



Corporation
for Public
Broadcasting

Public Media Serving Public Safety

2020 White Paper

Prepared by:



"Unleashing the Power of Technology"

**Federal
Engineering®**

Federal Engineering, Inc.
10560 Arrowhead Dr, Suite 100
Fairfax, VA 22030
703-359-8200

Table of Contents

1.	Introduction	3
1.1	Scope.....	3
1.2	Process.....	3
1.3	Background.....	4
1.3.1	About Public Media	4
1.3.2	How the Public Media System Works	4
1.3.3	Public Broadcasting Act of 1967	6
1.4	About Public Safety.....	7
1.4.1	Presidential Policy Directive / PPD-8 Definitions	7
1.4.2	Public Alert and Warning	8
1.5	Current Public Media – Public Safety Environment.....	9
1.5.1	The Culture of Public Media.....	11
2.	Public Media Emergency Alert Services (Mandated)	12
2.1	Public Media in the Current Public Alerting Environment.....	12
2.2	The Future of EAS and Recommendations for Public Media.....	13
3.	Public Media Station Support of Public Safety (Voluntary)	15
3.1	Introduction	15
3.2	Project Examples	15
3.3	Recommendations Summary.....	35
4.	Future Opportunities and Investments	36
4.1	State-Level Public Media Collaboration for Public Safety	36
4.1.1	Recommendation: SCIP Public Media Supplement Development.....	37
4.1.2	Recommendation: Public Media Collaboration Concept.....	38
4.2	Establish Technology and Implementation Centers of Excellence (CoE)	39
4.2.1	CoE Recommendations	40
4.3	The Outlook on Impact of 5G on Public Media	41
5.	Conclusion	43
Appendix A -	Current EAS/IPAWS/WARN Environment	44
Appendix B -	Glossary.....	49



1. Introduction

1.1 Scope

The Corporation for Public Broadcasting (CPB) seeks to better understand how public media, comprising public radio and television stations and their national organizations, can support mandatory and discretionary public safety services beyond the traditional distribution of audio and video content. To assist with this effort, CPB retained Federal Engineering, Inc. (**FE**) to:

- Identify and assess the ways in which public, private, and commercial media currently support public safety and emergency alerting across the U.S.
- Provide CPB with a white paper and presentation discussing opportunities and making recommendations on where and how public media can enhance its public safety support services.

FE approached this project from two directions:

- Using research to develop an understanding of public media's engagement with public safety today, as well as the strengths, gaps, challenges, and opportunities available to it in the future.
- Using our deep understanding of local, regional, state, and national public safety operations and culture to recommend specific actions, building upon its existing success to move public media into a meaningful position in the support of public safety nationwide.

1.2 Process

FE interviewed staff from 20 public television and radio stations or networks across the U.S.; national public media organizations, including CPB, America's Public Television Stations (APTS); PBS, NPR; as well as public safety organizations to identify unique opportunities for public safety solutions beyond public media's mandated broadcast of official public alerts and warnings. CPB selected the entities to be interviewed in order to ensure representation from the range of public media's efforts to serve public safety across the country.



The interviews focused on the following topics:

- What is being done today to support the public safety community, and what can be done in the future.
- What barriers exist in public media's support of public safety.
- How public media's support for public safety can be enhanced.
- What public media capabilities are being used to support public safety.
- How public media can improve its public safety services through emerging technologies, including: NextGen TV and Radio Data Systems (RDS).

1.3 Background

1.3.1 About Public Media¹

Since the 1920s, people across the U.S. have launched public broadcasting services in their own communities to champion the principles of diversity and excellence of programming, responsiveness to local community needs, and service to all.

Today's public media system began to take shape 50 years ago, with the creation of CPB in 1967. Public media now reaches nearly 99 percent of the U.S. population with free programming and services. In addition to providing access to high-quality, educational programming for children, arts, and award-winning current affairs programming, public media stations provide life-saving emergency alert services. In a world with many outlets for information, public media continues to be America's most trusted institution for news and educational programming.

1.3.2 How the Public Media System Works

Public media comprises independently licensed, managed and operated local public radio and television stations. In rural, Native American, and Pacific Island communities, public broadcasting stations are often the only locally operated media outlets as well as the only source of broadcast media available. Stations can choose to become PBS or NPR member stations, but do not have to join either organization.

CPB's role in public media is to deliver federal support to more than 1,000 public radio stations and 365 public television stations. While CPB does not produce programming, it

¹ Adapted from <https://www.cpb.org/aboutpb/>; accessed October 2019



does provide funding to content producers. CPB does not operate or control any public broadcasting station.

Each local public media station maintains sole authority and responsibility for selecting, scheduling, and presenting the programs it airs. In addition to locally produced programs, stations have a variety of choices on where to acquire content. Public television stations choose their programs from some of the following sources:

- PBS, which provides more than 1,200 hours per year of children's, primetime, educational, and cultural programming. This includes programming produced by stations such as GBH, WETA, WNET, among others.
- American Public Television (APT), which acquires programs that may be purchased by stations on a title-by-title basis. APT also maintains the largest source of free programming available to U.S. public television stations.
- The Independent Television Service (ITVS), which funds, distributes and promotes independently produced television programs.
- The National Educational Telecommunications Association (NETA), which annually distributes nearly 2,000 hours of programming produced by public television stations, other entities, and independent producers via satellite to stations nationwide.

Public radio stations typically produce nearly 40% of their own programming, acquiring additional programming from a wide variety of sources, including:

- NPR for news and information, cultural, and entertainment content.
- Public Radio Exchange (PRX), American Public Media, and other producers and distributors including independent producers and other public radio stations.

While broadcast remains the primary mode for reaching Americans, public media has expanded to include digital, internet, and mobile platforms for creating and communicating educational, informational, and entertaining content.

Public media stations, under their own initiative, and sometimes with funding from CPB, support public safety organizations by: providing infrastructure; supporting local, state, regional, and national alerting; and strengthening communications among first responders, governments, and the communities they serve, using all modes of dissemination from broadcast to social media.



1.3.3 Public Broadcasting Act of 1967

The Public Broadcasting Act of 1967² provides the legal license and responsibility for public broadcasting entities to encourage and support:

1. The development and growth of public radio and television broadcasting, including the use of such media for instructional, educational, and cultural purposes.
2. Public telecommunications promoting regional and local development along with those capabilities important to the federal government through all appropriate available telecommunications distribution technologies.
3. Public telecommunications services that will be responsive to the interests of people, both in particular localities and throughout the U.S., to express diversity and excellence.
4. Programming that involves creative risks and that addresses the needs of unserved and underserved audiences, particularly children and minorities.
5. Local community resources for utilizing electronic media to address national concerns and solve local problems through community programs and outreach programs.

The Public Broadcasting Act specifies that while remaining independent of all outside influence, public media must be used for cultural purposes that address matters of importance, for private and local development. Under the Law, public media must be responsive to the interests of people, both locally and throughout the U.S., and in doing so, it addresses the needs of unserved and underserved audiences. Public safety is arguably one of the most important interests of people in any community.

Further, public broadcasters must utilize electronic media to address national concerns and solve local problems. The electronic media to be employed is not limited to radio and television but may include all appropriate telecommunications distribution technologies to provide citizens access to public telecommunications services. The Law's principles support the use of public media to support public safety using whatever technology is necessary and reliable.

The balance of this page is intentionally blank.

² <https://www.cpb.org/aboutpb/act/>; accessed October 2019



1.4 About Public Safety

There are two categories of organizations responsible for public safety:

- Primary: Agencies providing primary public safety services, such as police, fire, Emergency Medical Service (EMS), Emergency Management (EM), public health, public works, hospitals, and others.
- Supporting: Organizations (public and private) providing support to public safety, such as National Guard, Red Cross, utility restoration (particularly power companies), commercial (supply) fleets, Volunteers Active in Disaster (VOADs), and others.

This White Paper defines “public safety” broadly as: 1) the range of primary and supporting organizations; and 2) the services and functions that go beyond the traditional first responders of police, fire, and EMS. **FE** looked to the National Preparedness standards referenced by *Presidential Policy Directive / PPD-8: National Preparedness* for our definition.

1.4.1 Presidential Policy Directive / PPD-8 Definitions

While public media stations and their representing organizations do not specifically define their support of public safety with respect to PPD-8, the related services stations provide to their communities do support the functions implied by these definitions through the use of their broadcast spectrum and other capabilities, including:

- “National Preparedness” referring to the actions taken to plan, organize, equip, train, and exercise to build and sustain the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats that pose the greatest risk to the security of the Nation.
- “Security” referring to the protection of the Nation and its people, vital interests, and way of life.
- “Resilience” referring to the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies.
- “Prevention” referring to those capabilities necessary to avoid, prevent, or stop a threatened or actual act of terrorism. Prevention capabilities include but are not limited to: information sharing and warning, domestic counterterrorism, and preventing the acquisition or use of weapons of mass destruction (WMD). For



purposes of the prevention framework called for in this directive, the term "prevention" refers to preventing imminent threats.

- “Protection” referring to those capabilities necessary to secure the homeland against acts of terrorism and manmade or natural disasters. Protection capabilities include, but are not limited to, defense against WMD threats; defense of agriculture and food; critical infrastructure protection; protection of key leadership and events; border security; maritime security; transportation security; immigration security; and cybersecurity.
- “Mitigation” referring to those capabilities necessary to reduce loss of life and property by lessening the impact of disasters. Mitigation capabilities include, but are not limited to, community-wide risk reduction projects; efforts to improve the resilience of critical infrastructure and key resource lifelines; risk reduction for specific vulnerabilities from natural hazards or acts of terrorism; and initiatives to reduce future risks after a disaster has occurred.
- “Response” referring to those capabilities necessary to save lives, protect property and the environment, and meet basic human needs after an incident has occurred.
- “Recovery” referring to those capabilities necessary to assist communities affected by an incident to recover effectively, including, but not limited to, rebuilding infrastructure systems; providing adequate interim and long-term housing for survivors; restoring health, social, and community services; promoting economic development; and restoring natural and cultural resources.³

1.4.2 Public Alert and Warning

One critical role met by all public media stations is to provide public alerts and warnings, also referred to as “public situational awareness,” through the Integrated Public Alert and Warning System (IPAWS).⁴ IPAWS incorporates the legacy Emergency Alert System (EAS)⁵ for broadcast media. The mobile-phone element of IPAWS, called the Wireless Emergency Alerts (WEA),⁶ relies on the PBS Warning, Alert and Response Network (WARN) system⁷ to provide a redundant communications path. These systems provide a wide range of local, state, and national alerts.

³ <https://www.dhs.gov/presidential-policy-directive-8-national-preparedness>; accessed October 2019

⁴ <https://www.fema.gov/integrated-public-alert-warning-system>; accessed October 2019

⁵ <https://www.fema.gov/emergency-alert-system>; accessed October 2019

⁶ <https://www.fcc.gov/consumers/guides/wireless-emergency-alerts-wea>; accessed October 2019

⁷ <http://www.pbs.org/about/contact-information/warn/>; accessed October 2019



FE extends the concept of “public alert and warning” beyond the mandated participation in the EAS/IPAWS/WEA/WARN systems to account for a broad range of voluntary services providing for the “safety of the public.” This includes public media’s distribution of weather and news along with educational television for emergency planning. Additionally, public media distributes language services to reach local non-English-speaking communities, public health announcements, and other content.

1.5 Current Public Media – Public Safety Environment

The national public media organizations, such as CPB, APTS, NPR, and PBS, support local stations’ public safety activities in many ways, including: coordinating national programs (like WARN), offering guidance and education, and providing federal and regulatory support to all station licensee types – state, community and university.

Through our interviews with public media stations, **FE** became familiar with public media’s interactions with public safety today. The interactive environment differs somewhat between stations and appears to be driven by various factors. One predominant factor is determined by the station’s Federal Communications Commission (FCC) license type. Stations that are either a state or college/university licensee appear to have a higher level of interaction with, and support for public safety activities. Stations that are licensed to a community or local education authority tend to offer programs assisting public safety on a secondary basis by communicating information rather than interfacing directly with public safety agencies and organizations.

Regardless of license type, stations primarily develop public safety-related programs internally, leveraging the capabilities of their own station or network of stations. In the range of observed solutions, the following stand out for meeting local needs in a way that would benefit from scaling up to a regional or national level:

1. Many solutions grew from within the fundamental mission and operation of the public media station, such as:
 - a. The addition of multi-language programming for emergency news and information content as an outgrowth of serving a multi-lingual community with education, news, and information programming.
 - b. The development of the Florida Public Radio Emergency Network (FPREN), as an outgrowth of serving the hurricane-prone region with rapid distribution of critical weather forecasts and real time reports.
2. Some solutions leveraged existing public media resources to the benefit of public safety. This is often done as a matter of necessity or historical



- coexistence, rather than as an intentional or strategic initiative. Examples include:
- a. The support of enhanced EAS distribution systems such as the Ohio Education Television Stations.
 - b. The development of the portable transmitter systems (radio-to-go) as an expansion of the redundancy required serving the tsunami and earthquake-prone state of Alaska.
3. Lastly, a few stations intentionally apply public media resources to deliver value to public safety in a specific and strategic way, including:
- a. The sharing and merging of the South Carolina state public safety and public media transmitter towers and interconnecting networks into a single network supporting both needs.
 - b. Las Vegas PBS developing its datacasting system for use by the Las Vegas School District Police department. This allows for the distribution of video from inside school buildings to responding police vehicles.

Observing these non-intentional and intentional actions taken by public media stations, along with their lessons learned, will help the public media system create specific, intentional, and strategic public safety projects with a high likelihood of success.

During the interview process with stations, **FE** noticed that public safety and public media interact on a wide range of activities in a variety of ways. Public media entities play a major role in providing trusted public safety alert and warning services as well as the ongoing distribution of information to local communities. The interviews confirmed public media's commitment to this role and demonstrated the following attributes:

1. Many stations with a direct relationship with their respective states, and all of the state licensees, demonstrate an interest in, and an ability to, extend their public safety role beyond broadcast alerts and warnings.
2. Most of the public media stations interviewed provide additional, innovative public safety services beyond FCC-mandated broadcast alerts and warnings. These innovations are driven by station personnel motivated to better serve their communities. Public media guidance and grant funding initiated some of these innovations, while others grew out of local inspiration and need.
3. Most station personnel interviewed expressed a desire for increased direction and coordination from the state and national public media organizations to



assist them with increasing or enhancing their station's public safety support activities. While stations emphasize their independence, they also desire guidance and a sharing of best practices.

One overall conclusion that **FE** arrived at is that public media would benefit from following similar processes and procedures to those successfully used by the thousands of independent local public safety organizations. Through the collaboration of public media entities within each state and at the national level, they can better present to public safety organizations the value they bring as a partner, and thus the value of the solutions they offer. The recommendations section includes methods and resources for this to be implemented.

1.5.1 The Culture of Public Media

There is a strong culture in public media of wanting to assist the community both as part of its stated mission and beyond. It is a culture that places the good of the public and the community ahead of any direct and/or indirect value returned to the station.

Likewise, there is a culture of "doing more with less." **FE** saw many examples of stations finding ways to accomplish projects with limited available resources, including creative reuse and/or deployment of resources towards their goals. This ethos energizes public media stations to accomplish significant work more efficiently than other often well-funded, private enterprises.

Such attributes align well with the public safety culture, suggesting that public media and public safety could be natural allies and partners in serving the community and the greater public. However, public safety also has a strong risk averse nature, one that relies on known and trusted solutions. It is this aspect of public safety that public media must also embrace to be seen as a trusted partner, one that can be regularly called on to develop solutions and services for the public safety community. Supporting this observation, **FE** found that in the instances public media stations employed personnel with backgrounds in public safety, this connection was instrumental in fostering in-depth, ongoing relationships between the two communities.

The balance of this page is intentionally blank.



2. Public Media Emergency Alert Services (Mandated)

Commercial and public media have a long-standing, mandated role in alerting the public to emergencies and disaster response through the EAS. In addition, public media has specific responsibilities under the 2006 WARN Act. These automated systems have been in existence in one form or another for many years. The stations and networks interviewed describe their commitment to public safety, though mandated, as fundamental, underscoring the value they place on public media's continued role as a provider of this critical information.

2.1 Public Media in the Current Public Alerting Environment

The EAS and WARN systems are primarily automated systems that broadcast local, state and Federal Emergency Management Agency (FEMA)-generated public alert messages as part of its IPAWS program. Federal regulations mandate that all broadcasters carry EAS messages, whereas WARN is a program implemented specifically by public media TV stations. The success of these programs are hallmarks of public media supporting public safety. Within the WARN program, public media provides a secondary conduit for the IPAWS information that shows up as the public alert data crawl and audio messaging we receive on cable networks and cellular phones as part of the WEA system. In some rural communities, these public media solutions are often the only warning about threatening weather conditions and other emergencies and disasters. Further, some public media stations assume a larger role than others in the distribution of EAS and IPAWS alert information. This includes acting in the role of the State Primary or Local Primary stations, and in some cases using TV broadcast infrastructure as a primary or redundant method of EAS/IPAWS alert distribution to end point stations. Appendix A of this White Paper provides a more detailed overview of the EAS/IPAWS/WEA/WARN environment.

FE found that public media stations in several states go beyond this mandated role by providing extended coverage of critical news and information events, such as governmental, emergency and disaster press briefings or news conferences. In at least one state, public media has been officially designated as the “media of record” for the state. This level of critical public information distribution provides situational awareness and guidance far exceeding the content of the mandated EAS and IPAWS messages. Even though public media stations support public alerting at this level, **FE** found that public safety leadership outside of these pockets is largely unaware of the ways public media supports public safety.



2.2 The Future of EAS and Recommendations for Public Media

As technology advances, EAS/IPAWS and the wider topic of public alerting and notification is likely to remain under the domain of FEMA and the FCC. Although current public safety systems operate with an amount of state control, that control may not be a dominant factor in their future development. During the past several years, federal agencies have been applying greater control, primarily with the goal of improving interoperability. This allows personnel from different jurisdictions and disciplines to communicate more efficiently, which increases the effectiveness of interagency operations. This is critical as many emergencies and disasters cross jurisdictional boundaries, even state lines. FEMA and the FCC exert this control through the combined effect of two primary actions:

- Implementing standardized operating procedures (SOPs) through all the available documented practices and federal agency training programs made available to the states.
- Influencing grant programs that dictate, or at least encourage, the use of the federal standards, procedures, and the implementation of the federal training programs.

In looking at public media's role in future public alerting systems, whether growing out of EAS, IPAWS, WEA, or WARN, or based on new concepts and technologies, it will be most important to work with FEMA and the FCC at the federal level in order to align with the most current regulations and guidelines. **FE** believes the best way for this to be accomplished is with the support and guidance from a national public media organization, or a very strong coalition of statewide public media organizations. The power of a bottom-up approach, which is very effective in many areas of public media station activities, can be much less effective when attempting to coordinate national level programs.

More specifically, for public media to build a stronger connection with public safety and become a more instrumental player in the next-generation of public emergency alerting systems, **FE** recommends that one or more of the national public media organizations begin a program charged with interfacing with the public safety agencies and becoming involved in industry workgroups such as those sponsored by the Association of Public-Safety Communications Officials (APCO), the National Public Safety Telecommunications Council (NPSTC), and NENA: The 9-1-1 Association (previously the National Emergency Number Association). In this way, public media becomes part of the process of defining the next generation of public emergency alerting systems and can best present its value in being part of the eventual solution. **FE** has not included this



process in the later recommendations section because the feasibility and implementation of such a project was not within the scope of this White Paper and requires further study.

The balance of this page is intentionally blank.



3. Public Media Station Support of Public Safety (Voluntary)

This Section discusses voluntary initiatives that public media stations and organizations currently undertake to support public safety.

3.1 Introduction

As previously noted, in many cases public media stations and organizations across the nation have gone above and beyond their mandated support of public safety. This includes projects that are extensions of their mandated role in public alerting, such as those referenced in Section 2 and also includes projects that extend their normal operations to supporting public safety in their community or offer direct support to specific public safety agencies.

3.2 Project Examples

The following are examples of successful public media projects in support of public safety that **FE** recommends for further investment or expansion. The recommendation is detailed in each example.

The balance of this page is intentionally blank.



Infrastructure Sharing

Public media's infrastructure assets represent a significant nationwide communications capability and opportunity for supporting public safety. Public media station infrastructure has resilience requirements comparable to those of public safety systems, and in some cases has demonstrated greater resilience to storm damage than public safety radio (transmission tower) infrastructure.

One challenge facing public safety in which public media could assist is the construction of new facilities. Whereas many agencies require radio coverage, no one wants a tower in their backyard. Oftentimes, towers need to be constructed in a remote location with no utilities or telecommunications connectivity. Sometimes site construction can be hindered due to issues arising under the National Environmental Policy Act (NEPA) or the National Historical Preservation Act (NHPA). By having public media and public safety partner to develop



Image:
<https://www.fcc.gov/wireless/bureau-divisions/competition-infrastructure-policy-division/tower-and-antenna-siting>

infrastructure, complications related to the environmental and permitting processes may be reduced, as restrictions are often lightened or waived when proposals include a public safety component that would improve emergency response and operations during natural and manmade events in the surrounding geographic area.

In addition to tower sites, public media's inventory of infrastructure assets including equipment buildings, emergency backup power, and redundant equipment could provide useful synergies with public safety. Both parties could receive cost benefits and enhance their respective missions by sharing infrastructure to provide public media and public safety messaging capabilities from a shared facility. A secondary benefit of sharing facilities and infrastructure would be a strengthening of the incidental relationships developed between public media and public safety personnel responsible for the shared infrastructure.

Transmission Tower Sharing

Our interviews revealed many examples of public media and public safety sharing towers, shelters, and power facilities. This was present at local, regional (county), state and federal levels of government.

Radio and television gain more coverage area and more listeners/viewers by operating from high points in the terrain. For this reason, the location of radio and television transmission towers are typically at the highest elevation in their FCC-licensed geographic area. These same locations have historically provided public safety and other Land Mobile Radio (LMR) users the coverage they require.

In some situations, a public media station or network will own the transmission tower, and public safety (and other) organizations pay a fee periodically for that tower space. In other situations, public media and public safety share towers owned by local government or others.

In some states, public safety has their own transmission towers collocated within public media facilities. In these cases, public media often provides additional support such as heating, ventilation, and air conditioning, providing temperature control for the equipment, and backup power service for equipment in the facility.

The sharing of transmission towers can lead to a natural sharing of backup provisions. Damage to a tower site or its communications capabilities (e.g., optical fiber), may render it unusable. In this situation, portable site equipment could be designed for shared use, supporting public media's and public safety's back-up needs, with the proper planning and allocation of resources.

Transport Network Sharing

Public media often uses optical fiber and microwave networks to link studios and production facilities with their transmitter tower sites. These networks can be significant for public media organizations supporting wide areas with multiple transmitter sites. In the cases where they are state agencies or state university systems, they may own the interconnecting network, or could provide access to another agency's network. In either case, there are successful examples of public safety agencies sharing these networks.

For example, in Hampton Roads, Virginia, the public safety agencies operate an optical fiber network interconnecting multiple emergency operations centers (EOCs) and other critical public safety locations. Through cooperative efforts, a public media station connects to this network and can receive video content from any connected EOC. The use of standard video conferencing equipment turns every EOC into a broadcast-ready location for press briefings and on-air news conferences. Stations or networks could also implement this concept in reverse by allowing or providing interconnection with public safety locations in areas where public media manages its interconnecting network.

Optical fiber provides high-capacity bandwidth between sites. The fiber paths are often built as loops around a state to provide redundancy should a link be severed, such as by



a backhoe operator cutting the fiber or a ground shift from an earthquake. This design allows the network to immediately re-route communications “the other way around” the loop and maintain operation. The resiliency this provides is highly valuable to both public media and public safety.

Many multisite systems on irregular terrain use line-of-sight microwave radio systems to link tower sites, typically in a statewide or wide-area television distribution network with multiple transmitters or translators. These microwave networks often have bandwidth to carry more information than required solely for public media use, so they could be shared by multiple entities, including public media and public safety. Microwave is beneficial, as it does not require a cable path to the tower site which can be difficult in rural areas or over rugged terrain. Additionally, microwave radio provides a near-term solution for situations where construction of other infrastructure could take significant time. Although public media may have relatively fewer transmitters than public safety due to the high-power levels used, often these microwave networks have intermediate relay sites that would be useful as public safety transmitter sites.

Facility Sharing

In some facilities, public media leases space to commercial and public organizations, and at least one emergency management agency (EMA) uses such space for their temporary EOC activities. This type of sharing is often overlooked, as people tend to place greater focus on technology over some very simple and efficient solutions.

As with the transmission towers, facilities can also provide an opportunity to share backup resources. At least one station uses its mobile broadcast facility to provide statewide official announcements when the official, usually the governor, is remote from the fixed facilities at the EMA. The mobile communications facility has all the equipment needed for EMA to use as a mobile command center, including satellite communications, two-way radio, generator, and conference space. At least one EMA designed and built a mobile command center using public media-provided design recommendations, demonstrating this concept in action.

Public Media Infrastructure Program Recommendations

To support infrastructure-sharing projects on a large-scale basis, public media can take the following steps:

1. Collect and quantify the types and economic value of current site, infrastructure and technology sharing activities.



2. Provide public media contacts to key public safety organizations, such as state and local emergency management organizations, state and regional communications departments, the Statewide Interoperability Executive Committee (SIEC), and statewide interoperability coordinators (SWiCs). Through increasing the familiarity of public media and public safety personnel, this provides a path to partnering on complementary infrastructure needs.
3. Create and/or encourage infrastructure sharing projects between public media and public safety.

These actions have the added benefit of enhancing public safety's awareness and trust in public media capabilities.

The balance of this page is intentionally blank.



Extending and Expanding the FPREN Success

The University of Florida public radio station, WUFT-FM, in association with other Florida public radio stations, created the Florida Public Radio Emergency Network (FPREN). This network of stations creates and distributes emergency weather information designed for broadcast and Internet distribution. The FPREN team designed the content for easy conversion between formats and localization. Paired with the Florida Storms mobile application, each station is able to present accurate and current weather information localized to their coverage area and branded to their station. FPREN achieved this in a state with independent (not state-affiliated) stations, which was unique when compared to most other successful programs studied.

Florida public media stations are a critical link in the State's Emergency Management Network during a crisis. Through the existing statewide communications network, the stations provide key safety and evacuation information that help protect residents during hurricanes and other natural disasters. These abilities are extended through the Florida Storms mobile application. The Florida Storms application distinguishes itself from many other weather applications by its ability to provide critical information and warnings directly from local emergency managers without advertising, subscription fees, or the commercial trappings of most other notification apps. Included in this critical, accurate and reliable information is:

- Evacuation zones, routes, and open shelters
- Storm survival tips and recovery resources
- Preseason checklists and risk assessment

Another feature of the application is the ability of users to submit pictures directly from their location to the network providing real time situational awareness of the incident back to the station and emergency management.

As with all smartphone technology, the Florida Storms mobile application depends on having an operational high-speed robust cellular network, such as Long-Term Evolution (LTE) or Fifth Generation mobile network (5G). In a widespread disaster, such as a

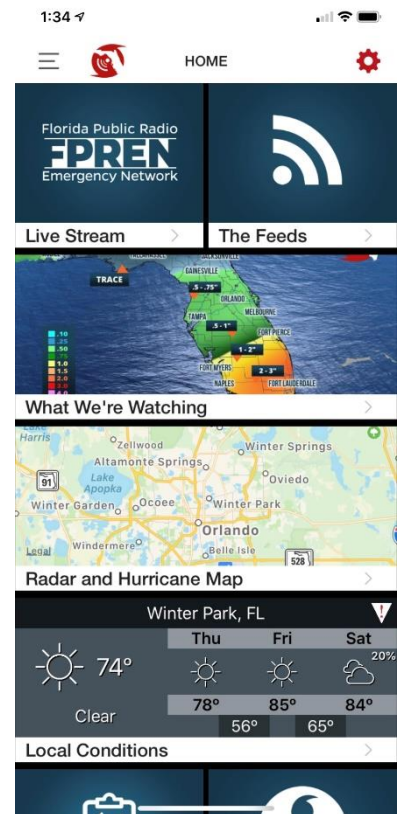


Image:
<https://floridastorms.org/app/>



hurricane, the cellular data network may be out of service. In this situation, the public would rely on FPREN broadcast stations for current warnings, alerts, and information. This pairing of public broadcasting and Internet smartphone distribution provides the public with consistent and reliable information when needed, even when cellular and other services may not be available.

Florida Public Media and WUFT designed the entire FPREN system and process to be extendable so that other stations could easily enter the network without losing localization and branding. Testing the concept of extendibility, FPREN currently supports the South Carolina Emergency Information Network (SCEIN) from their existing facility in Florida while providing content unique to the South Carolina stations and markets. This is a model for other types of localized emergency notification and information production and distribution.

FPREN Recommendations

FE recommends that public media invest in projects to extend FPREN, as well as to expand the FPREN concept to include other critical data as needed in other regions of the nation. These projects could replicate FPREN weather products starting from regional stations that would tailor the content to their region, then provide the service to other public media stations much the way Florida Public Media provides service to SCEIN. Over time, the stations could add vetted content relevant to the community. Such data could include earthquake, tsunami, wildfire, and other information. This investment could support projects initiated by state-affiliated networks, state-collaborative networks, and other groups of stations to establish regional weather/emergency networks. In this regard, **FE** recommends the following actions for public media at the national, regional, or local level, as appropriate:

1. Develop a plan to leverage and share existing resources, including NPR Regional News Hubs, MetaPub, the knowledge gained from the FPREN/SCEIN experience, and any similar experience and resources from PBS and NPR, to create other regional or statewide public media emergency information networks.
2. Develop a Concept of Operations Plan (CONOPS) for the operation of a public media emergency information network to build upon early successes and assist other emergency information networks in startup and sustainable operation. The CONOPS is a business requirements document detailing use cases for a system and suggested system architecture and interfaces. In this instance, public media would outline use cases to design, implement, and operate the public media/public safety emergency information network by engaging in the following process:



- a. Document solution vision and scope.
- b. Model existing or AS-IS environment (if applicable).
- c. Elicit stakeholder requirements.
- d. Model desired or TO-BE environment.
- e. Develop CONOPS⁸.
- f. Validate CONOPS by tracing technical, operational, and user requirements back to business requirements as the following figure shows.

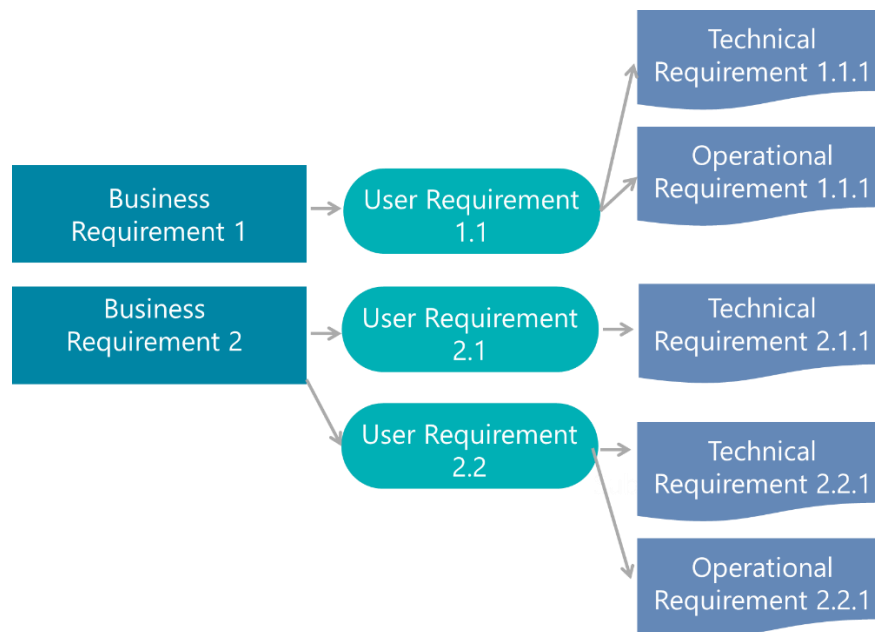


Figure 1 – Requirements Tracing

3. Work with FPREN to get requirements and cost estimates for duplicating the service in other regions, including cost for their consulting support on another region's initiative. Funding sources for this initiative beyond the station/licensee investment include grants from public media organizations, state and federal agencies, and potentially utilities and other companies. Such companies might also be contributors to the service by providing, for example, power outage maps and notifications.

⁸ For additional information on developing a CONOPS plan, reference: https://resources.sei.cmu.edu/asset_files/TechnicalReport/1999_005_001_16745.pdf; https://www.wmo.int/pages/prog/hwrf/flood/ffgs/meetings/presentations/day4/01-Development_of_Concept_of_Operations-CONOPS.pdf; accessed 9/26/2020



4. Consult with key state and local public safety officials, typically state emergency management directors and statewide interoperability coordinators (SWICs), for assistance building sustainable relationships with the state and local level emergency management agencies that would provide real time emergency response information for distribution.
5. Develop a business case for the sustainable operation of a public media emergency information network. Include guidance for public media to engage with state interoperability and emergency management groups and provide information on sources of funding as appropriate.
6. Explore the development of a public television version or addition to the FPREN system concept.
7. Consider the development of a common or symbiotic branding strategy to build national awareness of each local xPREN (x=other state or region) system, including the creation of a shared mobile app for consistent operation and possible co-branding with commercial stations' local news and weather applications.

The balance of this page is intentionally blank.



Datacasting Pilots and Usage

Datacasting technology allows a portion of a television station's signal to be encrypted to share critical real-time video and other data safely and privately with any number of recipients in the coverage area. Public media has partnered with public safety in several pilot studies to determine the feasibility and use of this technology in emergency situations.

In 2017, Houston Public Media proved the value of datacasting after the area was hit by Hurricane Harvey. Houston Public Media used it to stream real time flood video to incident commanders on scene enhancing situational awareness. This support was possible because the previous year Houston Public Media had assisted Houston Emergency Management in a datacasting pilot to secure the National Collegiate Athletic Association (NCAA) 2016 Final Four/National Championship Events and Super Bowl LI. While datacasting benefitted these events with its ability to transmit detailed information to multiple public safety officials, it was not adopted by public safety agencies for regular use within the Houston viewing area.



In 2016, California, as part of its "Great ShakeOut" earthquake exercise, implemented a datacasting trial to test the concept of transmitting an earthquake warning over a very large area. Earthquake warnings provide very little advance notice, typically seconds to tens of seconds. The exercise in California demonstrates that datacasting improves the transmittal speed and provides warning up to a few seconds in advance of an earthquake. Conceptually, these warnings would operate automated systems, helping prepare a facility for the impending earthquake. Although the demonstration was successful, smartphone technology rivaled datacasting shortly thereafter with a publicly available earthquake warning system using WEA.

Compared to other transports of mission-critical data, datacasting offers resiliency, elasticity, enhanced coverage, and secure data. Public broadcasting towers and facilities in which the datacasting streams initiate have emergency power and hardened facilities. While a typical datacasting bandwidth allotment is 1 Mbps, the bandwidth can be expanded during an emergency to accommodate the needs of public safety fulfilling bandwidth requirements to provide video and mission critical documents. Datacasting offers the ability to provide an expanded coverage area over the existing cellular network. Broadcast spectrum can be transmitted over long distances and can operate without requiring multiple towers. The datacasting stream can be encrypted with Advanced



Encryption Standard (AES) which meets Federal standards for secure communications. The application software allows the owners of the video and data to target individual receivers, users, or a group, to receive the video, files and notifications being transmitted.

The challenge to deploying datacasting for public safety emergency operations is that the data is one-way. For the return path, another medium must be chosen, resulting in disparate systems for the one-to-many datacast stream and many-to-one return path from responders in the field. Datacasting integration with other unidirectional and bidirectional communications technologies has not been addressed on a widescale basis.

In addition to the Houston and California datacasting pilots mentioned above, the following initiatives and pilots have tested datacasting for both emergency communications and daily use:

Las Vegas, Nevada

In 2006, Las Vegas public media outlet KLVX teamed up with local schools in a datacasting initiative to send specialized, secured information to laptops in 60 emergency vehicles for Clark County School District Police. This resource has not been extended to first responders outside the school district.

Boston, Massachusetts

Following the Boston marathon bombing, WGBH-TV and the Massachusetts Emergency Management Agency teamed to create a statewide emergency communications system using datacasting to provide secure video, audio and data, including live stream video. The system was implemented, tested and evaluated, including preparation of a CONOPS. According to our interviews this pilot has not resulted in day-to-day use.

Norfolk, Virginia

In 2010, WHRO-TV teamed with Virginia Tidewater Consortium for Higher Education, on an initiative to improve school security through datacasting. According to interviews, the project did not result in regular use.

Chicago, Illinois

On August 12-13, 2015, the Johns Hopkins University Applied Physics Laboratory, under the direction of the DHS Science and Technology Directorate First Responders Group, Office for Interoperability and Compatibility, teamed with public television station WTTW and the Chicago Office of Emergency Management



and Communication on a datacasting system demonstration meant to showcase the benefits of its use. For this pilot, a boat chase was simulated using Coast Guard and Chicago Police Department personnel. This pilot proved valuable in that streaming video could be sustained at chase speeds of over 35 knots and that datacasting functioned beyond the footprint of the cellular system operating eight miles offshore of Lake Michigan. According to interviews, the project did not result in regular use.

Adams County, Indiana

In 2018, PBS39 Fort Wayne partnered with state and local officials in an Adams Central Community School District simulation of a school shooting. In this exercise, datacasting was used to share critical information from the simulated incident with first responders and public safety officials from multiple agencies. This information included live video from multiple cameras, school blueprints and other information that would be essential for responding to and resolving an active school shooting situation.

Tennessee

In a statewide initiative, Tennessee public media outlets partnered with the Tennessee Department of Safety and Homeland Security to deliver encrypted videos, files, alerts, and other data to officials during emergencies and natural disasters. This program is grant-funded through the State's Department of Homeland Security using state and federal funds and is currently being implemented. Over time it may prove itself exemplary of sustainable success.

Ohio

Ohio Education Television Stations (OETS) partnered with the Ohio Emergency Management Agency and the (Ohio) Broadcast Educational Media Commission (BEMC) to use datacasting to deliver EAS messages to other Ohio broadcasters.

It is worth noting that many datacasting initiatives were pilot programs *without* a long-term business case. In fact, most of these programs were discontinued following a demonstration phase. Moreover, most of the ongoing programs have not expanded beyond the original, externally funded, pilot phase either. Although the pilot programs provide useful insights into the value of datacasting to public safety, **FE** recommends that future investments in this area be targeted at programs that are likely to be sustainable, as detailed in the recommendation section below.



Along with the primary concept of DTV datacasting for the distribution of high-bandwidth information, our interviews uncovered other datacasting concepts, including DTV datacasting for public safety alerting used in North Carolina. The North Carolina Department of Information Technology (NC-DIT), and North Carolina Public Media (UNC-TV), in concert with the State's Emergency Management Agency, developed a white paper⁹ on the use of DTV datacasting to supplement Land Mobile Radio and carrier-based paging services to alert public safety first responders. With the evolution of public safety radio systems, the support of wide-area highly reliable personal alerting (paging) has become difficult and significantly more expensive. The paper's authors submit that DTV datacasting could fill this role more effectively than other technologies, such as LMR and cellular Short Message Service (SMS) text messaging.

This concept requires both the development of a new public media service and acquiring equipment to support the alerting over DTV. As such, it is a program that will require significantly more resources than most others examined. Programs of this scope should be pursued only after the development of a thorough business plan.

Datacasting Recommendation

Public media organizations and stations should consider investments in projects to initiate or continue datacasting pilots nationwide. However, due to the varying results from the Boston, Chicago, Las Vegas, and Norfolk pilot programs, it is important to include provisions to minimize risk and maximize return on the investment. Therefore, **FE** recommends that the investment proposals include the following evaluation criteria:

1. Inclusion of at least one public safety partner willing to develop a use-case description and value proposition capable of justifying their application of datacasting.
2. A commitment to document the step-by-step use of the system by users and operators in the form of a formal CONOPS.
3. A definitive plan for explicitly testing, demonstrating, and reporting on the use case in terms of value to the agency.
4. A business case analysis describing the approach to sustaining the datacasting system, maintaining operations, training users, and providing maintenance support.
5. A plan for extending the datacasting solution to other public safety agencies in the coverage area.

⁹ http://files.unctv.org/pdf/Public_Safety_Datacast_Paging_v2017.02.13.pdf; accessed June 2019



RDS and Similar Solutions

RDS is the communications protocol and standard developed in Europe in 1984. In 1994, the U.S. National Systems Committee issued its own standard called Radio Broadcast Data System (RBDS). For purposes of this White Paper, we refer to the technology as RDS.

The availability of low-cost chipsets has led to enormous growth in automotive entertainment systems capable of RDS. Today, most car stereos support RDS data that displays station information with abilities for traffic messaging and news bulletins.

Some of the higher end automotive and home systems are capable of RDS2 or second generation RDS and have advanced abilities including graphic radio text which supports HTML and broadcasters' graphic logos which can be a low-resolution JPEG, PNG, or GIF.

In addition to RDS technology, Hybrid Digital Radio (HD-Radio) has gained some market acceptance. HD-Radio, just like RDS, offers enhanced data and graphic content sent by the broadcaster which can be parlayed into expanded messaging capability.

MetaPub, the API developed for the Public Radio Satellite System, provides the ability to broadcast images, text, and links to the listening public in real-time. Through the API, middleware programs receive the enhanced data and then forward it to the listener through RDS, HD-Radio or through public radio station web streaming.

With the roll out of the MetaPub program, more public media FM radio stations are enabling RDS-type technologies to transmit the multimedia information that accompanies public media content. With the enabling of this technology, public media stations will have the ability to distribute text and graphics beyond show information and related graphics. One such application is to use RDS technology to distribute public alerting information. Some of the recent pilot projects include the following:

“Tornado Alley” Storm Preparedness Exercise

In 2018, 27 radio stations participated in a pilot project that demonstrated how stations could provide enhanced tornado situational awareness and synchronize data with their audio broadcasts. The Public Radio Satellite System (PRSS) MetaPub equips 10 Midwest, South Central, and Gulf Coast states with the ability to broadcast digital content



Image:
<https://readyzeal.com/radio/radio-data-systems/>



to its listeners. In addition to the standard weather bulletin information, this pilot provided listeners with enhanced localization of tornado events.

Localization requires geolocation of an event. Using geolocation, stations can show the tornado location, path, and speed at the street and block level, and also be able to convey the location on a radio display for those without website map access. The public safety benefit of localization avoids complacency through listener desensitization when the alerting geographic area is too vast. Public safety agencies can also use this localization to plan their search and rescue (SAR) routes to avoid road blockage while getting quickly to the most damaged areas.

Our interviews indicate that the demonstration project was successful. However, there are issues that still need to be addressed, such as a more granular localization of the alerts.

Hampton Roads Sign Messaging

Public media station WHRO in Hampton Roads, Virginia uses RDS to push messages to electronic message signs. There are many locations where message signs, and more generally, the Internet of Things (IoT), can be controlled remotely by radio. This would remove the need for a direct hardwired or optical fiber connection, or a costly cellular connection. In addition, wireless transmission by public media eliminates the risk of the disruption of these message signs or other applications due to an optical fiber or other cable cuts. Pushing verified messaging and other IoT data can also avoid the cybersecurity risks involved with distributing content via the Internet.

RDS Extension/Expansion Recommendations

The successful use of RDS for public safety messaging relies on factors similar to that of datacasting, one of which is the inclusion of a public safety partner to demonstrate and validate the value of the solution. Public media investment in RDS implementations along with technology advances providing localization will benefit from including the following go/no-go decision indicators:

1. Inclusion of at least one public safety partner willing to write a use-case description justifying their application of RDS and their value proposition. The explicit testing and demonstration of this use-case would then be reported in terms of value to the agency.
2. The documentation of a CONOPS to define specific applications and use-cases.



3. Business case analysis describing the approach to sustaining the RDS solution, including private investment, to keep the system operational, train users, and provide maintenance support.
4. Plan for extending the RDS solution to other public safety agencies in the coverage area as well as other public safety IoT use cases.

The balance of this page is intentionally blank.



Portable Emergency Broadcast Service

Because of the challenges of their remote location, CoastAlaska created a set of transportable “radio-to-go” emergency FM broadcast kits. These kits are essentially mini stations that require only one or two people to transport and are operable using a variety of power sources, including portable generators or even automobile batteries (12 volt). The kits were designed to travel by Coast Guard or National Guard helicopter, small charter planes, road-based vehicles, commercial air freight or fishing boat.

The impetus for these systems was due to the remote geographical locations and essential services needed to preserve health and safety in the event of an emergency. Rural public radio stations in Alaska are often the only source of local and regional news, information, and public alerting in their communities. The potential for loss of service during a disaster is real, and reestablishing essential communications could be a significant challenge.

As with many emergency preparations, after the creation of these kits, there was a period when station staff wondered if it had been a good use of resources. However, in September 2017 the answer to this question came when Hurricane Maria pummeled Puerto Rico, causing widespread massive destruction and destroying critical infrastructure. With radio and television transmitters rendered useless, public safety was impeded in its ability to warn the public and provide lifesaving information. To assist recovery efforts in Puerto Rico, CoastAlaska donated two radio-to-go FM broadcast kits, arranged shipping from Alaska courtesy of Alaska Airlines, and relied upon personnel at WNYC and WMFE in Orlando for last miles to the island, restoring the vital public information link Puerto Ricans depend on.

Drawing on the lessons learned from this disaster, PRSS initiated a program to make emergency backup transmitter kits and portable studio systems available to public radio stations in the event of a disruption of their on-air operations by natural disasters, equipment failure, and other challenges to broadcast operation continuity. PRSS’s stockpile includes:



Image:
<https://www.kcaw.org/2017/10/14/juneau-sitka-public-radio-stations-restore-broadcasting-puerto-rico/>

- 3 Transmitter kits
- 3 Antenna kits
- 3 Masts (included in antenna kits)
- 2 Studio kits

In the future, this model could be replicated by public media and public safety within the U.S. as well as in other countries with PRSS fulfilling hardware requirements and public media outlets providing experienced engineers, electronics technicians, and broadcast experts whose skills could prove invaluable in recovery efforts.

This model could also be expanded by working with FEMA, which offers specialized training and certification for radio and telecommunications technicians to participate in the incident response, under their Communication Unit (COMU) structure. Together, a larger roster of qualified technicians could be deployed to local, state and federal emergency management agencies to assist with supporting efforts to deal with the information needs of populations dealing with major disasters.

The processes put in place to aid the Portable Emergency Broadcast Services would also provide benefits for the sharing of public media facilities and staff discussed in previous recommendations. The public media facilities that could be shared include studio space, training rooms, tower sites, and telecommunications networks. In an incident where communications infrastructure or facilities are destroyed or otherwise made unavailable, transportable FM broadcast kits could serve as a vital component in recovery efforts.

Finally, the cross-training of public media engineers as FEMA-credentialed communications technicians can be an invaluable exercise in deepening the partnership between public media and public safety.

Emergency Support Services Recommendations

Public media should continue and possibly increase investment in the following areas:

1. Expansion of the Radio-To-Go Program

Support additional institutionalization of public radio backup capability to provide important resiliency for impacted communities. While this concept targets FM broadcast stations, there is value in studying if there is a similar opportunity for television broadcast resiliency. For these reasons, public media organizations should consider the following projects:



- a. Further development of radio-to-go equipment and innovative improvements to its optimal nationwide deployment with designated training of public media responders.
 - b. Integration of a sufficient number of radio-to-go systems regionally to cover a maximum speed-of-response time of 24 hours from identification of the need to first transmission.
 - c. Development of a digital television equivalent of the radio-to-go project.
2. Creating an Engineer-to-Go Program:
- a. Develop a program to align and train radio station personnel to set up and operate radio-to-go equipment under anticipated emergency conditions. Each trained unit should be resourced as needed to be deployment ready.
 - b. Develop a distribution plan for moving these units into each region across the states and territories, accounting for the difficulty of post-disaster transportation.
 - c. Develop a program to provide station technicians and engineers the opportunity to participate in FEMA communications technician (COMT) training, and to be included on the COMT roster at the local or state level as appropriate.
3. Foster a partnership with local, state and federal emergency management officials:
- a. Develop a program to foster relationships between public media entities and the appropriate level local, state, or federal emergency management agencies.
 - b. Develop a sustainable program for public media resources to participate in local and regional disaster recovery plans, drills, and other activities.
 - c. Develop a program to provide station personnel the opportunity to participate in FEMA National Incident Management System (NIMS) training as appropriate. See <https://training.fema.gov/nims/> for additional information.



Twin Cities Public Broadcasting – Multilingual Initiative

The Minneapolis/St. Paul Twin Cities region comprises a diverse population with multiple languages spoken including English, Spanish, Hmong, and Somali. This diversity was the driving force behind a multilingual emergency messaging initiative developed by Twin Cities Public Broadcasting's (TPT) in 2013 with funding from CPB. This initiative resulted in the ability to broadcast IPAWS compliant emergency messages in the Somali and Hmong languages, ensuring that safety information reach those communities.

TPT accomplished this in partnership with ECHO Minnesota – a nonprofit supporting the multilingual community in Minneapolis that later merged with TPT, Minnesota Homeland Security and Emergency Management, University of Minnesota Emergency Management, and Wilder Research. Additionally, TPT documented best practices and resources to help other stations become involved with non-English speaking communities such as a language matrix documenting and mapping the translation process, and a procedures manual outlining required community building steps.

In 2018, the F.R. Bigelow Foundation awarded TPT over \$37 thousand to assist the St. Paul Police Department with the creation of multilingual public service announcements. This project supported a new channel devoted to public service called **TPT | NOW** that broadcasts PSAs and real-time emergency alerts in English, Spanish, Hmong and Somali.



Image:
<https://www.twincities.com/2020/04/06/coronavirus-first-major-test-for-emergency-channel-dedicated-to-limited-english-speakers/>

Because many other public media outlets have similar linguistic needs, this is a program that could be replicated. It fulfills a need that public safety often struggles with -- how to effectively get critical messages out in communities where English is not the primary language.

Local Language Service Recommendation

Public media can enhance public safety by increasing their ability to reach communities separated by language barriers by supporting projects that:

1. Encourage the development of programs like **TPT | NOW** that support non-English-speaking communities by distributing public health alerts, severe weather warnings, and other critical information.



2. Assist in the development of a language guidance document for stations nationwide that shows how to identify the non-English speaking communities in a station's coverage area, lists methods for communicating public safety solutions to these audiences, and incorporates the best practices identified in TPT's 2013 project for working with diverse, multilingual communities to create appropriate messaging.
3. Partner with public safety in exploring ways in which the language translation and communications processes developed for public media could be applied to public safety messaging, such as critical event news conferences, and other public safety announcements.

3.3 Recommendations Summary

In summary of Section 3, **FE** recommends that public media explore expanding and replicating the following initiatives:

- Infrastructure sharing
- FPREN model
- Datacasting for streaming information and paging
- RDS solutions
- Portable emergency broadcast services (e.g., radio-to-go)
- Multilingual translation services

FE believes these solutions will be best implemented through the establishment of a public media initiative to build sustainable public safety relationships (including, but not limited to alerts and warnings) on a state and national level, rather than a station-by-station basis alone. **FE** bases this overarching recommendation on its confidence that a long-term public media relationship with public safety is a critical component to the overall success of each of these recommendations. In doing so, public media can become an even more vital component of local, state and federal public safety services through the combination of partnering and specific programs.

The balance of this page is intentionally blank.



4. Future Opportunities and Investments

In addition to the specific recommendations in Section 3, public media organizations can greatly enhance their role supporting public safety – both public safety organizations of all types and the safety of the public itself – by putting in place projects that build and strengthen working relationships between public media and public safety. *FE* has identified specific projects and focus areas for building these relationships in a manner that is most likely to gain the trust of public safety.

4.1 State-Level Public Media Collaboration for Public Safety

Public media stations or networks with strong ties to a state tend to have the political and economic backing needed to support public safety solutions. A state affiliation helps to provide a governance structure that conveys trust to public safety agencies and emergency management. In some cases, public media personnel have become members of the Statewide Interoperability Executive Committee (SIEC) and have an official role in the state's incident management system with access to public safety leadership. This creates a natural starting point to expand and deepen the partnership between public media and public safety.

Exceptions exist. In some parts of the nation, particularly in major metropolitan areas that cross state lines, (for example New York City, Washington D.C., Philadelphia, and Boston), public safety and emergency management is addressed “area-wide” as opposed to operating at the state level. In these geographic areas, the natural starting point for public media collaboration with public safety may be, by necessity, the metropolitan area, rather than the state.

Public media stations should build sustainable relationships to make membership at the SIEC level possible by obtaining approval from the SIEC chairperson to serve as a non-governmental organization. Public media personnel engaging with SIEC members should have a basic understanding of public safety communication needs and awareness of the state's Statewide Communications Interoperability Plan (SCIP) initiatives.

Though this effort might be daunting for some in public media due to their lack of familiarity with both the public safety and emergency management structure, they will be aided by their long history of public trust and their legacy role in alerts and warnings as part of the IPAWS system, and the fact that the state emergency management agencies also benefit from public media's extensive coverage of a state population. Ultimately, the relationships developed through SIEC membership can provide insights into additional areas of engagement between public media and public safety and become another avenue for developing trusted relationships with leading state public safety personnel and



understanding their needs. Institutionalizing these relationships creates a path for public media to partner with public safety agencies in areas they most need and will lead to a sustainable long-term role for public media support of public safety.

As previously noted, public media personnel can become better familiarized with public safety incident planning and response operations by engaging in FEMA NIMS training in addition to participating on the SIEC.

In places where public media stations are independent of the state, **FE** recommends creating or strengthening state-wide public media associations, so they may be more effective in communicating their support for public safety with a unified voice. These associations can help stations build relationships with the appropriate local and state public safety and emergency management agencies.

The benefit of this consolidated-station approach is the ability to provide a unified representation of public media to state public safety authorities. Public safety leaders would then have a single public media point of contact, much as they are accustomed to having with other support organizations.

Once these supports are in place, the first step that **FE** recommends is for one or more of the national public media organizations to assist local stations with creating public media – public safety working groups or task forces. While the structure can range from an association of working teams to a formal organization, a central point of public media’s focus on public safety is vital to sustained success. This entity could also seek the contribution of selected public safety officials, especially those who are already engaged with public media.

Both public safety and public media have strong collaborative cultures, which should aid the development of a collaborative culture between public safety and public media.

4.1.1 Recommendation: SCIP Public Media Supplement Development

FE recommends that public media follow a similar approach used by public safety to conceive, implement, and monitor/track initiatives within each state. Using an approach created by FEMA, each state and U.S. territory has developed a SCIP. The SCIP details communications interoperability gaps and initiatives undertaken to resolve them. This document provides the best available source of public safety interoperability needs in each state and is an ideal starting point to collect state needs that may be relevant for a public media – public safety collaboration. Many states publish their SCIPs online and for those who do not, public media can request access to the document via the state department of homeland security (DHS).



FE recommends that the public media personnel supporting public safety within each state first review their state's SCIP. Then following a similar methodology, create a supplemental section to the SCIP addressing public media's capabilities and interface points. The planning steps for the development of a SCIP are well documented by FEMA and should effectively guide the development of this new section. With relative ease, public media personnel can provide a SCIP supplement detailing their station's capabilities to enhance public safety services and coordinate with the state's SIEC and DHS for integration into the document.

Developing the supplemental section expands public media's familiarity with public safety capabilities by providing:

- A better understanding of the state's public safety communications infrastructure, interoperability gaps and needs, and planned projects being developed by the SIEC.
- A useful starting point is identified for the development of a public media supplement that will be accepted for integration with the state's SCIP, which will, in turn, help the SIEC understand how public media could benefit their priorities.

4.1.2 Recommendation: Public Media Collaboration Concept

Much of the strategic direction for public safety interoperability comes from national agencies such as FEMA and the DHS. Their recommendations are primarily driven by the process documents, training materials, and grant funding they provide. Public media would benefit from effectively communicating their capabilities and educating FEMA and DHS on how they can assist public safety, homeland security and justice authorities at the national level.

Several specific steps presented here could enhance the engagement of public media with public safety at both the station and national level:

1. **National Support:** **FE** recommends that the national public media organizations support local and state level public media interfaces to public safety and emergency management. Success stories from the coordination of public media's public safety engagement in one or more states could be shared with other states, aiding the process.
2. **National Branding:** **FE** recommends that the stations work with the national public media organizations to develop a common branding for public media's commitment to and capabilities for supporting public safety. This branding would allow stations to more easily and effectively show public safety agencies



- that they are part of a substantive program with proven, repeatable, and supported capabilities.
3. **National Marketing:** *FE* recommends that national public media organizations collaborate to present their commitment to and capabilities for supporting public safety at conferences of the leading public safety organizations, and at leading communications technology conferences. This includes APCO, International Association of Chiefs of Police (IACP), NENA: The 9-1-1 Association, and the International Wireless Communications Expo (IWCE). This activity is similar to how public media currently addresses its presence at public media-centric and other broadcaster conferences such as the National Association of Broadcasters (NAB).
 4. **National Funding Sources:** *FE* recommends that national public media organizations help investigate and vet funding sources that may be available to support public media's public safety projects.

4.2 Establish Technology and Implementation Centers of Excellence (CoE)

The development of public media centers of excellence (CoE) could greatly increase public media's familiarity with a variety of future-looking technical public safety (and other) capabilities. Such an approach could also be used to scale the application of proven expertise and capability of a single local station to a group of stations in a region or the system as a whole.

Well-funded stations, such as Public Media North Carolina (UNC-TV), have the resources to experiment with such technologies as datacasting and NextGen TV. Such better-off stations, in concert with one or more other public media stations can then serve as a CoE for stations nationwide. The CoE could provide consultation as well as proof of concept, test, and evaluation for emerging technologies like NextGen TV and datacasting. It could also support trials, such as the integration of 5G carrier-grade broadband wireless technology with public media systems configured for public safety operations.



Image:
<https://d.lib.ncsu.edu/collections/names/8188-university-of-north-carolina-center-for-public-television>

The idea is for stations that are in the process of developing unique public safety or other solutions to consult with the relevant CoE. It could be valuable for these innovating stations to connect their technology to the CoE for the duration of the trial, effectively integrating with the CoE while evaluating the proposed solution. The intent is to create a technology proving ground for use by stations nationwide, resulting in use cases for public safety and other services being considered or developed by public media.

This process provides an opportunity to differentiate public media as a leader in public safety solutions. Building CoEs from stations with technical and other capabilities fosters collaboration among public media stations for the shared public safety service mission, among others.

Important benefits include:

- The focus created by a CoE allows a single station or small group of stations to gain the intellectual capability of other stations, without expending public media resources duplicating efforts at multiple other stations.
- The cost of the people and equipment constituting a CoE does not have to be replicated at every other interested station or group of stations.
- Advantages and pitfalls or obstructions to success can be identified before additional stations invest in solutions yet untailored to the station's community.

FE believes that the economy of scale provided by the CoE concept is an important priority for public media in developing and vetting public safety solutions and for its support for public safety in station communities.

4.2.1 CoE Recommendations

There are several possible initiatives, or projects, which could be undertaken to achieve the value of this CoE concept:

1. Establishing a TV-technology CoE focused on NextGen TV, potentially in concert with the North Carolina network, with emphasis on public-safety solution proof of concept and use-case verification.
2. Working with Public Media North Carolina and other potential CoE stations (e.g., University of Florida station, WUFT-FM), draft a CONOPS document defining use cases for the CoE station and an architecture to support other public media stations, through knowledge, cost and data sharing processes.



3. Increase awareness of the CoE process, ongoing successful CoEs and the CONOPS template to make other CoE opportunities available for all other public media stations.

Additional CoEs can be established for such skills as multimedia news production, social media site and content development, weather and environmental news product development, multi-lingual content presentation, earthquake warning, tsunami warning and other public media hallmarks.

4.3 The Outlook on Impact of 5G on Public Media

4G LTE currently provides much of the U.S. with wireless broadband access. It is a proven technology used in millions of smartphones as the delivery transport for expanded data offerings including applications, video and internet.

FirstNet®, being built by AT&T, is a 4G network to meet priority public safety broadband needs. FirstNet® provides public safety with priority access along with providing nonpriority or secondary use access for other users and subscribing entities. In 2016, public television stations pledged (in principle) to allocate 1 Mbps of their spectrum to FirstNet®, if needed.



Image:
<https://www.spokanepublicradio.org/post/pushback-against-superfast-5g-wireless-spreads-least-7-pacific-northwest-cities>

The advent of 5G offers great promise for delivery of mobile data. 5G is the 5th generation of the digital cellular network and promises download speeds of up to 3 gigabits per seconds (Gbps) using the high cellular frequency band 25 - 39 GHz. This marks an improvement over the previous 4G LTE maximum download speed of up to 300 Mbps and can deliver data speeds comparable to a cable TV provided Internet modem.

To achieve the maximum bandwidth promised with 5G, you must be located close to a site, usually well under a mile. Lower band LTE provides reduced bandwidth; however, it can provide reasonably fast data within a several mile radius. Another challenge of 5G is waiting for the build out of the system. Recently, there have been news stories regarding concerns expressed about safe levels of exposure to the 5G signal as well as the number of required cell sites. These concerns, which have not been substantiated, could still work to hinder the deployment and growth of the new technology.



Public media's ability to cover vast geographic areas using their existing robust networks currently provides a better cost/benefit than 5G architectures.

The balance of this page is intentionally blank.



5. Conclusion

This *Public Media Serving Public Safety, A White Paper* offers recommendations on how public media can support mandatory and discretionary community-based public safety messaging based on feedback from national public media organizations and stations, along with our understanding of public safety culture.

There are successful public media practices that have proven public safety value. **FE** believes these solutions represent some of the projects that public media could most usefully replicate at other stations. Developing these projects would further public media's progress towards greater engagement in its public safety mission.

However, it must be understood that for public safety organizations and public media entities to engage closely, they must see each other as trusted partners. This will be an incremental process, rather than a "magic bullet" occurrence. The offering of a service alone is not sufficient because public safety leadership needs to see public media as a committed partner before they can integrate the service into their critical routines. A step towards this goal is to share and build upon the methods used by those public media stations that have found some success. Over time, public media can leverage the trust gained locally to achieve its public safety mission broadly.

To achieve long-term meaningful results requires that public media, at the local, state, and national levels, take a consistent approach to nurturing the relationships and trust required to implement successful public safety engagements as our recommendations highlight.

The balance of this page is intentionally blank.



Appendix A - Current EAS/IPAWS/WARN Environment

EAS

The EAS is an evolution of predecessor alert systems Control of Electromagnetic Radiation (CONELRAD), established in 1951, and Emergency Broadcast System (EBS), established in 1963. These systems provided federal level and presidential alerts. Under a memorandum of understanding (MOU) in 1981, FEMA, the National Oceanic and Atmospheric Administration (NOAA) / National Weather Service (NWS), and the FCC extended the system to state and local level alerts. The FCC mandates the use of EAS emergency alerting by all broadcasters.

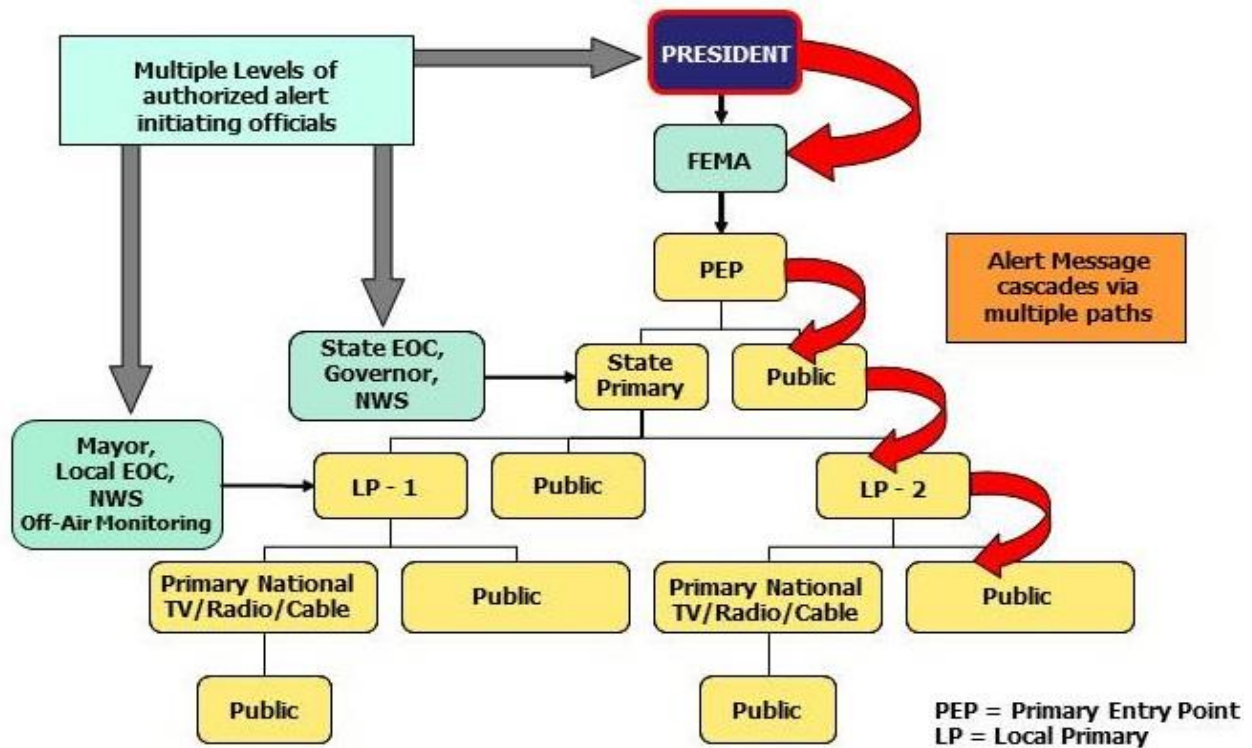
The EAS system is a hieratical chain, where alert information entered at the one of the upper or mid-levels is distributed to the public via the lower levels. In this chain, information entry points are defied as Primary Entry Points (PEP), and reside at the national, state (State Primary) or local levels (Local Primary or LP).

In some markets, the public media stations act as PEPs, either as “State Primary” or “Local Primary” stations. However, this is usually due to their historical status as a dominant broadcaster in the market area and not related to their status as a public media station.

The diagram below illustrates what is termed the “Legacy EAS Structure” and represents the alert information flow from the authorized sources to the public.

The balance of this page is intentionally blank.





Emergency Alert System (EAS) Architecture¹⁰

The balance of this page is intentionally blank.

¹⁰ Report: *September 27, 2017 Nationwide EAS Test* dated April 2018; Appendix: How EAS Works Page 19; Public Safety and Homeland Security Bureau, Federal Communications Commission.

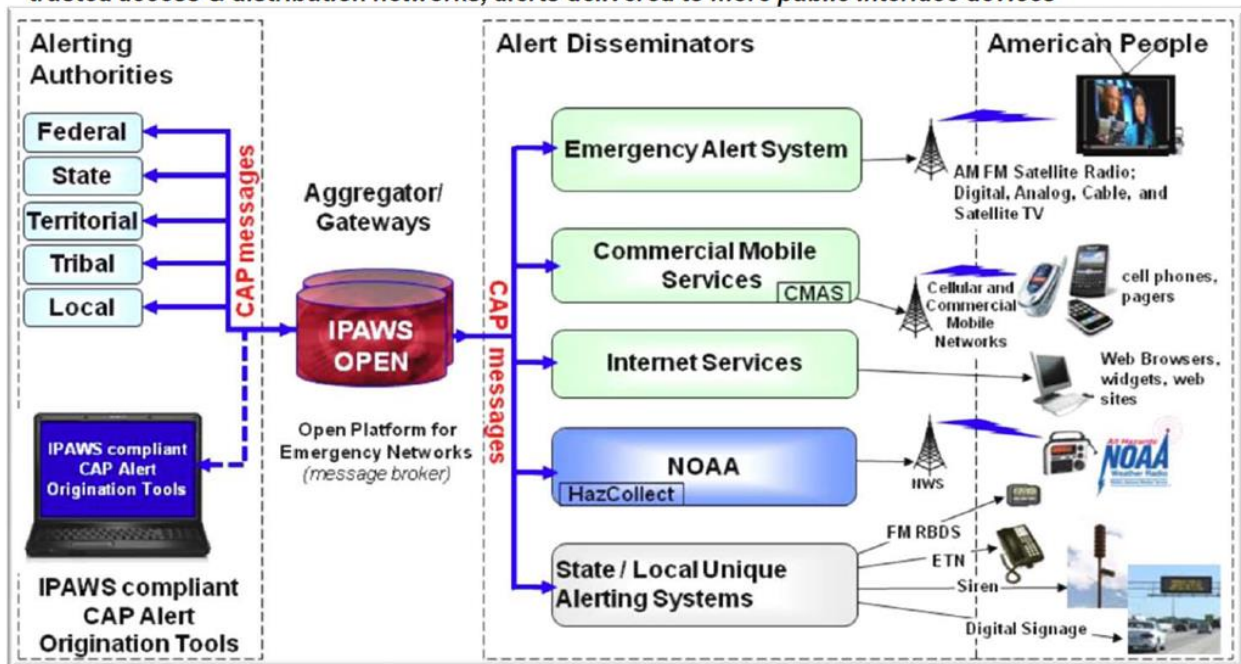


Integrated Public Alert and Warning System (IPAWS)

With the continued evolution of the EAS system, alerting authorities distribute alerts over the Internet by IPAWS.¹¹ IPAWS is a FEMA system for pushing alerts across all possible public information-transmission media as the IPAWS Architecture figure shows.¹² The key interfaces use the Common Alerting Protocol (CAP) to link to the Open Platform.

The IPAWS Architecture

Standards Based Alert Message data exchange format, alert message aggregation, shared, trusted access & distribution networks, alerts delivered to more public interface devices



The FEMA IPAWS Architecture¹³

¹¹ <https://www.fema.gov/integrated-public-alert-warning-system>; accessed October 2019

¹² https://emilms.fema.gov/IS247a/lesson1/L1_Print.htm; accessed 2/10/2020

¹³ https://emilms.fema.gov/IS247a/lesson1/L1_Print.htm; accessed 2/10/2020



PBS Warning, Alert and Response Network (WARN)

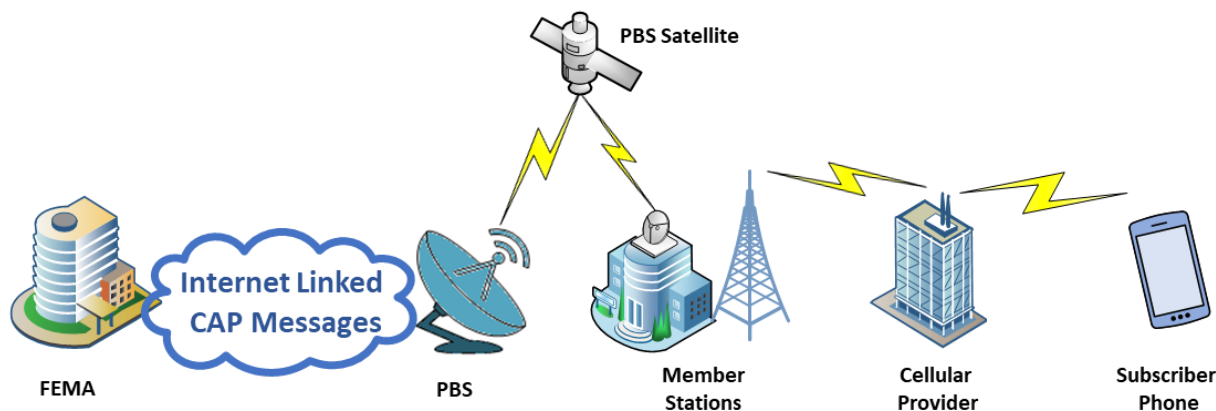
Public media television stations support IPAWS public warnings through the WARN system. PBS WARN is a system using PBS’s satellite distribution system and public media television broadcast stations to provide a redundant path between FEMA and cellular service providers for IPAWS CAP messages. By using PBS WARN, cellular carriers can receive IPAWS alerts independent of the Internet. This redundant path can prevent a cybersecurity incident or other Internet disruption of a carrier’s primary connection to FEMA for inbound Wireless Emergency Alert (WEA) messages.

The diagram below highlights the differences between these two paths, which is not visible in the previous IPAWS diagram. Note that the IPAWS architecture labels cellular providers as “Commercial Mobile Services.”

Primary Path for WEA Messages



Redundant PBS WARN Path for WEA Messages



PBS WARN Logical Flow Diagram¹⁴

¹⁴ Adopted from PBS.org; accessed November 2019



Unique State Emergency Alerting Systems

While the implementation of EAS is mandated by the FCC for all broadcasters, the architecture for delivering CAP standard digital alerting message to all broadcasters, including AM radio and satellite television, varies by state. As an example, delivering the CAP message in remote locations may require satellite communications for the link to some stations, as used by the Alaskan EAS delivery system in the figure.

EAS transmission systems in other states may be similar to the Alaska EAS distribution system, or use other architectures meeting the unique needs of the particular state. For example, with Ohio's EAS system, the public media network, Ohio Public Television, is central to the EAS distribution system.

The balance of this page is intentionally blank.



Appendix B - Glossary

Acronyms	Meaning	Description
4G	4th Generation Cellular	4G is the generation of digital cellular common today. It provided a significant increase in data speeds with wireless approaching typical wired speed and effectiveness for the first time. It is the technology FirstNet will be using.
5G	5th Generation Cellular	5G is the next generation of digital cellular. It consists of a set of technologies, primarily targeted at improving data communications speed and effectiveness and enabling efficient media streaming.
APCO	Association of Public Safety Communications Officials	APCO is the largest and dominant industry support organization in public safety communications, with membership regions representing the entire U.S. (and beyond). The annual conference draws over 5,000 people from both industry and agencies.
APT	American Public Television	American Public Television is the largest syndicator of programming for public television stations in the U.S. (Wikipedia).
APTS	America's Public Television Stations	America's Public Television Stations (APTS) is a nonprofit membership organization ensuring a strong and financially sound public television system and helping member stations provide essential public services in education, public safety and civic leadership to the American people
ATSC	Advanced Television Systems Committee	ATSC is the standards setting body for Digital Television (DTV). ATSC 1.0 is typically used a shorthand for the Current DTV in use in North America and beyond. ATSC 3.0 is the new set of TV and IP-based standards known by the consumer-facing brand of NextGen TV, the generation of digital TV to be implemented over the coming years.
CAP	Common Alerting Protocol	CAP is an XML format for transmitting public warnings and emergencies between alerting technologies and systems.
CoE	Centers of Excellence	CoE is an organizational concept whereby a team provides leadership, best practices, research, support and/or training for a focus area. The purpose is to focus these activities for improved results and minimized duplication of effort.
COMU/COMT	Communications Unit / Communications Technician	Portion of the FEMA National Incident Management System (NIMS) that provides a framework for support of communications during emergencies and disasters. FEMA NIMS definitions are supported by operational and procedure documents, and training programs to aid standardization and interoperability.
CONELRAD	Control of Electromagnetic Radiation	One of the first emergency alerting systems implemented in the U.S. for cold war alerting and later succeeded by EAS.
CONOPS	Concept of Operations	The CONOPS is a business requirement document detailing use cases for a system and suggested system architecture and interfaces. In the FPREN example, public media would outline use cases to design, implement, and operate the public media/public safety emergency information network.



Acronyms	Meaning	Description
CPB	Corporation for Public Broadcasting	CPB is a private, nonprofit corporation created by Congress in the Public Broadcasting Act of 1967. CPB is the steward of the federal government's investment in public broadcasting and the largest single source of funding for public radio, television, and related online and mobile services.
DEAS	Digital Emergency Alert System	The Digital Emergency Alert System was a system managed by FEMA and designed to alert first responders and civilians in the event of a national emergency. It was based upon and supplemented the EAS by sending out digital messages to mobile phones, pagers, radios, and televisions. The DEAS project was terminated in favor of FEMA's IPAWS Open Platform for Emergency Networks, with portions remaining in the Commercial Mobile Alerting System.
DHS	Department of Homeland Security's	Federal department overseeing many agencies including FEMA
DTV	Digital Television	Digital television encodes and transmits audiovisual signals using digital encoding, in contrast to the earlier analog television technology which used analog signals. The radio frequency waves that digital television uses transmit in discrete energy states rather than the continuous modulated waveform of analog signals.
EAS	Emergency Alert System	A nationwide alerting system instated in 1997 that replaced CONELRAD and EBS.
EBS	Emergency Broadcast System	An alerting system established to allow the President of the U.S. to communicate with the public in the event of a national crisis and was eventually replaced by EAS.
EM	Emergency Management	Leadership and organization of resources to deal with the humanitarian aspects of natural and manmade disasters.
EMAs	State Emergency Management Agencies	Generic name for State Emergency Management agencies and departments. The formal name varies by states, but EMD and EMA are most common.
EMD	Emergency Management Division/Department	Generic name for State Emergency Management agencies and departments. The formal name varies by states, but EMD and EMA are most common.
EOC	Emergency Operations Center	The facility of location used for planning and execution for emergency management functions at the local, county or state level. Often the structure varies by state.
ESF	Emergency Support Functions	FEMA ICS structure for coordinating interagency support for a response to an incident. ESFs are mechanisms for grouping functions most frequently used to provide support to States and other governmental levels, both for declared disasters and emergencies.
FCC	Federal Communications Commission	The Federal Communications Commission is a U.S. federal agency that regulates communications by radio, television, wire, satellite, and cable media.



Acronyms	Meaning	Description
FE	Federal Engineering, Inc.	FE is the consulting firm contracted to produce this White Paper. FE is an independent, worldwide public safety communications consulting firm. FE specializes in the planning, design, and implementation of state-of-the-art public safety mobile radio, 9-1-1 and PSAP emergency communications systems.
FEMA	Federal Emergency Management Agency	FEMA, a part of the U.S. DHS founded in 1978, assists national, state, and local first responders with resources to prepare for, mitigate, respond, and recover from national and manmade disasters.
FirstNet®	First Responder Network Authority	FirstNet® was created under the Middle-Class Tax Relief and Job Creation Act of 2012 is an independent authority within the National Telecommunications and Information Administration charged with constructing a nationwide public safety broadband network (Wikipedia).
FPREN	Florida Public Radio Emergency Network	FPREN is a consortium of 13 public radio stations that reach 99% of Florida's population to provide alert notifications for national and manmade disasters.
HD-Radio	Hybrid Digital Radio	HD Radio is the digital radio technology used by AM and FM radio stations in the U.S. The HD format also provides the means for a single station to simultaneously broadcast one or more different programs in addition to the program transmitted on the radio station's analog channel.
IACP	International Association of Chiefs of Police	IACP is a nonprofit organization dedicated to the support and continuous improvement of police leaders nationwide.
ICS	Incident Command System	A best practice that has been incorporated into the National Incident Management System (NIMS) that provides a framework for governmental and non-governmental organizations to prevent, protect against, mitigate, respond to, and recover from natural and manmade disasters.
IoT	Internet of Things	The Internet of Things is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction (Wikipedia).
IPAWS	Integrated Public Alert & Warning System	IPAWS system architecture unifies the U.S.' Emergency Alert System, National Warning System, Wireless Emergency Alerts, and NOAA Weather Radio, under a single platform. IPAWS was designed to modernize these systems by enabling alerts to be aggregated over a network and distributed to the appropriate system for public dissemination (FEMA.gov).
LMR	Land Mobile Radio	A push-to-talk based two-way radio system used primarily by public safety and public service organizations, utilities, and others to provide users with the immediate ability to initiate communication with one or more users.



Acronyms	Meaning	Description
LTE	Long-Term Evolution	LTE is a standard for wireless broadband communication for mobile devices and data terminals, based on the structure of previous analog and digital wireless technologies. It increases the capacity and speed using a different radio interface together with core network improvements (adopted from Wikipedia).
MetaPub	MetaPub	MetaPub was developed for the Public Radio Satellite System (PRSS) by NPR Distribution with funding from the CPB to enhance national and local public radio broadcasts with a seamless, real-time flow of metadata from PRSS producers, including NPR, PRI, APM and others. MetaPub enhances public radio broadcasts by providing images, text, and links and is available through broadcasts via web streaming, HD radios and RBDS-enabled radios (prss.org).
MOU	Memoranda or Memorandum of Understanding	A formal written agreement between two or more parties, often used by public safety agencies to share resources and provide mutual aid.
NC-DIT	North Carolina Department of Information Technology	NC-DIT is a North Carolina State Agency that provides technology services and support for other State agencies.
NEPA	National Environmental Policy Act	The National Environmental Policy Act (NEPA) is a U.S. environmental law that promotes the enhancement of the environment. NEPA creates the requirement that entities prepare environmental assessments (EAs) and environmental impact statements prior to undertaking many types of construction projects.
NETA	National Educational Telecommunications Association (NETA)	A professional organization representing 275 member stations in 46 states, the Virgin Islands and the District of Columbia. NETA provides leadership, general audience content, educational services, professional development and trusted financial management services, including human resources and benefits administration, to individual public media licensees, their affinity groups and public media. (netaonline.org).
NexGen TV	Next-Generation Television	The ASTC 3.0 standard, commonly known as “NextGen TV” is the first major upgrade in broadcast TV since the transition to digital broadcasting (DTV) in 2009. NextGen TV is an Internet Protocol (IP) based system, which means it can carry internet content and services alongside the traditional over-the-air broadcast signal (cpb.org).
NHPA	National Historical Preservation Act	The National Historic Preservation Act is legislation intended to preserve historic and archaeological sites in the U.S. of America. NHPA creates the requirement that entities prepare impact statements for many projects on historic properties (buildings, archaeological sites, etc.) through a process known as Section 106 Review.



Acronyms	Meaning	Description
NIMS	National Incident Management System	A framework for governmental and non-governmental organizations to prevent, protect against, mitigate, respond to, and recover from natural and manmade disasters. The NIMS framework includes specific roles and training for technical and public information staff, among other specialties. Both of these roles (technical and public information) fit well with public media's skill sets.
NOAA	National Oceanic and Atmospheric Administration	An agency within the U.S. Department of Commerce that studies oceans, major waterways, and atmosphere.
NPSTC	National Public Safety Telecommunications Council	NPSTC is a federation of organizations whose mission is to improve public safety communications and interoperability through collaborative leadership (NPSTC.org).
NWS	National Weather Service	The National Weather Service is an agency of the U.S. federal government that is tasked with providing weather forecasts, warnings of hazardous weather, and other weather-related products to organizations and the public for the purposes of protection, safety, and general information (Wikipedia).
OETS	Ohio Education Television Stations	Provides educational television programming for member stations in Ohio.
P25	Project 25	A suite of standards for voice and data communications systems focuses on public safety use.
PEPs	Primary Entry Points	The National Public Warning System, also known as the Primary Entry Point (PEP) stations, are a network of 77 radio stations that are, in coordination with FEMA, used to originate emergency alert and warning information to the public before, during, and after incidents and disasters (Wikipedia).
PIO	Public Information Officer	Public information officers are the communications coordinators or spokespersons of certain governmental organizations. The primary responsibility of a PIO is to provide information to the public and media as necessary and to meet the legal requirements (Wikipedia).
PPD-8	Presidential Policy Directive / PPD-8: National Preparedness	PPD-8's goal is strengthening the security and resilience of the U.S. through systematic preparation for the threats that pose the greatest risk to the security of the nation, including acts of terrorism, cyber-attacks, pandemics, and catastrophic natural disasters (DHS.gov).
PRSS	Public Radio Satellite System	The Public Radio Satellite System is the interconnected satellite-distributed network managed by NPR, and used by NPR, Public Radio International, and American Public Media, as well as independent public radio program producers, to distribute programming via satellite to public radio stations across the U.S. (Wikipedia).



Acronyms	Meaning	Description
PRX	Public Radio Exchange	The Public Radio Exchange is a nonprofit web-based platform for digital distribution, review, and licensing of radio programs. The organization claims to be the largest on-demand catalog of public radio programs available for broadcast and Internet use (Wikipedia).
PSA	Public Service Announcement	A public service announcement is a message in the public interest disseminated without charge, with the objective of raising awareness of, and changing public attitudes and behavior towards, a social issue (Wikipedia).
RDS/RBDS	Radio Data Services / Radio Broadcast Data System	The capability of FM radio stations to encode and transmit metadata, including narrative text, time stamps, and other information in addition to the audio signal.
SAFECOM®	DHS SAFECOM® program	SAFECOM is a DHS program that provides research, development, testing and evaluation, guidance, tools, and templates on interoperable communications-related issues to local, tribal, state, and federal emergency response agencies (NPSTC.org).
SAR	Search and Rescue	The search for and provision of aid to people who are in distress or imminent danger (Wikipedia).
SCEIN	South Carolina Emergency Information Network	An information sharing partnership between WUFT in Florida and SCETV in South Carolina to provide listeners with timely hurricane, tropical storm and other weather emergency content to South Carolina residents and visitors across the State.
SCIP	Statewide Communication Interoperability Plan	SCIPs are locally driven, multi-jurisdictional, and multi-disciplinary statewide plans to enhance emergency communications. SCIPs create a single resource for all stakeholders and a unified approach for enhancing interoperable communications for public safety and officials at all levels of government (cisa.gov).
SIEC	Statewide Interoperability Executive Committee	SIECs are organizations within each State government that define and implement initiatives outlined in the SCIPs. They are responsible for measuring the effectiveness of interoperability within their respective states and can also be involved in managing federal and state grant funds.
SOP	Standard Operating Procedure	A standard operating procedure is a set of step-by-step instructions compiled by an organization to help workers carry out complex routine operations. SOPs aim to achieve efficiency, quality output and uniformity of performance, while reducing miscommunication and failure to comply with industry regulations (Wikipedia).
SWIC	Statewide Interoperability Coordinator	The SWIC works with emergency response leaders across all levels of government to implement a statewide strategic vision for interoperability. As part of this effort, SWICs are responsible for the implementation of the Statewide Communication Interoperability Plan (SCIP), which establishes a vision for interoperability in the state (cisa.gov).



Acronyms	Meaning	Description
VOADS	Volunteer Organizations Active in Disaster	The National Voluntary Organizations Active in Disaster is a coalition of the major national voluntary organizations in the U.S. that have made disaster-related work a priority (Wikipedia).
WARN	PBS Warning, Alert and Response Network	PBS WARN provides a diverse, redundant path between FEMA and cellular service providers. Using one-to-many satellite distribution and terrestrial broadcast, PBS WARN reaches cellular carriers over-the-air (pbs.org).
WEA	Wireless Emergency Alert	Wireless Emergency Alerts, is an alerting network in the U.S. designed to disseminate emergency alerts to mobile devices such as cell phones and pagers (Wikipedia).
WMD	Weapon of Mass Destruction	A nuclear, radiological, chemical, biological, or any other weapon that can kill and bring significant harm to numerous humans or cause great damage to human-made structures, natural structures, or the biosphere (Wikipedia).

