



A Global Vision

The Mutualink Solution to Inter- and Intra-Agency Collaboration

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What is Mutualink?

- An IP-based interoperability/collaboration platform.
- Multi-media: Voice/LMR/PTT, Video, chat, files, GIS/location, data.
- Not just intra-agency, but heavy focus in inter-agency.
- Architecture: Distributed, not centralized.
- Allows agencies to maintain complete sovereignty & control over their assets.
- Operational worldwide in hundreds of public safety, critical infrastructure, federal, and military agencies.
- Deployed throughout New Jersey BTOP.

The Fundamental Problem

Silos are everywhere!



One Approach: Build a Bigger Silo

- All silos have boundaries. Bigger silos may reduce the number of boundaries, but they do not eliminate the fundamental problem.
- Silos are not all-encompassing. Even within a silo footprint, only certain agencies are included.
- Once a silo transcends organizational boundaries, sovereignty and control issues abound.

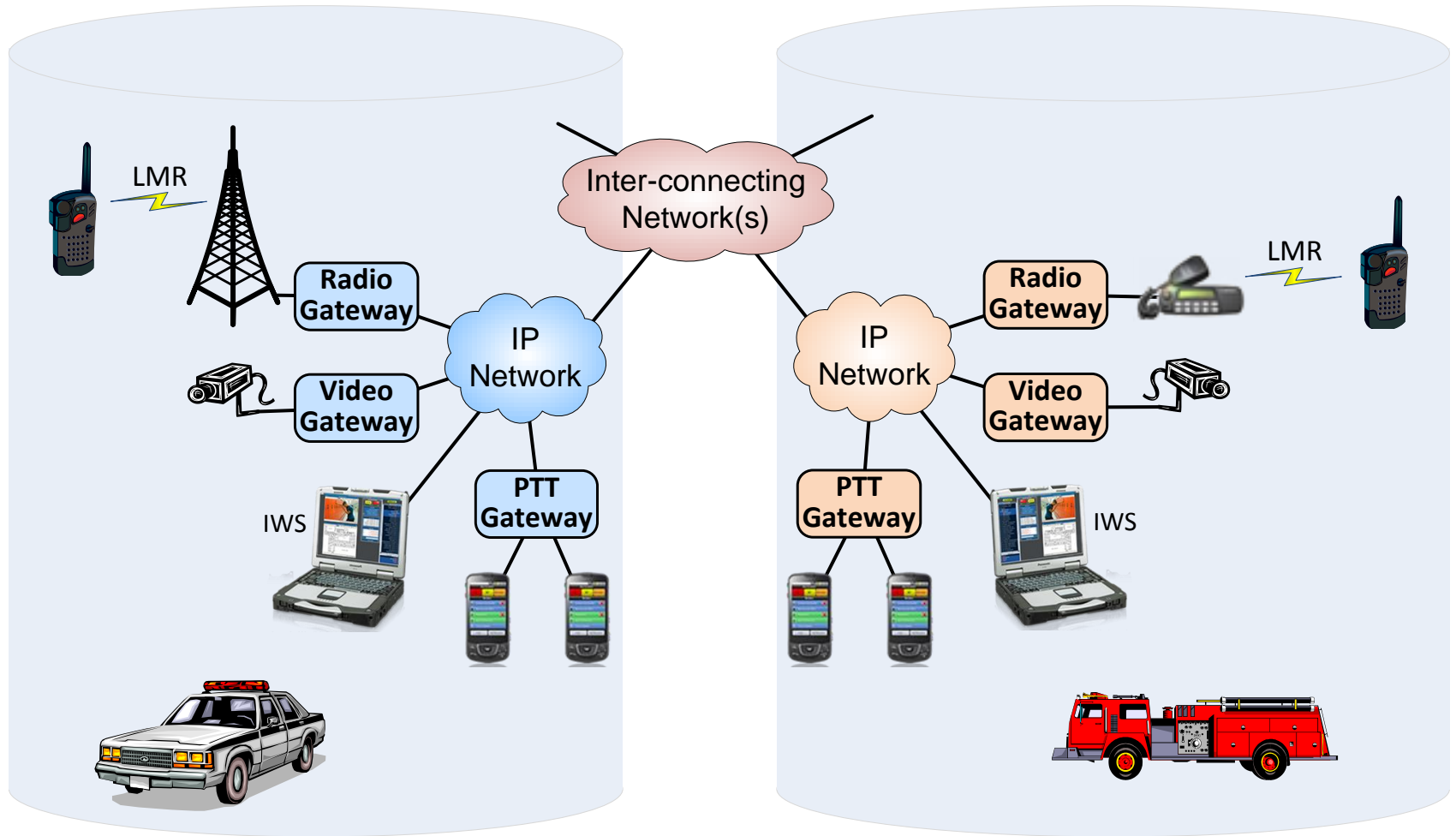
Goals For Ideal Solution

- Recognize that silos will always exist, so don't fight against them – work with them.
- Silos are not only LMR or voice - video, GIS, and data systems have the same problem, so need a media-agnostic solution.
- Enable “selective” information flow between silos.
- Ensure security with access control and encryption.
- Maintain sovereignty of owning agencies.
- Enable ad-hoc/on-scene sharing under control of agency personnel.

The Mutualink Approach

- Connect gateways to media/information systems desired to be shared between silos.
 - Gateways: LMR, voice/telephony, video, GIS, data
- Interconnect gateways via IP networks in a distributed manner (a.k.a. peer-to-peer).
 - No central server or switch to eavesdrop or exert undesired third-party control.
- Allow authorized users (local or remote) to control gateways.
 - Direct what information should be shared with which other gateways or users.
 - On-demand Discretionary Access Control (DAC).

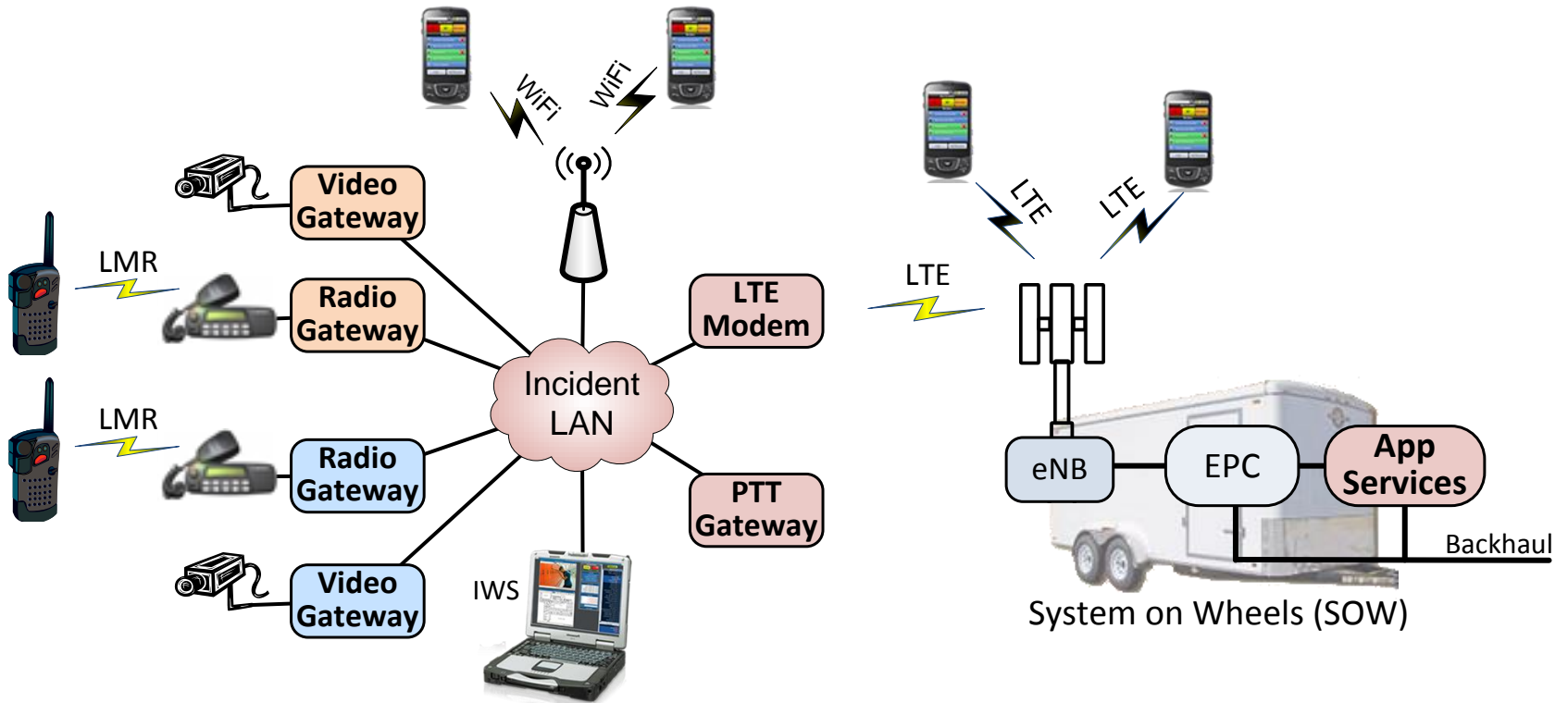
The Mutualink Approach



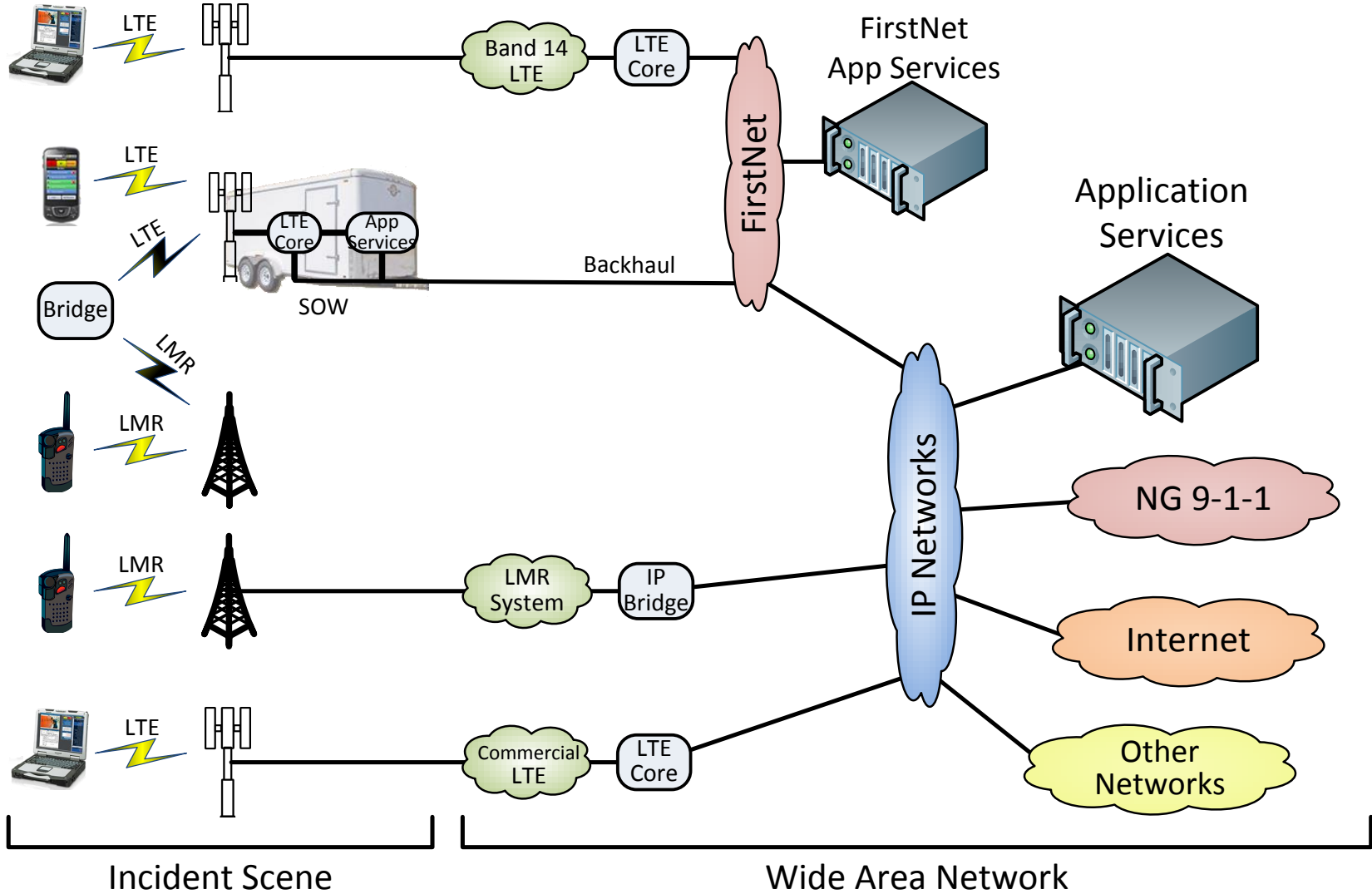
The “Mutual” Sharing Model

- All sharing (a.k.a. interoperability or collaboration) occurs within an **incident** session.
- Any user creates an incident, and **invites** in the desired agencies (drag-and-drop via GUI).
- The invited users may **accept or reject** that invitation.
- Users add their desired **resources** (via gateways) to the incident, which initiates the sharing of these resources.
 - For voice or LMR resources, incident members can now listen to and transmit to that resource.
 - Multiple LMR or voice resources in an incident are effectively “patched” together.
 - For video, etc. resources, they are now viewable by incident members.
- Resources may be dynamically added or removed at any time.

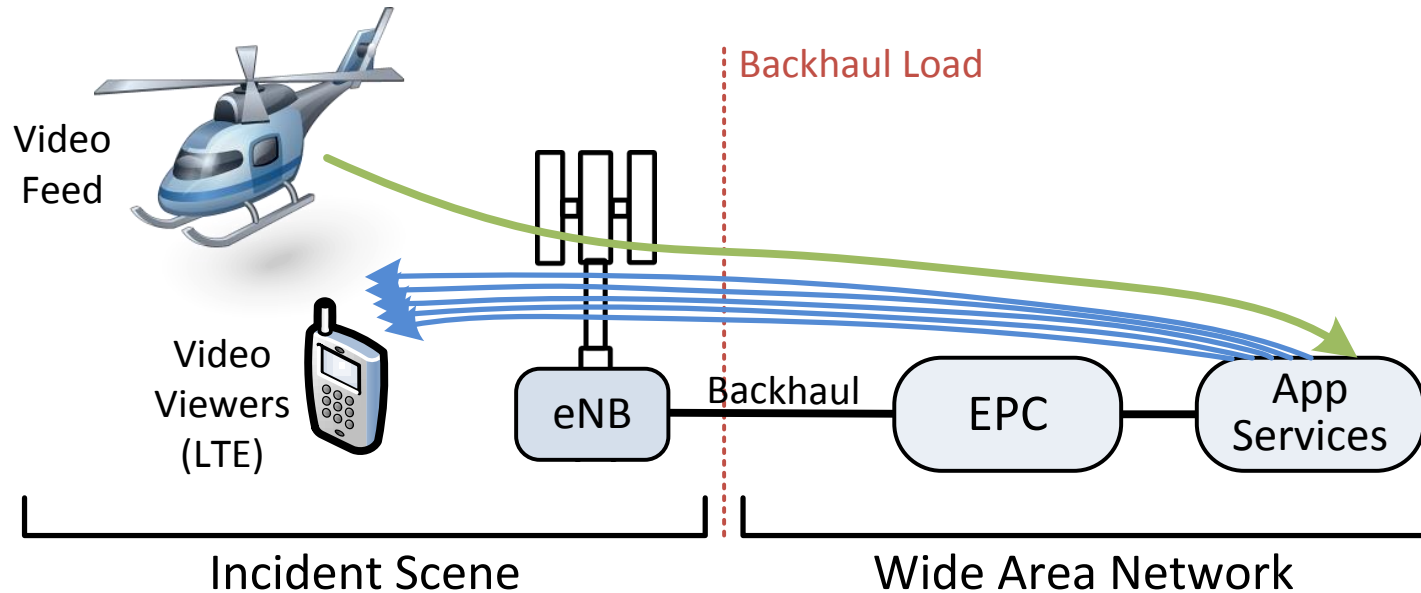
Incident Scene Collaboration



Multi-Network LMR <=> LTE

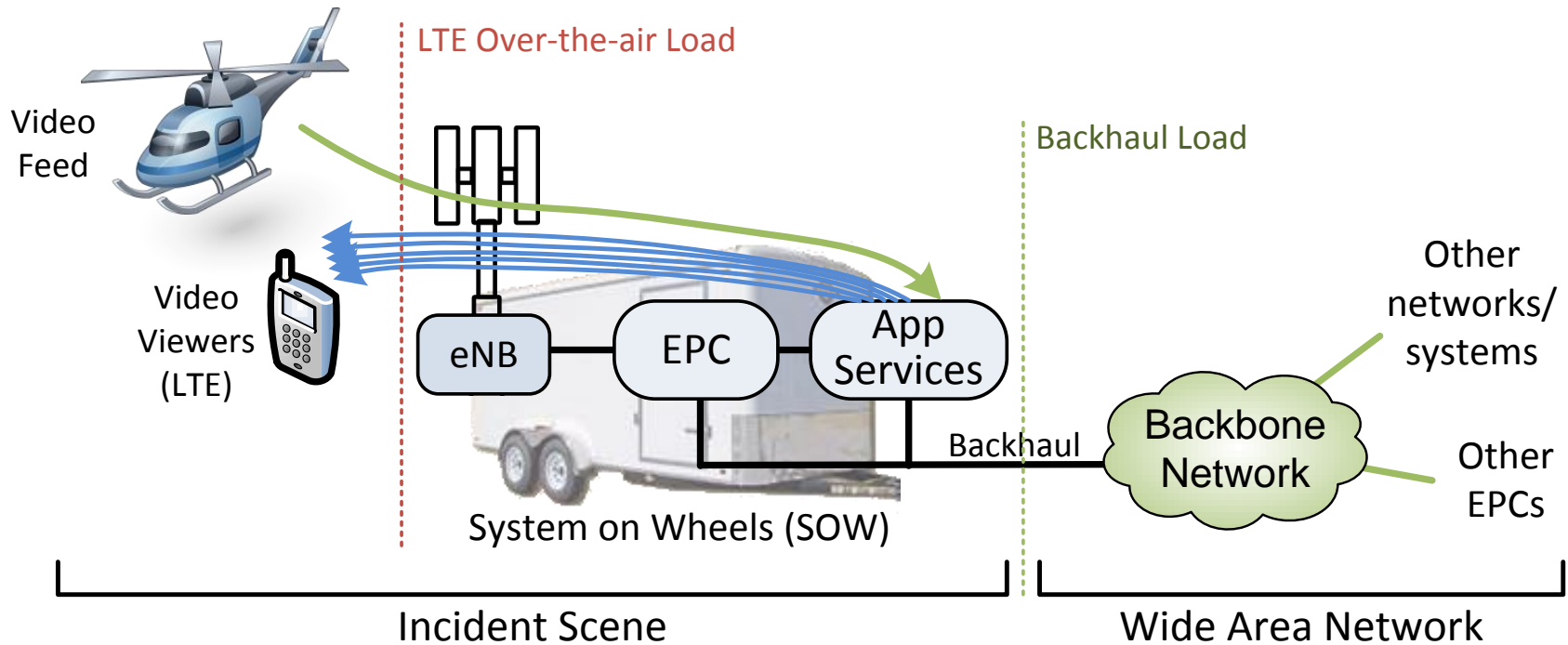


Video Sharing: Remote EPC



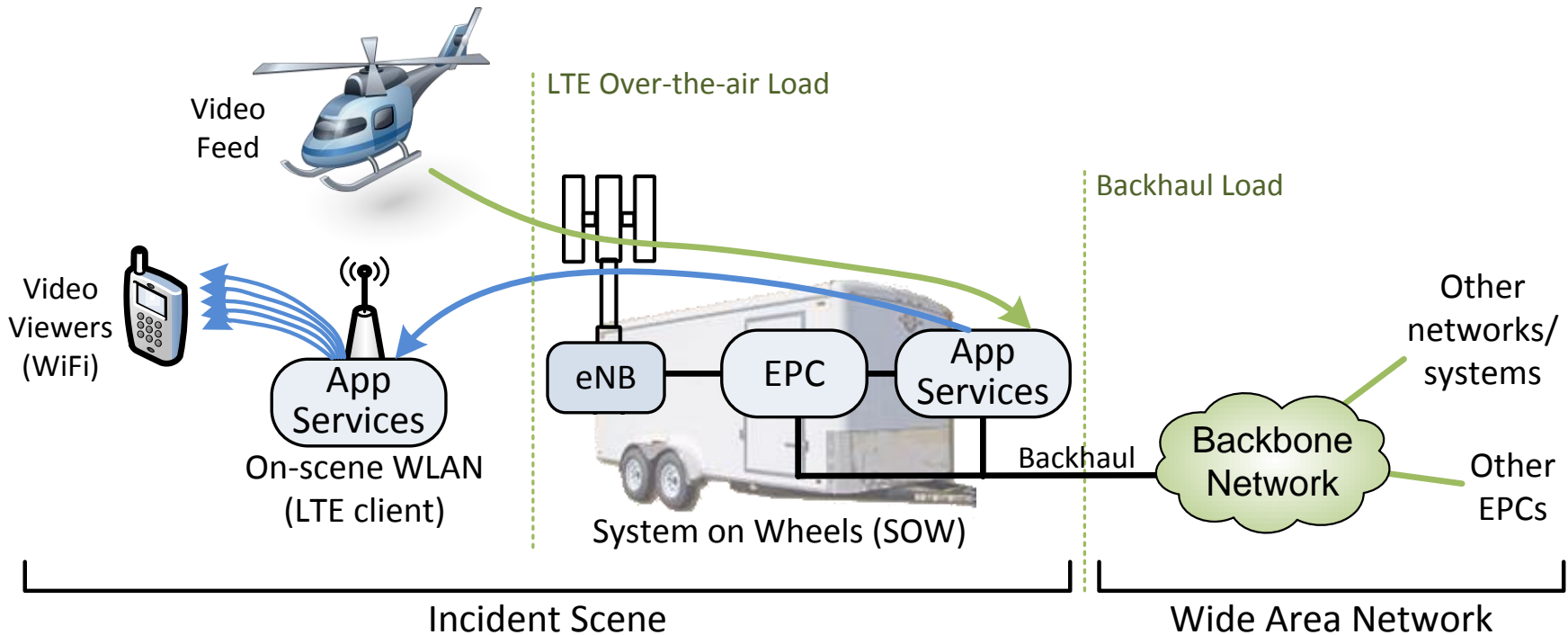
- Heavy load over-the-air and on backhaul.

Video Sharing – On-scene EPC



- Less load on backhaul, OTA still heavy.

Video Sharing: On-scene LAN



- Less load both over-the-air and on backhaul.

Data Sharing

- Ability to share arbitrary opaque data streams within an incident session.
- Streams may be message-based (i.e. UDP) or connection-based (i.e. TCP).
- Can be deployed using dedicated data gateways, or as a virtual function on other gateways or IWSs.
- Examples:
 - Share a private web or application server.
 - Exchange real-time tactical location info (military)
 - Allow on-demand database queries.

Security

- System is JITC certified for use on DoD networks.
- Identity Management uses a standard Public Key Infrastructure (PKI) with X.509 certificates.
 - Each Administrative Domain (silo) is authorized to issue credentials in their organizational name space.
 - Domains may trust each other directly, or via trust inheritance from a larger domain.
 - Does not require “cloud” to be present to function.
- Identities are used for access control to gateways and for name identification to other users.
- Encryption: All media/information is encrypted end-to-end with dynamically-generated symmetric keys (AES-256 by default).

Example: Hurricane Sandy

Mutualink / RollCall-5 Interoperability Workstation

New Incident

All IWSS Custom SmartLists

RollCall-5 Support ChrisA_Field

- NJ-AtlanticCity-ACCRCasino
- NJ-AtlanticCity-AtlanticareMCC
- NJ-AtlanticCity-BallysCasino
- NJ-AtlanticCity-CaesarsCasino
- NJ-AtlanticCity-GoldenNugget
- NJ-AtlanticCity-RevelResort
- NJ-AtlanticCity-TheBorgata
- NJ-AtlanticCity-TropicanaCasino
- NJ-AtlanticCity-TrumpPlaza
- NJ-AtlanticCityPD
- NJ-AtlanticCntyEOC
- NJ-BayonneHosp
- NJ-Belleville-ClaraMaassMed
- NJ-BergenCoPros_Off
- NJ-BergenPSOC
- Ops
- NJ-Camden-CooperUnivM
- NJ-CumberlandCoEOC
- PSAP
- NJ-CumberlandCoSheriff
- NJ-DenvilleSCHS
- NJ-DoverSCHS
- NJ-E.Orange-GeneralHosp
- NJ-E.OrangeVA_Hosp
- NJ-E_Rutherford-MetLife
- NJ-EastRutherford_EMCV
- NJ-EastRutherfordEOC

Add Resource

- Mutualink
- ChrisA_Video
- DSTAR
- NJPA_Scanner
- PR-Video

storm status

TX Intercom

Select Select

- Members -

- Mutualink: RollCall-5
- Mutualink: ProjectMgr
- ACCRCasino: Security
- RevelResort: Security
- RevelResort: Video
- TheBorgata: Surveillance
- TrumpPlaza: Surveillance
- NJ-Newark-FD_MCV: Ops
- NJ-Newark-NJIT: Lab
- NJ-NewarkEOC: OPS1
- NJ-NewarkEOC: OPS2

- Activity Log -

- Messages -

- Shared Files -

SANDY STATUS

TX Intercom

Select Select

- Members -

- Mutualink: RollCall-5
- NJ-Newark-FD_MCV: Ops
- Newark-FD_MCV: Video1
- NJ-NewarkEOC: OPS1
- NJ-NewarkEOC: OPS2

- Activity Log -

- Messages -

- Shared Files -

Hudson County Hosp

TX Intercom

Select Select

- Members -

- Mutualink: RollCall-5
- HobokenUnivMedCtr: EOC
- HobokenUnivMedCtr: Security
- NJ-HudsonCoOEM: EOC
- ChristHosp: EOC1
- ChristHosp: EOC2
- NJ-JerseyCityMed: EOC1
- PalisadesMedCtr: HRComm
- PalisadesMedCtr: Security
- PalisadesMedCtr: Video
- NJ-NewarkEOC: OPS1

- Activity Log -

- Messages -

- Shared Files -

Chris

TX Intercom

Select Select

- Members -

- Mutualink: RollCall-5
- MeridenSchools: Camera

- Activity Log -

- Messages -

I did
15:07:14 [Mutualink: ChrisA_Field]:
very strange that the MeridenSchools video
is in our incident but I no longer see it in my
available resources??
17:16:27 [Mutualink: ChrisA_Field]:
Just lost our power :!

Send

- Shared Files -

storm_status

SANDY STATUS

29°D
63°F
0:11:56

Hudson County Hosp

Application: localhost 29-Oct-2012 06:05 PM License Info

Applications Places System Mutualink / RollCall-5 I... Mutualink Audio Mana... "storm_status" "SANDY_STATUS" "Hudson County H..." Mon Oct 29, 6:04 PM

Example: Superbowl 48

Mutualink / ProjectMGR Interoperability Workstation

The screenshot displays the Mutualink / ProjectMGR Interoperability Workstation interface during Superbowl 48. The interface is divided into several panes:

- Left Sidebar:** A resource tree under "All IWSS" with tabs for "Custom" and "SmartLists". It lists various resources including NJ-StatePolice-PSC, NJ-StatePolice-ROIC, NJ-StatePolice-TroopB, NJ-SussexCo_OEM, and NJ-SussexSCHS, each with sub-resources like SEOC, WatchCommand, Operations, Comm, and MCC. An "Add Resource" section is also visible.
- Central Video Grid:** A multi-camera view showing various scenes, including a large stadium (Superbowl 48) and a "NEW JERSEY STATE POLICE PUBLIC SAFETY COMPOUND" overlay with a list of resources and a "Video" button.
- Media Day Panel:** A panel titled "Media Day" with "TX" (Transmit) and "Intercom" buttons, each with a "Select" button below it. It lists members such as Mutualink: ProjectMGR, Mutualink: RollCall3, ArmyNationalGuard: Operations, NJ-Newark-FD_MCV: Ops, UMDNJ_REMCS: Dispatch, NJ-Newark_FBI: IWS, NewarkArena: Security, NewarkArena: Video, NJ-NewarkEOC: FireEOC, NewarkEOC: OEM_EOC, NewarkEOC: PoliceEOC, PSC: NJSP-Edge1, PSC: Operations, ROIC: WatchCommand, and Albany_State_Watch_Center: Ops. It also includes sections for "Activity Log", "Messages", and "Shared Files".
- SB48 Info Forum Panel:** A panel titled "SB48 Info Forum" with "TX" and "Intercom" buttons, each with a "Select" button below it. It lists members such as Mutualink: ProjectMGR, Mutualink: RollCall3, ArmyNationalGuard: Operations, NJ-Newark-FD_MCV: Ops, FD_MCV: Video2, PrudentialFinancial: GlobalSecurity, UMDNJ_MCC: Dispatch, UMDNJ_REMCS: Dispatch, NJ-Newark_FBI: IWS, Newark_PSEG: Command_Ctr, NewarkArena: Security, NJ-NewarkEOC: FireEOC, NewarkEOC: OEM_EOC, NewarkEOC: PoliceEOC, PSC: NJSP-Edge1, PSC: Operations, StatePolice-ROIC: SEOC, and NY-NYC_OEM: OEM. It also includes an "Activity Log" section.

The bottom of the interface shows a taskbar with the application name "Mutualink / ProjectMGR Interoperability Workstation", the date and time "28-Jan-2014 10:57 AM", and the license information "License Info".

Example: Boston Marathon

