SOLACOM

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Comtech Telecommunications Corp.

What PSAPs Need to Know About 3D Location Mapping

A Solacom Brief

Vertical Location Data Is Coming Soon

Today, there's a strong industry focus on pinpointing 9-1-1 caller location faster. But, it can still be very challenging for emergency responders to quickly find callers in tall buildings and large venues when they're calling from a mobile phone. The extra time it takes can mean the difference between life and death.

Three-dimensional location mapping technology resolves this issue. With 3D location mapping, call takers can see exactly where wireless calls are coming from on a 3D image or rendering of a building. This visibility:

- **Increases location accuracy** because call takers know which floor of the building the person is calling from and where they're located on the floor

- **Accelerates response times** because call takers can see the location of nearby building entrances, elevators, escalators, and stairwells to guide first responders to the caller

- **Improves context for dispatch** because call takers know whether first responders will need ladder trucks, specialized stretchers, or other equipment to access, treat, and remove the caller to safety

The FCC Is Establishing Rules

To show call takers the height the 9-1-1 call is being made from, Next Generation 9-1-1 (NG9-1-1) solutions need the Z axis vertical height coordinate from the mobile device. Z axis data isn't available yet, but it will be soon.

In March 2019, the Federal Communications Commission (FCC) proposed rules that would require mobile network operators to provide Z axis location data that is accurate to within three meters above or below the mobile phone for 80 percent of wireless calls made indoors.

Discussions about the exact timing this data will be available to PSAPs are ongoing. However, the FCC's current location accuracy benchmarks and timeline indicate that nationwide mobile operators must provide either a dispatchable location or Z axis location information by April 2021.

Call Management Solutions Already Support 3D Location Mapping

It's in everyone's best interest for PSAPs to start making use of Z axis data as soon as possible after it's available so they can take advantage of 3D location mapping.

The good news is the most advanced, multimedia NG9-1-1 call handling and management solutions already support 3D location mapping. That means PSAPs that are evolving to NG9-1-1 need to start thinking about how this crucial functionality is supported in the solutions they're evaluating.

3D Location Mapping in an NG9-1-1 System

The first step is to understand how 3D location mapping fits into an NG9-1-1 system. To take advantage of 3D location mapping, PSAPs need two key components:

- An NG9-1-1 geographic information system (GIS) database
- A graphical mapping application

The GIS Database Includes Building Data

The GIS databases and GIS data sets in an NG9-1-1 system replaces today's Master Street Address Guide, Emergency Service Number (ESN), and Automatic Location Information (ALI) databases.

It includes information such as road centerlines, PSAP boundaries, and emergency services boundaries. It can also include additional information, such as street name aliases, landmark names, state and county information, and municipal, community, and neighborhood boundaries.

One of the biggest benefits of a GIS database is that PSAPs can add information that is specific to indoor locations, including:

- Building floor plans with details about floor heights, seating plans, entrance locations, and heating, ventilation, and air conditioning (HVAC) systems
- The geographic layout of large venues with indoor and outdoor spaces

The Map Displays Precise Caller Location

The mapping application combines the building images in the GIS database with the X, Y, and Z axis information from the mobile phone to show the caller's precise location in a building.

The ability to accurately map location coordinates onto a building image gives call takers the context they need to locate callers faster. Call takers can't determine where a caller is by simply reading the spatial coordinates. And, they can't accurately determine which floor a caller is on by knowing the elevation they're calling from.

When the call taker can see that the caller is on the fifth floor of the building, near a stairwell and a window, they can act on the information in a meaningful way.

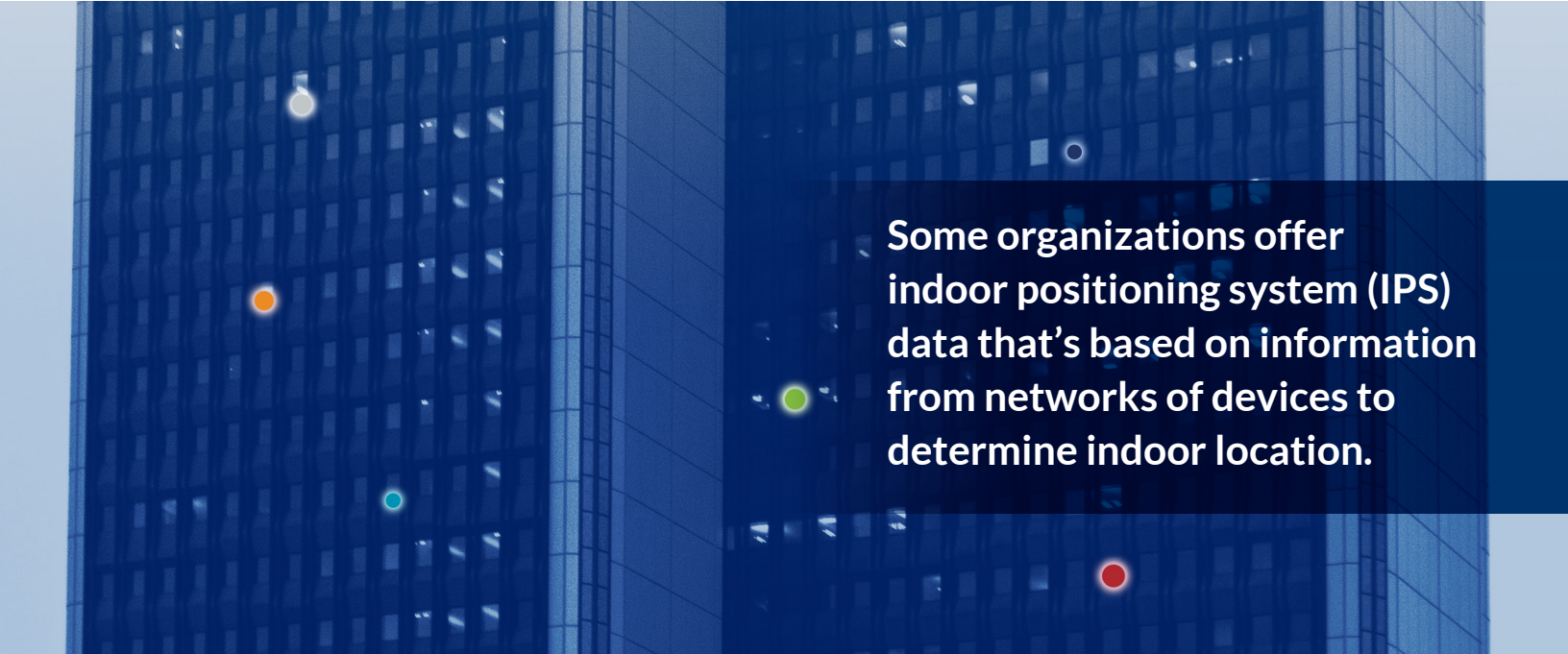## Data Is Available From Multiple Sources

Although Z axis data is not yet available, building and location data is available from a variety of sources.

- Depending on the building, digital wireframe drawings may be available from the local assessor's office, or from the building architect, construction firm, owner, or management company.

- A number of private corporations offer aerial photos that provide oblique views of a building from all directions.

- Some organizations offer indoor positioning system (IPS) data that's based on information from networks of devices, such as smartphones, Wi-Fi access points, Bluetooth antennas, digital cameras, and clocks to determine indoor location. For example, the National Emergency Address Database (NEAD) created by the CTIA leverages information from commercially deployed Wi-Fi access points and Bluetooth beacons to enhance indoor location accuracy.

- Other organizations have partnered to give PSAPs access to connected building sensor data and detailed floor plans.

The true value for PSAPs and the ability to significantly accelerate response times will come when PSAPs can blend Z axis and building data with other multimedia information, such as text messages with and without images, voice calls, and video when requested by the call taker.

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Selecting the Right Call Management Solution

To make the best use of 3D locating mapping, PSAPs should look for NG9-1-1 call handling and management solutions with a very specific feature set.

A Flexible GIS Database With Development Support

The GIS database must support:

- A synchronization server that allows GIS data updates to be automatically propagated to all workstations from a single location

- Customized GIS data layers and base maps, such as aerial photos and address points

- Multiple base maps that can be toggled by call takers

- Location information from third-party organizations

- The ability to attach documents, such as floor plans or photos to the GIS data

- ArcGIS® Server data so the mapping application can use base maps, network datasets, published locators, and additional GIS layers directly from the ArcGIS Server published services

- ArcGIS Server/Enterprise geocoding services so they can build customized geocoding services and ensure call takers have the most up-to-date information possible

PSAPs should also look for a solution vendor that offers worry-free GIS database development, standardization, and maintenance services. This expert assistance will dramatically simplify the transition to new data standards and ensure location-based information meets the latest benchmarks for uniformity, accuracy, and timeliness.

Call Handling From the Map

To take advantage of Z axis location data, 3D mapping applications must be fully integrated into the call handling and management solution and give PSAPs the ability to answer and manage 9-1-1 calls from the map.

When call takers can see the location and status — ringing, answered, muted, on-hold, abandoned — of all calls on the map at a glance, then simply click the icon for the call to act on it, they can quickly prioritize call handling in a logical way.

The most sophisticated mapping applications allow call takers to isolate and view GIS information in layers and to easily zoom in and out and pan around the map view. With these capabilities, call takers can change the map view to show only the elements that are relevant to the current call.

For example, call takers may want to show only specific types of buildings, such as schools, shopping centers, or banks. Or, they may want to zoom in from the view of a building footprint to a detailed view of its floor plans so they can accurately guide first responders to the most convenient entrance and the fastest path to the caller.

Multimedia Messages and Content

In today's multimedia, multidevice world, the ability for call takers to manage any emergency call from any device, at any time, from anywhere, and in any format — voice, text, data, and video — is crucial.

Look for solutions that support:

- Next-generation voice
- Text-to-911
- Text-from-911
- Real-time texting
- Image-enriched messaging
- Video-enhanced data

With these capabilities, call takers can gather actionable intelligence that's related to the caller's location — such as activating a video camera on the caller's floor in a building or asking the caller to send a photo of the surroundings.

An Intuitive and Customizable User Interface

To further accelerate call handling and management, look for solutions that offer a standardized configuration and user interface that can be customized to fit individual call taker preferences.

Key features to look for include:

- Customizable icons and buttons
- Buttons sized for touch screen operation
- Mute, privacy, and hold buttons
- Buttons sized for call takers with visual disabilities
- Intelligent transfer buttons that allow call takers to select the type of outgoing call based on the type of incoming call

Adapting Operations to Leverage 3D Location Mapping

T he most advanced, public safety-grade call management and mapping software will be able to display 3D location data as soon as it is available. That means PSAPs must ensure all of the operational pieces are in place to leverage the capability.

Incorporating and Managing GIS Data

To take advantage of 3D location mapping, PSAPs will need to update their call handling and management software and their GIS database.

Updating call handling and management software is typically a very straightforward task that can be completed by the PSAP's IT staff, the software vendor, or the vendor's local partner. However, updating the GIS database is a more significant and time-consuming undertaking that will require assistance from an expert in GIS data for PSAPs.

There are three phases to updating a GIS database:

- Acquiring the GIS data from government and private-sector sources

- Auditing the data to determine the enhancements and corrections required to comply with the NENA GIS data model standard

- Adapting the data to fix attribute and geometry errors, create missing GIS data layers, and add mandatory data to existing map layers

PSAPs must also consider how they will manage ongoing additions, changes, and deletions to the GIS database. This is another area where a GIS expert can save PSAPs considerable time, effort, and headaches.

Training Call Takers

PSAPs will also need to review call taker procedures and train call takers in how to best incorporate the additional location information into the call handling process.

Call takers will need time to familiarize themselves with interpreting 3D images and becoming adept at manipulating 3D location information on the map. No matter how user friendly the mapping application is, learning how to rotate and make sense of 3D building images, wireframes, and floor plans takes practice.

An Experienced Partner Is Essential

A s PSAPs evolve to take advantage of more sophisticated capabilities, such as 3D location mapping, they need a highly experienced and proven partner to guide and support their efforts.

Solacom understands that PSAPs must be able to combine 3D location mapping and multimedia data to locate callers faster. And we've tailored our offerings to support this need:

- The Solacom **Guardian 9-1-1 Call Handling solution** features a sophisticated, integrated mapping application that supports all spatial and geographic data, including 3D building images and wireframes. **Guardian Map** is the only mapping solution available today that provides complete call handling capabilities from the map.

- We also offer a complete set of services for GIS database development and management to simplify the transition to a GIS database and ensure database content remains relevant and compliant with the latest standards.

At Solacom, public safety communications management is not a sideline, it's our single focus. Our user-centric, multimedia 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, our 9-1-1 solutions support thousands of agencies of all sizes and affect millions of lives annually. From dense urban environments to the most widespread deployments, our solutions are trusted to streamline 9-1-1 call handling and management processes and enable more efficient collection of critical information in emergency situations.

Solacom Is a Trusted Partner for NG9-1-1 Evolution

Leading public safety agencies rely on Solacom's user-centric, multimedia NG9-1-1 emergency call handling and management solutions, including:

Alberta Health Services

Florence County, South Carolina

Franklin, Gulf, and Calhoun Counties, Florida

City of Gatineau, Quebec

Huntsville-Madison County, Alabama

Lincoln County, Montana

Manitoba Provincial 911

Maricopa Region, Arizona

Owensboro-Daviess County, Kentucky

San Luis Valley, Colorado

State of Maine

Sussex County, New Jersey

Additional Information

Click here for more information about our NG9-1-1 solutions.

Contact Us

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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