The Status of 9-1-1 Apps

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I. BACKGROUND

Mobile apps are not ready to replace calling 9-1-1. While apps undoubtedly hold great promise for improving public safety and emergency response, much work remains to ensure apps are sufficiently secure and reliable. These issues are being addressed, but for the foreseeable future, placing a voice call to 9-1-1 will remain the best way to get help.

A 9-1-1 call is often the first step for getting help in an emergency, whether personal or catastrophic in nature. The 9-1-1 network is trusted, reliable, and secure. It's the product of years of careful design to ensure callers are connected with the appropriate 9-1-1 center (known as a "public safety answering point" or "PSAP"). This network is separate from the networks that handle ordinary calls and other smartphone communications (such as texts, apps, social media, Internet access, etc.). When you dial 9-1-1, your service provider hands off your emergency call to this special network, which is designed to handle communications involving the safety of life and property.

In the United States, 9-1-1 is closely regulated and monitored at the federal, state, and local levels with rules that vary by jurisdiction. These regulations address funding for 9-1-1 networks and services, which is often insufficient and requires a balancing of staffing, training, and equipment needs. Expert bodies of industry and public safety professionals regularly work to improve regulation, enhance 9-1-1 network performance, and develop best practices and standards for 9-1-1 service providers to follow. The expertise that supports this work cannot be easily obtained. For example, public safety telecommunicators, those who answer 9-1-1 calls, dispatch first responders, and manage high-stakes incidents have a unique understanding of emergency operations that only comes through first-hand experience.

The best way to request emergency services is through the secure and reliable 9-1-1 network with the support of public safety telecommunicators. The 9-1-1 network is only capable of handling voice calls or, in some cases, basic text messages. However, 9-1-1 is gradually transitioning to IP-based networks that will enable new forms of communication from the public and other benefits such as better performance during disasters or high call volumes. These Next Generation 9-1-1 (NG9-1-1) networks will enable the use of text, video, and other data with the same security and reliability the public has come to expect from 9-1-1.

Mobile apps are being developed that attempt to provide advanced capabilities before NG9-1-1 arrives. Apps designed for 9-1-1 purposes are potentially dangerous: apps use the public Internet, as opposed to the safe and reliable 9-1-1 network; many 9-1-1 centers do not have Internet access; standards must be completed to ensure these apps work nationwide and are effective for emergency response; and these apps often make misleading claims that they can replace a voice call to 9-1-1.

Progress is being made. APCO International, the world's largest non-profit association of public safety communications professionals, including those that answer 9-1-1 calls and dispatch first responders, is developing a standard so that apps can communicate with 9-1-1 centers in a universal format that enables nationwide use. This will be an important step, but having a common way for apps to work with 9-1-1 is only part of the puzzle. Apps that would serve such an important function will also need to be secure, reliable, and easy to use. APCO has taken steps to address several of these issues and remains committed to ensuring all public safety apps, not just those that contact 9-1-1 centers, are as effective as possible.

This document focuses on 9-1-1 apps, meaning apps designed to replace or augment communications that would otherwise take place via a voice call to 9-1-1. The purpose is to provide an

overview of the apps being used today, areas of concern, and efforts to ensure apps are as effective as possible.

II. APCO's Role

As the world's largest association of public safety communications professionals, APCO has become a leader in apps related to public safety. APCO recognized that apps hold great potential and engaged in significant efforts to ensure they're as effective as possible.

a. AppComm

APCO determined to support the development of a diverse public safety app ecosystem fostered through the collaborative efforts of public safety professionals and app developers. APCO launched the Application Community (www.AppComm.org) to facilitate this collaboration by serving as the single, trusted site for public safety apps.

AppComm does not include 9-1-1 apps due to concerns described in this document. However, there is a "9-1-1" category, along with Police, Fire, EMS, and Alerts, for apps that are related to 9-1-1. For example, this category includes apps that provide a 9-1-1 call feed, assist first responders with requesting a medevac helicopter through a dispatch center, and allow users to send crime tips to a public safety agency.

From the start, APCO was clear that it was not endorsing or formally vetting the apps listed on AppComm. As developers sought to have their apps included, it became evident that an objective rubric was needed to ensure that inappropriate apps were not receiving tacit endorsement or otherwise benefiting from inclusion on the site. Thus, APCO developed the Key Attributes of Effective Apps for Public Safety and Emergency Response to guide the selection of apps.

b. APCO's Key Attributes

The Key Attributes of Effective Apps for Public Safety and Emergency Response provide public safety professionals, app developers, and the general public with an outline of important considerations for apps that include public safety or emergency response features. The Key Attributes address issues such as security, data and battery efficiency, privacy, location information, and how apps interface with 9-1-1 centers.

APCO is uniquely suited to ensure apps do not negatively impact public safety operations or lead to consumer confusion. As discussed in greater detail below, APCO is developing a standard for how apps interface with 9-1-1 centers. For other Key Attributes, such as security and efficiency, APCO invited assistance from a variety of stakeholders to ensure public safety professionals and the general public are provided with reliable tools. In this regard, APCO has collaborated with industry leaders and government officials to explore testing programs designed to ensure apps are secure and reliable. APCO continues to welcome additional partners interested in working to test mobile apps.

The Key Attributes and APCO's efforts to ensure apps are secure and effective are especially important for apps that seek to provide mission critical features such as contacting 9-1-1.

c. Addressing App Efficiency and Security

The success of AppComm and publication of the Key Attributes resulted in discussions with a variety of stakeholders.

i. App Security Workshop

APCO hosted a Public Safety Mobile Application Security Requirements Workshop in cooperation with the U.S. Department of Commerce, Public Safety Communications Research (PSCR) Program,[1] and the First Responder Network Authority (FirstNet), which is implementing an advanced mobile broadband network for the nation's first responders. This first-of-its-kind event brought together public safety practitioners, app developers, industry experts, and government officials to identify initial security requirements for apps intended for public safety use.

During sessions facilitated by representatives from APCO and NIST, workshop participants addressed app security topics such as data protection and identity management. Breakout groups comprised of individuals with diverse professional backgrounds considered use cases to identify public safety needs, mobile app technology issues, and potential security requirements for public safety apps. NIST produced an Interagency Report capturing initial public safety security requirements for mobile apps and strategies for determining if apps meet the requirements and making this knowledge available to purchasers/users.

ii. Testing Pilots

APCO is collaborating with partners that have expertise in app efficiency and security testing on pilot programs to evaluate apps. These pilots are in progress, but the early stages have revealed several important lessons:

- The diversity and uniqueness of apps make it difficult to design a comprehensive and objective evaluation program. For example, battery drain can be a serious concern for public safety apps. However, some well-designed apps may employ useful features that unavoidably tax the battery but serve an effective purpose. Other apps may drain a battery because they are poorly designed. An evaluation program needs to be able to take these circumstances into account.
- Updates, whether required for the app to run on an updated operating system or for changes to the app's features, might be so frequent that maintaining a certification by testing each version could be resource-intensive and impractical.
- App developers, particularly small teams, may lack financial and personnel resources that thorough testing programs would require.

[1] The PSCR program is a joint effort between the National Institute of Standards and Technology (NIST) and the National Telecommunications and Information Administration (NTIA).

It's clear that no one-size-fits-all solution exists for evaluating public safety apps. The complexity underscores the value of a vetting process that end-users could rely on. The integrity of the 9-1-1 system, which has historically been very secure and reliable, will need special attention to be properly protected as apps are introduced.

d. Creating a Standard

APCO is an American National Standards Institute (ANSI) Accredited Standards Development Organization. APCO is currently developing an ANSI standard for Application Integration with Public Safety Communications Centers and Public Safety Responders. This effort will address the development of a common approach to interfaces with public safety communications centers (PSAPs, emergency operations centers, etc.).

This standard will create a model for public safety and industry alike and will facilitate a better understanding of, and integration into, the public safety operations environment as it relates to apps and the value they bring. Enabling interoperability for a diverse app ecosystem will address a major limitation on 9-1-1 apps.

The standard is currently under committee review, and will thereafter be made available for public review and comment. As filed, the standard will address "smart" devices (phones, tablets, etc.) and computer based applications, both mobile and fixed, that impact operational and technical elements of public safety communications. Topics will include:

- Development of a common approach to interfaces with public safety communications centers (PSAPs, emergency operations centers, etc.). Interfaces may be browser-based, IP direct, or via other methods such as, but not limited to, relay services.
- How to make apps device and operating system agnostic for how they interact with public safety communications.
- Integration to both legacy and Next Generation public safety communications systems.
- Security requirements.
- The critical nature of location information in apps designed for public safety.
- Planning for evolution of voice and data networks as they relate to apps specific to public safety.

III. 9-1-1 Apps

Some countries are using apps in an official capacity for emergency services nationwide. These apps can simultaneously place a call and send the phone's GPS coordinates for display on a map-based interface, transmit the name and number of an emergency contact, send the user's medical information, log check-ins that help track location in case of emergency, and even send texts or videos to the PSAP.[2]

The United States does not have an official 9-1-1 app, but some colleges and universities have adopted campus safety apps that serve a similar function within those communities. For example,

[2] See, e.g., Denmark http://www.112app.dk/, Iceland http://www.safetravel.is/112-iceland-app/, and Canary Islands http://www.112canarias.com/info/index.php/nuevas-aplicaciones/fress.

students and faculty can use apps to contact campus police to share video, audio, and location data.[3] These microcosms offer a glimpse into what will be possible with a nationwide solution. Because campus safety agencies are already understood to be separate from 9-1-1, these apps avoid some of the risks presented by apps claiming to replace 9-1-1. These limited, small scale deployments can enable innovation and provide test environments to help inform more general solutions for the 9-1-1 environment. However, there's a risk that familiarity and a preference for the app would lead users, particularly young adults, to inappropriately attempt to use the app for help when outside of the service area instead of calling 9-1-1, delaying an effective emergency response. As with all public safety-related apps, campus safety apps should adhere to APCO's Key Attributes. Concerns with 9-1-1 apps and issues that need to be addressed are discussed in greater detail below.

IV. Misleading Claims and Dangerous Features

Lacking a nationwide standard or official certification has not prevented developers from marketing 9-1-1 apps in the United States. Apps that hold themselves out as being ready to replace or substantially augment 9-1-1 present significant problems for PSAPs and put users at risk. APCO has become aware of more than 20 such apps. Some of these apps make misleading claims such as:

- Claim: *Using the app is preferable to calling 9-1-1*
- FACT: Calling 9-1-1 is the best way to get help in an emergency. Failing to warn of possible delays and reliability concerns associated with the app communicating outside of the 9-1-1 network and over the public Internet is misleading and potentially dangerous.
    - BEWARE of apps that say "better than 9-1-1" or "it has been called 9-1-1 on steroids."

- Claim: *The app can pinpoint user locations*
- FACT: Location accuracy can be a significant challenge. For example, GPS does not work well indoors, or in dense urban areas. Major efforts are underway by wireless service providers, technology companies, and the public safety community that will lead to significant improvements in location accuracy for emergency situations.
    - BEWARE of apps that say "it sends your precise location to 9-1-1."

- Claim: *The app is certified*
- FACT: No app certification process exists that has been developed or approved by 9-1-1 public safety organizations or government entities with authority over 9-1-1.
    - BEWARE of apps that say "it's certified by medical doctors and paramedics."

- Claim: *The app sends information to first responders*
- FACT: Bypassing 9-1-1 call takers and dispatchers could place first responders and those in need of assistance in danger. Public safety telecommunicators are the critical link between the public and the nation's first responders. They adapt to rapidly changing, high-stakes situations,

[3] See, e.g., Emergensee (http://appcomm.org/emergensee/), ResCUer: Cornell (http://appcomm.org/rescuer-cornell/), and ELERTS Campus (http://appcomm.org/elerts-campus/).

obtaining and dispensing lifesaving information. Further, in many cases first responders would only receive the information if they download the app, pay a fee, and actively monitor it for updates. And because there's no nationwide standard for these apps, they're only usable in jurisdictions that have adopted them.

- BEWARE of apps that say "it allows you to communicate directly with first responders," "it's always available to law enforcement," "the app allows law enforcement and first responders to identify people and their locations," or "it notifies off-duty and retired law enforcement officers of active shooter incidents."

These examples illustrate the most troubling claims and features being advertised with 9-1-1 apps. Some developers have produced apps with substantial guidance from public safety communications experts, but even with the best of intentions and thoughtful design, a host of issues need to be addressed for 9-1-1 apps.

V. Critical Issues for 9-1-1 Apps

Even well-designed apps present a variety of issues for consumers, PSAPs, and app developers.

a. What Consumers Need to Know

For voice calls, the 9-1-1 system in the United States is robust, secure, and reliable. Because apps depend on the public Internet, they inject several points of vulnerability. In addition to cybersecurity concerns, a wireless Internet connection may not always be available. Reliability challenges also come in non-technical forms. Many PSAPs don't have Internet access at telecommunicator stations, which app developers may not anticipate or make clear when advertising to the public. Further, what if a developer stops supporting the app, whether for financial or other reasons? What if the developer released an essential update, but the consumer wasn't informed or had not yet updated the app before the emergency arose? When a person needs emergency assistance, adding complexity to the familiar simplicity of dialing 9-1-1 could delay the response or result in a failure to get help altogether.

Even if a 9-1-1 app is deployed in full cooperation with the local PSAP, limited geographic availability is another concern. When a person calls 9-1-1, that call is routed to the appropriate PSAP to coordinate the local response, without any further action required of the caller. Making this vital routing determination isn't something that an app can automatically do. Apps seek to get around this problem by having users select their area or marketing the app for use in a particular jurisdiction, but that can leave users in a bind when they travel outside of the covered area.

Finally, there is currently no trusted process in place to inform the public of which apps are safe to use. Apps introduce security vulnerabilities, and those that rely on GPS or video features impose significant battery drains that can quickly leave a consumer without a lifeline. APCO is committed to establishing additional guidance for the public, app developers, and public safety professionals. Until this work is completed, including the development of an ANSI standard, consumers should not use mobile apps for contacting 9-1-1.

b. What Developers Need to Know

Developers seeking to provide a 9-1-1 app face significant challenges and must appreciate the gravity of the responsibilities they're assuming. As an initial matter, knowledge of the 9-1-1 system, public safety, and emergency response is critical. While APCO encourages innovation, developers need to understand that 9-1-1 has a universal connotation, and users will expect 9-1-1 apps to work across the United States. Further, cost should not be a barrier to using 9-1-1, and this should not change for 9-1-1 apps. Developers also need to be highly diligent concerning software updates, ensuring functionality across devices and operating systems just as today's 9-1-1 network supports any and all forms of phone service – landline, mobile, and Voice over Internet Protocol (VoIP).

Developers also must prepare for the potential liability exposure that comes with providing 9-1-1 apps. The stakes are high for public safety, where failure can mean a loss of life. Additionally, federal, state and local requirements concerning 9-1-1 may be applied to app developers. Recent FCC enforcement actions underscore the importance placed on compliance with applicable rules.[4]

The local nature of emergency response presents an additional problem for 9-1-1 apps. In general, calls to 9-1-1 are routed to the appropriate PSAP without any work from the caller or public safety telecommunicator. This happens quickly and reliably, thanks to decades of public safety and industry collaboration. Some apps have found a workaround to this routing problem by designing an app for use in a particular area or allowing users to self-select a jurisdiction which, as discussed above, can create problems for the app's users. Developers will need to adhere to established procedures for properly directing emergency requests to the correct PSAP, no matter where the caller is located.

c. What PSAPs Need to Know

Meeting evolving consumer expectations is a challenge, whether it's providing text-to-911, pinpointing wireless callers, or quickly getting the right resources to the scene of an emergency. For apps, as with prior implementation of new technologies (most recently, text-to-911), the technology is only part of the story. For any new technology, public safety telecommunicators will need equipment, training, standard operating procedures, and funding to support these new functions.

On the technical side, calls to 9-1-1 are delivered through a time-tested process that complies with standards that were developed by industry and public safety professionals. No comparable standards or processes exist for 9-1-1 apps. That creates several problems.

i. No Common Interface

Apps are being developed in a vacuum. Each app comes with its own web-based interface for viewing information from the app's users. 9-1-1 apps allow for the delivery of information such as medical history, emergency contacts, vital signs, live video, etc. While feature differentiation is

[4] See fines assessed in the wake of an April 2014 outage in which more than 6,600 calls to 9-1-1 went undelivered, http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0406/DOC-332853A1.pdf, and a fine for misrouting 9-1-1 calls to an automated message for several months, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0804/DA-14-1070A1.pdf.

important for the process of innovation, a common interface for the PSAP is going to be essential. PSAPs cannot monitor a separate interface for each app.

The app standard APCO is developing will enable apps to communicate with 9-1-1 centers in a universal format across the nation. As part of this effort, the standard will ensure that apps are device and operating system agnostic from the perspective of the PSAP, for both legacy and next generation systems. Further, the standard will address security requirements to protect the 9-1-1 network and 9-1-1 centers.

ii. Problematic Pricing

The public has come to expect free access to 9-1-1. This expectation, combined with the competitive nature of a new app ecosystem, may be leading to practices in which apps are offered to users for free to encourage adoption. Unchecked marketing of 9-1-1 apps to the general public will create a mistaken belief that the public can use these apps, which may pressure PSAPs to adopt and pay, perhaps substantially, for the enterprise version of the mobile app. This problem is exacerbated by a developer's failure to clarify that an app will only work if supported by the local PSAP, not to mention the need to clarify that connecting to the right PSAP might not be possible.

Similarly, the pressure to adopt can become pressure to continue supporting an app. The standard APCO is developing is intended to ensure that apps can work across all 9-1-1 centers without PSAPs from being locked into supporting potentially expensive and proprietary solutions. However, without a standardized interface, PSAPs would not be able to change products without losing the ability to communicate with apps that have already been adopted by the community.

iii. Internet Access

Until NG9-1-1 is deployed, 9-1-1 apps would connect with PSAPs over the public Internet bypassing the trusted 9-1-1 network. Not all PSAPs provide Internet access at call taker and dispatcher consoles. Even if there's Internet access, PSAPs face a much larger challenge in that the public Internet lacks the reliability and security built into the 9-1-1 network.

VI. A Vision for a 9-1-1 App

An effective 9-1-1 app should:

- Comply with industry standards
- Work anywhere in the country
- Be as reliable as the existing 9-1-1 system
- Preserve the familiar simplicity of dialing 9-1-1
- Connect (route) users to the appropriate PSAP
- Efficiently use and monitor a device's battery and have a mechanism in place to restrict battery-intensive features as the battery life nears a safety threshold

- Work without delay, regardless of any updates to the device's operating system or the app itself
- Be free to use for the public
- Not impose unreasonable costs on PSAPs
- Comply with FCC rules, state and local regulations, and industry best practices
- Be device and operating system agnostic
- Meet public safety's cybersecurity requirements

VII. Conclusion

This is a time of exciting change for 9-1-1. As consumers, we've seen that mobile apps hold great potential. 9-1-1 may eventually benefit from these tools, but considerable work remains to protect the public and the integrity of the emergency response system. Just as we're seeing agencies deploy text-to-911 with slogans like, "Call if you can, text if you can't," the public safety community will need to educate the public and manage expectations to ensure that the power of apps is not overshadowed by hasty adoption. APCO will continue to leverage its expertise to serve as a resource to app developers, the public, and PSAPs.