,092	41.7%
FY 2004 SHSP	27,951,001	2,184,997	7.8%
FY 2004 LETPP	8,296,000	1,078,765	13.0%
FY 2004 UASI NO	7,110,625	74,601	1.0%
FY 2004 UASI BR	7,151,362	10,693	0.1%
FY 2005 HSGP	17,579,253	-	0.0%
FY 2005 LETPP	6,428,817	-	0.0%
FY 2005 UASI NO	9,305,180	-	0.0%
FY 2005 UASI BR	5,226,495	-	0.0%
FY 2006 HSGP est.	10,990,600	-	0.0%
FY 2006 LETPP est.	6,400,000	-	0.0%
FY 2006 UASI est.	17,907,500	-	0.0%
	170,363,186	15,906,999	9.3%

Remaining ODP Grant Dollars Awarded to Louisiana (State and Local Awards)

ODP Grant Name	Total Funding	Dedicated Equipment Funding	Remaining Equipment Funding	Percent Remaining
FY 1999	904,000	904,000	-	0.0%
FY 2000	1,175,000	1,175,000	-	0.0%
FY 2001	1,228,000	1,228,000	-	0.0%
FY 2002	5,331,000	5,331,000	-	0.0%
FY 2003 I	9,451,000	6,865,570	-	0.0%
FY 2003 II	21,698,692	17,346,481	1,395,947	8.0%
FY 2003 UASI NO	6,228,661	5,501,630	974,604	17.7%
FY 2004 SHSP	27,951,001	20,987,328	15,542,367	74.1%
FY 2004 LETPP	8,296,000	8,104,830	2,844,963	35.1%
FY 2004 UASI NO	7,110,625	4,766,764	4,289,305	90.0%
FY 2004 UASI BR	7,151,362	3,522,872	3,220,631	91.4%
FY 2005 HSGP	17,579,253	13,281,581	13,281,581	100.0%
FY 2005 LETPP	6,428,817	6,233,476	6,233,476	100.0%
FY 2005 UASI NO	9,305,180	7,444,144	7,444,144	100.0%
FY 2005 UASI BR	5,226,495	4,181,196	4,181,196	100.0%
FY 2006 HSGP est.	10,990,600	8,792,480	8,792,480	100.0%
FY 2006 LETPP est.	6,400,000	5,120,000	5,120,000	100.0%
FY 2006 UASI est.	17,907,500	14,326,000	14,326,000	100.0%
	170,363,186	135,112,352	87,646,694	64.9%