LAUREA
UNIVERSITY OF APPLIED SCIENCES

Prime Mover

Mobile Digital Services for Border Protection:
Standardization of Emergency Response Vehicles


Photo: Tapio Mäkinen

Outline

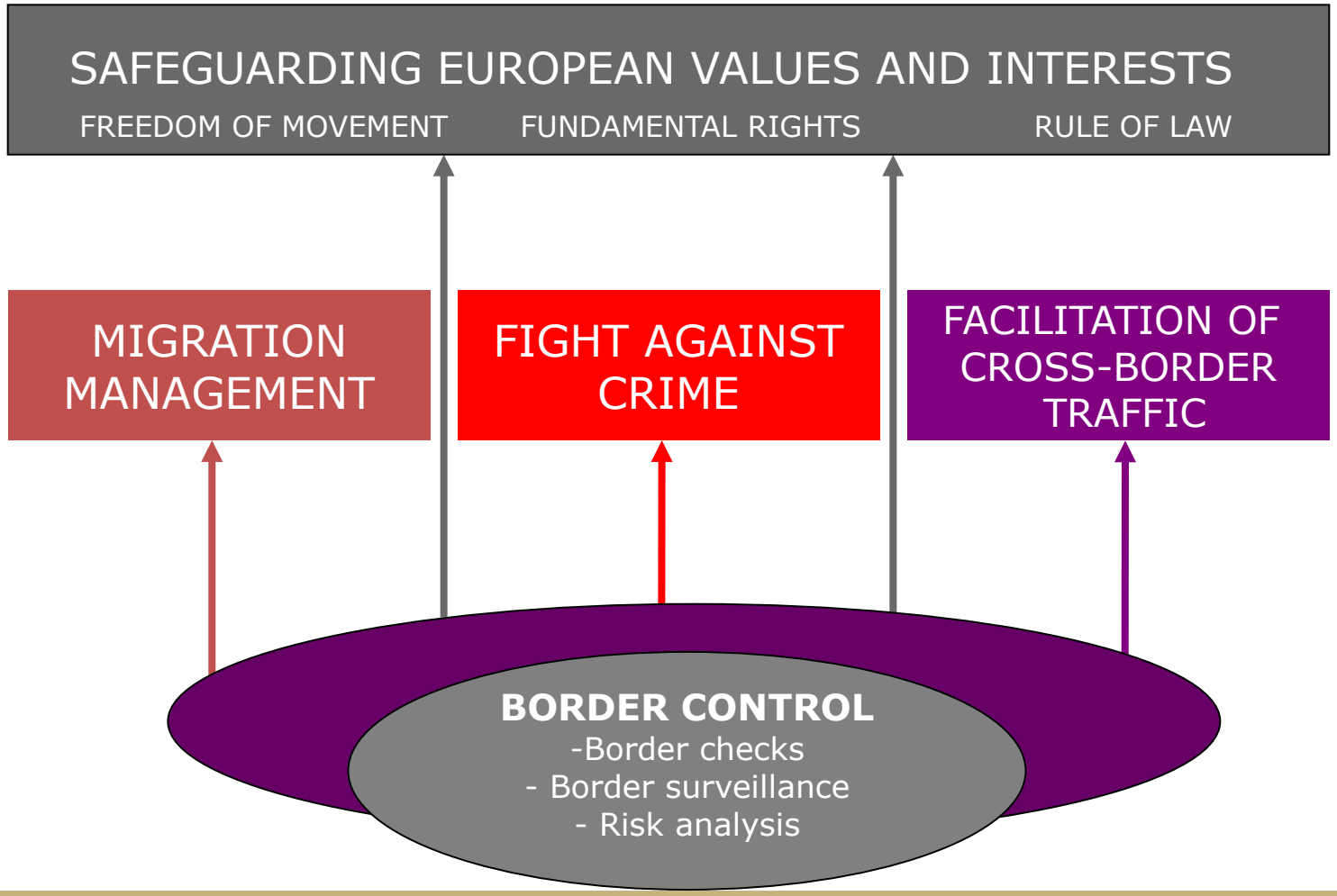
Introduction
- Objectives of Border Security (BS)
- Digital Services for BS
- Why Mobile?

Finnish Approach
- Patrol cars also field command centers and mobile offices / customer service units
- Common model for all emergency response vehicles

Standardization aspects
- a vehicle infrastructure and power management layer;
- a communications layer;
- a service platform and common services layer; and
- an actor-specific services layer.

Discussions & Conclusions
- Benefits
- Competition
- conclusions

Objectives of EU Border Security



Digital Services (DSs) for BS

1. Border control

a) Border Checks - "Smart borders"

- registered traveler programme (RTP) for frequent prescreened and pre-vetted third country travelers
- entry/exit system (EES) allowing the electronic recording of the time and place of entry and exit of third country nationals
- automated border checks (ABC)

b) Border Surveillance

- EUROSUR; the future European integrated border surveillance system
  - Reduce the number of deaths of illegal immigrants by saving more lives at sea
- new high-tech services (unmanned aerial vehicles, unattended ground sensors, surveillance towers equipped with camera sensors, etc.)

c) Risk analysis tools

2. Border management

- EUROSUR
  - Reduce the number of illegal immigrants who enter the European Union undetected;

3. Detection and investigation of serious international (cross-border) crime

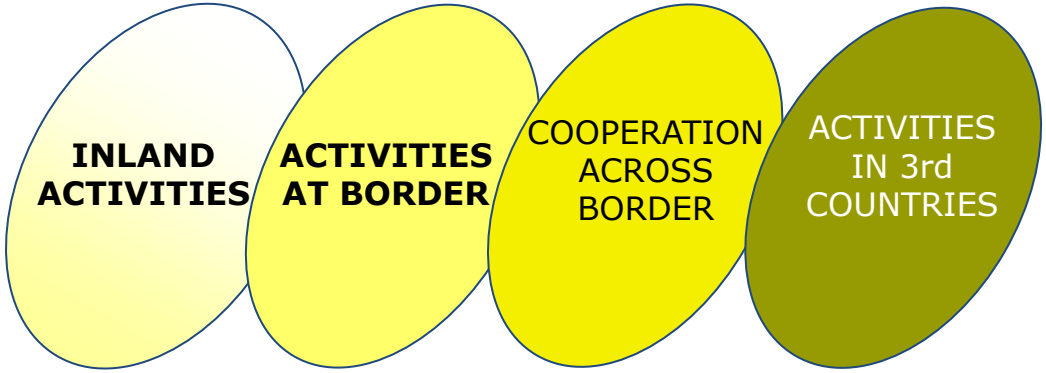
- EUROSUR
  - Increase the internal security of the EU as a whole by contributing to the prevention of cross border crime.
- Forensics technology for investigations and field work; e.g. tracking systems to track criminals and vehicles that have been tagged

4. Inter-agency cooperation

- EUROSUR
- Next generation PMR
- SOA-based DSs

Why Mobile?

Four-tier access control model



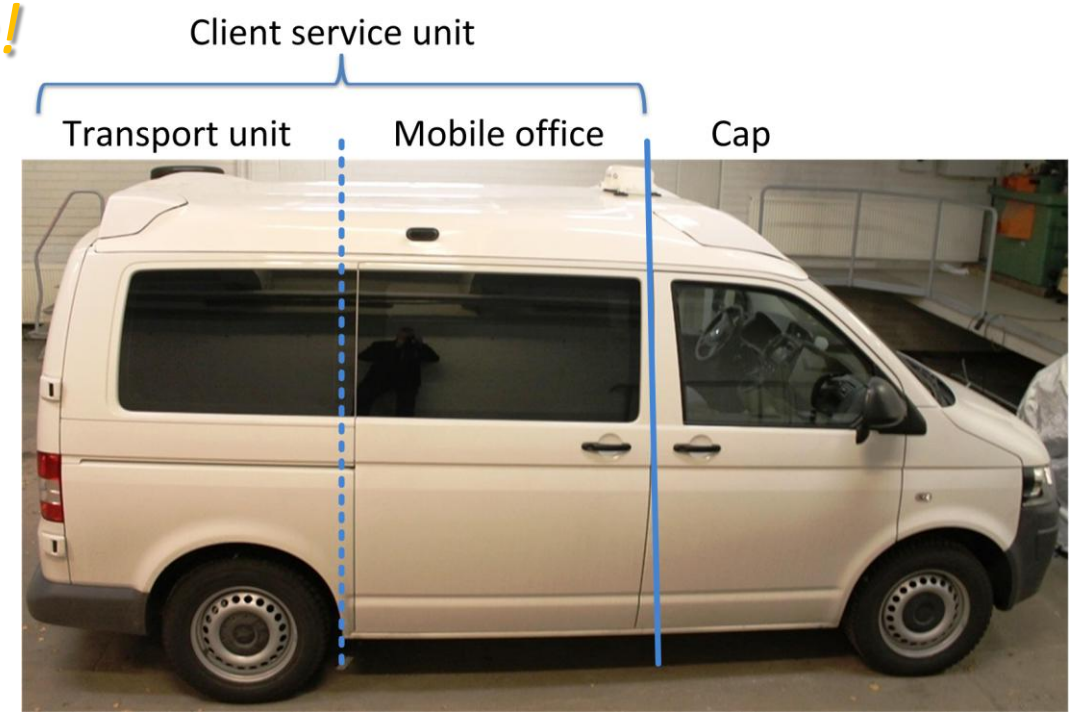
Need for seasonal border crossing points (BCP)

Finnish Approach

In Field operations, LEAs' most important tool is their vehicle!

Vehicles are at the same time

- patrol cars
- field command centers
- mobile offices / customer service units



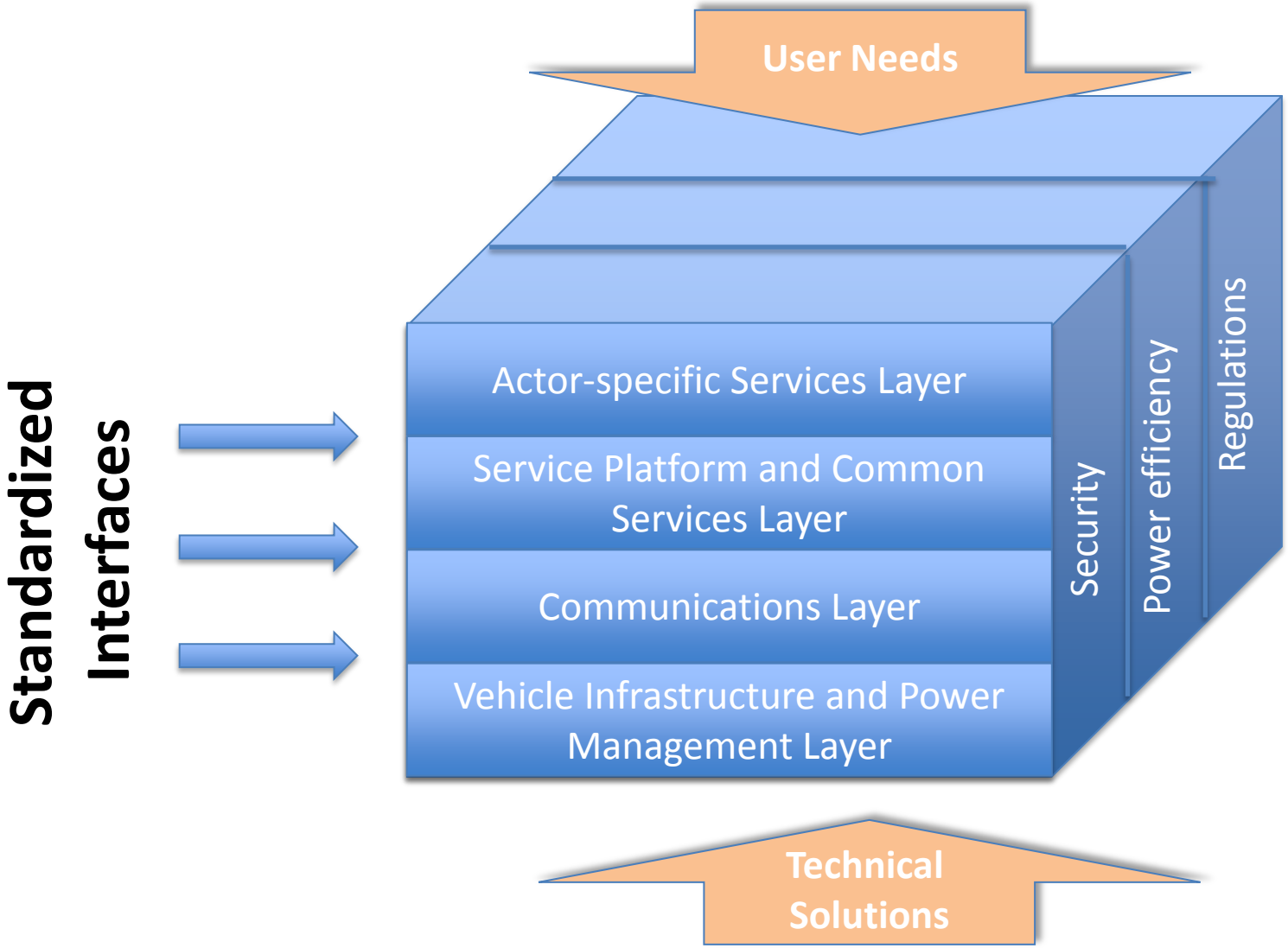
All First responders have similar needs. Could we create common standards for all ERV?

REAL PROBLEMS:
40+ Extra Human-Machine Interfaces,
> 200 Amps

- Patrol cars have c. 40 HMIs (for radio, navigation, field command systems, radar, alarms and emergency lights etc.) on the deck beyond cars' own user interfaces
- In cold weather conditions, all vehicles are not creating enough electricity (203 amps) for intensive operations
- Wiring (EMC) and ergonomics are problematic

=> System integration is needed!

Solution: OSI model for ERV



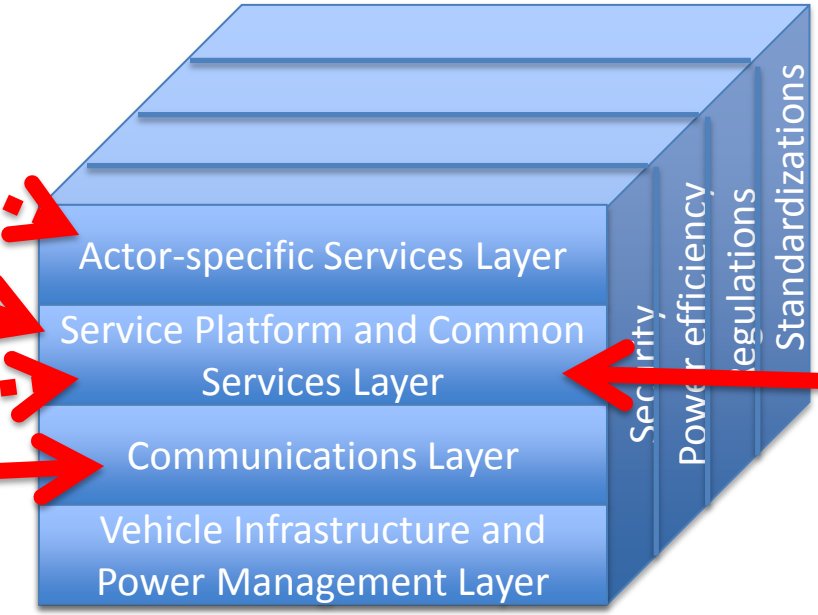
Finnish ERV Projects

The **MOBI** (Mobile Object Bus Interaction) **research** project led by **Laurea**

Research results, Equipped demo vehicle

Secure Software Services in ERV project led by **Insta DefSec**

TETRA vehicle terminal project
led by **Cassidian Finland**



Pre-commercial Procurement project **PARVI** led by **Police Technical Center**

KEJO project - a common Field Command System for all first responders -
led by **ICT Agency HALTIK**

Industry supply, technology push

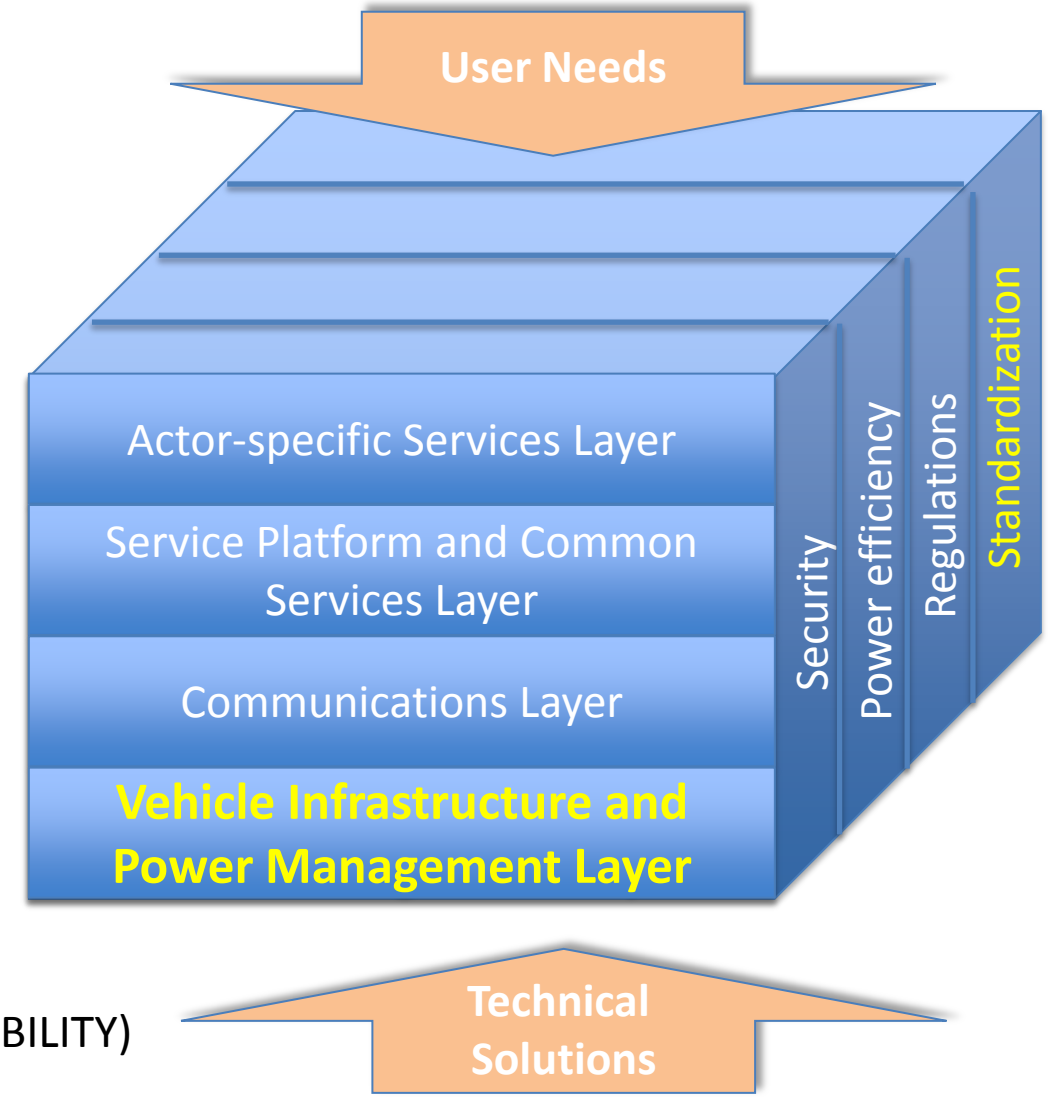
Market demand, pull

Standardization

Two MAIN AREAS

1. Services adopted from "Standard" vehicle systems
- power generation when engine is on
- information applied from CAN bus

2. Installations
- car body modifications
- emergency lights and alarms
- intelligent power system (distribution, storage, generation when engine off)
- cabling, antennas (ELECTROMAGNETIC COMPATIBILITY)



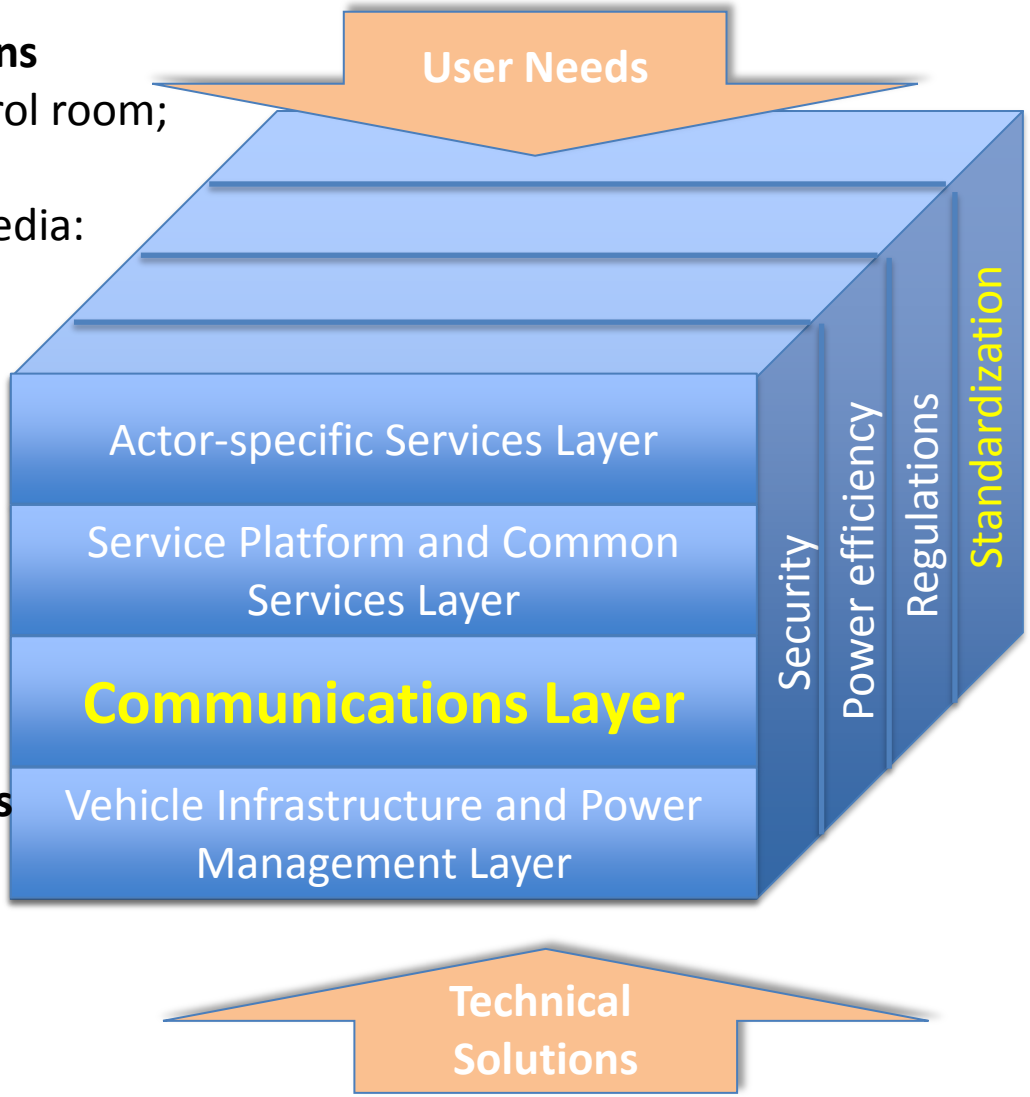
Standardization

1. **Long distance communications**
- vehicle – command and control room; vehicle – vehicle
- parallel use of all available media: TETRA, 2/3/4G, satellite
- WAN = WLAN + Internet when hotspots available

2. Vehicle area communication
- CAN, LAN, WLAN
- ad-hoc –communications in field operations
- updating large databases at stations

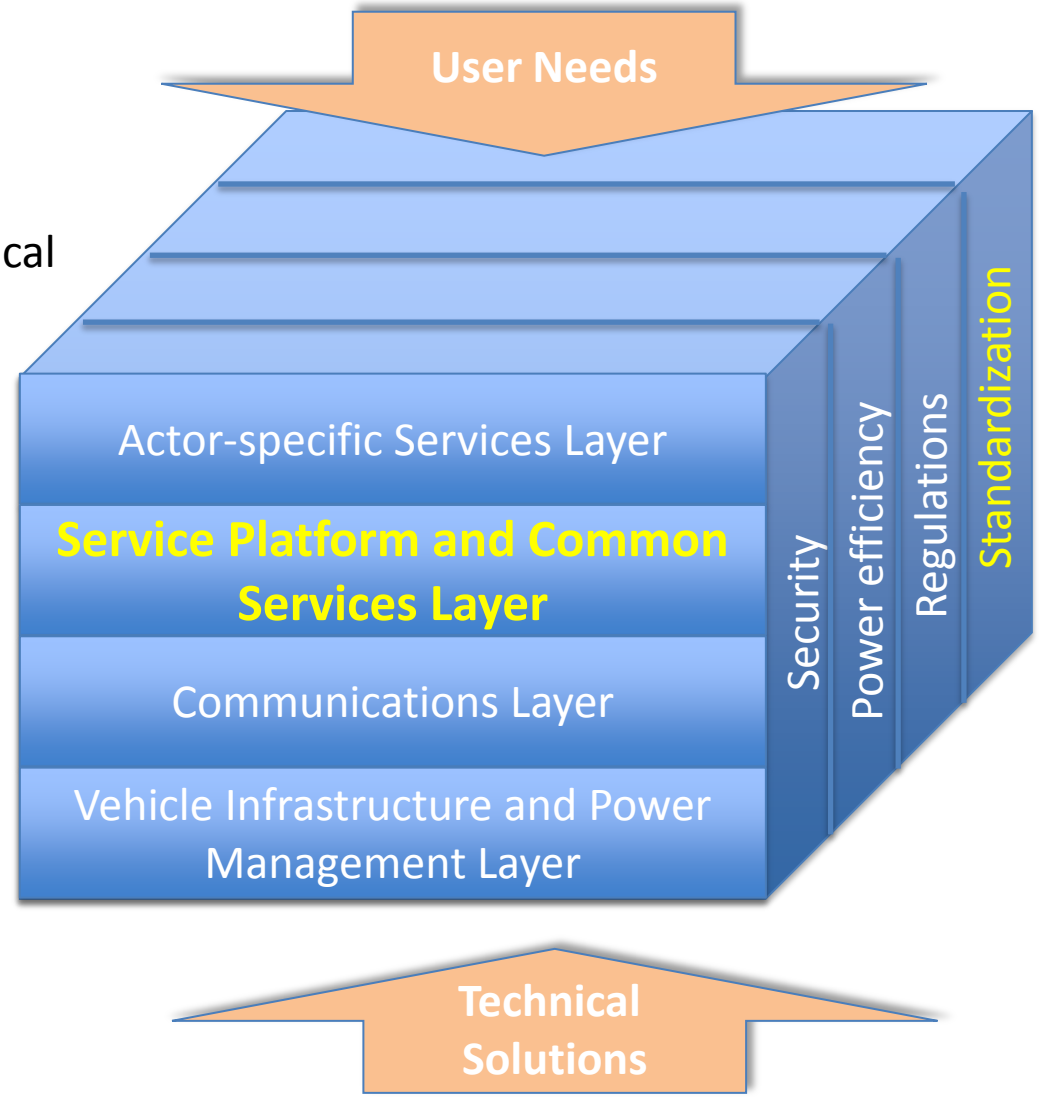
3. Personal area communications & Accessory communications
- e.g. hands free

Both VOICE & DATA !



Standardization

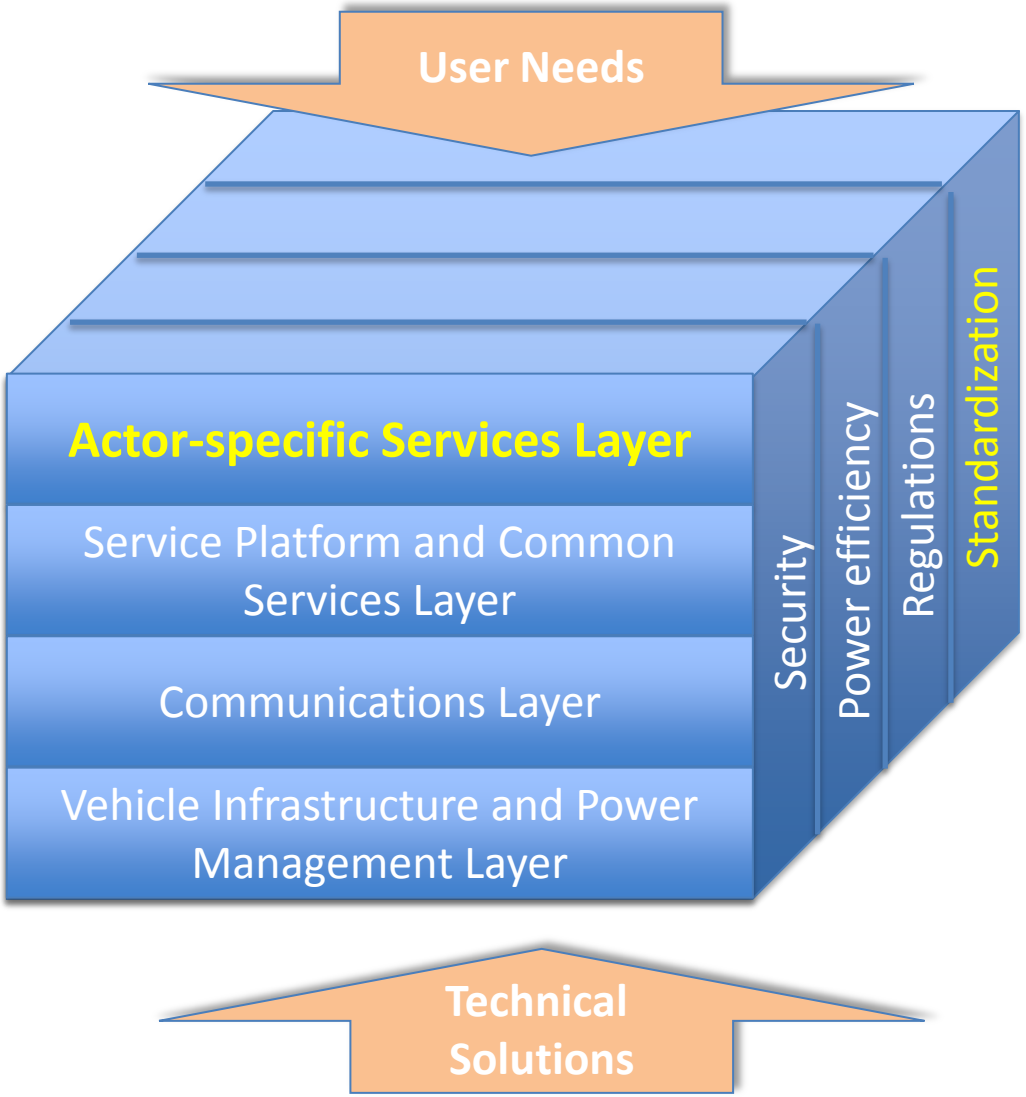
1. Reducing the number of physical human-machine interfaces
2. Common field command system for all PPDR actors
3. Service platform applying Service Oriented Architecture



Standardization

Special services for LEAs' running on top of common services via a standardized interface:

- forensics technology
- GNSS tracking systems
- UAVs

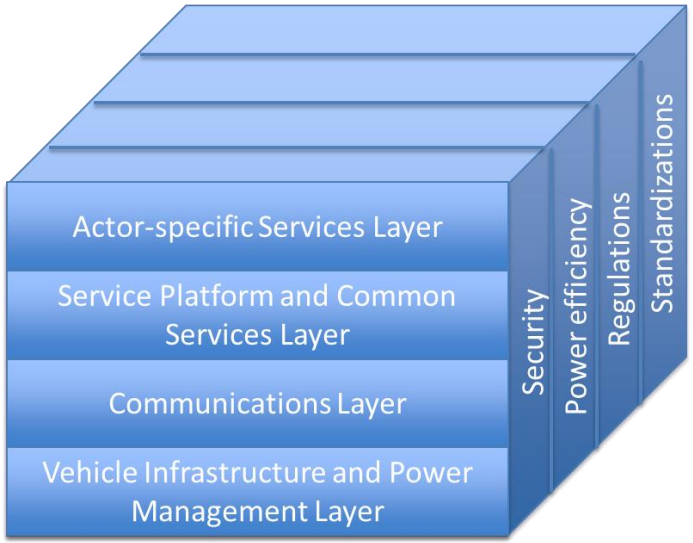


Benefits

What are the quantitative benefits to the customer and how much is it worth?

Layered approach

1. Reduces complexity
   - Smaller and simpler development tasks
2. Standardizes interfaces
   - Prevents changes in one layer affecting the other layers
3. Facilitates modular engineering
   - Allows different types of HW and SW to communicate with each other
4. Interoperability between vendors
   - Allow multiple vendor development and support
5. Ensures interoperable technology
6. Accelerates evolution



Competition

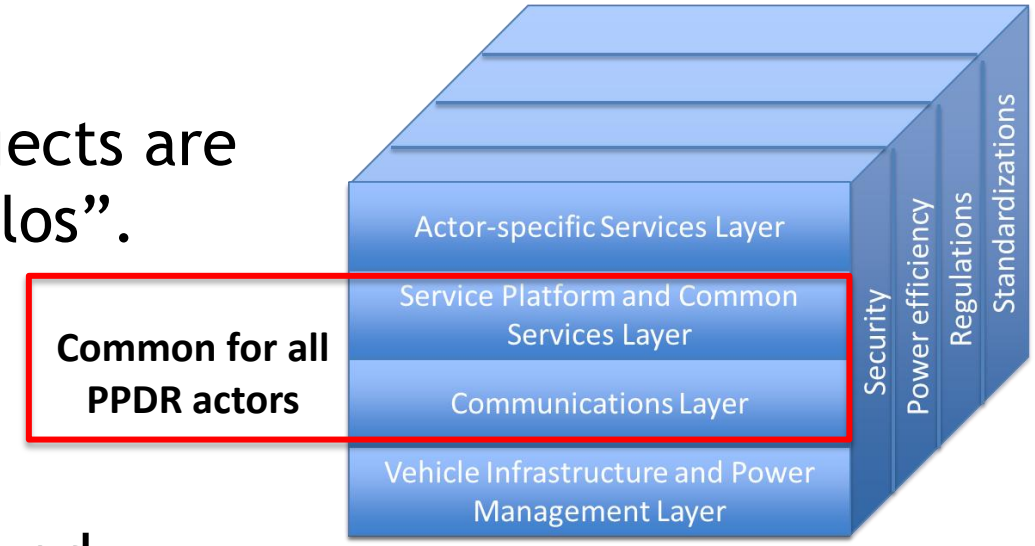
Who/What are competitive alternatives and why this solution is better?

Problems within PPDR branch are similar in all countries; e.g. the constant increments in ICT devices in vehicles.

Many vehicle development projects are ongoing, but they remain "in silos".

Our solution

- Out from silos
  => bigger markets
  => more and reasonable-prized products and digital services
- Better interoperability



Conclusions

- LEAs main need is to maintain their core services with a significantly reduced budgets.
- Traditionally LEAs suffer from intensive human involvement.
- The only realizable solution is the better piggybacking of ICT and digital services.
- In field operations, the LEAs' most important tool is their vehicle.
- This paper presents a layered approach for standardizing the electrical, electronic and ICT devices of ERVs.
- On the basis of this infrastructure, the mobile digital services needed for first responders could be supplied.

Thank You!

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