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**Federal Communications Commission
Independent Panel
Reviewing Impact of Hurricane Katrina
on Communications Networks**

Jackson, Mississippi
March 6, 2006

Hurricane Katrina – Lessons Learned
For Emergency Communications

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“People plan for a **disaster**, and we have them frequently. However, Katrina was a **catastrophe**. She brought different challenges than the Florida hurricanes in 2004.”

Sheriff Kevin Beary, Orange County, Florida
FCC Hurricane Katrina Independent Panel, January 30, 2006

Hurricane Katrina - Lessons Learned
For Emergency Communications

Although Public Safety communications are delivered in a number of ways, most agencies rely upon their traditional government owned or leased land mobile radio systems. Such systems are usually built to plan for unusual stresses. Public Safety also relies upon commercial cellular type services, and to a smaller degree on satellite communications, for supplemental or back up communications services, but unfortunately those services are not always reliable when public safety needs them the most.

Hurricane Katrina - Lessons Learned
For Emergency Communications

PRIORITY # 1

Reliable Agency Specific Voice Communications

Public Safety mission critical every day voice communications

PRIORITY # 2

Reliable InterAgency Voice Communications

This is what we commonly refer to as “Interoperability”

PRIORITY # 3

Reliable Data Communications

There is an increasing need for Public Safety to have access to secure text messaging, documents, photographs, diagrams, streaming video

Hurricane Katrina - Lessons Learned
For Emergency Communications

Reliable means whenever public safety personnel need to communicate that **it works** !!!!

1. They can reach the intended target directly or through a radio tower & base station or repeater
2. There is an available radio channel
3. The radio has power

This is true at all times and not just during disasters or catastrophes

Hurricane Katrina - Lessons Learned For Emergency Communications

Reliable means that public safety must plan for

1. Every day peak service times and large incidents
2. Radio system disruptions such as power outages, tower failures, system interconnect failures
3. Personal radio equipment failures
(electrical/mechanical problems, battery failure, etc.)
4. Catastrophic wide area failures of almost everything

Hurricane Katrina - Lessons Learned For Emergency Communications

Public Safety has traditionally planned for short term events/disasters – not long term widespread catastrophes

Five outcomes from Katrina stand out in the reports so far:

1. **Tower/Infrastructure Failures**
2. **Power Failures**
Tower Sites, Dispatch Centers, Portable Radio Batteries
3. **Public Switched Telephone Network (PSTN) and Network Infrastructure Failures** (landline & microwave)
4. **Public Safety personnel issues**
5. **Need for deployable systems**

Hurricane Katrina - Lessons Learned For Emergency Communications

1. Tower/Infrastructure Failures

Most Public Safety radio systems are designed to account for the possibility of a single tower site failure, resulting from the loss of the actual tower, the failure of a base station or repeater, and/or loss of commercial power. In the case of Hurricane Katrina, the affected area (parts of 4 states) was equal to the size of Great Britain, about 90,000 square miles.

When many or all tower sites are damaged or destroyed as the result of a catastrophic event, contingency plans must be in place to quickly install temporary alternative Public Safety communications.

Such plans must include prior arrangements for bringing in temporary self-contained communications systems including power generating equipment that will enable delivery of basic communications services

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2. Power Failures

For Tower Sites and Dispatch Centers, most Public Safety agencies plan for power failures, but generally those plans are for 24-48 hours of outage rather than several days or weeks. Generators are usually powered by gasoline, diesel, natural gas, or propane. Soon after Hurricane Katrina struck it was realized that fuel supplies were not readily available and the natural gas supply was disrupted

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2. Power Failures

Public Safety uses rechargeable portable radio batteries that are limited to 8-10 hour duty cycles. Throwing away batteries are costly and have limited storage or shelf life.

In many cases the portable radio charging units were either destroyed or there was no generating power to power the chargers. With no way to charge the batteries the portable radio units became useless.

Satellite services (SatCom) were also utilized where traditional land mobile services were out of service but the same issues applied to hand held satellite units when they did not have batteries to power the units.

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3. Public Switched Telephone Network (PSTN) & Network Infrastructure Failures (Landline & Microwave)

The failure of the PSTN created massive outages in Public Safety land mobile communications networks and 911 services. Most land mobile systems depend on interconnection through the PSTN or by microwave links, many of which were destroyed or out of power and inoperable.

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4. Public Safety personnel issues

The failure to plan for personnel problems resulting from a disaster or a catastrophic event like Katrina is a major problem.

Public Safety has to be prepared to support their personnel in first assuring that their families are out of harm's way. This is essential if they are to be expected to attend to their public safety functions.

There must be plans to feed, clothe and house personnel during and after disasters and catastrophic events.

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5. Need for deployable communications systems

We need deployable systems that can be brought into an area where communications infrastructure is inoperable or has been destroyed.

Commercial services do have what are known as Cellular Systems on Wheels (COWS) but in large scale catastrophes like Katrina there are simply not enough of them and we need similar deployable systems that are available to replace traditional public safety communications.

Hurricane Katrina - Lessons Learned For Emergency Communications

The lessons learned can easily apply to any short term disaster or long term catastrophic event, whether a natural disaster such as a hurricane, tornado, flood, forest fire, earthquake, or a terrorist attack such as the events of 9/11.

The lessons tell us to be prepared for more than the short time outages that we have traditionally planned for



Chief Harlin R. McEwen
FCC Hurricane Katrina Independent Panel - March 6, 2006
Additional Observations

- Public Safety today faces increased and more complex communications requirements. Public Safety still must handle the criminal investigations, responses to traffic accidents, firefighting and emergency medical situations that we have always faced day-to-day. In addition, we are planning for increased prevention and response activities related to natural disasters like Katrina, and to address potential terrorist activities. Most day-to-day operations require better coordination among departments within a jurisdiction while preparation for disasters and catastrophic events require better communications across multiple levels of government.
- Existing communications must be maintained and improved. It must be recognized that there is simply not enough local, state and federal funds to provide for the wholesale replacement of Public Safety communications systems as some have proposed. However, new tools are being developed which will enhance current capabilities.
- Moving into the 21st century, we have the advantage of some key resources such as new spectrum and ingenuity.
- New spectrum and necessity spur ingenuity, both by Public Safety agencies and by our industry partners.
Some examples are:
 - New Gateway or Patching products that allow for the interconnection of systems on different radio bands and to connect systems of different vintages and manufacturers.
 - New broadband equipment is becoming available for operation in the 4.9 GHz band. Also, manufacturers are discussing ways to integrate 4.9 systems with traditional systems through IP connections. Our Public Safety agencies are testing these new options and developing ways to use these tools to help protect the public.

- The 700 MHz band has generated the manufacture of standardized dual band voice radios covering both the 700 and 800 MHz spectrum. This means that Public Safety agencies can start to build up 700 MHz capability at the same time they expand or replace their 800 MHz radios. We never had this opportunity in moving from VHF to UHF or UHF to 800 MHz.
- The legislation to clear 700 MHz by February, 2009, has also given rise to increased Public Safety and industry discussions on technology for data. The National Public Safety Telecommunications Council (NPSTC) has developed a recommendation that would provide Public Safety users the flexibility to deploy either wideband or broadband data systems to match their needs. We look forward to the FCC opening a rulemaking on this issue and if approved, we should see further development of both wideband and broadband data equipment at 700 MHz over the next two to three years.
- Both satellite operators and radio manufacturers are developing ways to deploy satellite as a backup to provide communications when natural disasters like Katrina disable portions of the traditional land mobile radio infrastructure.
- Public Safety users and manufacturers are examining how commercial networks and dedicated private networks could be better leveraged and connected to provide more seamless mobility.
- All of these new ingenious tools will require funding to implement. We are working with Congress and the Administration to help increase the awareness of funding requirements.
- Finally, these new communications tools and potential funding increases provide a foundation. People - that is the Public Safety administrators and rank and file - are essential in deploying these advances to benefit the public we serve. Agencies are increasingly focused on planning and training to help improve Public Safety communications, both operability and interoperability.