OPERATIONS

INTRODUCTION

Operations is where the stark reality of an emergency situation is confronted by public safety communications professionals. The day-to-day processing of emergency calls, which occurs at the local level, is the first layer of any response. Technical solutions will only work if they are interoperable, intuitive, and useful to 9-1-1 professionals staffing or managing PSAPs. Operational impact must be factored into all aspects of design and implementation of technology, and requires close coordination with technology and information services departments. Additionally, when grounded in a well-developed governance structure and cybersecurity framework, operational considerations will drive training and workforce requirements.

The time is now to embrace the opportunities and minimize the challenges that broadband will bring to operations.

The receipt and processing of broadband data from NG9-1-1 and FirstNet will have a number of substantial impacts on PSAP operations. Policies must address all functional elements including call processing, CAD, GIS, location technologies, ESInet, records management system (RMS), recording, data processing, management and evidence retention, as well as dispatch console (radio and NPSBN) operations. Further, policies should address how staff interact with each of these elements, the capacity of the workforce and PSAP systems to handle the amount and type of data involved, the role of technology and service providers, and the different ways PSAPs will interface with the public, responders, third party providers, and other systems

The receipt and processing of broadband data from NG9-1-1 and FirstNet will have a number of substantial impacts on PSAP operations.

and databases. This requires an evaluation of a variety of potential policy solutions and areas of improvement to existing consensus-based standards and best practices.

The nation's 9-1-1 networks are among the last still entrenched in legacy technology, and are quickly becoming an island in the middle of advanced technologies available to the public and soon to come to first responders over the NPSBN. Like the experience in the private sector, broadband technology will completely revamp 9-1-1 and emergency communications. The time is now to embrace the opportunities and minimize the challenges that broadband will bring to operations. Interoperability, cost-effectiveness, innovation, and cybersecurity can and should be the goals to achieve at the outset.

THE OPERATIONS ROLE

The ability to share information across jurisdictions is limited today but also bound to grow significantly with use of IP and broadband technologies. Examples of how information sharing could be leveraged by public safety agencies and resources include but are not limited to:

- Home medical devices designed to store and share patient information with emergency responders.

- Electronic health records made available to doctors before the patient arrives at the hospital and soon to the responders in the field to assist with pre-hospital emergency treatment.
- Building records and floor plans could be sent through CAD to incident command.
- Broadband interfaces could connect on a much larger scale to numerous camera systems and detectors including at schools, public gathering places, and critical infrastructure facilities allowing for real-time situational awareness.
- Officer-worn body cameras will have the ability to transmit video to the PSAP and supervisors in real time for immediate situational awareness.
- Video from security surveillance systems at residences and businesses that are triggered by an alarm can be streamed live to PSAPs and shared with responders.

FINDINGS

Broadband technology will impact almost all aspects of operations. The following is a non-exclusive list.

Funding

Sufficient funding is essential for both the initial capital expenditure to purchase the networks, equipment, software, hardware, and applications needed to move from legacy to new technology, and the operating expense to sustain, maintain, and upgrade these technologies. Congress to date has established limited grant programs, but a more substantial grant program to modernize 9-1-1 services across the country is a national imperative. This would help ensure that PSAPs across the country have the resources needed to upgrade in approximately the same timeframe, while preserving the responsibility of state and local governments to address funding for workforce, training, and sustainability.

Policy Development

The current 9-1-1 environment supports a structured process with relatively clear delineation of responsibilities as defined by statutes, rules, standard operating procedures, and guidelines for call processing. Broadband-based NG9-1-1 introduces complexities into this structure requiring increased coordination and partnership with other stakeholders, including other local PSAPs, regional or consolidated 9-1-1 centers, fusion centers, real-time crime centers, hospitals, supporting agencies such as utilities, departments of transportation, federal agencies such as the Department of Homeland Security (DHS),[9] and the private sector such as alarm companies and private ambulance services. Not only will all of these entities serve as resources of data and information sharing, a connected, broadband-enabled network of PSAPs across the country will, for the first time, be able to act as a sensor network and indicator of developing trends and threats. This will necessitate reexamination of certain existing governance and policy structures and call flows, as well as new or modified APCO standards.

Standard operating procedures will be needed to address handling each type of broadband data (voice, text, photo, video, sensor, etc.). Procedures will also need to account for:

- Increased call or session times
- Errors made by the public
- Legitimacy of the information
- Potential for real-time text and video chatting with the public and responders

- Opportunities to send media back to 9-1-1 callers, including instructional materials and photos (such as to verify a suspect or location)
- New technological options for communications with non-English speakers, and hearing and visually impaired callers
- Hosted services including CPE, CAD, and RMS
- Sharing and exchanging data with first responders, hospitals, support agencies such as departments of transportation, utilities, and private companies such as alarm companies
- Management of the data (how received, analyzed, shared, retained, and stored)
- False or unconfirmed alarms from automated systems and sensors
- Implementing systems (such as the APCO ASAP program) that substantially reduce errors and delays

IP and broadband technology will make a marked improvement in the ability and ease of transferring information between PSAPs. Fully interoperable ESInets will be key to data exchange. However, policies will need to govern when and how to transfer a call to ensure seamless operations and to cover shifting responsibilities over the data such as for record management and liability.

Policies and procedures will also, for some time, need to address the transition period as IP connectivity and broadband technology are introduced. While this transition period ideally should be kept as short as possible, PSAPs will need to contend with the various stages of legacy, transitional, and fully deployed NG9-1-1 and broadband technologies.

Simultaneously Triaging Multimedia Data from Multiple Sources

Call processing times will vary depending on the type of information being received. For voice calls or text messages, call processing times are more readily established and managed. But with the introduction of multiple types and sources of data in addition to or in place of voice calls, and the need to process this information as part of an overall response, operations will need to make adjustments to measure and manage call flows and processing times. At the same time, PSTs will continue to perform many of the same fundamental tasks they perform today: triage (where is the emergency, what is the nature of the emergency, are weapons involved, number of injured, when the emergency occurred, what is the callback number), classification of the information received, and conveying information to field responders.

In the broadband environment, PSAPs may need to create a new position or function for a data or intelligence analyst.

In the broadband environment, PSAPs may need to create a new position or function for a data or intelligence analyst to triage multiple sources of information concerning the same or unrelated incidents, in order to determine what multimedia data is critical to forward to responders immediately, versus what data is more "background noise" or evidentiary rather than actionable. The work of the data or intelligence analyst may at times need to be coordinated with other public safety agencies.

The analyst function may require certain certifications or core competencies, and likely would be a specialty skill requiring cross training or additional staff positions. Particularly for data mining technology applied to social media outlets, data mining specialist positions may also be needed. It is becoming increasingly more common for a first report of an incident to be posted on social media before a 9-1-1 call is made.

Priority must be given to information of an emergent nature, such as crimes in progress, HAZMAT situations, fire and medical emergencies, etc. Also, decisions need to be made as to what type of information can or should be sent based on the role of the particular responder receiving the information. For example, a police officer rushing to a scene, who is focused on speed of arrival and the immediate environment, cannot necessarily absorb an abundance of information. There are also practical considerations – if a fire response typically occurs within minutes of time, determining what information is most critical, at what particular moments, and to whom to send the information

to during the response will be necessary. Further, since responders using the NPSBN will have new options for receiving information, such as through touch screens, hands-free devices, messaging, etc., PSAPs will need to decide how and in what format to send information to responders. Many agencies are already deploying PSTs tactically to the field, whether for pre-planned events or major incidents. Similar to field responders, tactical PSTs will be afforded additional broadband-enabled means to communicate with the PSAP, and this too will require consideration.

Today, multiple reports to 9-1-1 can come from the same incident, such as a traffic accident. In a full NG9-1-1 environment, this would now include multiple photos, videos, and other data coming not only from the public, but from field responders, surveillance cameras, drones, as well as sensor data such as vehicle telematics, biometrics, gun shots, chemicals, etc. Further, these sources of multimedia are not necessarily fixed in time, but can yield continuous and dynamic information, requiring continued vigilance. The analyst and PST could be aided by systems being developed with data mining, intelligence, or cognitive (self-learning) capabilities that identify key indicators and provide dispatch recommendations. However, operations would always need to account for the human element in emergency response. The human element is the value that PSTs add regardless of the technology available to them, based on their training and interview skills (such as EMD questions, obtaining suspect descriptions, identifying fire exposures or entrapment data). Ultimately, it is the experience and expertise of PSTs that best ensure a successful response.

There will also be numerous sources of additional information from the public that will tax resources. With all of the potential ways that the public could communicate with 9-1-1, PSAPs large and small will also need to contend with reports made through mobile apps, social media, and crime tip portals. Many of these reports will not be emergencies and may be more numerous as compared to today's non-emergency voice calls. Further, with the consumer expectation for immediate response typical of their personal experience with texts, social media, and mobile apps, the PST will need to remain focused on emergencies while balancing the public's expectation for an immediate answer to their inquiries. At the same time, standard operating procedures will need to address how to handle, preserve, and store the information received from the public in a way that is compliant with relevant laws and regulations.

Ultimately, it is the experience and expertise of PSTs that best ensure a successful response.

Broadband technology will also provide new options for PSAPs to send alerts and notifications to the public. In addition to official outlets, such as the Emergency Alert System and Wireless Emergency Alerts, there are a number of alerting and Emergency Notification Systems (ENS) currently on the market. All require the input of information and selection of the area to be notified. Many PSAPs and state and local agencies have web pages and social media forums as well. Public alerts and notifications can be very helpful to reduce or focus 9-1-1 inquiries and reports. PSAPs need to establish procedures for coordination of these numerous alerting platforms, selection and timing of emergency notifications, and compliance with applicable laws and regulations including storage and retention. It may be best to identify a supervisory level position to originate and execute alerts to permit the PST to remain focused on coordinating the response to the emergency, processing incoming calls and information, and updating responders.

PSAPs also need to determine how operations will complement and interact with other entities such as fusion centers that manage multiple sources of information and data.

Data Storage, Retention, and Evidence Control

The recording and archiving of voice, text, audio, photographs, video, data, location information, etc. is going to be a major operational concern. Consideration must be given to the open records acts, privacy, and evidence retention related laws for each state. Local requirements for retention of data will drive agency requirements for equipment or services. In addition, with certain hosted solutions, records may be retained in more than one place (such as for redundancy and security reasons) and consideration must be given to identifying the responsible custodian of record, such as for subpoena purposes.

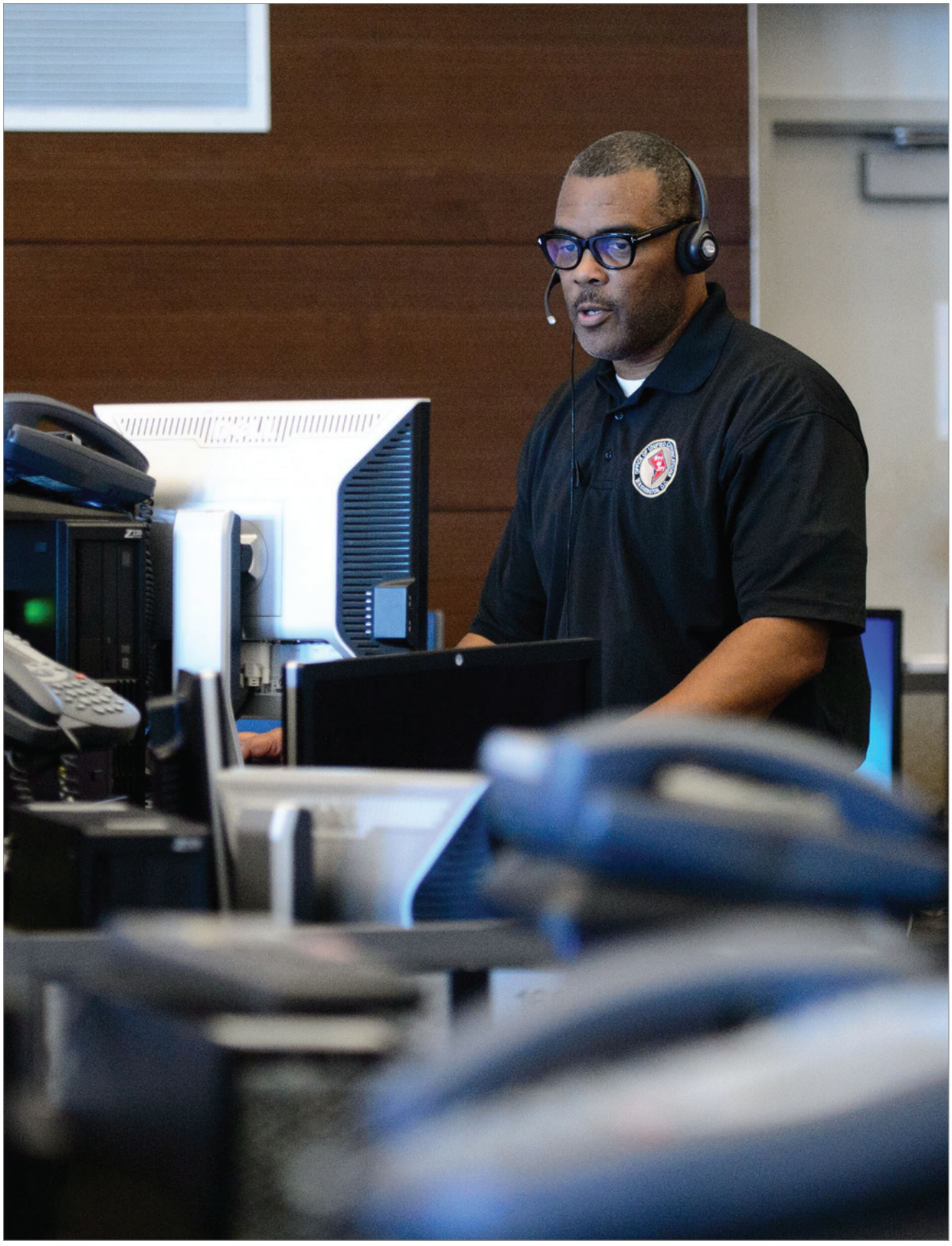
Standard operating procedures need to ensure that the handling, disseminating, and storage of the information received are compliant with all local, state and federal laws and regulations.

Standard operating procedures need to ensure that the handling, disseminating, and storage of the information received are compliant with all local, state, and federal laws and regulations while still maintaining an orderly and efficient flow of data. This extends to the need for tracking the flow of information, and flagging information for confidentiality, evidentiary, chain of custody, and investigative purposes.

Maximizing Staff Effectiveness in the Next Generation PSAP

With the new forms of data that will be available to the PSAP, PSTs will need to triage information in a fast-paced, high emotion environment. Incident-related photos and video messaging, in contrast to voice calls, will have a different and more disturbing impact on PSTs, potentially leading to additional stress-induced issues. Because PSAPs are the concentration point for incidents, the exposure to high volumes of information and disturbing content may be especially intense on staff. Further, the unique responsibilities of PSAP personnel mean that they cannot necessarily take a break before responding to the next call for service from the public, processing new information from other agencies, or assisting first responders facing life-threatening situations.

Preparing staff for this type and level of activity, and hiring the right personnel to begin with, is key. As detailed in the Workforce section, hiring processes will need to adapt to the broadband-driven, rapidly changing environment, including adding new positions and functions such as data analysts. Agencies are already being asked to do more with the same staffing, or find ways within existing or declining budgets to hire additional staff with enhanced skillsets. This is unsustainable and, with



the approaching impact of broadband on PSAPs, will require the attention of leadership at all levels.

Training will be a critical aspect of preparing for and implementing broadband-based technologies and services.

As detailed in the Training section, training will be a critical aspect of preparing for and implementing broadband-based technologies and services. This extends to new positions (e.g., analysts), new responsibilities (evidence documentation and retention), new forms of EMD, and resulting stress brought on by imagery normally only experienced by field personnel. It will be important for agencies to provide information to employees regarding access to and participation in critical incident stress management (CISM) and other programs including employee assistance, health and wellness, and stress management. With the potential for additional critical incident stress, this may require reconsidering twelve hour shifts and creating shorter shift hours or split shifts.

Cybersecurity Hygiene and Requirements for the PSAP

In the legacy environment, PSTs have for the most part been immune to cybersecurity issues. The Cybersecurity section goes into much greater detail, but this threat is only going to grow, and even with hosted or shared solutions, must be taken into account throughout all aspects of PSAP operations for prevention, detection, mitigation, and recovery from cyber threats.

The Impact of Mobile Apps on the PSAP

Mobile apps, such as those used on smartphones and tablets, will play an increasing role both in the use by the public to contact 9-1-1, and by responders in the field using apps including those to be made available by FirstNet. Apps can make emergency response more effective and efficient by incorporating useful information in an easy and intuitive way to the user. PSAPs in turn will be able to receive and process information that apps make possible.

Through its "Application Community" (www.AppComm.org) website, APCO has led the way in helping to ensure that apps used for public safety and emergency response purposes are as effective and efficient as possible. APCO has also produced a helpful Fact Sheet on Mobile Apps and 9-1-1,[10] and a White Paper on "The Status of 9-1-1 Apps."[11] In addition, APCO has been partnering with DHS on a pilot project to advance interoperability and security of mobile apps.[12] Standards including a common way for apps to provide data to PSAPs are critical.

Important considerations for mobile apps include the necessity of open APIs (to avoid proprietary, non-uniform solutions), interoperability among PSAPs and responder agencies including seamless integration with CPE, CAD, GIS, and RMS, and cybersecurity and reliability (particularly if the app uses networks, databases, and servers outside of the trusted 9-1-1 network). Cost is also a consideration, especially if the public comes to rely upon an app and the PSAP is faced with a lack of funding or a cost increase for using the app. Further, app developers must appreciate and accept the responsibility and commitment that comes from producing a product used for emergencies.

Operationally, PSAPs need to ask developers questions about costs, interoperability, commitment, etc. and plan on ensuring sufficient liability protection and training. ■

RECOMMENDATIONS: OPERATIONS

Operational Standards

Standards are critical to effective operations, and to ensure interoperability, cost effectiveness, and innovation. For operations, new ANSI standards should be developed to address data triaging; real time evidence management, retention, and control; and interoperable interactions with other agencies. With the advent of a major transformation within 9-1-1 and emergency communications, this will be a large but valuable undertaking.[13]

Best Practices

The nature of broadband technology to lead to uniform deployments and applications across the country, while allowing room for local customization and control, provides opportunity for model best practices development. APCO will develop an online repository for PSAPs to post and share next generation best practices.

Resources and Funding

PSAP managers and directors should work to build their cases for new or modified personnel positions and the funding needed to upgrade and maintain needed services and equipment. They should also engage in a broad dialogue with IT departments and other existing or developing intelligence analysis centers to frame out respective operations and division of responsibilities. APCO will advocate at the federal level for a sufficient, effective, and efficient grant program for the initial capital needed to modernize 9-1-1 networks and equipment across the country.

Public Messaging and Education

The impacts on operations, from today's legacy systems through the transition and eventual completion of NG9-1-1, can be mitigated by a better informed public. For example, public education campaigns for nascent text-to-911 services have been successful in reinforcing the concept to "call if you can, text if you can't." As the expectations of the public become increasingly disconnected from the actual capabilities of PSAPs, 9-1-1 authorities and PSAPs should convey what services they currently offer.

Quality Assurance/Quality Improvement (QA/QI)

One of the larger impacts broadband capabilities will have is on QA/QI. Not only will calls continue to require review in a systematic and objective manner, but new data types, requirements, capabilities, and stresses will all have to be taken into consideration.

The following are recommended updates to the QA/QI program:

- Set clearly defined minimum standards and expectations for processing SMS/text-to-911 and multimedia/MMS calls. The QA/QI program must be understood by PSTs.
- Update pre-scripted "interview" questions for each public safety discipline (police, fire, EMS).
- Set minimum expectations for gathering critical criteria particularly for callers sending multimedia information (address, callback telephone number, nature of emergency, etc.).
- Establish new requirements for objective scoring categories and supporting standard evaluation guidelines for the handling of broadband information (below expectations, meets expectations, exceeds expectations, etc.).

- Maintain a log of all incoming SMS/text-to-911 and multimedia/MMS calls which are subject to random or requested/special review in the QA program.
- Access and print transcripts of SMS/text-to-911 and record and store multimedia/MMS calls along with other associated information (CAD event, ANI/ALI data, etc.).
- Review data, photos, videos, etc. associated with incidents to assess how this information was utilized by the PST.
- Provide appropriate training for conducting reviews on SMS/text-to-911 and multimedia/MMS calls to QA evaluators.
- Establish timeline benchmarks for conducting QA reviews on SMS/text-to-911 calls and multimedia/MMS calls (e.g., weekly, monthly, etc.).
- Establish an accountability process, training, performance improvement plans, and/or corrective action specific to SMS/text-to-911 and multimedia/MMS calls as required.
- Align standard operating procedures (SOPs) with those areas identified for improvement so that the SOPs can be used in future training related to use of broadband technologies (in-service training, remedial training, training bulletins, etc.).
- Implement or expand Critical Incident Stress Debriefing to address Post Traumatic Stress Disorder experienced by PSTs exposed to disturbing multimedia/MMS data.

Notes

9 DHS provides a number of resources to support a robust information sharing environment. See https://www.dhs.gov/topic/information-sharing.

10 http://appcomm.org/wp-content/themes/directorypress/thumbs/FactSheet_911Apps.pdf.

11 http://appcomm.org/wp-content/themes/directorypress/thumbs/WhitePaper_911Apps.pdf.

12 http://psc.apcointl.org/2016/11/10/apco-partners-with-dhs-to-advance-interoperability-and-security-of-mobile-apps/.

13 On the technical side, NG9-1-1 standards are needed to ensure seamless interoperability, connectivity, and data sharing, especially among and between CPE, CAD, RMS, and radio and broadband communications consoles. However, until standards are both developed and implemented in a manner that PSAPs can rely upon as being "build to" or "end state" in nature, PSAPs need to make important inquiries of their vendors. See the Technology section for a more detailed discussion of this issue.