Enhancing Response Capabilities

with Smartwatches in Public Safety

Examining how wearable technology can deliver reliable in-field communications, greater situational awareness and improved first responder safety.

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Smartwatches are ready to be leveraged today by public safety personnel across law enforcement, fire services, and emergency medical services (EMS). The wearable form factor, in combination with advanced sensors, offers unique capabilities for this highly mobile workforce, and will mark an important shift in the everyday lives of all first responders.

In this paper, we'll lay out the key benefits of smartwatches in public safety, look at the key factors supporting smartwatch adoption, and discuss the technological and ROI considerations for public safety organizations considering a deployment. We'll also present a case study and outline areas for future innovation as public safety applications for the wrist-worn form factor evolve.

How are smartwatches making first responders safer, more responsive, and more effective?

Safer: Smartwatches send real time location, safety, and emergency data from the first responder to dispatch, incident command, and other public safety personnel.

More Responsive: Smartwatches receive computer aided dispatch (CAD) messages and updates, monitor alerts for calls for service, and check real time availability of resources.

More Effective: Smartwatches support discreet, haptic vibrations to communicate alerts - for example, that the car just pulled over was stolen or the individual at a traffic stop was wanted for a violent crime.

Real time situational awareness shared via a wearable like a smartwatch could be the difference between life and death for a first responder.

Improved Situational Awareness with Smartwatches

Public safety networks with priority, preemption and end-to-end encryption make it possible for first responders to leverage smart devices for daily operations in a way they couldn't even as few as five years ago. Now, smartwatch technology has taken the core communications capabilities of the smartphone and translated them into a wearable device.

Smartwatches can be the lifeline to critical public safety communication through two-way voice and text communications, CAD integration, and the ability to receive, acknowledge and respond to incident updates.

Equally as importantly, the ability to more accurately track the real-time location of responding law enforcement, fire, and EMS resources improves overall incident situational awareness. Automatic vehicle location is helpful to locate a law enforcement or EMS vehicle, but it is not enough to know where the vehicle is located if the public safety personnel have been separated from their vehicles. It is imperative to understand the physical locations of the responders themselves while on scene, whether that is in connection with a foot pursuit, managing a wildland fire, or inside a commercial high rise responding to a call for service.

With a smartwatch, command personnel and public safety dispatch have the ability today to locate personnel at any time, send a check-in message to responders, and view real time responder health information. With sensors in smartwatches measuring heart rate, and detecting acceleration and orientation, incident command can be automatically alerted to sudden movement or an increase in heart rate above a predetermined limit. Incident commanders can send urgent help if motion has stopped or the device indicates personnel have fallen. Since the smartwatch is attached to the wrist, vital signs and key data on the safety and health of public safety personnel can be monitored in real time.

While smartphones and tablets have larger screens to view detailed information, they are not always accessible when first responders are performing their lifesaving mission and/or on the move. Smartwatches can fill that communications gap.

With all of these real time data and monitoring capabilities, developers are continuing to create applications with significant operational and administrative benefits for all law enforcement officers, firefighters, and EMS personnel.

Public Safety is the Mobile Workforce

There is no better example of a true mobile workforce than public safety, which primarily operates in the field in all kinds of weather at all hours of the day.

Firefighters responding from a fire station need a fire engine, a ladder truck, a squad, a rescue truck, a quint, or another type of first response vehicle to get to the scene of the fire, hazmat, accident or medical scene. EMTs and paramedics respond in ambulances, sports utility vehicles (SUVs), trucks, motorcycles, helicopters, or bicycles every day in call outs to homes, offices and road accidents. These professionals are constantly in the field and need technology solutions that bring communications and other capabilities to them to enable performance.

Key Public Safety Requirements for Smartwatches

To operate effectively in all conditions, wearable devices must:

- **Be weather resistant and durable**
- **Deliver all-day battery life when in full use**
- **Integrate with key applications such as CAD**

The adoption of smartphones and tablets to enhance communications and information access has accelerated in recent years. But handheld mobile devices are not always practical in the field. Connected, wrist-worn smartwatches complement these other devices and ensure that first responders stay closely connected to the data they need.

While in the field, first responders are often dealing with dangerous situations and outside of their response vehicles; therefore:

- Relying on a laptop computer in the vehicle for situational awareness is no longer good enough
- Relying on a tablet or smartphone while in pursuit of a suspect is no longer good enough
- Relying on only a radio to convey critical situational awareness, health and dispatch data is no longer good enough

Outfitting all first responders with smartwatches enables the instant transmission of potentially lifesaving communications directly to every law enforcement officer, firefighter, and emergency medical responder in a large-scale emergency response.

Public Safety Characteristics and Trends Supporting Smartwatch Adoption

Public safety officers need the right tools to optimize outcomes and truly go mobile first. Mobile first means that we equip our first responders with mobile tools to operate and maximize effectiveness in the field. This is in stark contrast to station- or office-based legacy technology tools like desktops, laptops, and applications tied to on-premises client or web-based services only.

Mobile first thinking flips that approach by 180 degrees. We start by thinking about the practical realities of firefighters, law enforcement officers and EMS personnel responding in the field. We then redesign their experience and interaction with technology to take full advantage of today's mobile tools and reliable broadband connectivity.

Applying mobile first thinking, rather than station- or office-based thinking, produces some very different economic and operational decisions and solutions.

First responders will leverage technology most when:

- it is easy to use
- it makes them more effective
- it allows them to respond faster
- it allows them to do their jobs more safely

Public safety personnel are always looking for ways to provide better outcomes for the community. If they can leverage technology to respond faster, safer and more effectively, they will embrace it.

We should seek the input from frontline first responders on what operational problems need to be solved and apply our mobile first thinking to the problem before just buying more of the same legacy technology.

Cost Considerations for Smartwatch Deployments

We are already seeing a distinct shift toward mobile-first and the leveraging of easy-to-use, affordable mobile technology. Today, with public safety LTE networks' reliable connectivity and always-on priority and preemption, public safety can count on broadband to deliver critical communications and situational awareness. Additionally, the cost of powerful mobile broadband devices is significantly less than legacy land mobile radio (LMR) devices, making them easily affordable with greater capability.

How Mobile Investment Measures Up

- **Smartwatch: $300 - $400**
- **Smartphone: ~ $1,000***
  * Full retail price before carrier subsidy.
- **Land Mobile Radio: ~ $8,000**
- **In-Vehicle Laptop: $3,000 plus installation**

In addition to affordability, mobile devices are able to leverage the power of sensors, rich data, and cloud platforms to advance public safety operations like never before. In discussions with public safety agencies, we are already seeing that virtually all first responders carry a personal or agency-issued smartphone at work and use it daily to perform their lifesaving mission.

Smartphones have become indispensable now with priority, preemption, encryption, and public safety cloud platforms available to all public safety personnel in the United States. Add to this, the intuitive, ease-of-use of these devices, in particular with the new, tech-savvy generation of first responders, and the use of mobile first technologies like smartwatches becomes a very easy decision to make for those who operate in the field on a regular basis.

Six Key Benefits of Smartwatch Technology

1. **Dispatch alerts and CAD integration.** CAD software providers are developing new applications to enable alerts and information access on smartwatches. Currently, Northrop Grumman, Caliber, Tyler Technologies, Central Square Technologies and Rapid Deploy all offer commercially available off-the-shelf Samsung smartwatch CAD applications. These solutions are optimized to maximize the advantages of smartwatches with functionality like short messaging, haptic alerts, voiceless and voice capabilities to enhance communication between dispatch and the first responders in the field.

2. **Hands-free.** The inconspicuous and hands-free nature of the smartwatch enables public safety personnel in the field to view messages without having to take out a smartphone. Many responders wear protective latex or leather gloves during incident response so hands-free voice communications is important. The use of haptic alerts and having key mission data appear on the smartwatch instantly upon raising your arm is a significant improvement in the way critical short messages are delivered.

3. **Body-worn sensors.** Having real-time access to data on all first responders' locations, heart rates, movements, and emergency status while responding is critical to an incident commander. Smartwatches enable that data to be monitored and tracked at incident command in real time to help ensure the safety of their personnel. Smart algorithms can also provide early detection of potential life-threatening situations.

4. **Responder back up/emergency requests.** Smartwatches can enable automatic notification to command and dispatch of a responder in trouble with one-button alert. In addition to the quick and easy access to the smartwatch alerts, solutions can be designed to trigger a microphone on the smartwatch that enables dispatch to immediately listen in, while tracking location, heart rate and other key data that will help commanders determine the best response to the unfolding situation.

5. **Flexible integration and configuration.** The ability to integrate devices and technologies for a seamless experience by first responders is becoming more and more critical. In addition to the integration with CAD, smartwatch manufacturers offer software development kits (SDKs) to developers and agency IT leaders that can be leveraged to build innovative applications flexibly and at minimal cost. No longer does public safety have to rely on expansive, capital intensive, proprietary programs to obtain the solutions that they need.

6. **Enhanced security.** Mobile device management (MDM) solutions and security platforms, such as Samsung Knox, provide a significantly improved level of security for public safety personnel communicating the field. Endpoint security protocols, such as locking smartwatches if they are removed, riding on top of fully encrypted broadband public safety networks provides agencies the assurances necessary to adopt these new critical technologies.

Deployment Case Study: Chicago Police Department

Smartwatch technology is already in operational use in large and small public safety agencies across the United States. Agencies have found that by providing the right technology and applications to their first responders, they can better equip and empower them to respond to emergencies in their jurisdiction with the information and data they need to excel at saving lives.

In one innovative pilot, the Chicago Police Department is trialing smartwatches with customized applications for its officers on bike patrol.[1] Officers on bike patrol use Samsung Galaxy smartwatches with a mobile dispatch application to keep their hands free and still interact with dispatch as needed.

Chicago PD leveraged Northrop Grumman's Command Point Mobility, which brings CAD interaction to the smartwatches. Distinct patterns of haptic vibration and color-coded screen alerts notify responders to critical alerts from dispatch. Officers can interact with the watch to acknowledge notifications, change their response or availability status, or activate an emergency alert that will notify surrounding officers when they are in distress, both through push button operation and voice control. The watches are paired with the officer's mobile phone via Bluetooth, so a separate cellular connection is not required.

Jonathan H. Lewin of the Chicago Police Department Bureau of Technical Services noted that as voice recognition functionality on smartwatches improves, it will further increase the utility in public safety. "We want to get that to officers so they don't have to touch anything [on the watch] and can focus on the things in front of them," he said.

Voice recognition would enable officers to not just send hands-free messages but to leverage database searches, to request resources, as well as leverage applications in the cloud to support their on-the-go operational needs.

Given the benefits seen from smartwatches in this and other early deployments, we anticipate a significant increase in the use of smartwatches in the field.

Conclusion: Smartwatches Will Become Mission Critical

Smartwatches are being leveraged more and more in public safety today by police officers, firefighters, and EMS personnel to handle daily operations. Agencies are able to take advantage of these capabilities immediately and applications will continue to improve over the next several years. Smartwatches are affordable, easy to use, and can be deployed quickly with very little required integration or training.

The first smartwatch was released in 2000 and device capabilities have continued to expand as competition in the market intensifies. In contrast to the early days, the smartwatches available today are extremely capable, available at reasonable cost, and are built to withstand the tough conditions in which public safety operates. Battery life continues to improve and today easily covers the 24-hour shifts and on-call capability that are inherent to public safety operations. With continuous access to the cloud through the use of dependable public safety broadband networks, first responders are always connected to the critical data and communications they need to make daily operational and lifesaving decisions.

1."Chicago Police Department's Bike Patrol Trials Smart Watches," Mission Critical Communications, Nov. 7, 2018 https://www.rrmediagroup.com/News/NewsDetails/NewsID/17588