

PPDR

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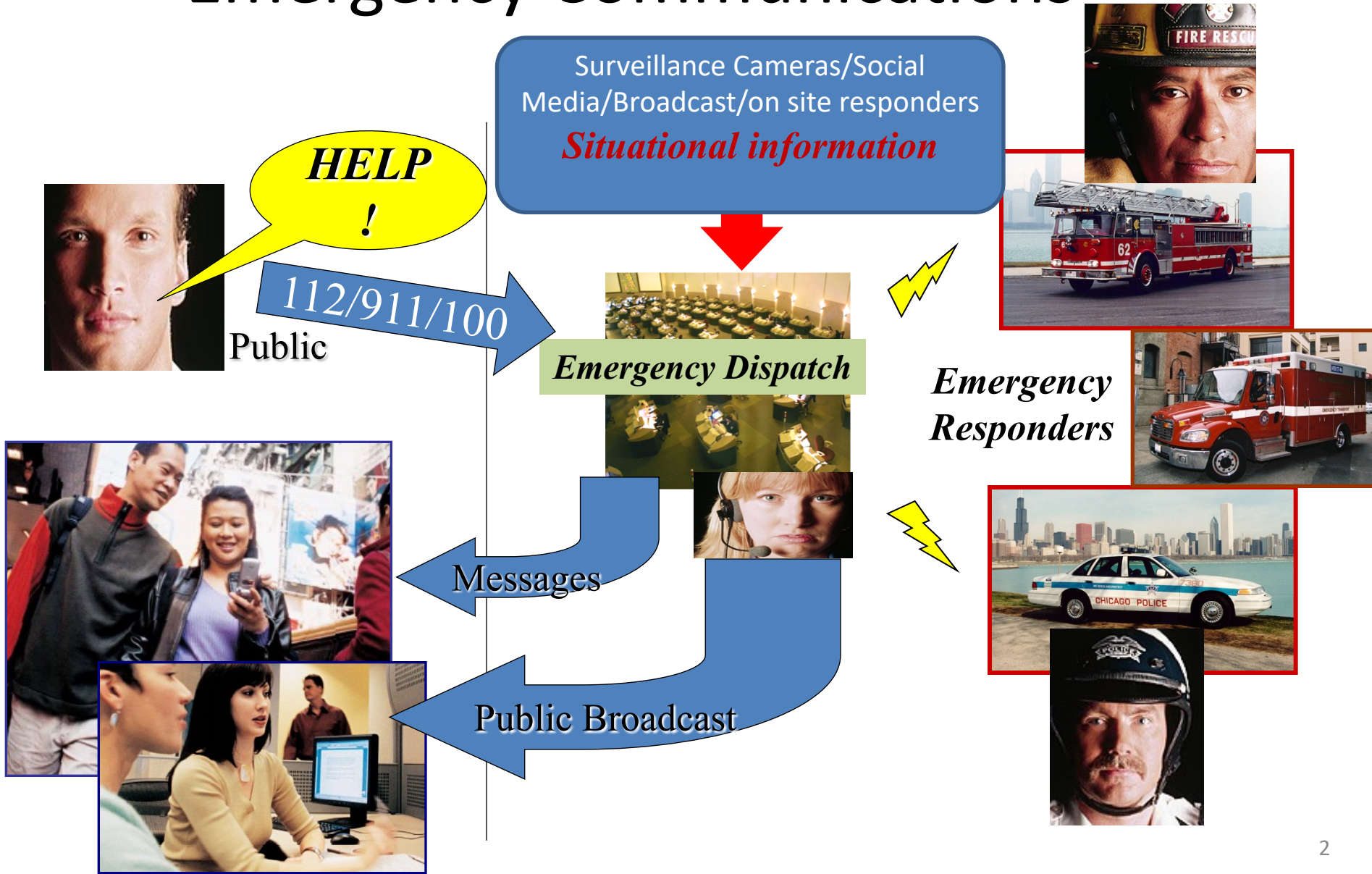
Vice Chairman, World Wireless Research Forum

Chairman, APT AWG Task Group on PPDR

Chairman, ITU-R WP5D SWG on IMT applications



Emergency Communications



Emergency Communications Systems are Essential for day to day Emergency Response Missions...



Improve Situational Awareness

Know What's Happening Everywhere



Share Incident Scene Information

Operations and Control Center, Helicopter Feed, Enroute Units, Remote Support



Improve Responder Safety

Deployment and Evacuation Decisions

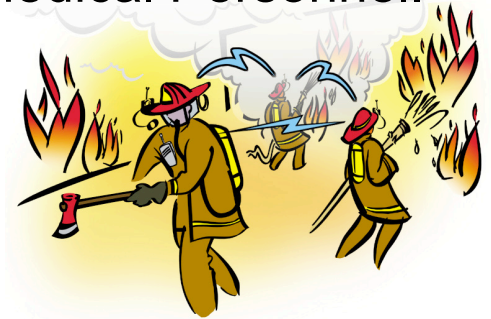
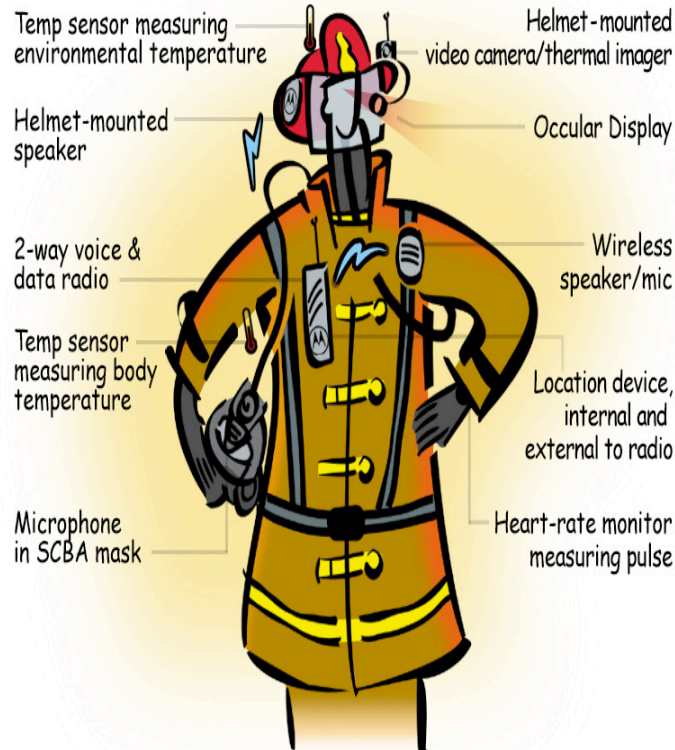
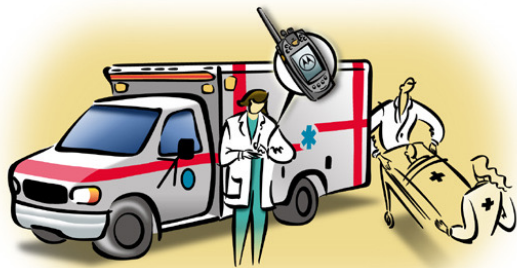
Technology Needs of Emergency Communications

- **Guaranteed service**
 - - **under normal conditions and during incidents & disasters**
 - - **Planned capacity for emergency handling**
 - - **Semi-duplex (only one channel per group per site)**
- **Fast group communications**
 - - **Fast set-up time**
 - - **Good dispatching facilities**
 - - **Dynamic group management**
- **Specific functionality**
 - **Emergency calls (pre-emptive)**
 - **Security**
 - **Monitoring,**
 - **Status messages**



Emergency Responder

The Vision of Emergency Responder Is One of **Seamless Communication** Between Command, Vehicle and Field, **Rapid Access** to Mission Critical Data and video, and **Smart Tools** That Empower Individual Firefighters and Emergency Medical Personnel.



WHAT IS PPDR? (Defined by ITU)



PUBLIC PROTECTION

MAINTAINING LAW AND ORDER,
PROTECTING LIFE AND PROPERTY,
RESPONDING TO EMERGENCIES

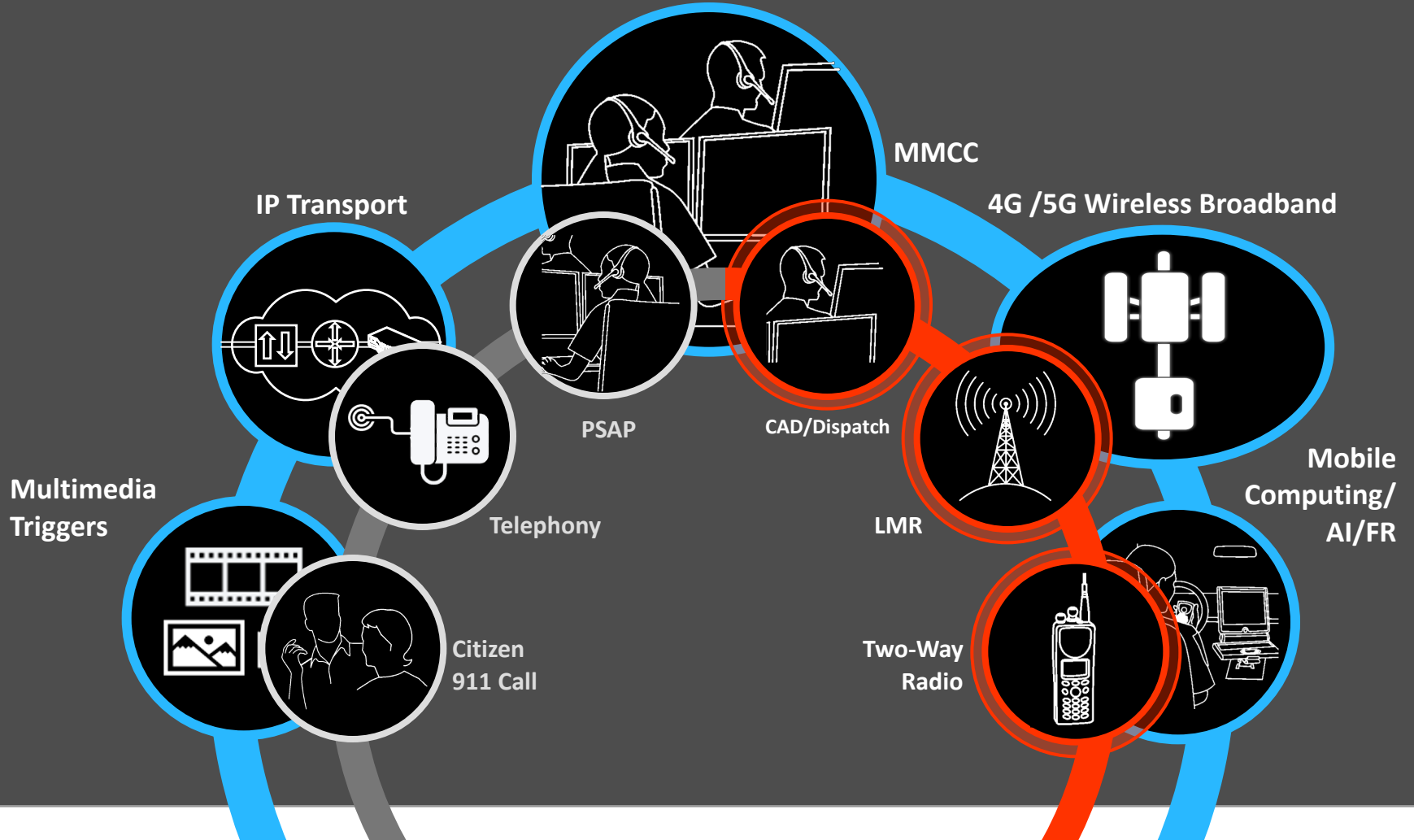
DISASTER RELIEF

RESPONDING TO SERIOUS DISRUPTIONS OF
THE FUNCTIONING OF SOCIETY THAT POSE
A SIGNIFICANT WIDESPREAD THREAT TO
HUMAN LIFE, HEALTH, PROPERTY, OR THE
ENVIRONMENT



Today's Emergency Communications Technologies Leverage mobility and multimedia

Virtualized Command Center



What video bring to Public Safety?



Collaborate in real-time,
share video, improve
emergency response



Automated intelligence with
integrated physical security
& analytics



Effectively manage correlated voice,
data & video evidentiary information



Real-time video surveillance
of vital property, assets &
people

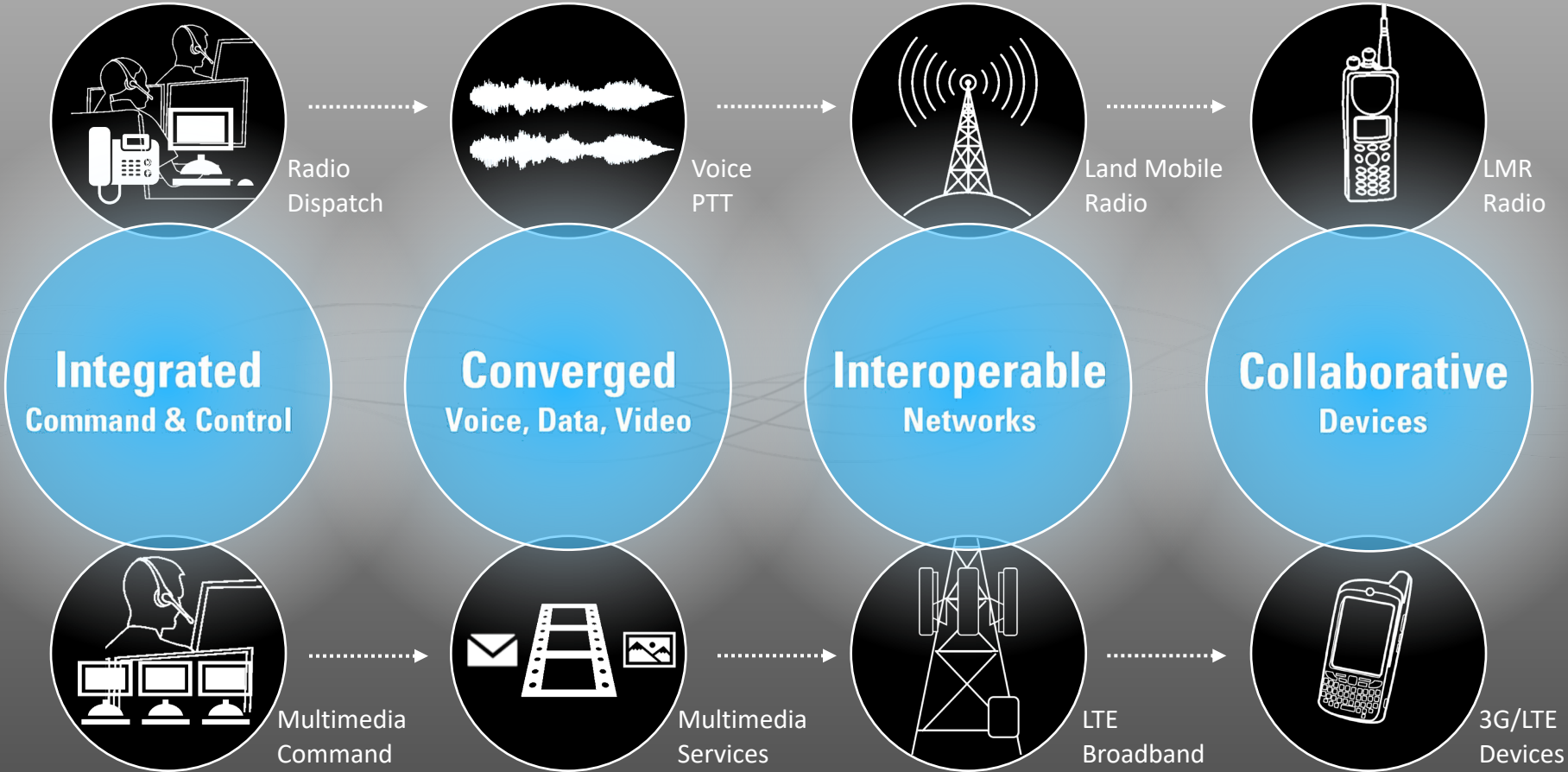


Benefit from demonstrated
crime deterrence in public risk
area



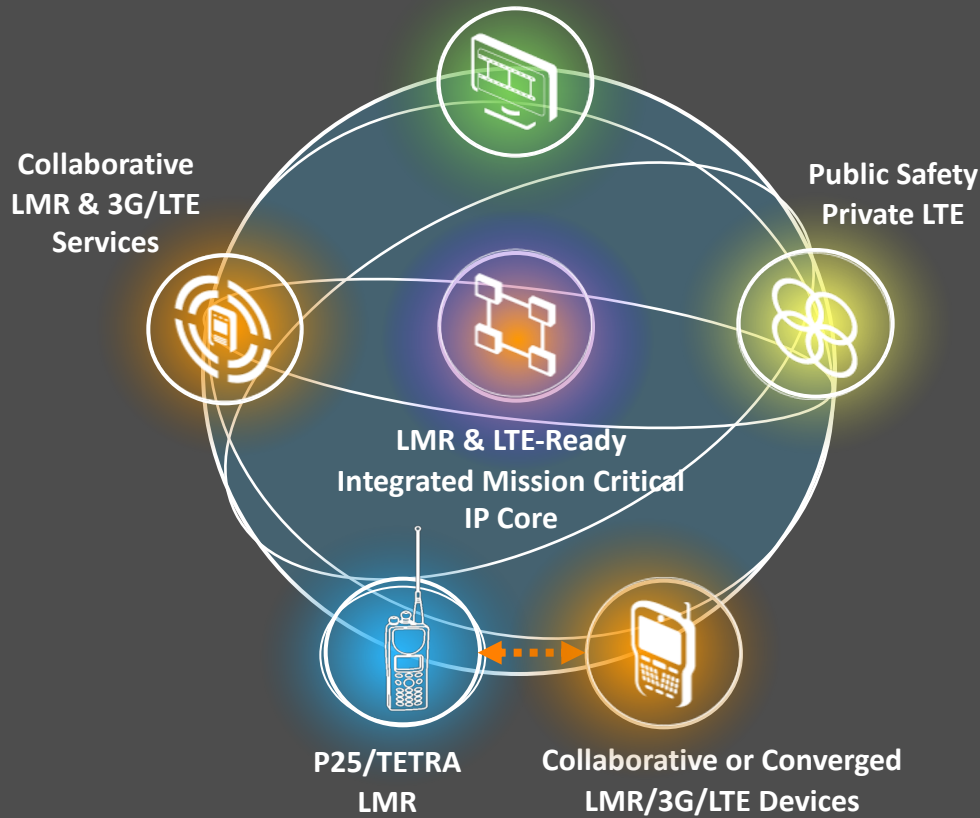
Trust & transparency
between community & law
enforcement

Integrated, Converged, Interoperable, Collaborative Communications

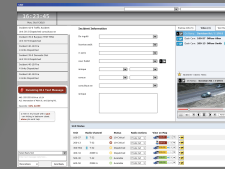


Technologies for Emergency Communications

Integrated Command & Control
(SOA/ Web Service App Suites, NG-911/112
Multimedia CAD, MC-Video, Analytics)



Multimedia
Command & Control
& Next Gen 911/112



Mobile Multimedia Applications Driving Mobile Broadband Deployments

“Business Critical”



“Mission Critical”

Tier 1 (< 20kb/s)

- Messaging
 - Dispatch
 - Text messaging
- Query Databases
 - Driver’s License
 - License Plates
 - Warrants
- AVL (Limited)
- Meter Reading
- OTAP

Short Text

Tier 2 (<100kb/s)

- Mobile AFIS (Tx)
- Mug Shots (Tx/Rx)
- Reports (Tx)
- AVL (rapid update)

Long Text / Image

Tier 3 (<1Mb/s)

- Intranet Access
- Internet Access
- Office Apps
- Images (Tx/Rx)
- Single Session Hi-Res Video (Rx)
- Multi-session low resolution video streaming (Tx/Rx)

Browser/ Video

Tier 4 (>1Mb/s)

- Multiple Session High Res Video streaming
- HD Video streaming
- Rich Web Multimedia
- Multimedia CAD
- Real-time 3D Graphics
- Video Archiving

Rich Multimedia

B-PPDR spectrum harmonization by ITU and APT

- ITU World Radio Conference 2015 adopted Revised Resolution 646 that harmonized 694-894 MHz (700-800) as the globally harmonized frequency range for broadband PPDR.
- In addition, 400 MHz and 4.9 GHz band were also harmonized for BPPDR in Asia
- 694-894 MHz is the global harmonized frequency range for PPDR LTE and includes:
 - 700 MHz bands (APT band 28, US Band 14 & EU Band 68)
 - 800 MHz bands (EU Band 20 and AP Band 26)

Resolution 646
World Radio Conf-2015

Recommendation
M.2009

Recommendation
M.2015

Report ITU-R M.2291

Report
M.2368

APT Recommendation 1
APT Reports 73

As a follow up of World Radio Conference 2015, ITU developed harmonized arrangements in ITU-R Recommendation M.2015

700 MHz

**3GPP Band
28**

**703-748/
758-803 MHz**

800 MHz

**3GPP Band
26**

**814-824/
859-869 MHz**

400 MHz

**3GPP Band
31**

**452.5-457.5/
462.5-467.5 MHz**

4.9 GHz

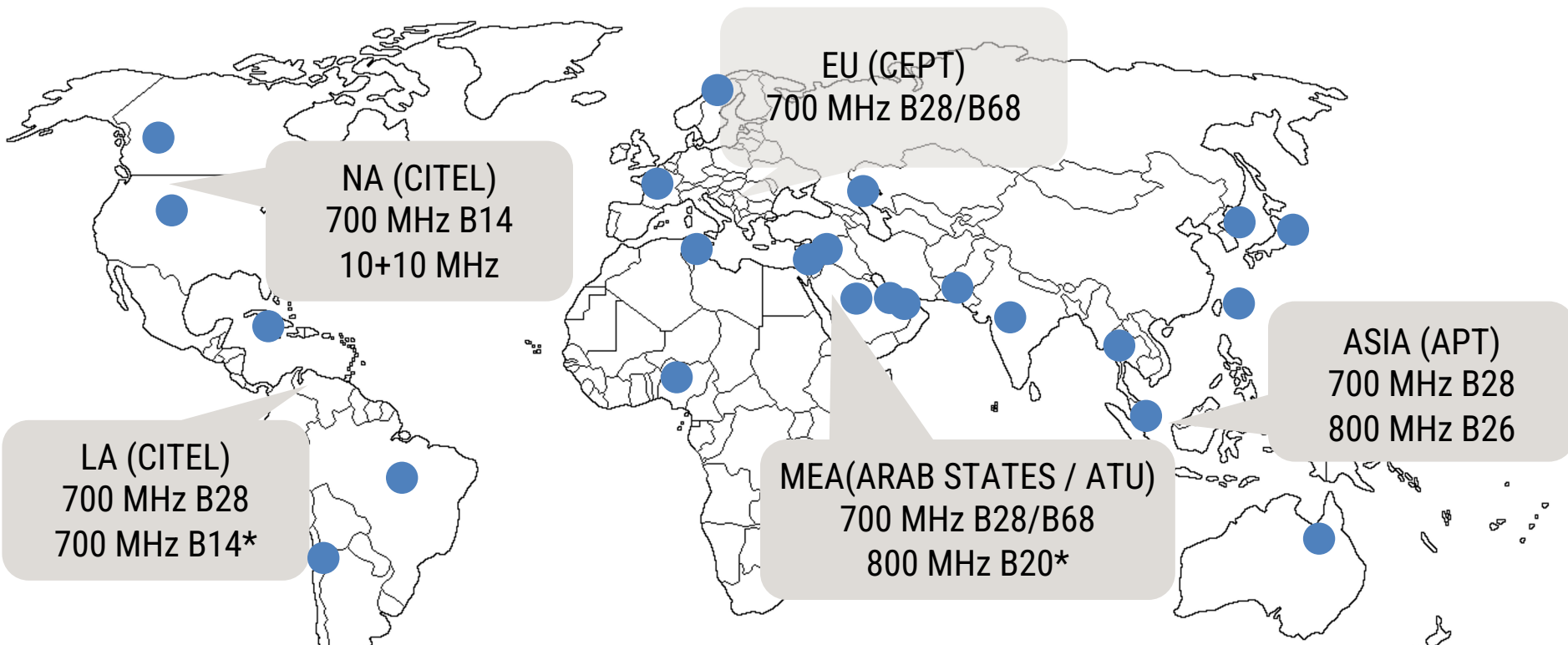
**3GPP Band
n79 (5G)**

**4940-4990
MHz**

Within Asia, the Asia Pacific Telecommunity has adopted Report 73 which recommends 700, 800 and 4940 MHz bands for Broadband PPDR

BROADBAND PPDR SPECTRUM AROUND THE WORLD

38+ countries, >2.6 Billion population: dedicated B_PPDR spectrum in 700/800MHz



The World is adopting 700-800 MHz bands for Broadband PPDR

Traffic Demand per Incident

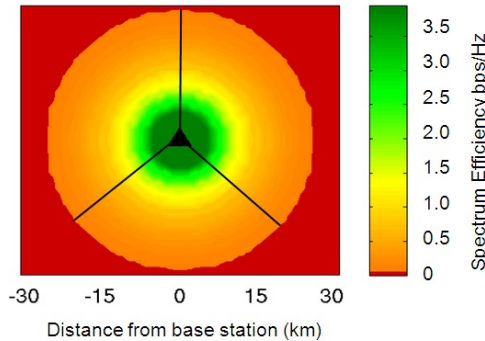
- The main driver for spectrum demand is real time video.
 - Experience in US has demonstrated benefits of video for improving situational awareness.
 - But need to balance users' aspirations against what is practical.
 - Multiple HD cameras would demand tens of MHz more spectrum or many times more cell sites to achieve national coverage.
 - Other studies and discussion with vendors and users suggest bit rates of 512 – 1024 kbps are sufficient in many cases.
- Other data applications (e.g. database / Intelligence gathering) are more demanding, because some latency / content requirements.
- Our Estimate based on realistic user requirements and data bit rates is **1.2 Mbps downlink** and **1.9 Mbps uplink**.

Converting traffic demand to spectrum demand (assuming LTE or similar technology)

- Spectrum demand per incident depends on spectrum efficiency, which varies depending on where in the cell you are.

- We have assumed :

- Cell Edge Efficiency = 0.15 bps/Hz
- Average Efficiency = 1.5 bps / Hz
- Two incidents in the same cell sector
- One at the cell edge
- The other at a location with average spectrum efficiency



Conclusion: Require 10 MHz for the downlink and 15 MHz for the uplink

In Summary

- Emergency communications needs are increasing every day
 - Due to increased frequency and higher destructive powers of natural disasters
 - Geopolitical situation in the world is causing increased unrest
 - Terrorists today have more available means to inflict extensive damage than at any other time in history
- Emergency Communications technologies are evolving from mission critical voice and low speed data to provide high speed broadband access and video capabilities
- New devices and systems need to be developed and deployed to meet these new challenges
- Policy and regulatory challenges have to be resolved to provide these critical infrastructure for saving lives.



THANK YOU

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