APCO International
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Emerging Technologies Forum

BROADBAND AND THE FUTURE USER'S EXPERIENCE

Richard Coupland
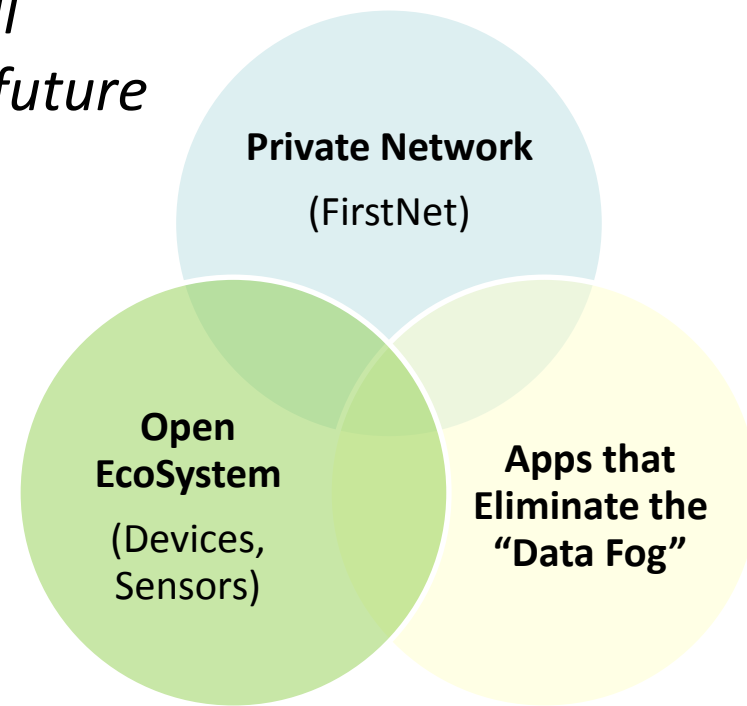Director, Public Safety
Market Development, GDC4S
@rcouplandiii

26-27 February 2014

Emerging Technologies in Public Safety

Public Safety is beginning to discover a world of connected sensors and data that will transform the way you respond in the future

1. *Purpose-built private networks, meeting public agencies' demand for secure voice, data and video (the NPSBN by FirstNet)*

2. *Industry's offering of an open Eco-System of devices, end points and capabilities that run on the NPSBN*

3. *Unique visualization and collaboration apps that reduce the "Swivel Chair" paradigm, and manage the "Data Fog"*

Private Network
(FirstNet)

Open EcoSystem
(Devices, Sensors)

Apps that Eliminate the "Data Fog"

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The Private Network

- Future Public Safety communications will rely on the 700 MHz LTE Network from FirstNet

- General Dynamics is a leading provider of 700 MHz LTE networks
  - Committed to research in 700 MHz LTE systems
  - Ongoing Internal Research and Development
  - Collaborative Research and Development with government, universities and industry partners

The End in Mind – Better Connected Operations Between Dispatch, Incident Command and Responders
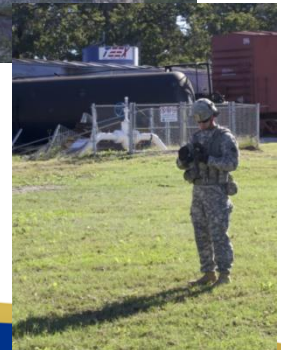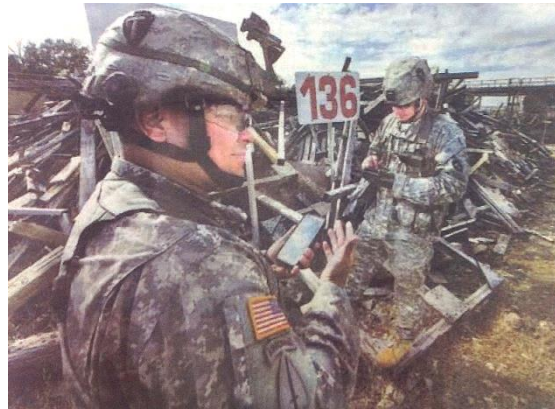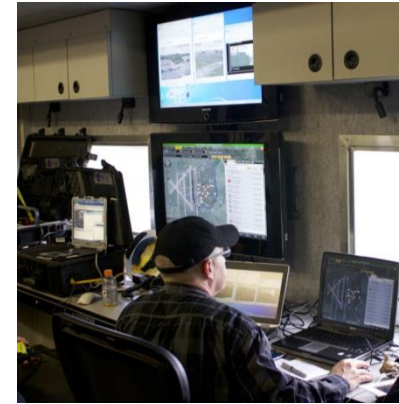
How Do We Know?

- We have lived this digital transformation once before

- GDC4S has been at the forefront of the DoD transformation to "digital battle command" over the past 20 years

A Look Back…

- Early 1990's – Gulf War triggers the need to better manage communications (networks) on the battlefield, for _DATA_, as well as Voice

- 1990's – Significant advancements in digital data networks, enable users to access far more data than they ever had before

- Late 90's, early 2000's – The surge of sensors, endpoints and raw data begins to consume the User's ability to make decisions → Creates the need for applications that "manage the complexity"

- 2005-2011 – Fielded systems (deployable networks, sensors, and applications) transform the ability to plan and execute the mission

- Today – New, Emerging Technologies continue to offer enhanced and expanded capabilities
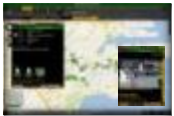
… And A Look Ahead

- Today – The Public Safety community articulates the need to better manage communications (networks) across the Nation, for *DATA*, as well as Voice

- 2013-2020
  - Initial broadband capabilities running over commercial or unlicensed spectrum show operational promise, but expose need for private Broadband
  - Realization of the NPSBN 700 MHz LTE data network, will enable users to see far more than they ever had before, in a dedicated spectrum band
  - The surge of sensors, endpoints and apps offering raw data will begin to consume the User's ability to make decisions → Creating the need for applications that "manage the complexity"
  - Applications key to the Public Safety and First Responder Mission will evolve, capable of access to all relevant data, but without undo burden on the PSAP or Responder

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Lessons Learned from Current Operations Over Commercial/Unlicensed Networks

- Overall Issue – Need for real-time connectivity between incident and command center in a clean spectrum

- Inability of existing broadband networks to support current deployments
  - NASCAR Race – Carrier back haul conflicted with 5.8 GHz network
  - Large Running Event – Federal Agency and Local/City Agency use of 4.9 GHz conflicted with our 4.9 GHz network
  - Downtown Demonstration Event – State Agency network conflicted at 4.9 GHz
  - General misuse of available public safety frequencies

Emerging Technologies That Enable Responders

Enabler	Users	Location	Benefit / New Capability Offered
Private , Assured 700 MHz LTE Network	• All Users	• Throughout Area of Operations	• Private, Secure, Broadband Data • Infrastructure to integrate sensors and assets • Ability to collaborate and share across all users
In-Vehicle Modems	• First Responders in Proximity to Vehicles	• Installed in First Responder Vehicles	• Connects to Private 700 MHz Broadband • Connects to Public Commercial LTE (Roaming / Fallback) • Integrates Vehicle Systems; Offers Position Location • Offers local WiFi around Vehicle
Field Sensors and Devices	• Operators of Assets • Inc. Command Staff • PSAP / Dispatchers • All Networked Users	• Aerostat over Scene • Ground Robots in HAZMAT locations • Fixed or Mobile Video	• Offers video feeds that assist teams in situational awareness and better decision making
Common Operating Picture	• All Networked Users	• Command Post • Vehicle MDTs • Field Laptops • Mobile Handhelds	• Map-Based Situational Awareness across all Users • Position Location of Networked Assets and Resources • Access to all data collected or interfaced from legacy systems • Access to all Video Feeds from Field Sensors and Devices
Rugged Laptops / MDTs	• Any User in MDT-equipped Vehicle or with Rugged Field Laptop	• In-Vehicle Mobile Data Terminals • Rugged Field Laptops	• User Access to Broadband Applications and Video such as the Common Operating Picture • Field Access to back-end data systems and records
Mobile Devices	• Any Mobile User equipped with a Networked Device	• Throughout Area of Operations	• User Access to Broadband Applications such as the Common Operating Picture • Ability to run future Apps to bring further value to Users in the Field • Voice over LTE

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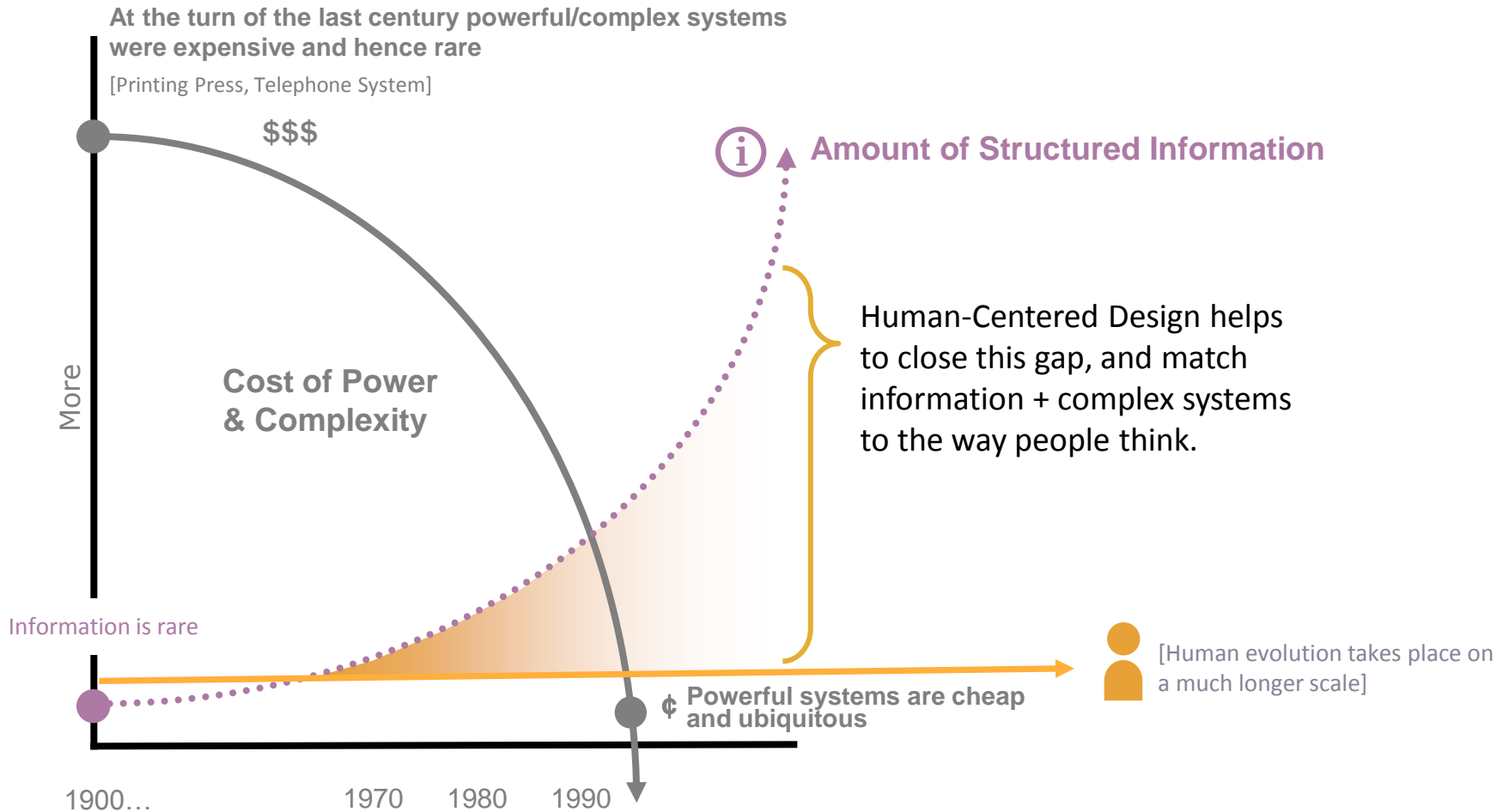
A Few Relevant Systems and Sensors…
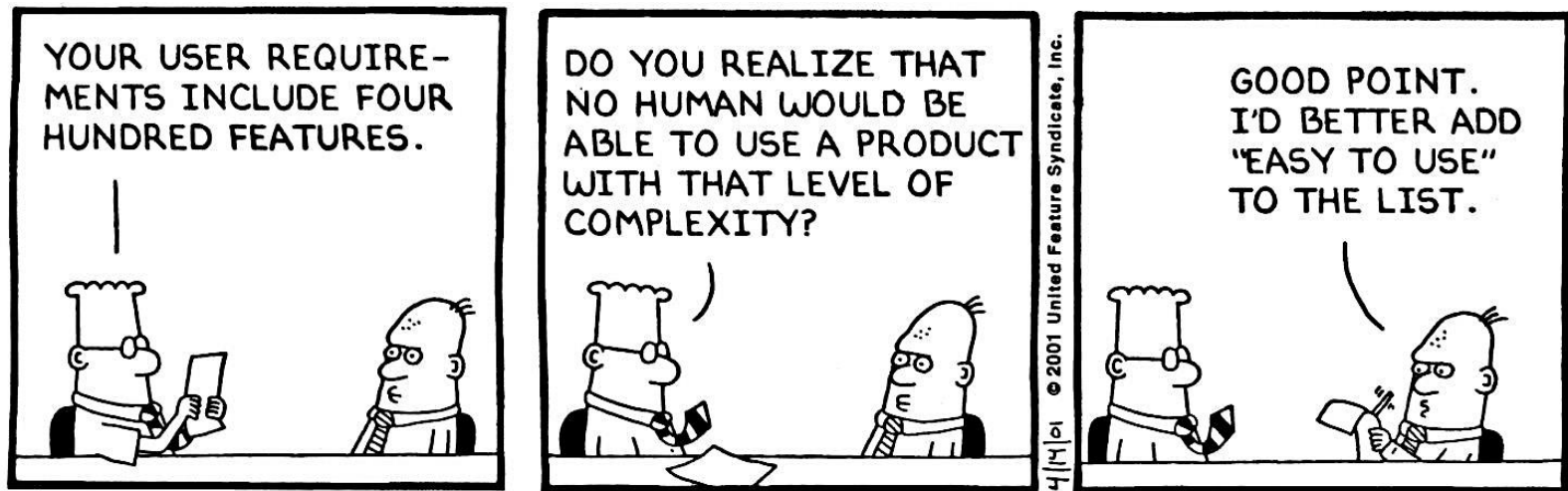
Data Systems

1. CAD
2. RMS
3. Warrants
4. Intelligence
5. Critical Infrastructure
6. Multi-Agency collaboration

Sensors and End Points

7. Asset / Responder Location
8. Responders as a Sensor
9. Social Media Feeds
10. Cameras (Traffic, Security, News, Industry partners, etc)

Taming Complexity - The Root of the Problem

At the turn of the last century powerful/complex systems were expensive and hence rare

[Printing Press, Telephone System]

$$$

Amount of Structured Information

Cost of Power & Complexity

Human-Centered Design helps to close this gap, and match information + complex systems to the way people think.

Information is rare

¢ **Powerful systems are cheap and ubiquitous**

[Human evolution takes place on a much longer scale]
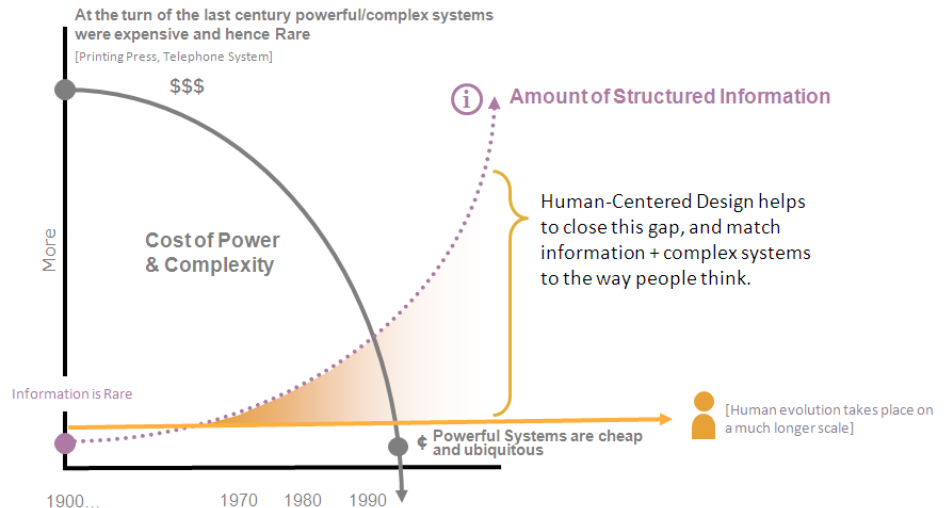
More

1900…   1970   1980   1990

Adams, Scott. Dilbert, www.dilbert.com. 14 Apr. 2001, United Feature Syndicate.

The Future Experience of the User

- The PSAP or Responder can't manage 10+ systems with thousands of sensor end points on their own

- The Future Experience of the User will be gaining the RIGHT information, at the RIGHT time, with the LEAST amount of effort.

At the turn of the last century powerful/complex systems were expensive and hence Rare
[Printing Press, Telephone System]

$$$

More

Cost of Power & Complexity

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1900...   1970   1980   1990

ⓘ Amount of Structured Information

Human-Centered Design helps to close this gap, and match information + complex systems to the way people think.

[Human evolution takes place on a much longer scale]

¢ Powerful Systems are cheap and ubiquitous

Less time trying to sift through the data, and more time to make decisions from the information provided to you

Leveraging Prior Investments

- Public Safety Users can benefit from the investments and maturity of Incident Command and Decision Support capabilities developed by others
  - Individual Capabilities
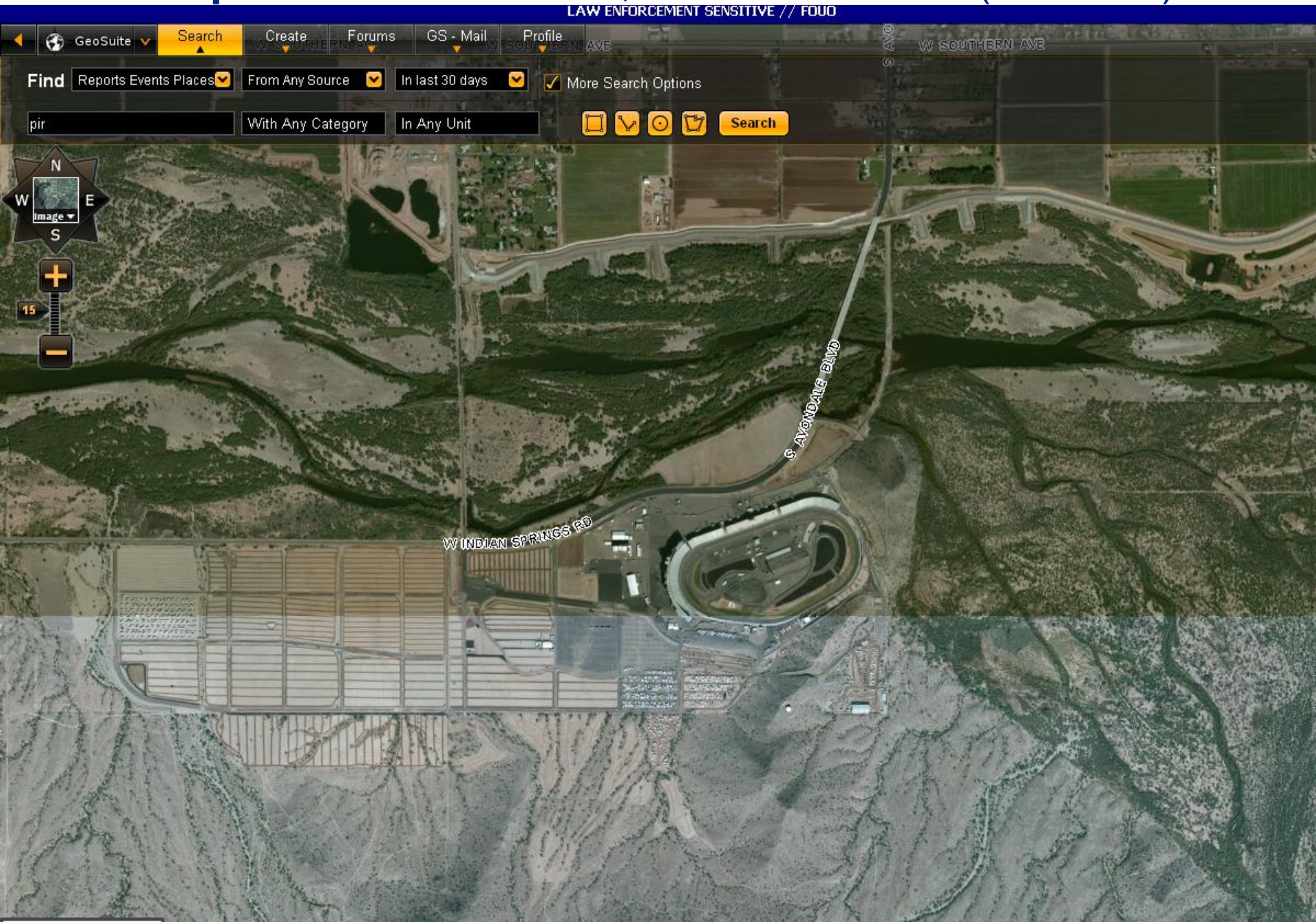 - Tools that Integrate Multiple Capabilities

Example – GeoSuite®
Commercial Equivalent to US Army's Tactical Ground Reporting (TiGR)

Wheel diagram showing segments:

Social Media: Gang, Narcotics

National Response: Int'l Response

Local Response

Events: Major Incidents, VIP / Dignitary, Critical Infra., Counter Terrorism, Intel

Patrol: SWAT, Investigations, Intel, Traffic

Inner ring: Special Units, Disaster Response/Search & Rescue, Planning & EOC, Community Policing / Crime Reduction

- Search segments defined by search commander from remote CP
- Automatically pushed to on-site search teams

"...h Complete" events dropped ...eoSuite on Handhelds ...atically pushed up to search ...der at remote CP

Multimedia attachments associate with search events

Police and Fire Asset Locations
Police CAD Events
Fire CAD Events
Open Warrants
Density/Heat Maps

Example – NASCAR Race, Phoenix Arizona (11/10/13)

Example – NASCAR Plans and Segments

Example – On-Scene CAD Calls During Execution

Example – Social Media Feeds as an Additional Layer
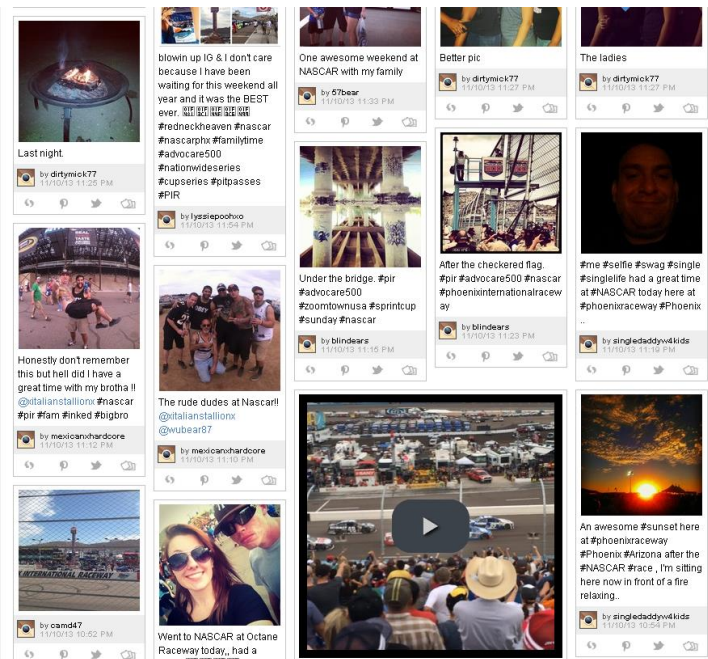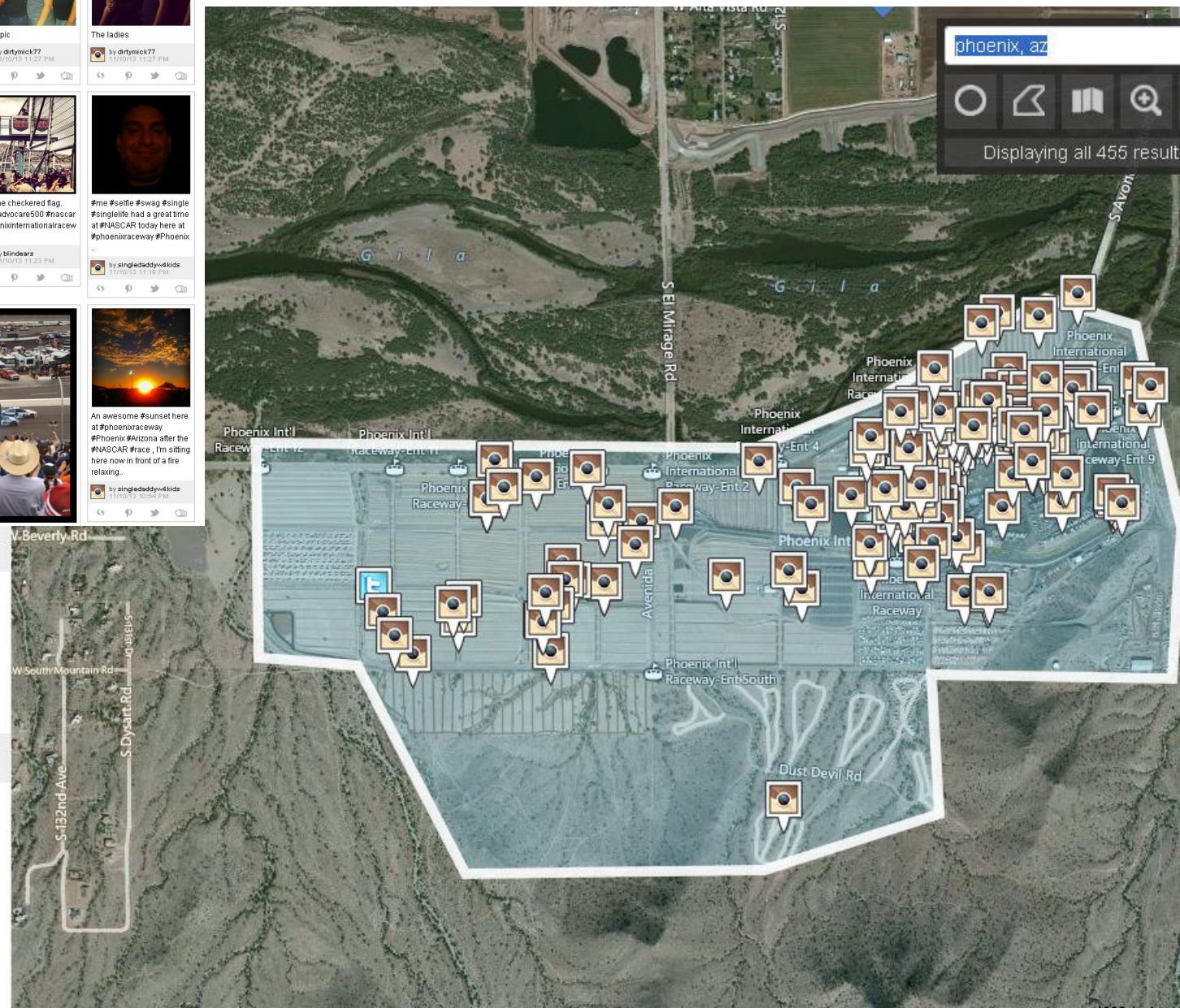
Example – Integrated Police CAD, Fire CAD and Position Location of Assets

Police Incidents by Priority

Integrated Incident List

Fire Incidents

# **Example** – Search and Rescue Operations

Moore, OK
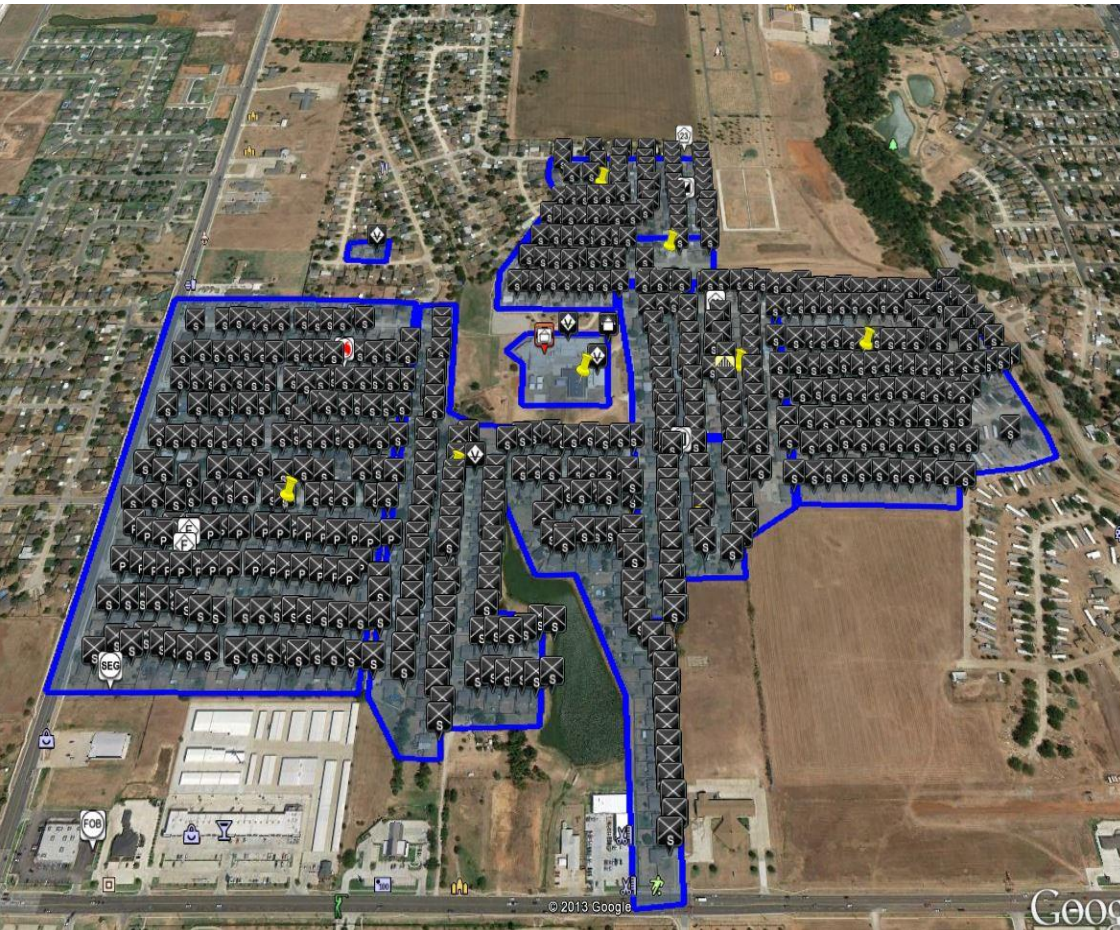
West, TX

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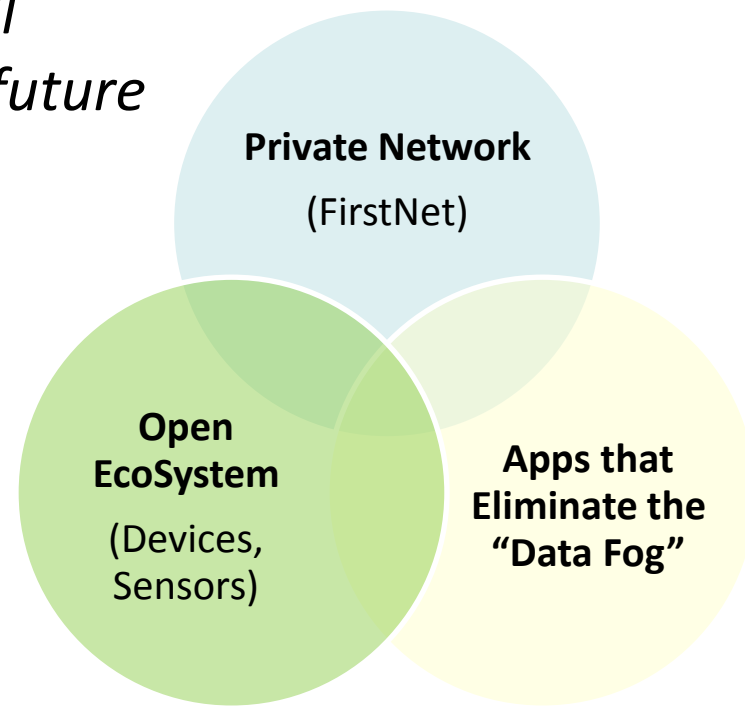
Q & A

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