

MUTUALINK™

Command & Control

Rapid Deployment of Multi Media Interoperability Across Multiple Agencies in Critical Conditions



Meeting the Emergency Response Challenge

- **Emergencies are no respecters of borders, boundaries, or the limitations of diverse networks:**
 - Accidents
 - Spills
 - Natural disasters such as floods or landslides
 - Criminal and terrorist incidents
- **Many agencies need to work together:**
 - Police, armed forces, ambulances and other medical services, fire, marine agencies, vessels, border forces
- ***Rapid response time is critical to avoiding even greater tragedy***

InterLink's Solution

- **K Mesh, based on MN MIMO wave form, not restrained by 802.11 specifications**
- **Mutualink™ Instantaneous Multimedia Collaboration Network with IP-Centric Interoperability**

K (Carrier) Mesh Technology

- 2X and 4X MIMO COFDM - far exceeds the capabilities of WiMesh 802.11
- Superior proprietary meshing algorithm – development funded by DARPA
 - No tower to tower failover - assured delivery at the packet level
 - Extremely robust in Urban Canyons and Subterranean Passages
 - Very high DATA throughput (>100 Mbs)
 - Extremely reliable at long ranges (30 Mbs at 25 miles, 2 Mbs at 60 miles or more)



K Mesh Advantages

Due to the extraordinary level of real-time, packet-level control and the advantages of MN MIMO, K Mesh advantages include:

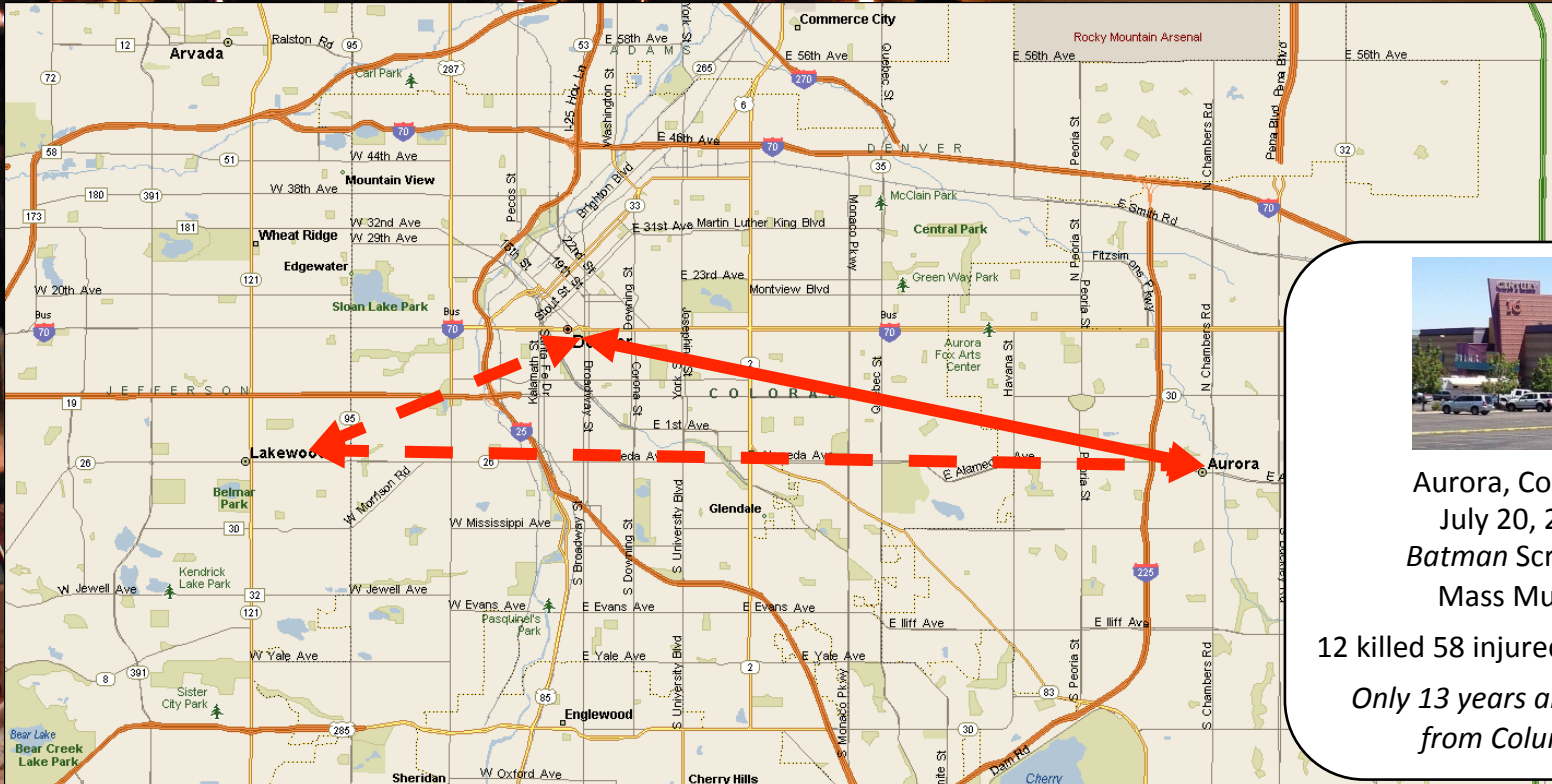
- Instantaneously routes each packet by the current optimal path
- Automatically selects the optimal modulation scheme for each packet according to current conditions
- Space-Time coding distributes redundant copies of data across multiple antennas to improve robustness
- Spatial multiplexing permits multiple data streams to be sent simultaneously, increasing the capacity of the link
- Rx Beamforming allows radios efficiently to sum energy received by all receiving stations
- Tx Beamforming allows radios to steer transmit beams toward the receiver on a real time basis

Common Interoperability Problems

- Radios cannot talk to other radios unless already engineered to do so
- Establishing inter- agency connections is:
 - Cumbersome
 - Requires highly trained personnel
 - Slow, uncertain, costly in time (and money!)
- Can't add agencies or individuals on the fly
- Common limitations include the inability to collaborate :
 - With agencies or individuals outside the predetermined public safety network
 - Across certain jurisdictional lines
- Common “Can't Dos” Include
 - Connect with phones
 - Share videos on the fly
 - Share images or diagrams, floor plans, etc.

Establishing Simple Connections Costs

VITAL Time—LIVES MAY BE LOST



Aurora, Colorado
 July 20, 2012
 Batman Screening
 Mass Murder

12 killed 58 injured in 7 minutes
*Only 13 years and 13 miles
 from Columbine*

CONVENTIONAL interop: 76 seconds lost yet NO connection
 MUTUALINK interop: Multiple connections in less than 12 sec.

Mutualink ip-Centric versus Conventional Radio-Centric Interoperability Solutions

- **Conventional Interoperability Solutions are costly, slow, cumbersome, and uncertain. As in the Aurora theatre shooting in the US in 2012, difficulty in establishing connections cost lives.**
- Peer-to-Peer ip based interoperability is cost-effective, fast, easy to use, and certain. Contrast the exemplary public safety response in the Boston Marathon bombings versus the response in Aurora
- Mutualink is used throughout the United States and around the world, by agencies such as NATO, and has been a key element of the security infrastructure for Hurricane Sandy in NY and NJ, the Pope's visit to Brazil, the 2016 Olympics in Rio, the Boston Marathon bombings, the Super Bowl, President Obama's inauguration, the World Cup, and other events.
- Mutualink is highly cost competitive compared to conventional radio-centric interoperability solutions, and can be implemented without replacing or disrupting existing radio and video infrastructure.

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Mutualink for Trains & Transportation

- Emergencies do not respect timetables or restrict themselves to easily accessible areas
- Floods, fires, derailments, accidents, terrorist events, criminal acts, trespass, livestock on the line, landslides, breakdowns
- People have to be rescued, moved, treated, resources mobilized
- Mobile carriers do not provide complete coverage and cell-based LTE does not provide a complete solution
- K-Mesh's permanent and ad-hoc network capabilities working in tandem with Mutualink provides a complete, immediate, reliable, and affordable solution

GIC's Mutualink Solves the Problem

– Cost Effectively

- Connects different agencies together in seconds
- Allows them to share the same resources – voice, data, live video
- Provides a low-cost common communications framework for use in responding to emergency situations
- Used worldwide

Mutualink Provides Instantaneous Multimedia Collaboration

- Converts all resources (radios, phones, videos, images, files) into a common ip format that can be shared with any and all agencies and individuals needed in an emergency
- Allows all participants to retain control of their own resources
- Through Peer-to-Peer networking allows all agencies to perform as equals

Mutualink Connections: Quick and Easy and Certain

The screenshot displays a 'High School / Security Interoperability Workstation' interface with the following components:

- Left Panel:** A list of Mutualink connections under 'All IWSS' and 'IWSS Lists'. The 'Mutualink' section is expanded, showing a list of resources including 'RollCall2', 'Support', 'EngSupport', 'Support1', and various regional entities like 'NJ-AtlanticCityHS', 'NJ-AtlanticCityPD', 'NJ-BayonneHosp', etc.
- School Intruder Window:**
 - Buttons for 'TX' (red) and 'Intercom' (yellow), each with a 'Select' button below it.
 - Members:** A list of participants including 'HighSchool: Security', 'NJ-Atlantic City: Dispatch', 'NJ-Lyndhurst: Dispatch', and 'HighSchool: LobbyVideo'.
 - Activity Log:** A log of events such as '09:48:27 Joined: [HighSchool: Security]', '09:48:31 Invited: [Smallville: Dispatch]', and '09:48:44 Accepted: [Metropolis: Dispatch]'.
 - Messages:** A chat window showing messages like '09:50:47 [HighSchool: Security]: Intruder is in main lobby', '09:50:58 [Smallville: Dispatch]: SWAT team on the way', and '09:51:08 [HighSchool: Security]: starting live video feed now'.
 - Shared Files:** A section for sharing files.
- School Videofeed Window:** A video player showing a night-time aerial view of a school building with smoke and emergency lights. The status bar shows '0:00:00 / 0:00 x1.00 udp:@239.232.1.133'.
- School Layout Window:** A floor plan diagram of a school building with various rooms labeled, including 'Classroom # 1-10', 'Lunch Room # 12', 'Gymnasium # 14', 'Gym # 15', 'Gym # 16', 'Gym # 17', 'Gym # 18', 'Gym # 19', 'Gym # 20', 'Gym # 21', 'Gym # 22', 'Gym # 23', 'Gym # 24', 'Gym # 25', 'Gym # 26', 'Gym # 27', 'Gym # 28', 'Gym # 29', 'Gym # 30', 'Gym # 31', 'Gym # 32', 'Gym # 33', 'Gym # 34', 'Gym # 35', 'Gym # 36', 'Gym # 37', 'Gym # 38', 'Gym # 39', 'Gym # 40'. A red dot on the floor plan indicates the intruder's location. A 'File Display' box is overlaid on the layout. The status bar shows 'udp:@239.232.1.133'.

Mutualink Connections are Quick and Easy and Certain

Start Incident

New Incident

All IWSS | IWS Lists

- AR-LittleRock-AWINHQ
- AR-NLittleRock-ADEM
- Mutualink
 - RollCall2
 - Support
 - EngSupport
 - Support1
- NJ-AtlanticCityHS
- NJ-AtlanticCityPD
- NJ-AtlanticCntyEOC
- NJ-BayonneHosp
- NJ-Belleville-ClaraMaassMed
- NJ-E.O.
- NJ-Eng
- NJ-Hackensack-Grivmedctr
- NJ-HobokenUnivMedCtr
- NJ-HudsonCoSheriff
- NJ-JerseyCity-ChristHosp
- NJ-JerseyCityMed
- NJ-JerseyCityOEM
- NJ-LyndhurstPD
- NJ-Montclair-MountainSideHosp
- NJ-N.Bergen-PalisadesMedCtr
- NJ-Newark-BethIsraelMed
- NJ-Newark-UMDNJ_REMCS
- NJ-Newark-UniversityHosp
- NJ-NewarkArena
- NJ-NewarkDeptHealth
- NJ-NewarkEY-VNA

Add Resource

Agencies Available

PTT

TX Intercom

Select Select

Members

- HighSchool Security
- NJ-Atlantic City: Dispatch
- NJ-Lyndhurst: Dispatch
- HighSchool LobbyVideo

Activity Log

- 09:48:27 Joined: [HighSchool: Security]
- 09:48:31 Invited:
- 09:48:33 Invited:
- 09:48:36 Invited:
- 09:48:36 Accepted:
- 09:48:36 Invited: [HighSchool: LobbyVideo]
- 09:48:36 Accepted: [Metropolis: Dispatch]
- 09:48:44 Accepted: [Metropolis: Dispatch]

Messages

- 09:50:47 [HighSchool: Security] Intruder is in m
- 09:50:58 [Email] SWAT team on s
- 09:51:08 [High] starting live video feed now

Send

Activity Log

Text Window

File Transfer

Resources (video and voice)

School Videofeed

Live Video Stream

0:00:00 / 0:00 x1.0C udp:@239.232.1.133

School Layout

File Display

udp:@239.232.1.133

Five Easy Steps to Collaboration:

Takes 12-15 seconds PLUS includes streaming video, files sharing and other Resources

- Steps:
- 1 Create New Incident
 - 2 Invite other agency (or agencies)
 - 3 Drag in radio
 - 4 Drag in video
 - 5 Click to open a file

The screenshot displays the 'High School / Security Interoperability Workstation' interface. It features several key components:

- New Incident:** A green button at the top left.
- IWS Lists:** A list of various agencies including AR-LittleRock-AWINHQ, Mutualink, RollCall2, Support, EngSupport, Support1, and numerous NJ-based agencies like AtlanticCityHS, AtlanticCityPD, and HudsonCoSheriff.
- School Intruder:** A central panel with 'TX' and 'Intercom' buttons, a 'Members' list (HighSchool: Security, NJ-Atlantic City: Dispatch, NJ-Lyndhurst: Dispatch, HighSchool: LobbyVideo), an 'Activity Log' with timestamps and messages, and a 'Messages' section with a 'Send' button.
- School Videofeed:** A window showing a live night-time video feed of a school building with smoke and fire.
- School Layout:** A floor plan diagram of the school with various rooms labeled, such as Classroom #1-15, Gym, Cafeteria, and Computer Lab.

At the bottom right, the status bar shows 'Server: localhost' and '12-Mar-2010 12:00 PM'.

Mutualink Equipment:



Portables



Edge™
Devices



Desktops
Rackmounts
Handhelds



“Endpoints” for Radio, Video, Telephone, PA

We Form the Bridge!



Within Public Safety and
With Other Public Safety and Critical Infrastructure



Seamless Multimedia Collaboration
Among:

- Public Safety
- Emergency Services
- Private Security
- Military
- Regional Police
- National Police
- Transport Security
- Key Individuals
- Critical Infrastructure
- Key Resources
- Health
- Others as needed

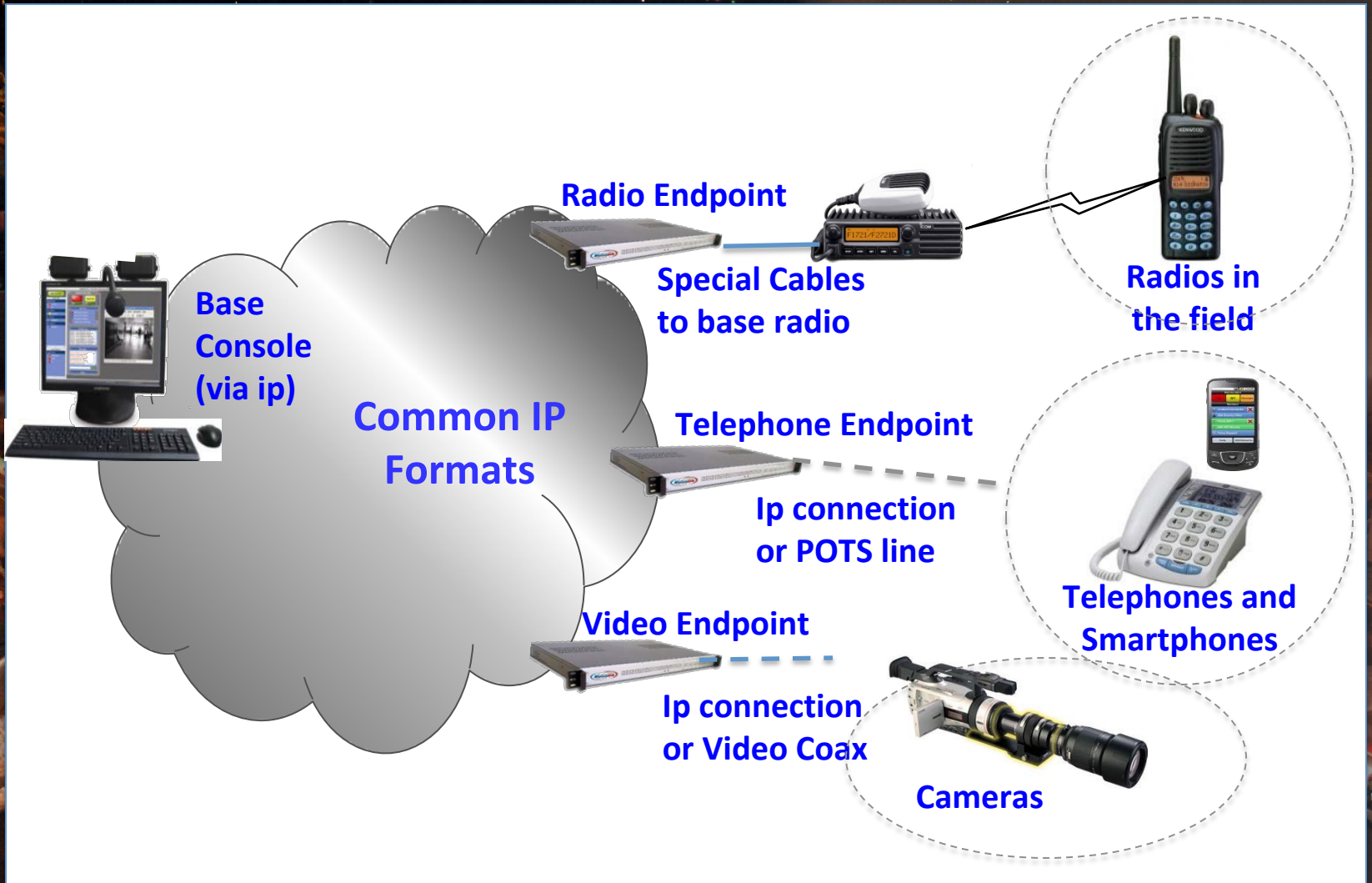
How do we do it?



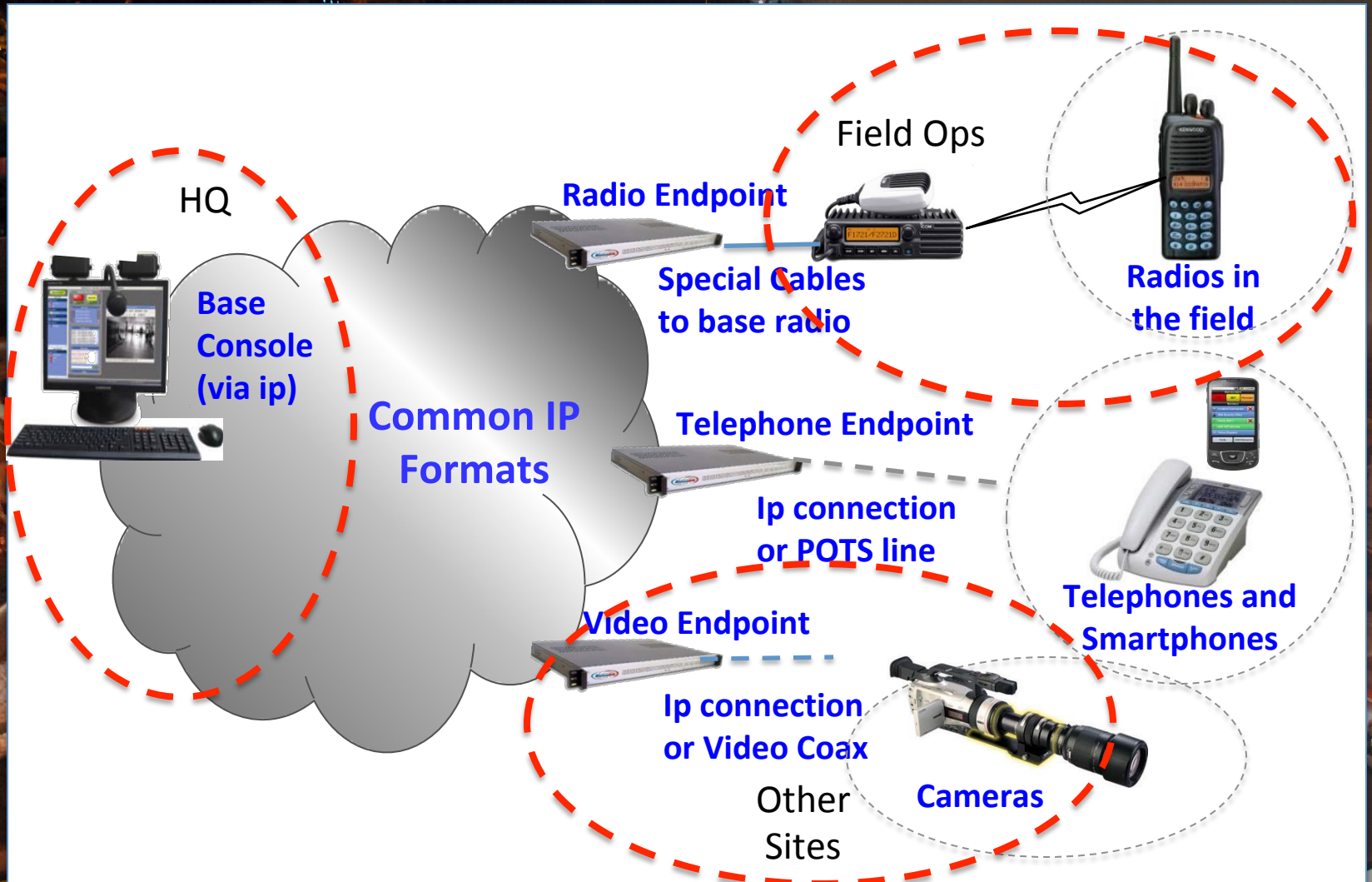
Mutualink endpoint adapters convert all media (voice, video, and files) into a common ip format which can be heard or viewed wherever needed.



Base Consoles and Endpoints



Geographical Extension of Radio Networks:



Securely Add as Many Sites and Resources as Needed:



GIC's K-Mesh Providing The Connectivity

- **K-Mesh can provide both permanent and ad-hoc network connectivity**
 - Always on, low latency, high bandwidth meshed IP
 - Not limited by vehicle, train, speed and cell hand-off issues
 - Works in a very wide range of frequencies
 - Very lightweight infrastructure with great range and lower power requirements – can use solar power
 - Each user node adds capacity to the network - instantaneously
- **Avoids mobile network congestion and backhaul costs**

K Mesh: A Unique Combined Capability

Taking Emergency Collaboration to where it is otherwise impossible to connect to ip



Law Enforcement, Emergency Responders Public Safety, and Schools

- Military
- Governments
- Nearby Cities
- Local Services
- Local Agencies
- Local E911



LTE



Area and Aerial Surveillance

Radios and Voice PLUS Simultaneous Viewing of Multiple Resources

The screenshot displays the InterLink software interface, which is designed for simultaneous viewing of multiple resources. The interface is divided into several sections:

- Top Left:** A large video window showing an aerial view of a building complex.
- Top Right:** Three control panels, each with a "Members" list and buttons for "Activity Log", "Messages", and "Shared Files". The middle panel's "Members" list includes: Interlink: Support2, Interlink: Support, Knoxville-KCSO: Dispatch, Knox_Schools: Dispatch, Knox_Schools: Video (selected), and Knoxville-PEA: Dispatch.
- Bottom Left:** A window titled "helicopter" showing a video feed of a person on a hillside. It includes a status bar with "Disabled" and "Invalid Position" and a "Gimbal" section. A data panel on the right shows: 14Z 10:46:26, 48° 931', 63, and "23-Apr-2014".
- Bottom Right:** A window titled "Avigilon Control Center 4 Enterprise Client" showing a video feed of a control room with several operators at workstations.

Border Interoperability for US Dept. of Homeland Security



Border Interoperability Demonstration Project (BIDP)

Project Sponsor: US Dept. of Homeland Security (USDHS)

Participants:

In the US:

- Wayne County Airport Authority
- Wayne County OHSEM
- Detroit DHSEM
- Chippewa County
- Monroe County
- Macomb County

In Canada:

- Essex County
- City of Windsor fire and police,
- Town of LaSalle
- Sault Area Hospital Central Communication Center.

Milestone: 17 Agencies 10 Locations, 46+ Smart Endpoints

BOSTON

Urban Area Strategic Initiative



- Boston Police Department
- Criminal Investigation Division
- Boston Emergency Medical Services
- Massachusetts Bay Transit Authority
- College Campuses
- Other Municipalities
- Area Hospitals

State of New Jersey



New Jersey

Almost the entire state of New Jersey has deployed this safety initiative. Here are three specific examples:

- Atlantic City**
 New Jersey State Police and the New Jersey Office of Homeland Security Preparedness working with the Division of Gaming Enforcement. Now all 11 Atlantic City casinos use the Mutualink solution to collaborate with each other and with NJ State Police.
- Newark**
 Started with Newark Police Department as a community wide deployment including one hospital. Today, three years later, 55 hospitals in Northern NJ use the system in collaboration with the police department, public transit, colleges, Prudential Arena, and each other. Unlimited growth potential. All agencies working in cooperation.
- Trenton**
 Every public school is able to work in collaboration with city police, fire, and ambulance when needed.

California Earthquake Coalition

Northern California Interoperable Regional Alliance Preparedness Platform (Cal IRAPP)

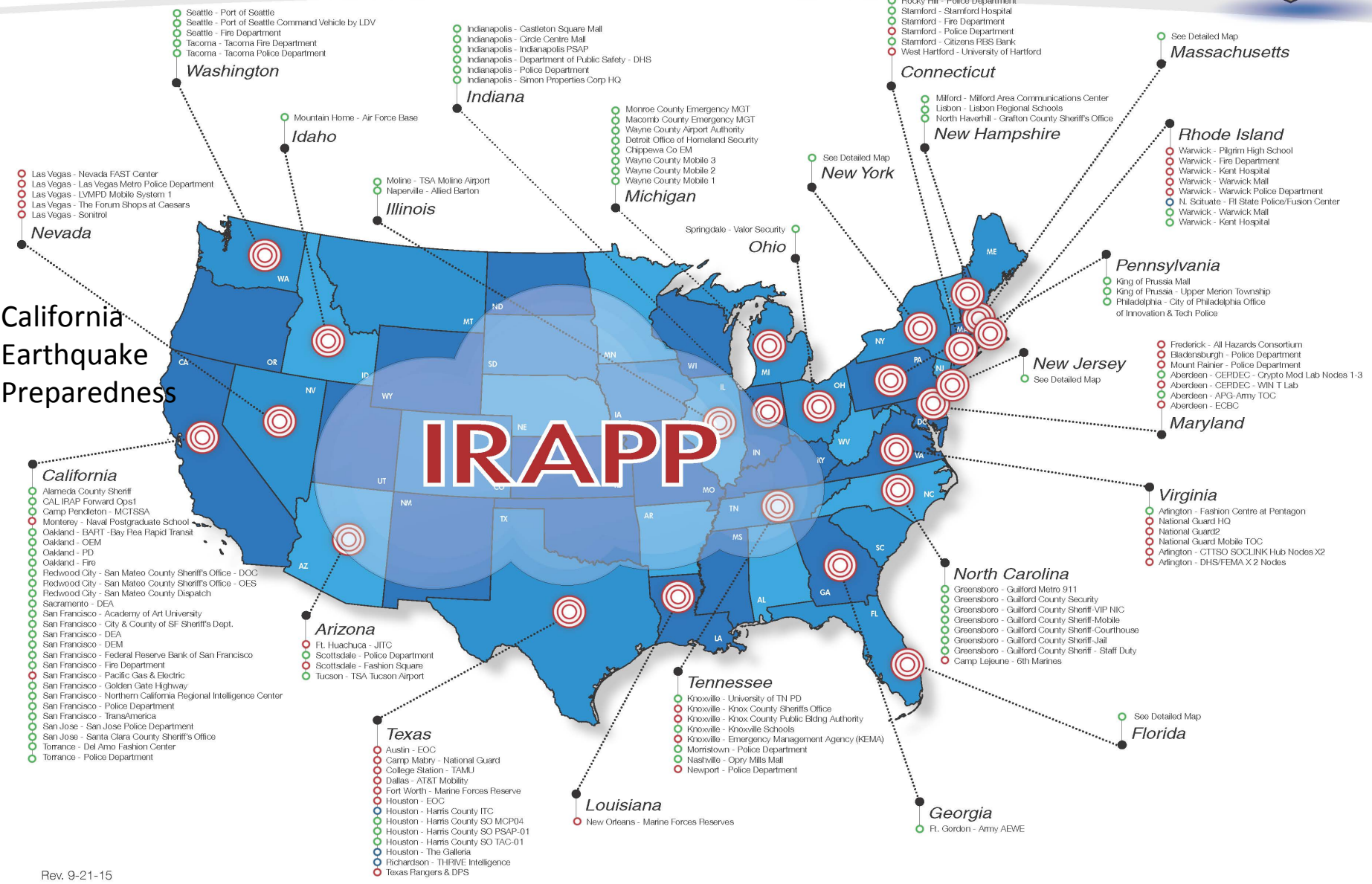
Project Sponsor: Northern California Regional Intelligence Center (NCRIC)
 Champion: Ronald Brooks - Director, NCRIC
 Advisers: General (Ret.) Wesley Clark & General (Ret.) Barry McCaffrey

Phase 1 Participants:

1. NCRIC
2. San Francisco Police
3. San Francisco Fire
4. San Francisco Emergency Management
5. San Francisco Airport Police
6. San Mateo County Office of Emergency Management
7. Alameda County Office of Emergency Management
8. Trans America Tower Building Security Center
9. San Francisco Federal Reserve Building Security Center

Next Milestone: 48 Agencies / Locations, 150+ Smart Endpoints by the end of 2012





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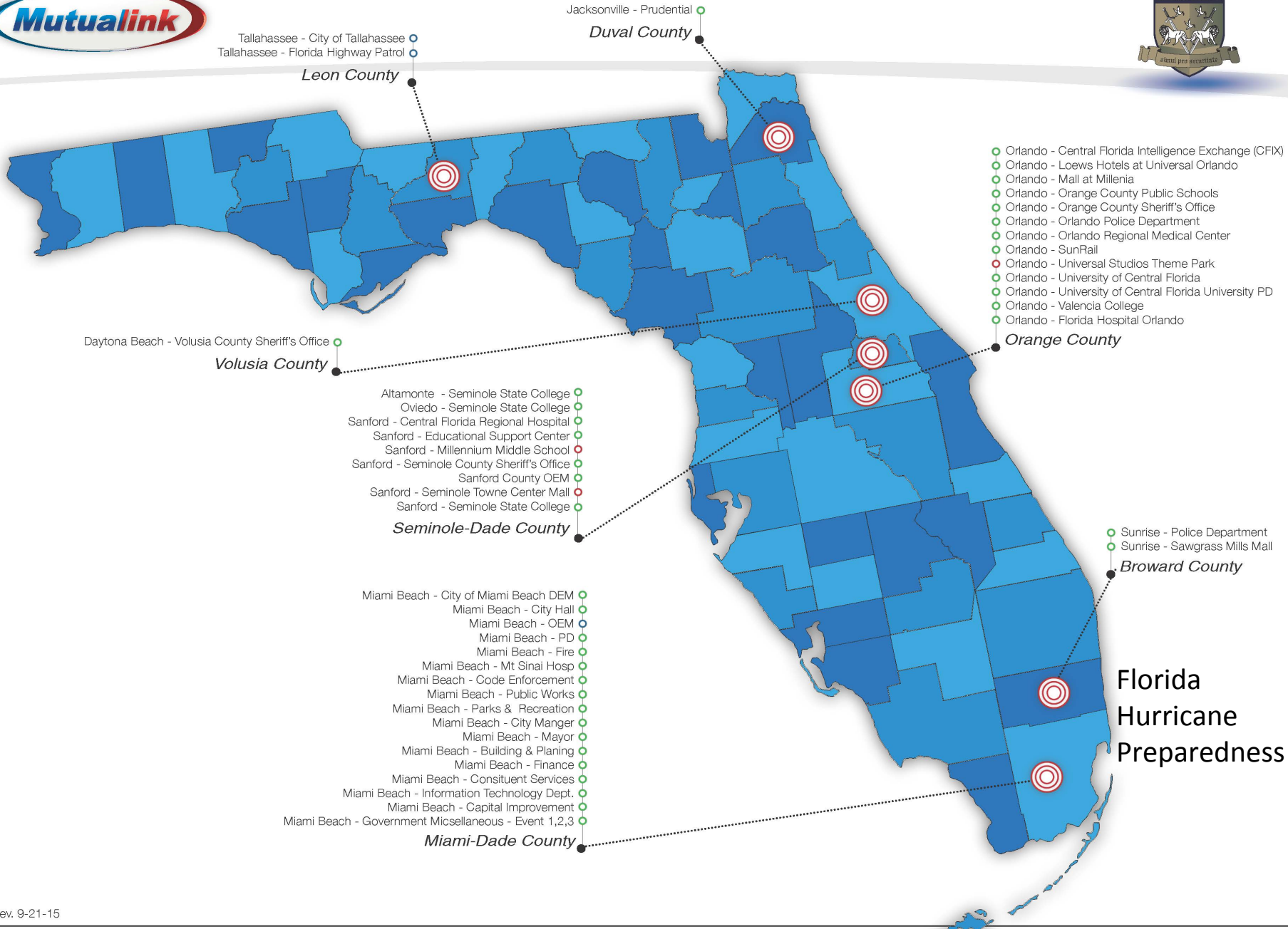


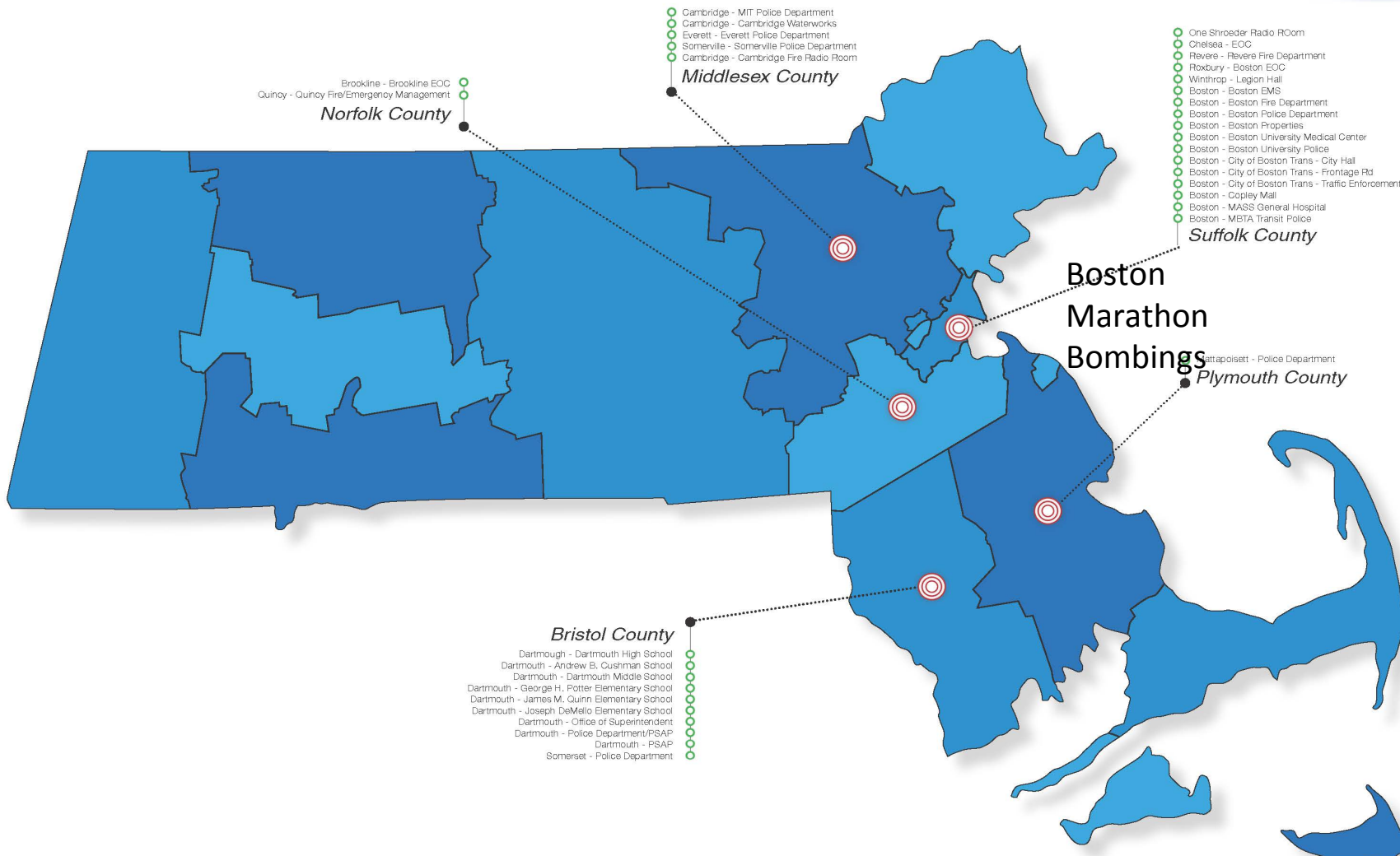
Mutualink US Installations:

CUSTOMERS

PILOTS

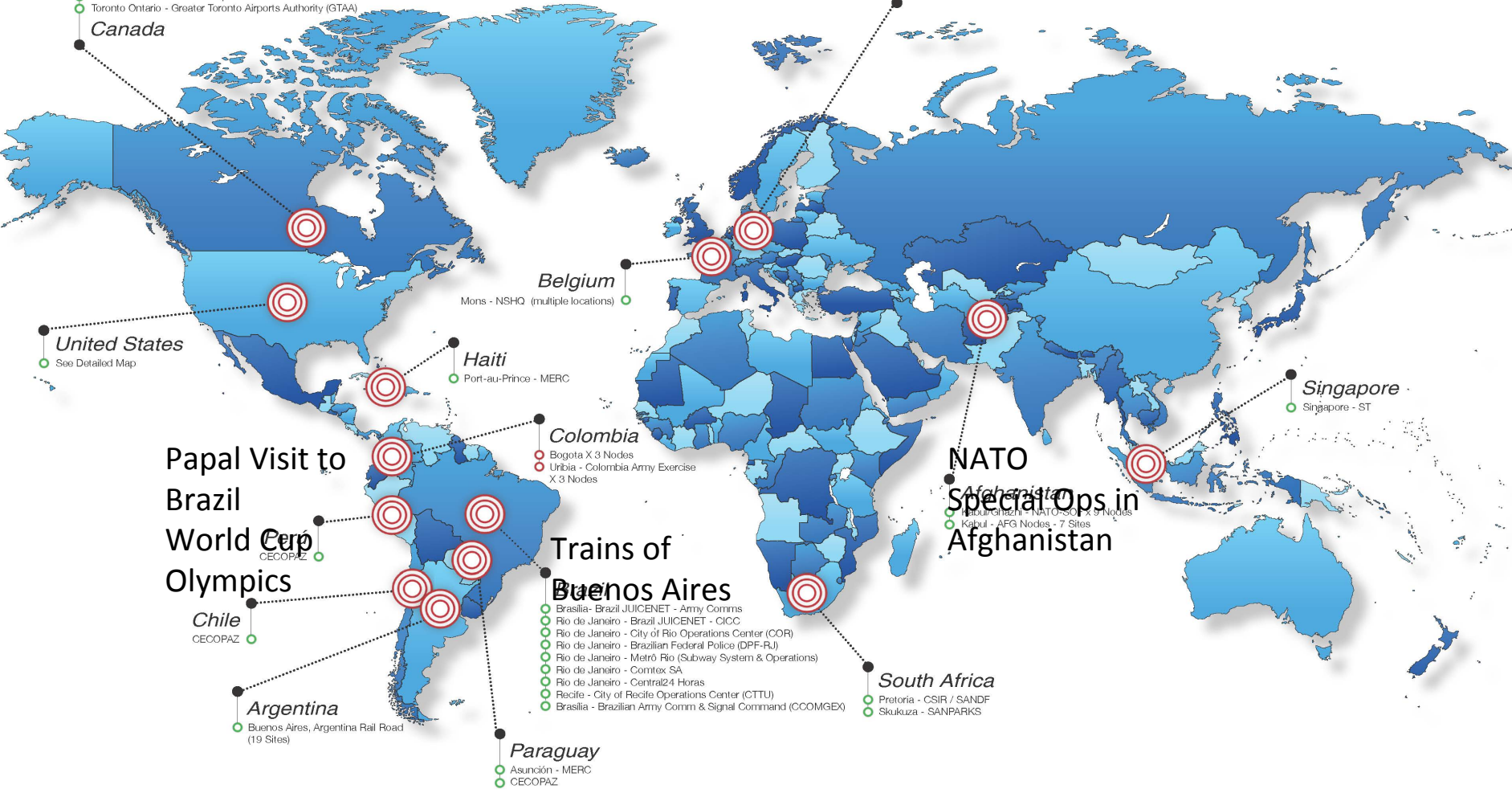
EDGE TRIAL





- Ontario - Sault Ste-Marie Hospital
- Ontario - LaSalle Police & Fire Department
- Ontario - Windsor University Police Department
- Ontario - Windsor Police & Fire EMS
- Vancouver British Columbia - Vancouver Police Department
- Quebec Montreal - Fire Department
- Quebec Montreal - Police Department
- Toronto Ontario - Greater Toronto Airports Authority (GTAA)

- Stuttgart - US SOCAFRICA
- Grafenwöhr - US EUCOM
- Stuttgart - US SOCAFRICA



Papal Visit to Brazil
World Cup
Olympics



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Decades of Experience in Mission Critical Environments