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

- Border checks
- Border surveillance
- Risk analysis

SAFEGUARDING EUROPEAN VALUES AND INTERESTS
- Freedom of movement
- Fundamental rights
- Rule of law

MIGRATION MANAGEMENT

FIGHT AGAINST CRIME

FACILITATION OF CROSS-BORDER TRAFFIC

BORDER CONTROL
- Border checks
- Border surveillance
- Risk analysis
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)
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?
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

- User Needs
- Security
- Power efficiency
- Regulations
- Communications Layer
- Vehicle Infrastructure and Power Management Layer
- Service Platform and Common Services Layer
- Actor-specific Services Layer

Standardized Interfaces

Technical Solutions
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

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

TETRA vehicle terminal project led by Cassidian Finland

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

- User Needs
  - Actor-specific Services Layer
  - Service Platform and Common Services Layer
  - Communications Layer
  - Vehicle Infrastructure and Power Management Layer

- Standards
  - Security
  - Power efficiency
  - Regulations

- Technical Solutions
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

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!

jyri.rajamaki@laurea.fi
http://mobi.laurea.fi

8/13/2013

Industrial, Security & Telemetry Electronics