i-Axis: Indoor Mapping, Tracking, and Navigation

14 November 2019
Introduction – 0900 – 0915
Outline the Issues / i-Axis Overview – 0915 – 0930
Survey Questionnaire – 0930 – 1000
Break -1015 – 1030
Preplanning –1030 - 1100
Technology Discussion – 1100 – 1145
Round table discussions – 1145 –1220
Closing Remarks – 1220 -1230
Objectives

By the end of this session all participants should have:

• An understanding of the core issues facing technology innovation with indoor mapping, tracking, and navigation.

• An opportunity to provide a status update with regards to pre-incident planning for their organization and see how they compare to other agencies.

• Resources that they can begin using today to advance their pre-incident planning process – including access to a new community.
From Preparedness through Response and into Recovery

First Responders, Operators, and Decision Makers have access to and know how to use the right actionable information at the right time.
Opening Address

Jeb Benson
National Institute of Standards and Technology (NIST)
Poll

Who do you work for?
What is your GIS knowledge?

Go to www.menti.com
Enter code 71 17 59
i-Axis Project Overview

Paul Doherty, PhD - NAPSG Foundation
1) First responders are not rapidly adopting and using the existing location-based solutions and capabilities available today.

2) Therefore, the research and development teams do not have actionable input from first responders to develop the practical solutions of tomorrow.
What are location-based services (LBS)?

“provisioning of customized information, features, or services based on a user’s current or projected location”
When you think of Location-Based Services in public safety, what capabilities come to mind? Describe in 3 words or less.

Go to [www.menti.com](http://www.menti.com)
Enter code 87 60 88
July Results
Focus on Indoor:
• Mapping
• Tracking
• Navigation

This figure references the well-known “diffusion of innovation”, which represents market share / adoption over time.
Firefighter down
11S MT 81890 68580
3rd Floor
Proof of Concept Video

*disclaimer - these are real people, not paid actors 😊

https://youtu.be/XqYwT8bQnJY
Goals

• Create a **community** of Innovators and Early Adopters using existing solutions (indoor and/or outdoor).

• Identify existing and proposed **best practices**.

• Accelerate the **adoption** of new and emerging LBS into public safety daily operations.
NAPSG Foundation Staff

Paul Doherty, Program Manager
Jared Doke, GIS Specialist
Emilie Pratt, Behind the Scenes GIS Ninja
Peter Hanna, Technical Subject Matter Expert
Chris Rogers, Technical Subject Matter Expert
Tommy Hicks, Industry Subject Matter Expert
Angela Pervel, Logistics Chief
Accelerating Adoption and Use of Emerging Location Based Services by Public Safety

Add your department to the map and share how you are using:

• Mapping
• Tracking
• Navigation
1. Access the form.
2. Fill-out the form.
3. Add yourself to the map.
4. Submit the form.
5. See your department on the map.

How does it work?

1. Open Camera
2. Point at QR Code*
3. Open the link

*Some phones require that you hold the “home” button. You can also access this form on your PC https://bit.ly/20190709_iAxis
Discussion: How do you compare?

Who is responsible for conducting pre-incident plans for your Department/Agency?

<table>
<thead>
<tr>
<th>Answers</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is not a dedicated person or team to conduct pre-incident plans</td>
<td>13</td>
</tr>
<tr>
<td>There is a person or team whose primary role is to conduct pre-incident plans</td>
<td>8</td>
</tr>
<tr>
<td>There is a person or team that conducts pre-incident plans as one of several duties</td>
<td>36</td>
</tr>
<tr>
<td>Various personnel as they have time</td>
<td>22</td>
</tr>
<tr>
<td>Recruits, Cadets, or volunteers</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
</tbody>
</table>
Discussion: How do you compare?

What type of map products are generated during the pre-incident planning process?

- We do not currently create any map products: 10
- Paper Maps, Map Books, and Diagrams: 31
- Electronic PDF Maps/Diagrams: 42
- Mobile App on a Smart Device: 19
- Maps for Mobile Data Terminal: 34
- Other: 0
Social Networking Break
10:15 – 10:30
Pre-Incident Planning

Yesterday, Tomorrow, and Today
External Considerations

**External Sources**
Open source, commercial data, etc.

**NG 911**
GIS Oriented Next Generation 911

**Location Services (LBS)**
Features all exist based on “geography”

**Building Information Systems**
Modern building systems to monitor systems

**Existing GIS**
GIS systems that exist within a jurisdiction

**InSPiRE**
Balancing Act

Access to a Large Amount of Data

The need to aggregate the data for the user
Technology Discussion

• Mapping
  • Old school
  • Situational Awareness
  • Floor Plans / CAD
  • Other Technology

• Tracking
  • GPS, RFID, Ultra-wideband, WIFI, and Bluetooth

• ESRI Indoors Covers all 3
Mapping – Old School
Mapping – Situational Awareness
Mapping – Floor Plans / CAD
Mapping – Floor Plans / CAD
Mapping – Floor Plans / CAD

Georeferenced Image

- Placing an image in the real-world location
- 4 points are needed to georeference an image
- Creates and world file that contains the location information
Mapping – Other Technology

Indoor LIDAR
Mapping – Other Technology
Mapping – Other Technology

Virtual Reality / Augmented Reality

https://www.youtube.com/watch?v=m6RNkqFgdUI
Mapping – Other Technology

Eagle View/Pictometry Critical 360
Tracking

- Bluetooth
- RFID
- Wi-Fi
- UWB
Tracking – GPS and UWB

TRX First Responder Location Technology

London Fire Brigade to be tracking uniforms using RFID solution

Vero Solutions, a leading supplier of RFID tracking solutions, has been selected by Bristol Uniforms, one of the world’s leading emergency services protective clothing providers, to provide RFID technology to start tracking uniforms – nearly 60,000 items for London Fire Brigade.

Bristol Uniforms has already successfully been tracking uniforms supplied to Cambridgeshire Fire & Rescue Service using RFID technology from Vero Solutions since November 2015.

To enable the tracking, an RFID tag is securely sewn into a pocket in each garment.

Each uniform item is then scanned using a handheld RFID reader at key points of the managed services process, from point of collection at the emergency services through washing, inspection and repair cycles right through to return delivery.

Edward Shepherd, Service Operations Director at Bristol Uniforms, commented:

Source - https://vero.solutions/lfb-tracking-uniforms-rfid/
ESRI Indoors (Map, Track & Navigate)

Source YouTube - https://www.youtube.com/watch?v=GHvVw8XPVpY
ESRI Indoors (Map, Track & Navigate)

Source YouTube - https://www.youtube.com/watch?v=tZouNROhHeE
ESRI Indoors (video)

https://www.youtube.com/watch?v=gPKAWz1dOgM
Discussion
Discussion Questions

• When could you see your agency using indoor mapping, tracking, and navigation?
• What would limit your agency from implementing these technologies?
• How often are your maps / preplans /GIS layers updated?
• Does mutual aid units have access to you maps / preplans / GIS layers?
• With NG 911 gaining steam, has your agency increased or considered increasing full time GIS personnel?
• What could you see this technology being used for besides emergency response?
Closing Remarks

Where do we go from here?
i-Axis Community Website

Mapping, tracking, and navigation indoors is one of the greatest challenges facing first responder safety today. The built environment is growing both in volume and complexity—increasing the potential frequency of public safety response to 911 calls made within structures where locating victims poses unique challenges. Today more than ever, first responders need solutions to provide better situational awareness indoors, equipping them with the necessary capabilities to operate effectively while maximizing responder and citizen safety. The i-Axis community is your home for indoor mapping, tracking, and navigation. If you would like to join our community and receive email updates please click on the button below to register and be added to our map of Location Based Services Innovators.
i-Axis 2020

- February 18th 2020 1st Working Group Meeting
- April 2020: FDIC
- July 2020: NIST PSCR
- Fall 2020: Workshop (TBD)
i-Axis 2021

• 3 Virtual Trainings
• Best Practices Guide
• Research Priority Guide
Thank you!

NAPSG Foundation Contact: Paul Doherty pdoherty@publicsafetygis.org