

WELCOME



ROLE OF LTE IN FUTURE PPDR SYSTEMS

Jérôme BROUET

26th November 2014, PSC Europe Forum Conference

..... Alcatel-Lucent 
COPYRIGHT © 2014 ALCATEL-LUCENT. ALL RIGHTS RESERVED.

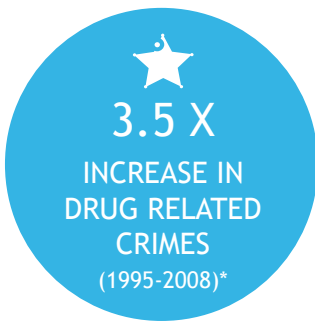
AGENDA

1. Context
2. Benefits of LTE to PPDR users
3. Role of LTE vs. deployment options
4. Concluding remarks

CONTEXT

PPDR USERS ARE FACING INCREASED VOLUMES FROM DAILY OPERATIONS

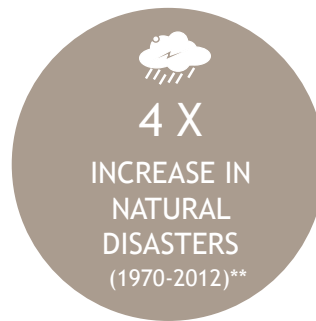
LAW ENFORCEMENT



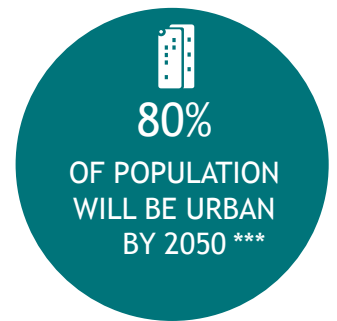
INDUSTRIALIZATION



NATURAL DISASTERS



URBANIZATION

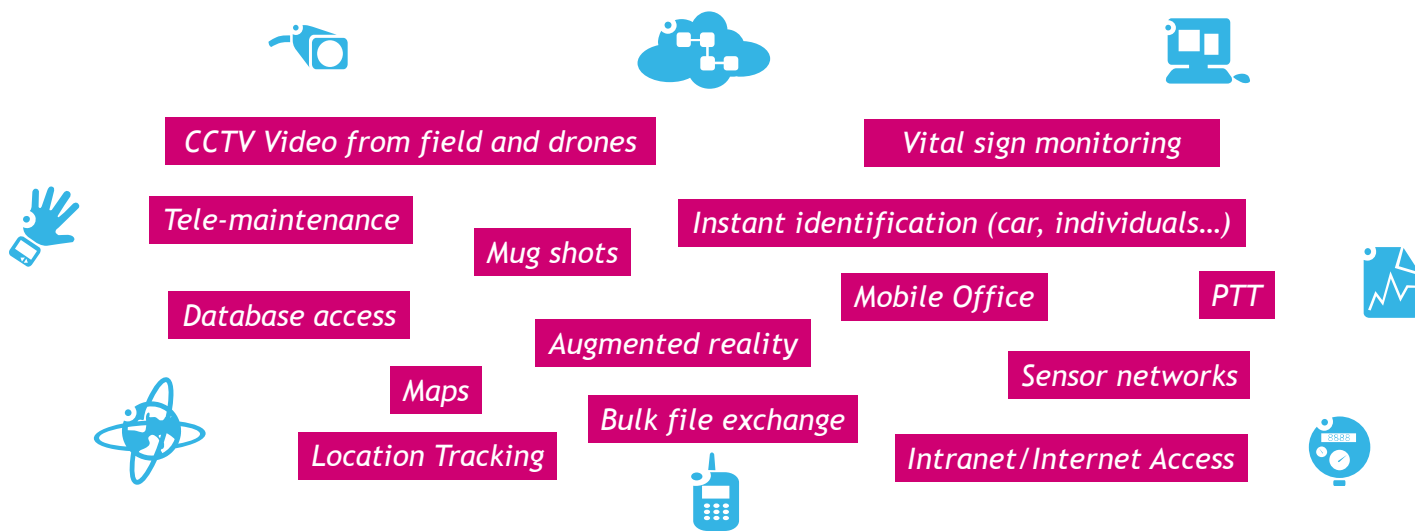


Sources: *HEUNI, UNODOC, ** Swiss-Re, *** UNO

- MOBILE BROADBAND IS KEY TO IMPROVING OPERATIONAL EFFECTIVENESS.
- LTE SELECTED BY APCO AND TCCA AS FOLLOWER TECHNOLOGY OF CURRENT SYSTEMS.

BENEFITS OF LTE TO PPDR USERS

ANY MIX OF CRITICAL AND NON CRITICAL REAL-TIME MULTIMEDIA INFORMATION EXCHANGE...



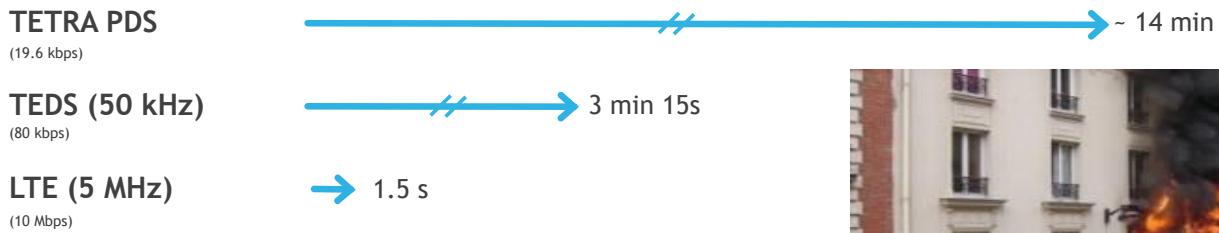
ENHANCED OPERATIONAL EFFECTIVENESS, TIMELY DECISION AND COORDINATION BASED ON REAL-TIME INFORMATION SHARING USING COTS TECHNOLOGY (ECOSYSTEM, ECONOMIES OF SCALE, CONTINUITY WITH COMMERCIAL NETWORKS)

BENEFITS OF LTE TO PPDR USERS

REAL-TIME INFORMATION ACCESS AND SHARING

A PICTURE IS WORTH 1,000 WORDS...

Example: Transmission delay of High Resolution picture (2 MB)



... IF IT ARRIVES ON TIME!

BENEFITS OF LTE TO PPDR USERS

LIVE VIDEO ACCESS (MOBILE AND/OR FIXED)

VIDEO TRANSMISSION AT CELL EDGE (UPLINK)



Video over TETRA
10 kb/s (4 fps, 128x72)



Video over LTE (BW=1.4 MHz)
512 kb/s (25 fps, 630x250)

BENEFITS OF LTE FOR PPDR USERS

KEY 3GPP LTE FEATURES OF RELEVANCE FOR PPDR TODAY

MOST FEATURES FROM FIRST 3GPP LTE RELEASE (R8/R9)

RF Performance

Low Latency

E2E QoS framework

Multicast/Broadcast

Mutual-Authentication

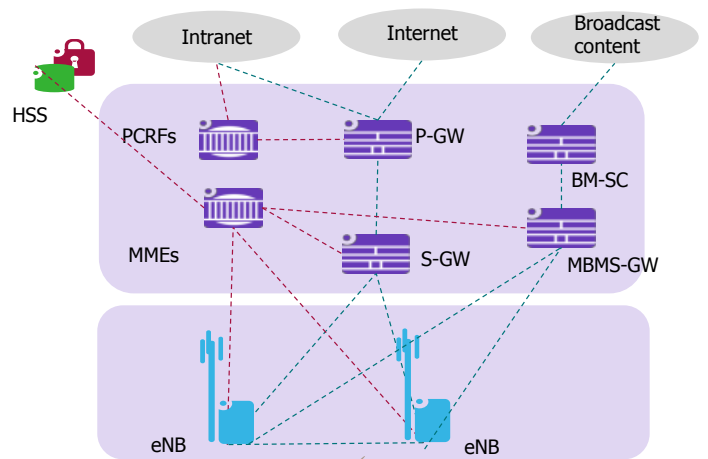
"S1-flex"

Loss-less HO

RAN Sharing

...

BASED ON CURRENT 3GPP SPECIFICATIONS, LTE CAN PROVIDE DATA OVERLAY SERVICES TO DEFENSE TODAY



UE User Equipment
 eNB Base Station
 EPC Evolved Packet Core (MME+S/PGW)
 HSS Home Subscriber Server
 MME Mobility Management Entity
 PCRF Policy and Charging Rules Function
 PGW Packet Data Gateway
 SGW Serving Gateway
 BM – SC Broadcast Multicast Services Center
 MBMS – GW Multimedia Multicast Broadcast Services Gateway

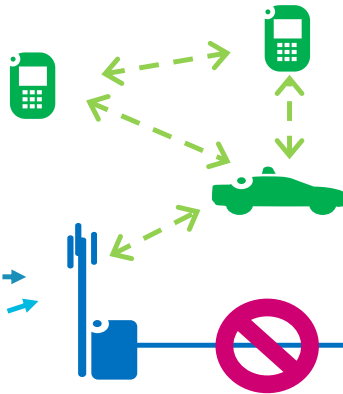
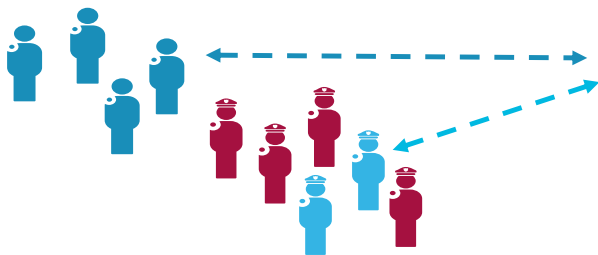
BENEFITS OF LTE FOR PPDR USERS

KEY 3GPP FEATURES UNDER DEVELOPMENT

MASSIVE GROUP COMMUNICATIONS

- One to many communications per group
- 10s to 1,000s members per group
- 10s of group per cell
- Fast call set and floor control
- Pre-emption and Emergency calls

GCSE (3GPP R12)



DIRECT MODE OPERATIONS

- Direct communication between terminals in group mode
- Relay mode
- Out-of coverage operations
- Special mode of operations

ProSe (3GPP R12 and R13)

GCSE – Group Communications System Enablers
 ProSe – Proximity Services
 IOPS – Isolated E-UTRAN Operations
 MCPTToLTE – Mission Critical PTT over LTE

FALLBACK MODE

- Base station continues to offer services to users under the coverage area even if disconnected from the network

IOPS (3GPP R13)

PUSH TO TALK (PTT)

- Primary mode of communications mission and business critical users
- Emergency calls, late entry...

MCPTToLTE (3GPP R13)

BASED ON 3GPP CALENDAR (R12 = Q3 2014 and R13 = Q1 2016)

ROLES OF LTE IN FUTURE PPDR

MATCHING OBJECTIVES AND CONSTRAINTS

OBJECTIVE:
IMPROVED OPERATIONAL EFFECTIVENESS AND SAFETY FOR CITIZENS AND PPDR USERS

COVERAGE, RESILIENCE

- Infrastructure
 - Nationwide / Cities
- Systems on wheels

APPLICATION FAMILIES

- Video
- Data
- Voice (PTT)

DEPLOYMENT MODELS

- Dedicated
- Commercial

CONSTRAINTS



BUDGET



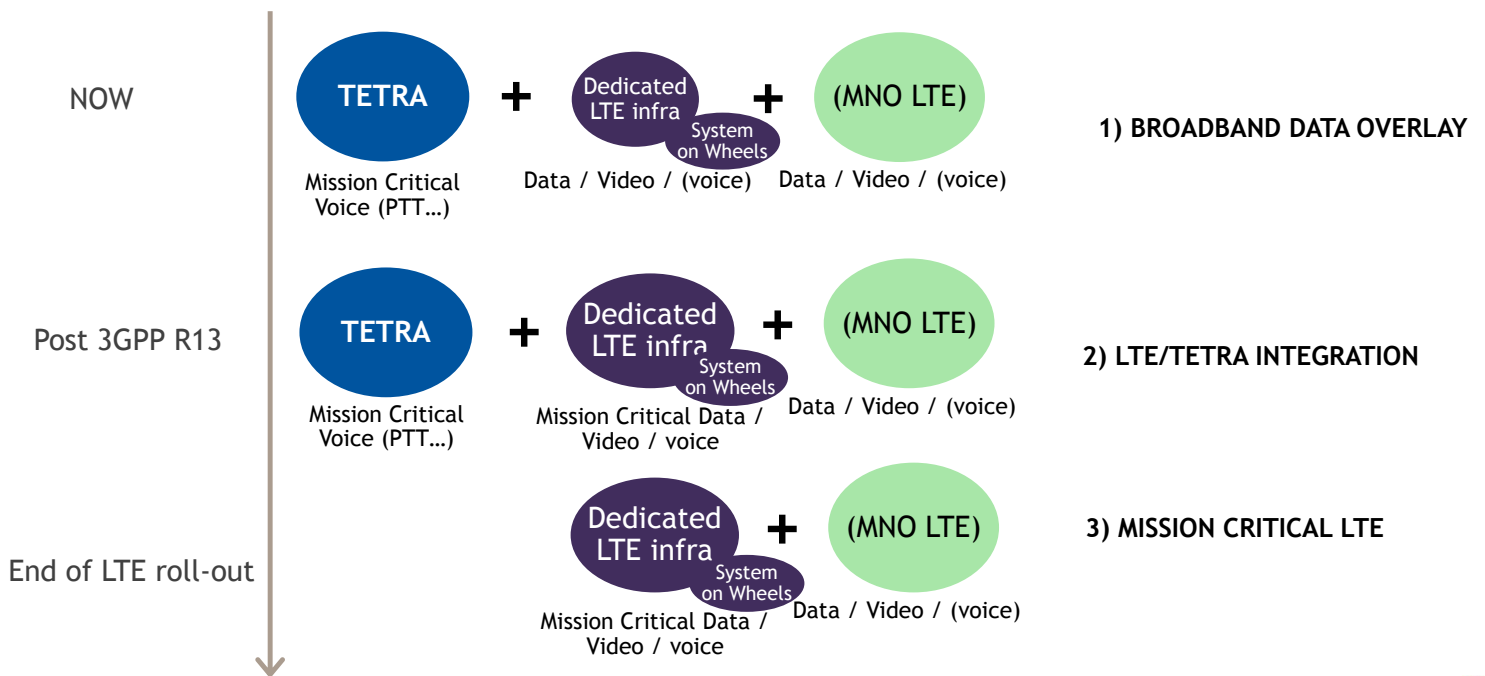
TIMING



SPECTRUM

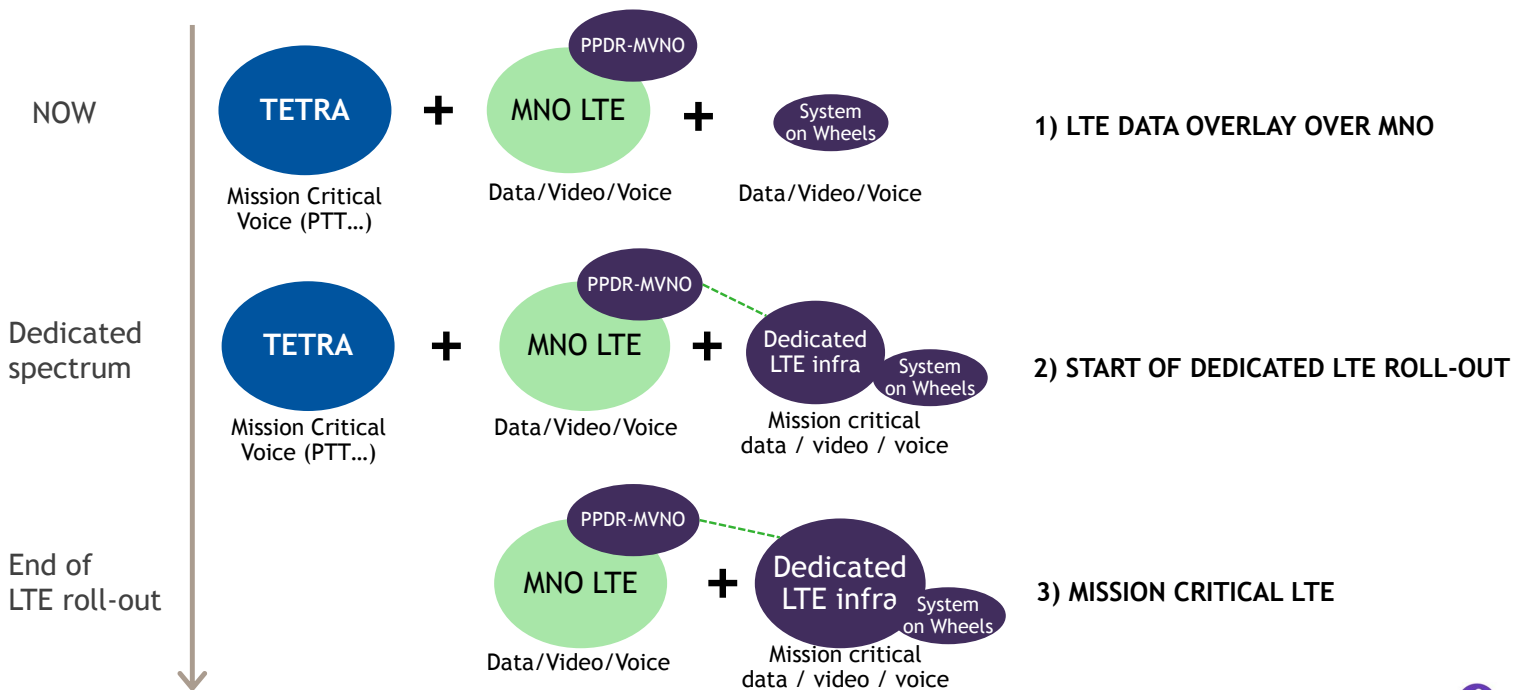
ROLE OF LTE VS. DEPLOYMENT MODEL

EXAMPLE 1 - DEDICATED SPECTRUM NOW



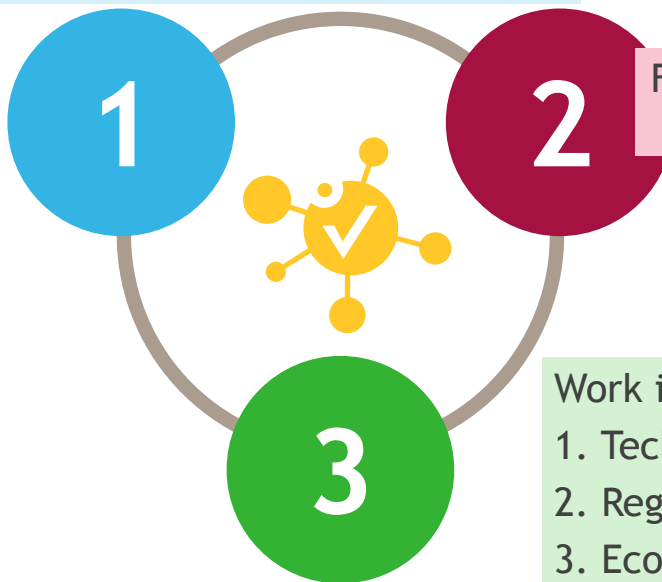
ROLE OF LTE VS. DEPLOYMENT MODEL

EXAMPLE 2 - DEDICATED SPECTRUM IN A LATER PHASE



CONCLUDING REMARKS

LTE enable new applications for improved operational effectiveness and safety



First LTE systems for PPDR are being deployed in some geographies

Work in progress:

1. Technical (TCCA/CCBG, 3GPP, SALUS...)
2. Regulatory (FM49, WRC-15)
3. Economical

www.alcatel-lucent.com