



What Smart Cities and IoT Mean for PSAP Operations

A Solacom Brief

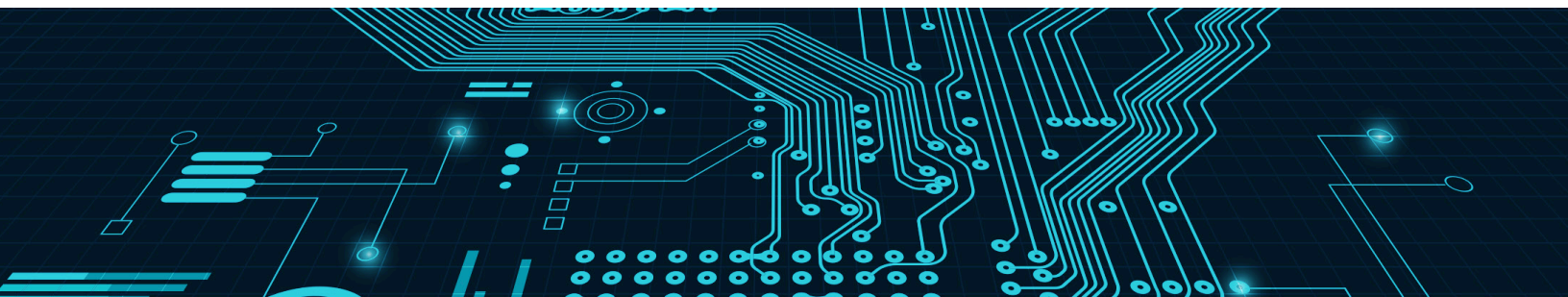




We're Headed to a Data-Driven Future

The news today is full of stories about what the latest advances in wireless technologies will mean for people at home, at work, and at play. With 5G wireless networks and small cells that bring broadband internet to street level, we'll be living in smart cities that use the Internet of Things (IoT) to connect and automate any number of processes, devices, and systems.

In a smart city, sensors monitor everything from temperature, pressure, and humidity to motion, lighting, location, and liquid flows. The IoT connects all of these sensors and transmits the data they've collected back to systems and people. The data is used to make real-time decisions about actions that need to be taken and for analysis that reveals longer term trends.





Smart City Applications Improve Public Safety

A number of smart city applications are focused on improving public safety.

For example:

- Smart street lighting increases in intensity when people are nearby
- Street-level surveillance cameras and microphones give authorities new abilities to monitor illegal and dangerous activities
- Connected ambulances, fire trucks, and police cars automatically optimize their routes based on road, weather, and traffic conditions
- Smart traffic management systems automatically adjust stop lights and traffic signals to optimize vehicle flows and reduce the chance of accidents
- Smart buildings automatically detect unacceptable levels of heat, cold, gases, chemicals, and water and send notifications when thresholds are breached

PSAPs Have New Opportunities to Improve Operations

With data from smart city sensors, public safety answering points (PSAPs) will have the potential to supplement and enhance the voice and text information they already receive. But, they'll need a way to filter, process, and present the data so it can be quickly and easily incorporated into their call handling processes and shared with emergency response teams, if required.

Looking at the potential to incorporate all of this data today, when many PSAPs are still trying to determine how they will evolve to Next Generation 9-1-1 (NG9-1-1) call handling and management systems, can seem futuristic, ethereal, and intimidating. But, smart city data will soon be key to helping PSAPs respond to emergency situations faster and more effectively.

To ensure they are not left behind as technology evolves, PSAPs must increase their awareness about the impact of smart city applications on their operations. This will help them choose the right building blocks as they migrate to NG9-1-1 call handling and management systems.

To help PSAPs understand how smart city data will affect their operations, we've put together brief summaries of the potential that exists — before, during, and after 9-1-1 emergencies.



Before: Finding Out About Emergencies

Today, PSAPs typically find out about emergencies when they receive voice or text calls from members of the public. With data from smart city sensors, PSAPs can learn about emergency situations, or the potential for emergency situations, before they are notified by members of the public.

For example, with data from sensors that monitor heat, smoke, chemical, and gas levels, PSAPs can be informed instantly when pre-set safety thresholds are breached and can notify the appropriate authorities before fire breaks out, chemicals leak, or gases explode.

With data from sensors that detect changes in physical environments, PSAPs will no longer have to wait for a phone call or text message to determine an emergency has occurred. Sensors can monitor:

- Shock, impact, and vibration levels that indicate an earthquake, explosion, or vehicle crash
- Unexpected sound levels, such as when a gun is fired or an explosion occurs
- Vehicle tilt levels that indicate a train derailment, a ferry sinking, or a bus rollover

Many smart home technologies and smart, wearable medical devices can also automatically notify PSAPs when unexpected physical changes occur. Sensors can detect when windows are broken and secure entries crossed. They can also detect when people fall out of bed or down a set of stairs. When connected devices can instantly alert PSAPs to these types of changes, response times will be much faster, especially in cases where people won't discover a break-in for days or an elderly person is living alone and is unable to get to a phone.



During: Assessing and Responding to Emergencies

Smart city and IoT technologies open the door to new monitoring and communications capabilities that give PSAPs numerous opportunities to accelerate response times and improve situational awareness.

New Technologies Increase Insight

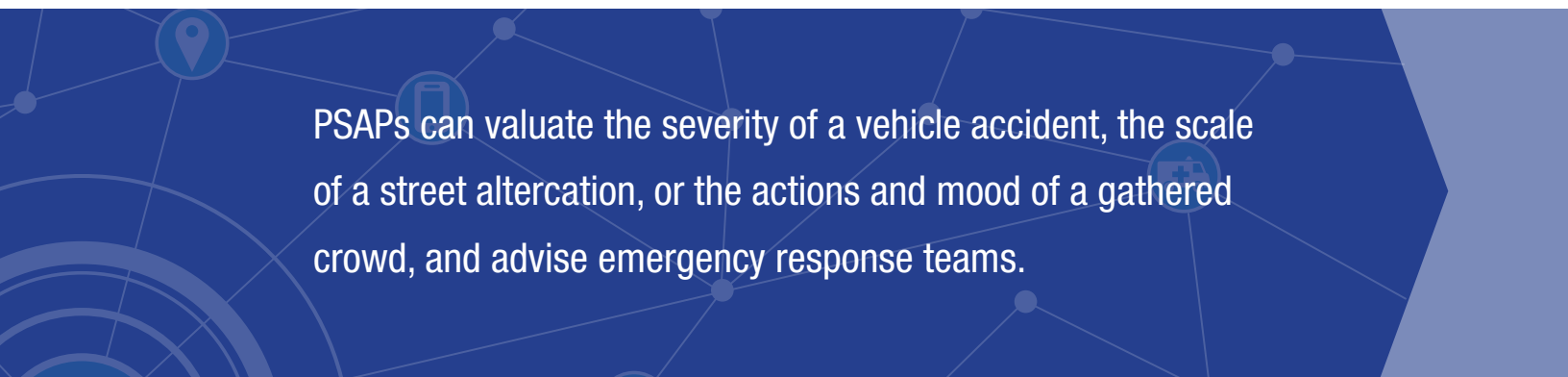
Innovative new ways of bringing wireless communications to street level will be one of the most important enablers of smart city applications and improved situational awareness for PSAPs.

For example, small cells are short-range cellular communications solutions that can be enclosed within streetlight poles, park benches, and other city infrastructure. They're being widely deployed to strengthen broadband wireless networks in urban areas where it's increasingly difficult to deploy new cellular infrastructure.

With seamless, low-latency, street-level networks, cities can deploy monitoring devices, such as surveillance cameras and microphones, in many more locations. Access to the data from these devices will give PSAPs many more eyes

and ears on the street. They will then be better equipped to evaluate the severity of a vehicle accident, the scale of a street altercation, or the actions and mood of a gathered crowd, and advise emergency response teams so they are fully prepared for the situation. When emergency response teams arrive on-scene, the street-level network can also be leveraged to improve real-time communications with PSAPs and among agencies to enable new levels of interoperability and cooperation.

In other situations, the ability to manage video footage and images captured by camera-equipped drones will give PSAPs an all-important overhead view of events. With this view, they can provide firefighters with specific details about fires in progress, give police officers information about crowd sizes and movements, assess water levels in flooded areas, and see how many vehicles are involved in large-scale traffic pileups.



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Likewise, sensors along roadways can provide real-time information about road surface, weather, and traffic conditions to help PSAPs guide first responders on the fastest route to incident locations.

In situations involving damage to buildings, bridges, and other infrastructure, data from sensors will help PSAPs evaluate structural integrity and guide emergency responders accordingly. For example, PSAPs will have access to information that shows whether heat, smoke, or chemical levels in a certain part of a building are too high for safe entry. And they will have data that shows whether the support structure for a bridge or a building has been compromised.

Ideally, as all these interconnected sensors and new sources of data are deployed, call handling systems will also evolve. New functionality will be included that will provide call takers with the ability to activate data flows from sensors as needed so they can access this essential information without having to filter high volumes of extraneous data.

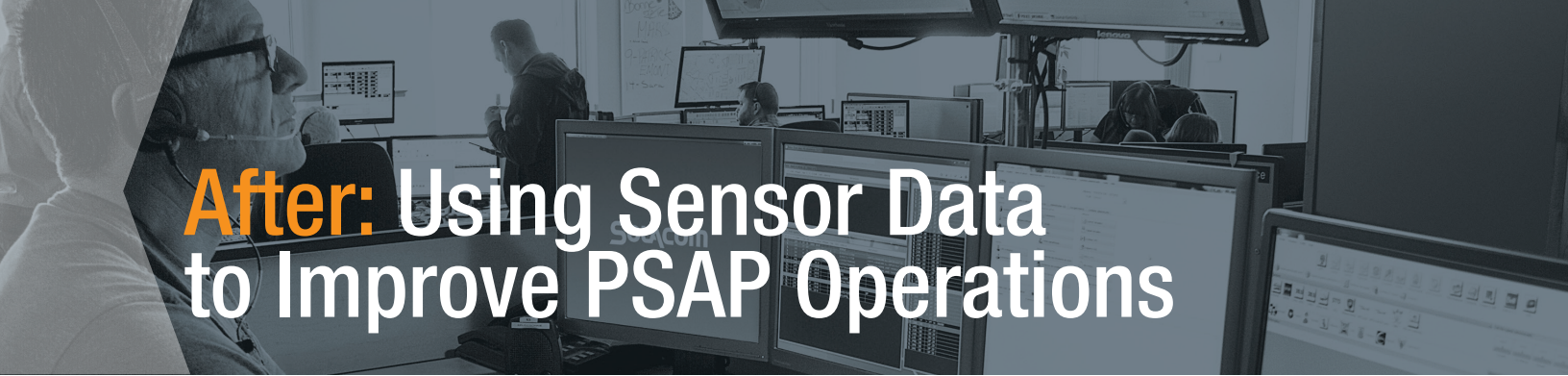
Smartphones Play an Important Role

The smartphones that many people carry with them are the most prolific source of sensor data. Most of these advanced phones include location sensors that can automatically send precise location details, including Z coordinates, for a caller's location. This data will help PSAPs quickly [pinpoint a caller's exact location](#), a task that can be difficult and time-consuming when people make 9-1-1 calls from tall buildings or large venues.

Smartphones can also deliver pictures and video clips of emergencies in progress to PSAPs. PSAPs have already evolved from receiving only voice calls to receiving voice calls and text calls. The ability to receive visual data is the next logical step in this evolution. In the future, it may also be possible for call takers to receive and manage video calls with more-advanced call handling and management systems.

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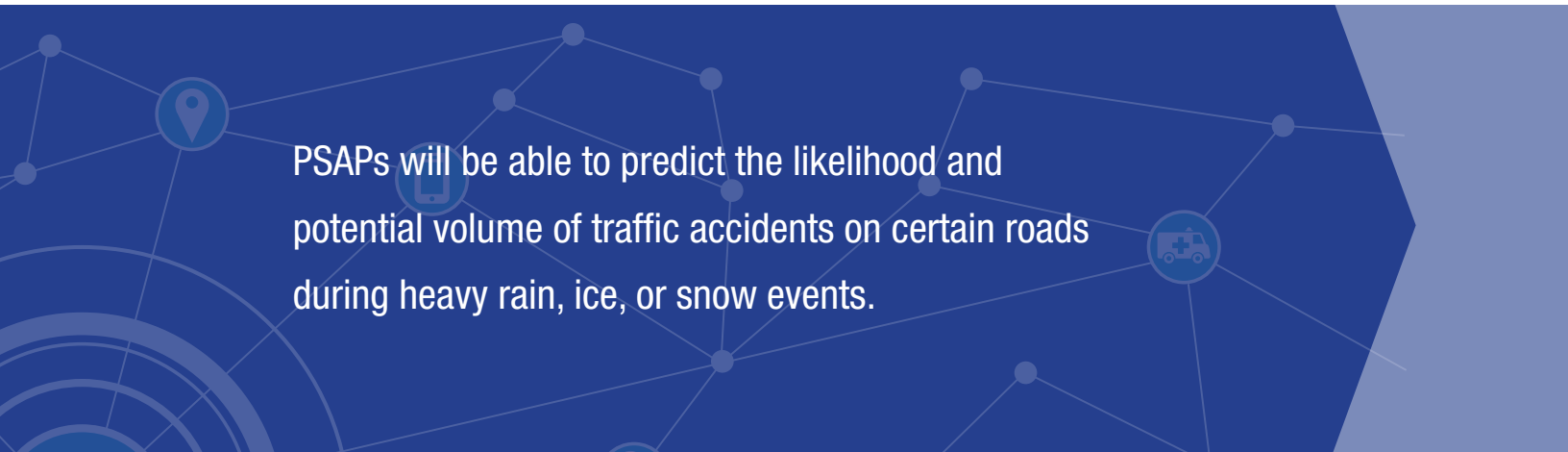


After: Using Sensor Data to Improve PSAP Operations

Today, the [next-generation analytics and reporting capabilities](#) in NG9-1-1 call handling and management systems allow PSAPs to generate a variety of detailed reports summarizing call types and volumes. As PSAPs increasingly move to incorporate data from smart city sensors in their call handling and management systems, they will have new opportunities to analyze historical sensor data along with data from other sources to identify trends and predict what is likely to happen in the future.

For example, by analyzing historical data from vehicle impact sensors, road sensors, and weather reports, PSAPs will be able to predict the likelihood and potential volume of traffic accidents on certain roads during heavy rain, ice, or snow events. Similarly, by analyzing location data and the dates of previous emergencies, PSAPs will be able to predict when and where future incidents are most likely to occur.

With the ability to anticipate events and predict the sequence of activities that can be expected, PSAPs can staff the right number of call taker positions with the right skill sets and experience levels. They can also use the insight gained through predictive analytics to train call takers in what to expect in certain situations. This training will help call takers respond faster, more intuitively, and more effectively when they are communicating with 9-1-1 callers and with emergency response teams.



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Putting the Right Building Blocks in Place

There's no question that 5G and small cell technologies will stimulate use of smart city and IoT applications that can provide PSAPs with valuable new insights in emergency situations. And there's no question that PSAPs will evolve to NG9-1-1 call handling and management systems. That means PSAPs must migrate to NG9-1-1 systems in a way that ensures they have the essential building blocks needed to take advantage of smart city and IoT technologies as they become available.

Five Essential Capabilities

There are five essential capabilities to look for in NG9-1-1 systems today that will be ready to leverage all the data that will be available from smart city and IoT sensors tomorrow:

- **An IP-based system.** Smart city and IoT applications rely on IP. This is the easiest requirement for PSAPs because the NENA standard for NG9-1-1 systems defines an IP-based architecture.
- **Advanced visual mapping.** While almost every NG9-1-1 system offers the ability to leverage location information from a geographic information system (GIS) database, only the most sophisticated systems allow call takers to view and manipulate all available data and handle calls directly from the mapping application. These abilities help call takers accelerate response times and make more-informed decisions.
- **Data filtering and organization.** Incorporating data from sensors means call takers will have a lot more data to consider in their decision-making process. The roadmap for the NG9-1-1 system must include functionality that allows call takers to quickly find and isolate the most relevant data, faster.
- **Data analytics and reporting.** NG9-1-1 systems that offer comprehensive data analytics and reporting capabilities help PSAPs understand the different ways they can use the results of statistical analysis to fine-tune their operations. This understanding will put PSAPs in a better position to leverage predictive analytics as they evolve their operations.
- **Easy expansion and upgrade.** To take full advantage of data from sensors, PSAPs need the ability to easily upgrade NG9-1-1 systems as new capabilities emerge. It's very important that they don't lock themselves into rigid systems that require expensive hardware replacements when upgrades are required.



Partnership Offers Significant Advantages

In addition to choosing the right NG9-1-1 system architecture and functionality, it's also important for PSAPs to partner with an NG9-1-1 thought and technology leader that can guide them as their needs evolve. Solacom is that partner. Solacom's NG9-1-1 call handling and management systems provide leading-edge capabilities today that pave the way for PSAPs to make the best possible use of the data generated by smart city and IoT technologies.

All of our solutions enable smooth integration of new technologies and capabilities over time. PSAPs choose the hardware, software, features, and functions they need, when they need them. They are not forced to replace legacy equipment, interrupt workflows, or disrupt work environments. Instead, they have customizable, interoperable solutions that help them:

- Protect past investments
- Streamline the migration to NG9-1-1
- Simplify future upgrades
- Lower total cost of ownership

SOLACOM IS AN INDUSTRY LEADER AND INNOVATOR

We've showcased our leadership and innovation through a number of industry firsts, including:

- First geospatial router in operation
- First demonstration of USDOT proof of concept
- First national deployment that replaced DMS-100 tandems for 9-1-1 selective routing
- First national deployment using direct IP connectivity from a Local Exchange Carrier (LEC)
- First fully IP-hosted customer premise equipment (CPE) ESInet
- First NENA-certified NG9-1-1 system
- First statewide NG9-1-1 system



Additional Information

[Click here](#) for more information about how Solacom can help you make the move to an integrated, future-ready NG9-1-1 call handling and management solution for your PSAP.

Contact Us

Solacom 9-1-1 call handling and management solutions are built on more than 30 years of research and innovation in the application of advanced hardware and software technologies for public safety. Today, Solacom Guardian 9-1-1 solutions support thousands of agencies affecting millions of lives annually — from dense urban environments to statewide deployments.

Contact us today to discover how our Guardian solutions can help your PSAP streamline 9-1-1 call handling and management processes and enable more efficient collection of critical information in emergency situations.

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