

i-Axis: Indoor Mapping, Tracking, and Navigation



14 November 2019

Agenda

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

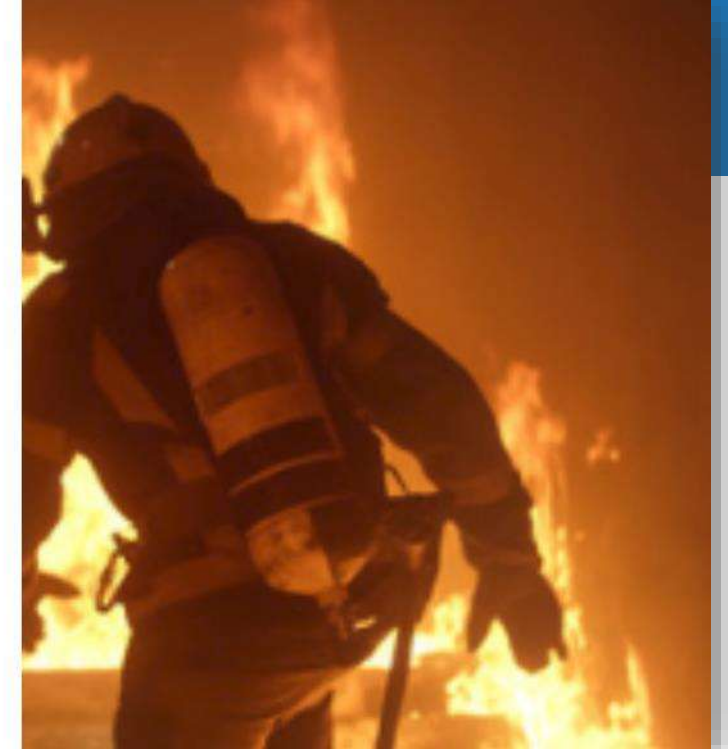
Jeb Benson

National Institute of Standards and Technology (NIST)

In Search of the Holy Grail: Indoor Tracking for First Responders

The ability to locate and track first responders operating indoors under difficult conditions remains a 'Holy Grail' sought by the public safety community. Every year, firefighters die or are seriously injured because they become lost, separated, or difficult to locate inside buildings or houses. Every day, law enforcement officers enter buildings, often alone, with their precise whereabouts unknown.

At the National Institute of Standards and Technology, the [Public Safety Communications Research](#) program is on the hunt for a solution to this extremely difficult problem. Follow the rest of this story to learn more about this complex issue, how PSCR is driving research and innovation in this area, and providing opportunities to get involved.



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

Problem

- 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.

In Search of the Holy Grail: Indoor Tracking for First Responders

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Question

What are location-based services (LBS)?

“provisioning of customized information, features, or services based on a user’s current or projected location”

Poll

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

Enter code 87 60 88

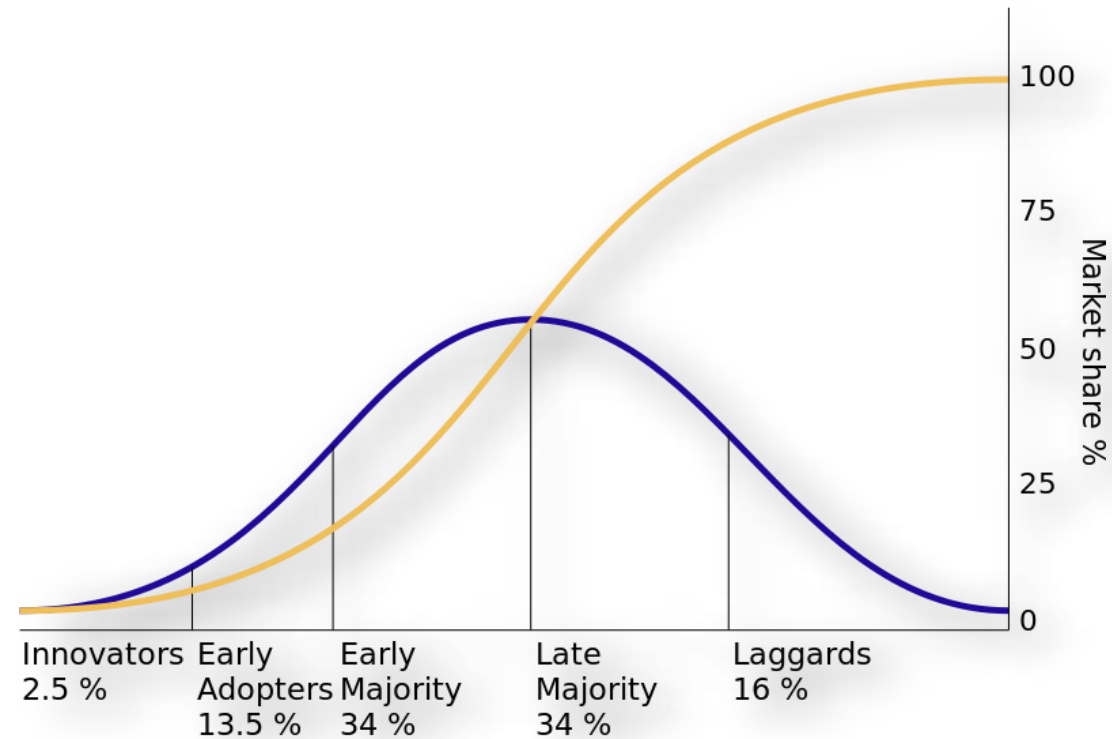
July Results



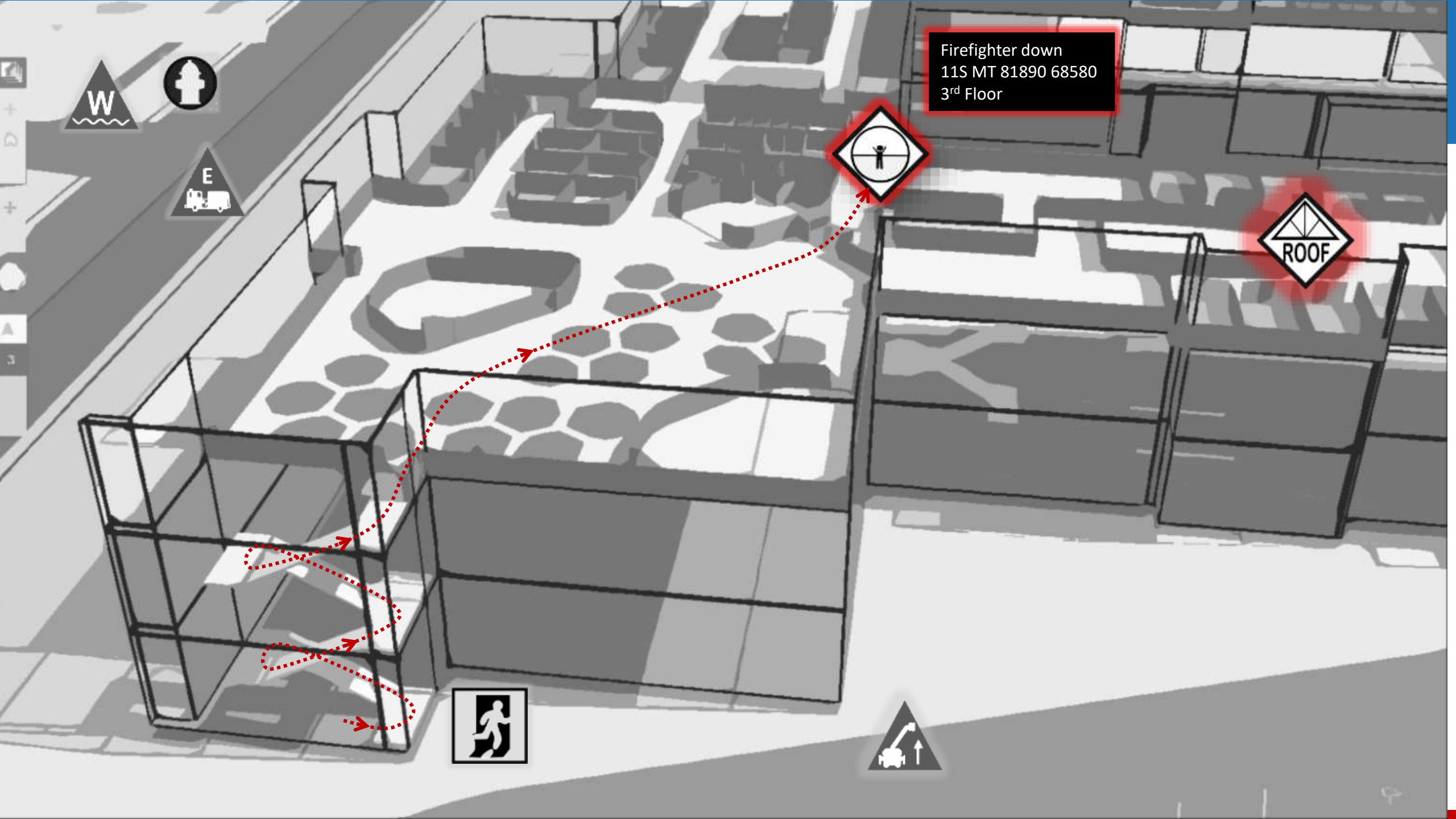
i-Axis Project Overview

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

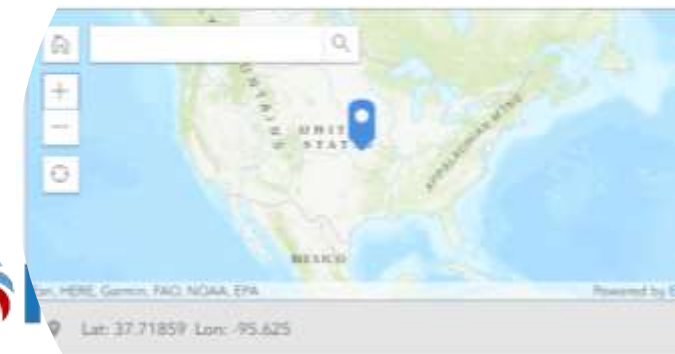
Accelerating Adoption and Use of Emerging Location Based Services by Public Safety

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

- Mapping
- Tracking
- Navigation



Agency Headquarters*
The department/agency headquarters in the "Find Address" field. When completing the questionnaire **at the headquarters building**, you will see the "Find my location" button (right below the Plus and Minus buttons) to use your device's GPS. Please check the accuracy after using the "Find my location" button. No. If your browser or security settings will allow for detecting your location. In this case, please address and/or drag the pin on the map.



How does it work?

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.

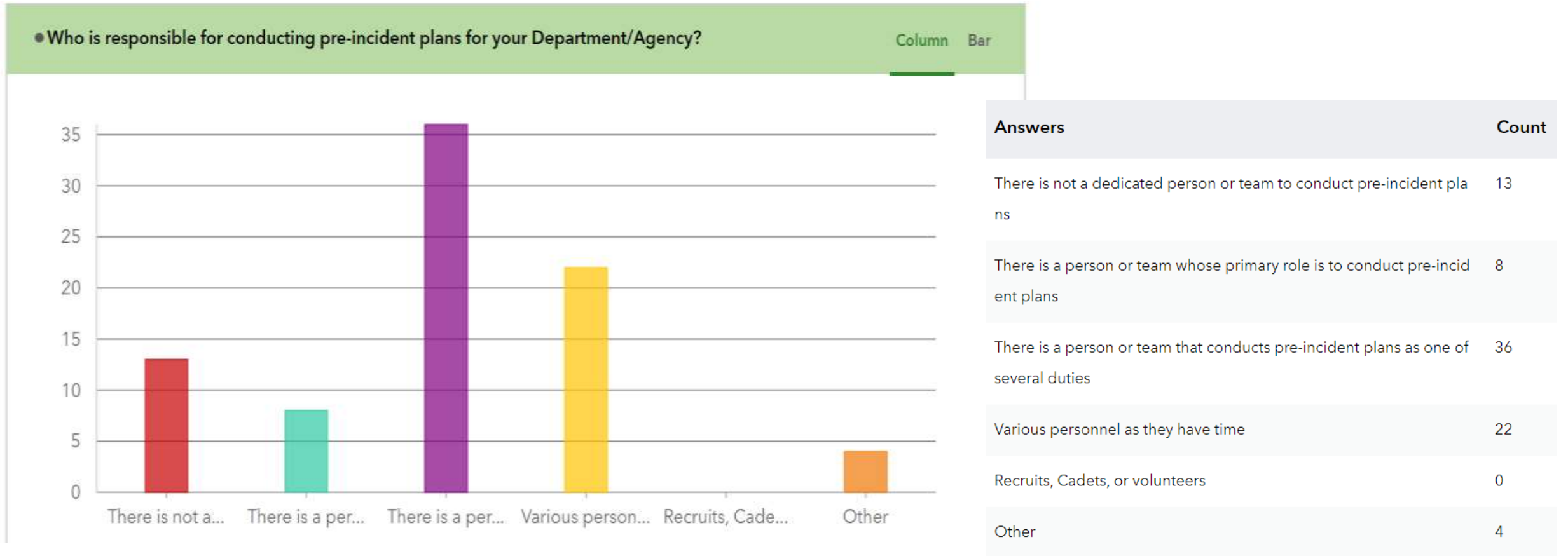


1. Open Camera
2. Point at QR Code*
3. Open the link

*Some phones require that you hold the "home" button. You can also access this form on your PC
https://bit.ly/20190709_iAxis

A sequence of four smartphone screens illustrating the steps to complete the NIST Questionnaire. The first screen shows the 'General Information' section with fields for 'Department or Agency' and 'Department/Agency Type'. The second screen shows the 'Mapping and Pre-Incident' section with checkboxes for pre-incident planning responsibilities. The third screen shows the 'Location of Department/Agency Headquarters' section with a map and a location pin. The fourth screen shows the 'Thank you' message and a link to the NIST Questionnaire.

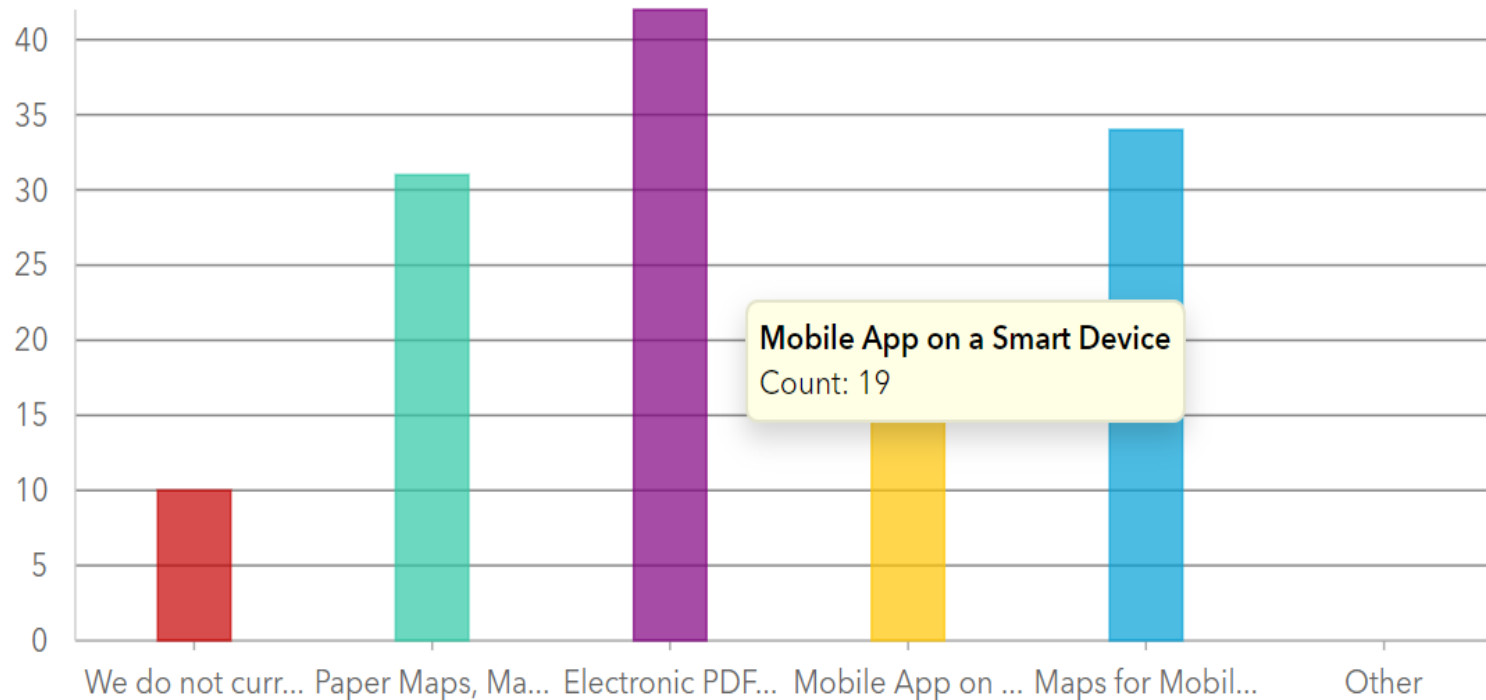
Discussion: How do you compare?



Discussion: How do you compare?

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

Column Bar



Answers	Count
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

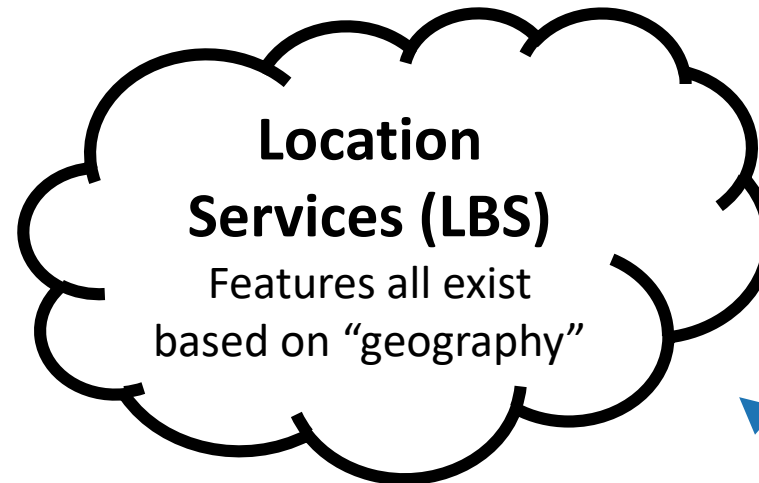
External Considerations

External Sources

Open source, commercial data, etc.

NG 911

GIS Oriented Next Generation 911



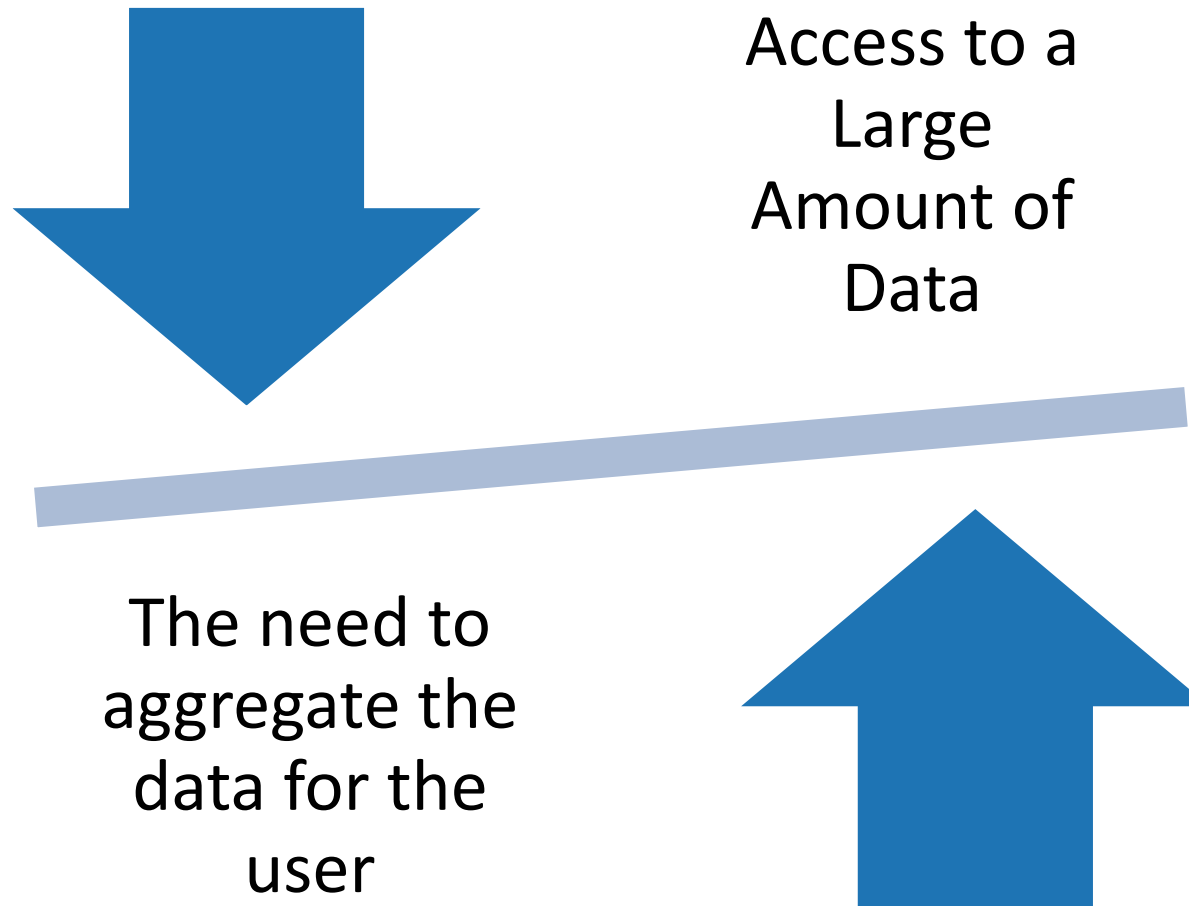
Building Information Systems

Modern building systems to monitor systems

Existing GIS

GIS systems that exist within a jurisdiction

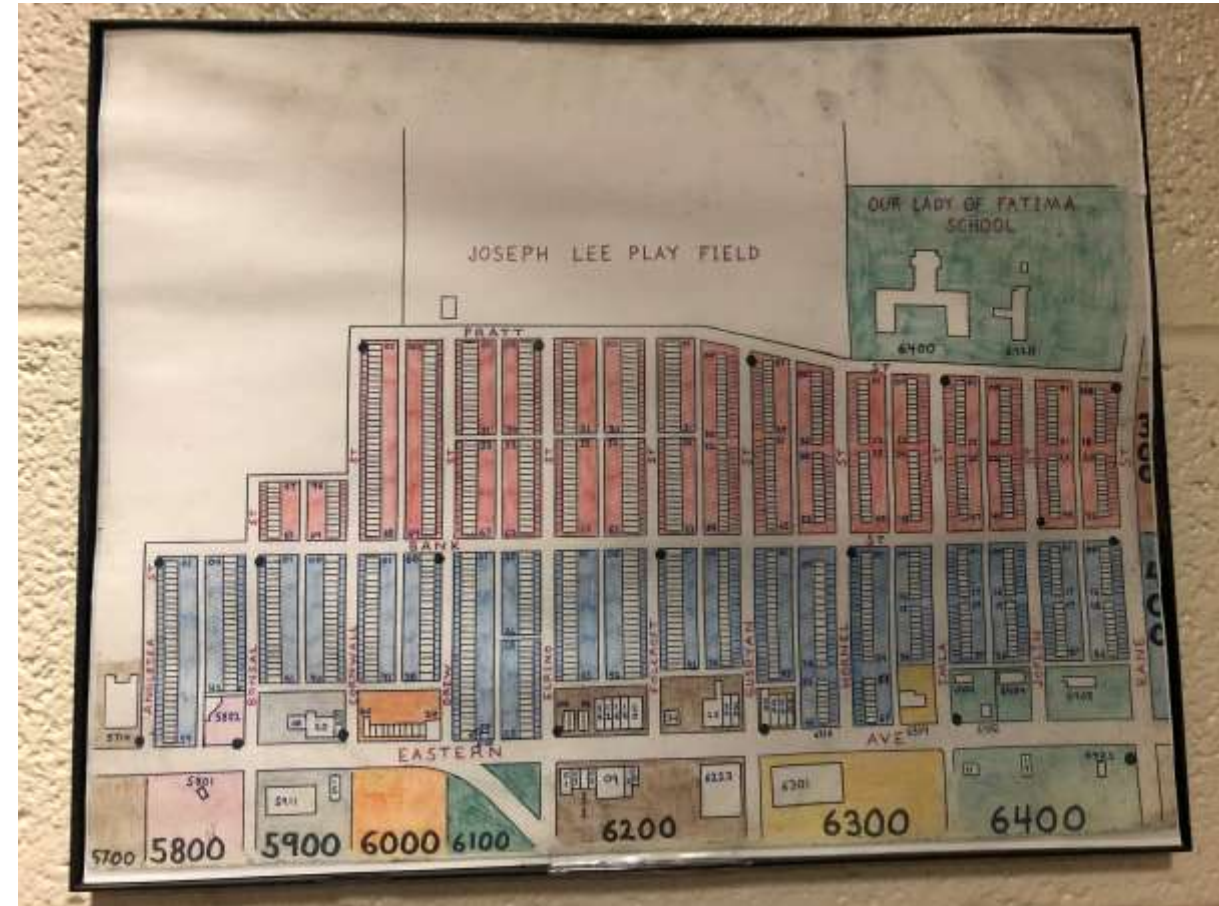
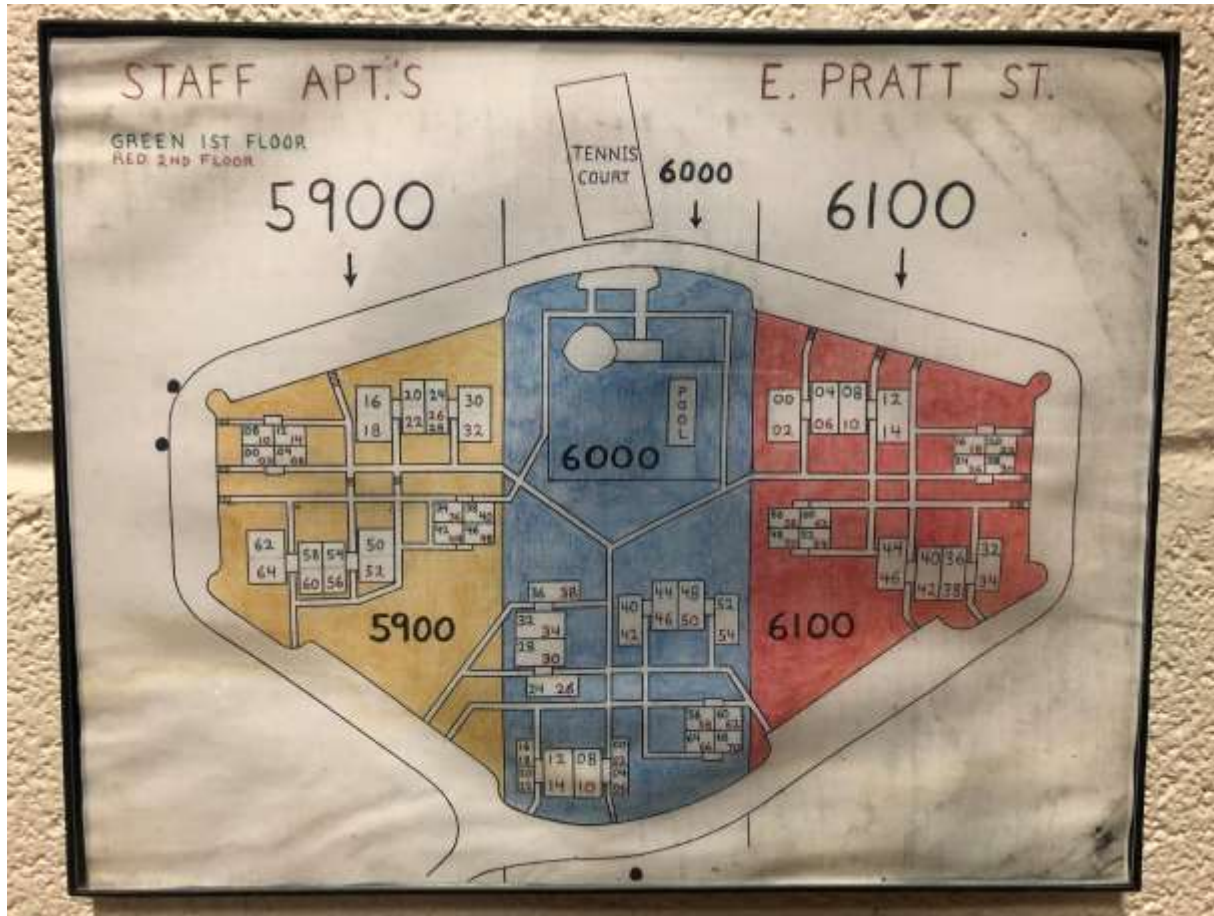
Balancing Act



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

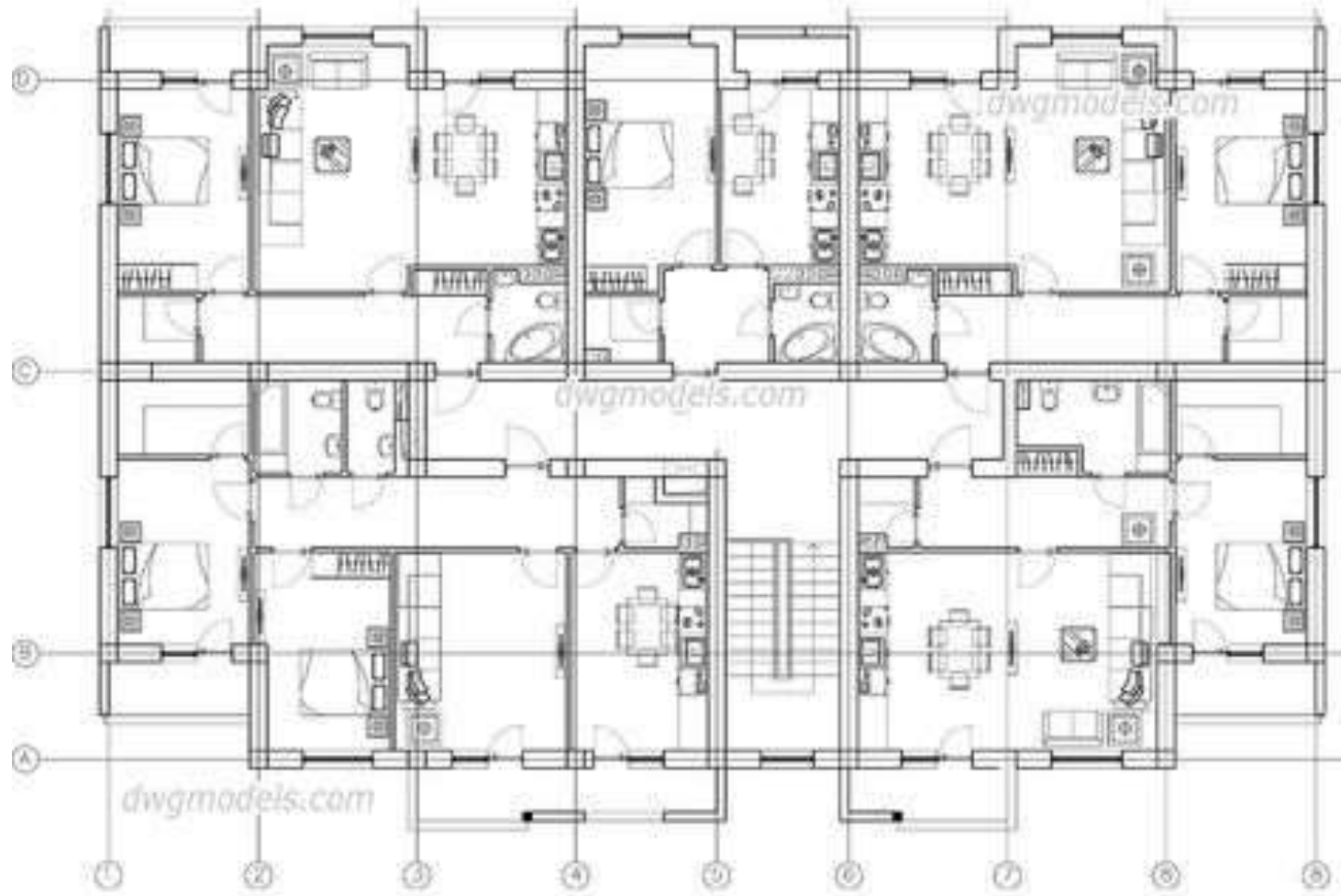
Mapping – Old School



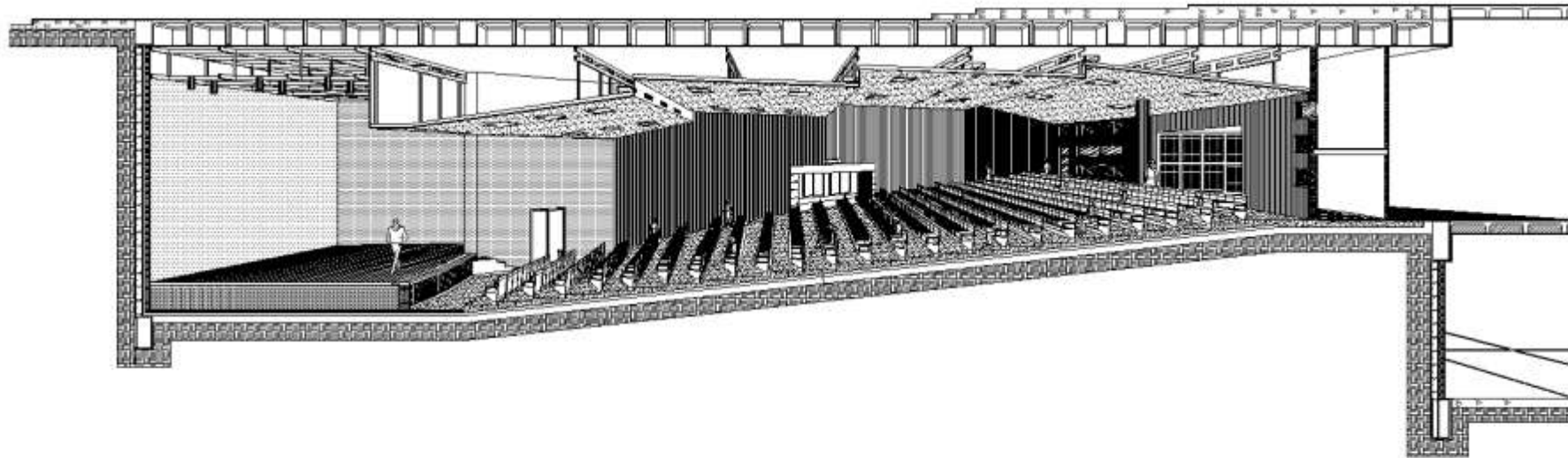
Mapping – Situational Awareness



Mapping – Floor Plans / CAD



Mapping – Floor Plans / CAD



Mapping – Floor Plans / CAD



Georeferenced Image

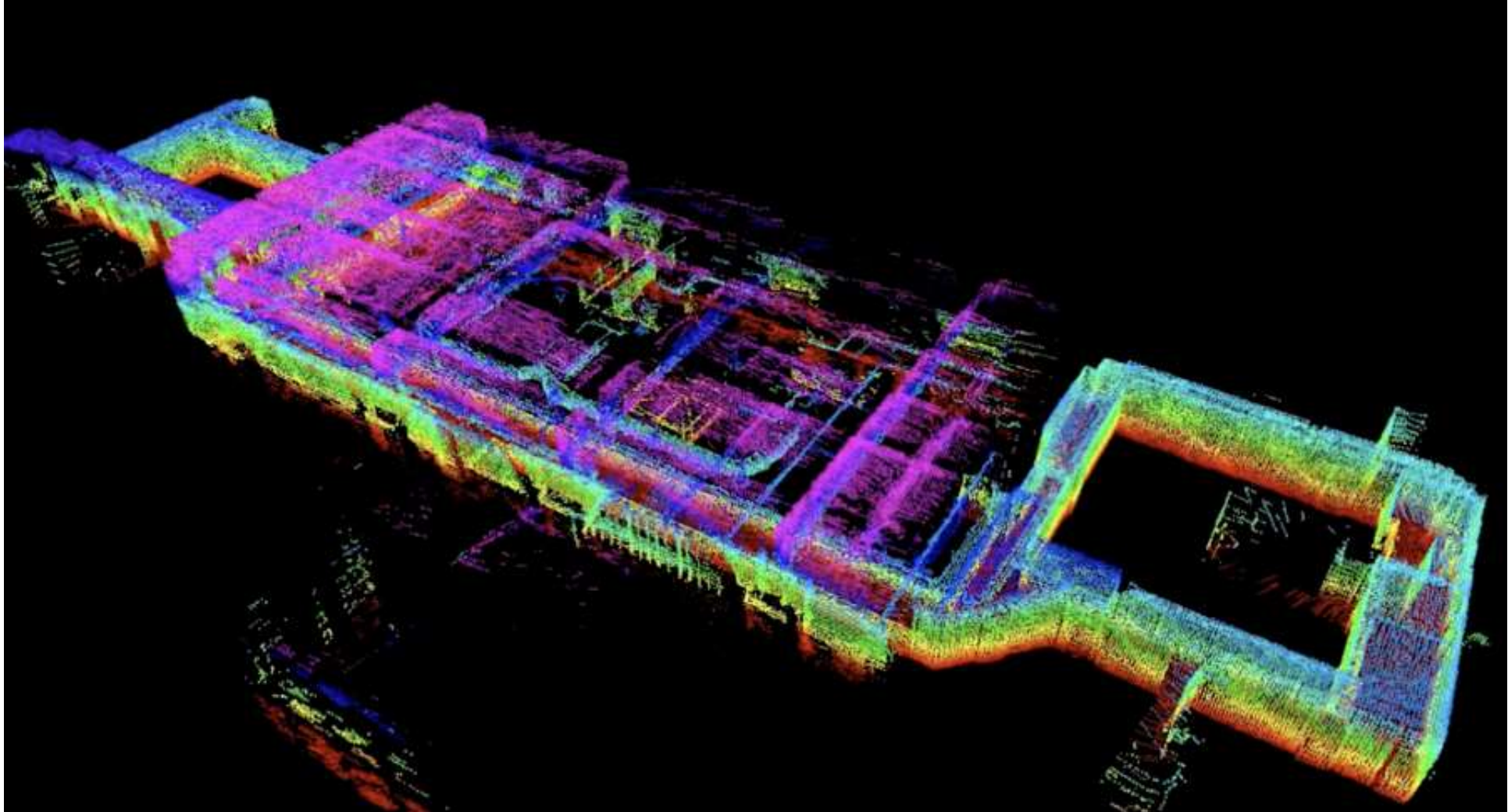
- Placing an image in the real-world location
- 4 points are needed to georeference an image
- Creates a world file that contains the location information

Mapping – Other Technology

Indoor LIDAR



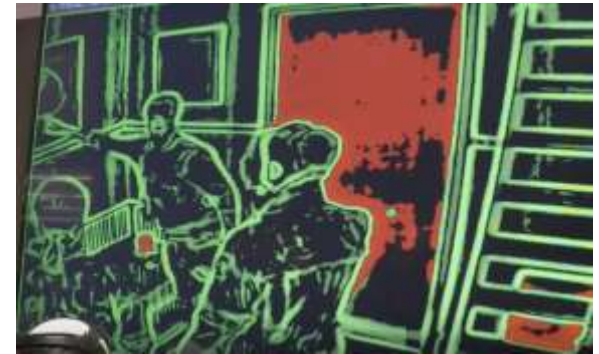
Mapping – Other Technology



Mapping – Other Technology



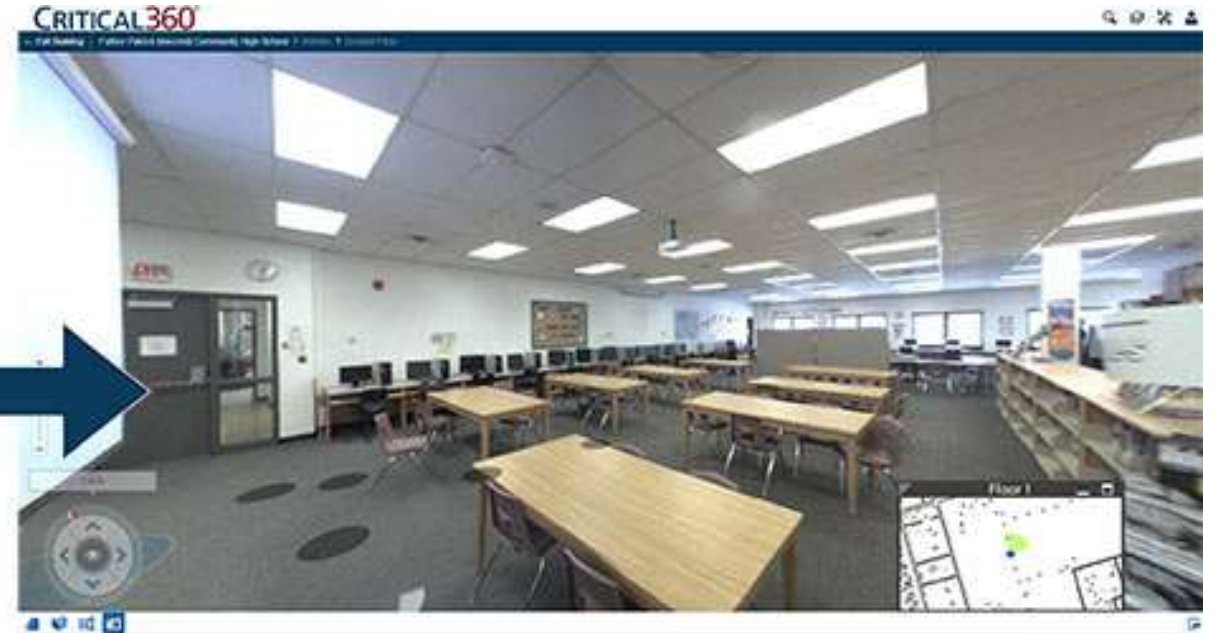
Virtual Reality / Augmented Reality



<https://www.youtube.com/watch?v=m6RNkqFgdUI>

Mapping – Other Technology

Eagle View/Pictometry Critical 360



Tracking



Tracking – GPS and UWB

TRX First Responder Location Technology



Tracking - RFID



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:

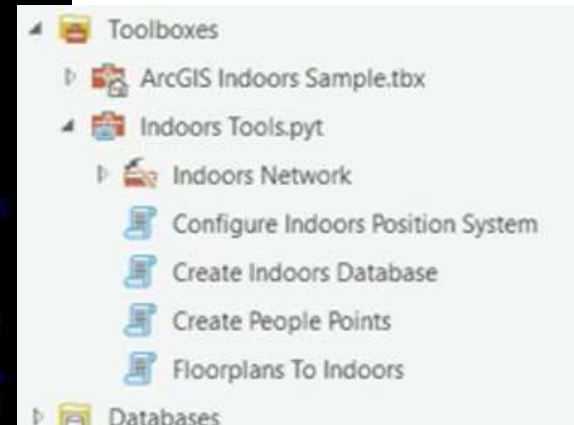
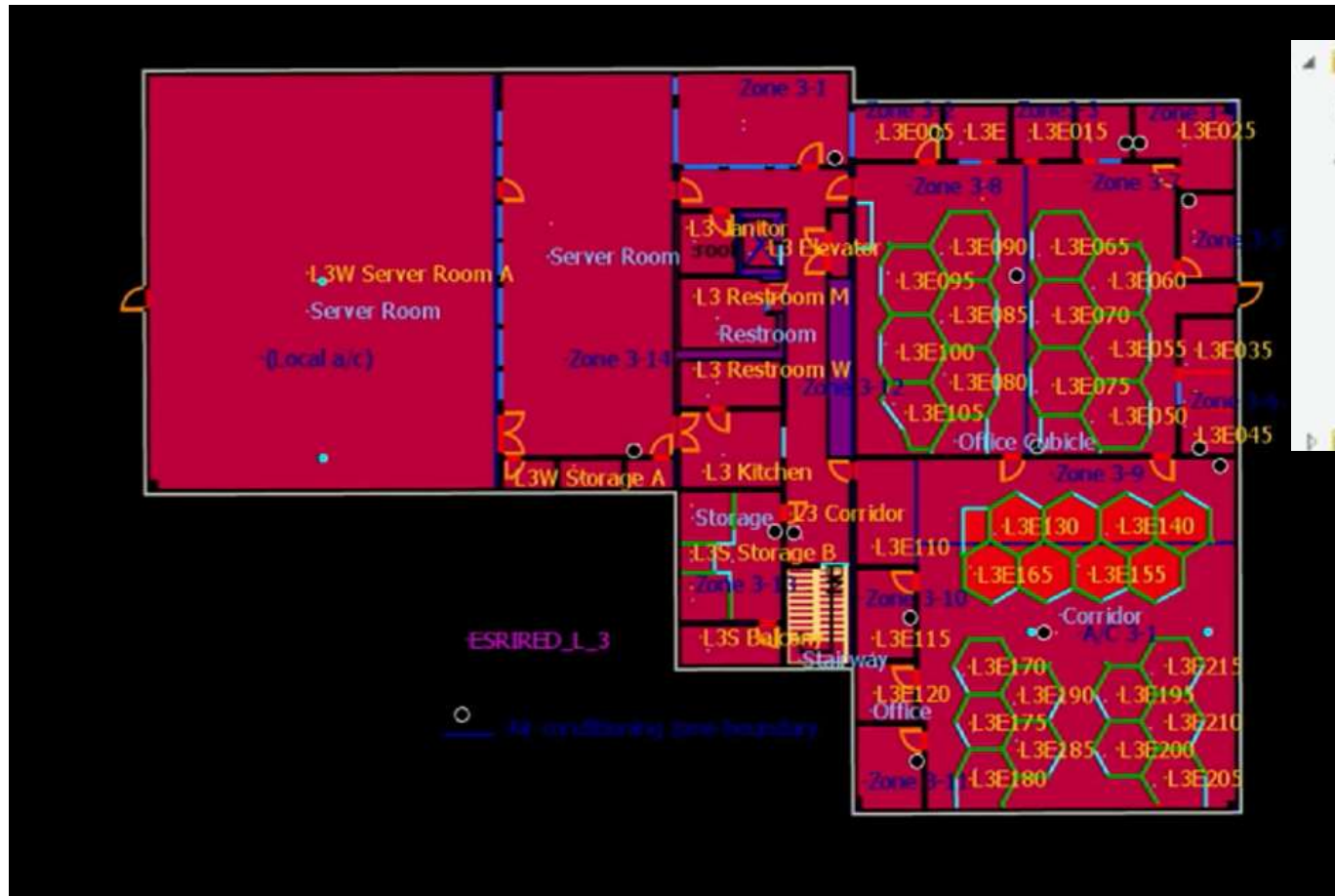
ESRI Indoors (Map, Track & Navigate)



ESRI Indoors (Map, Track & Navigate)



ESRI Indoors (Map, Track & Navigate)



ESRI Indoors Partners



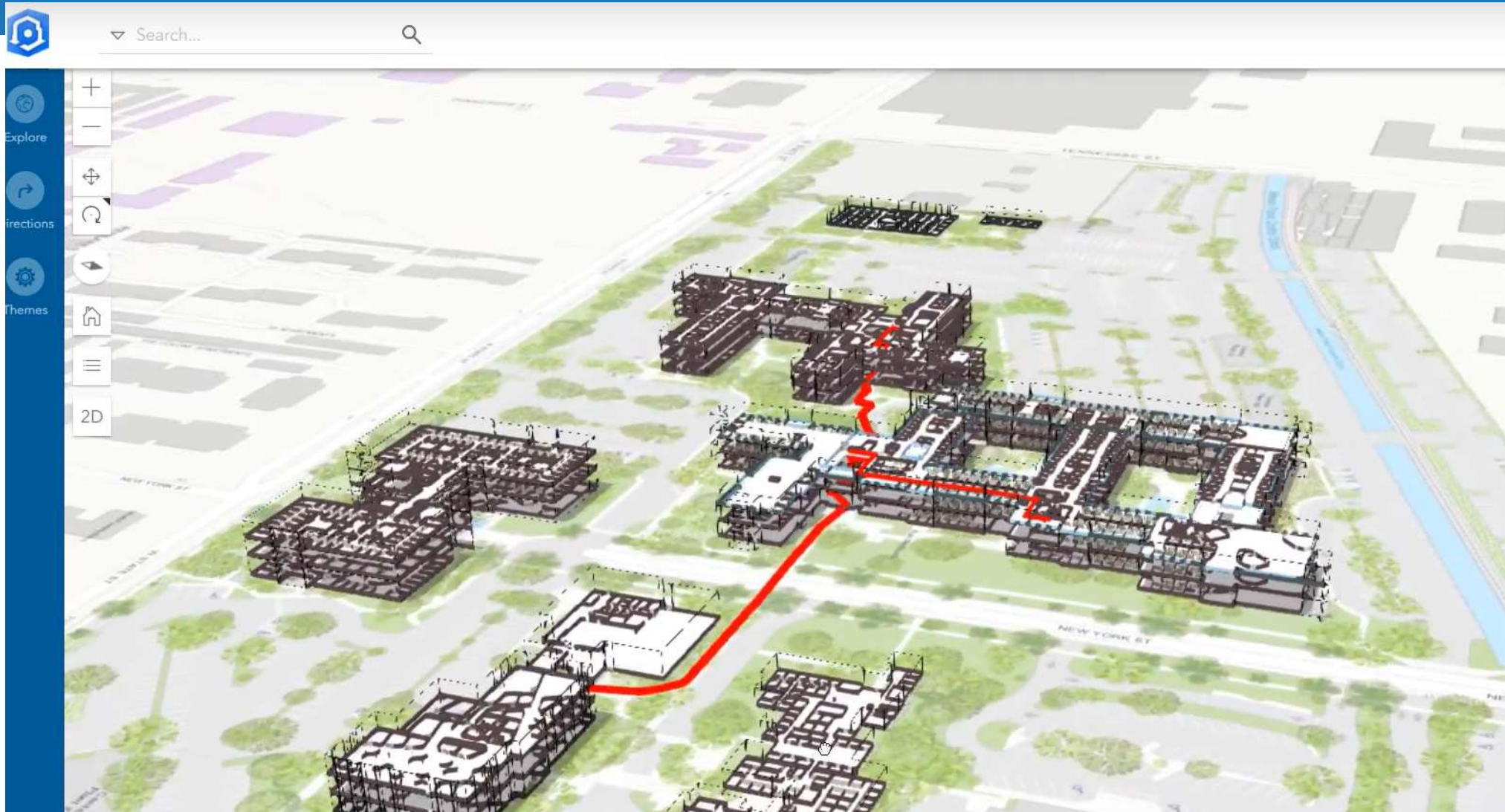
aruba

cisco



AcuityBrands.

ESRI Indoors (video)



Discussion

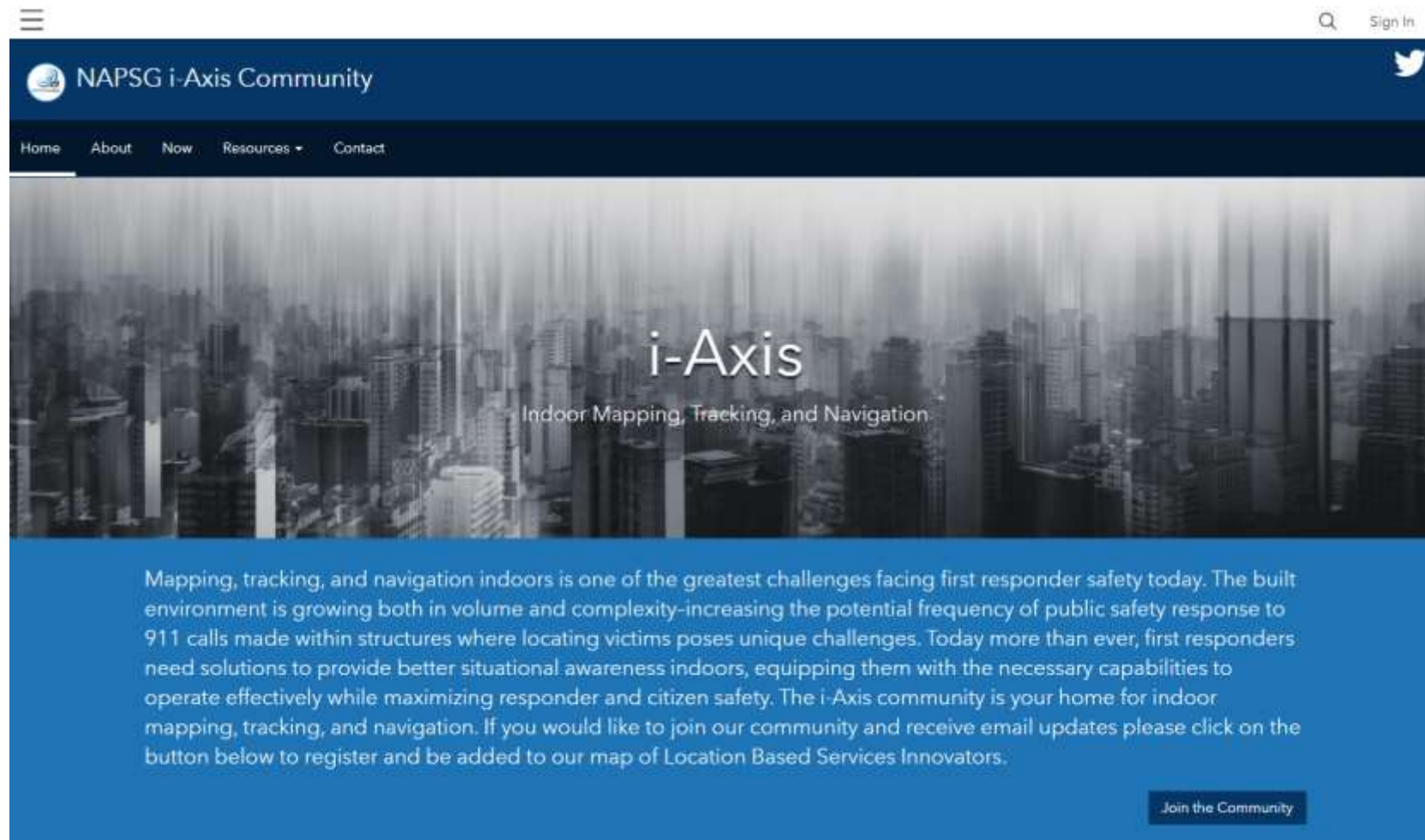
Discussion Questions

- 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



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

Appropriate Link If Needed: http://bit.ly/NAPSG_USNG