5G Project in Slovenia

Janja Varšek
5G – revolutionary technology

- upgrade of previous technologies
- change of human society

1G (NMT); analogue technology
- mobility for voice calls

2G (GSM); digital technology
- mobile calling
- text messages,

3G (UMTS);
- more efficient access to the Internet via mobile phone

4G (LTE);
- higher speed rates
- support for »All-IP« communications.

5G – upgrade previous technologies
The architecture of the network + Technological breakthrough = New 5G society

- 10-100x END-USER DATA RATES
- 1000x MOBILE DATA VOLUMES
- 5x LOWER LATENCY
- 100x MORE DEVICES
- Cost DEVICE COST REDUCTION
- 10+ YEARS BATTERY LIFE
- +20dB BETTER COVERAGE

Vir: http://www.libelium.com/wp-content/themes/libelium/images/content/applications/libelium_smart_world_infographic_big.png
**Slovene 5G initiative**

AKOS – support for fast introduction of 5G in Slovenia

EU with COM (2016) 588 promote and financially support 5G-PPP:

EU supports international projects for 5G ecosystem

**Slovenia: one of priority verticals BB PPDR**
On 22 December 2015, the Agency, in cooperation with the Ministry of Public Administration, welcomed the 5G initiative of the European Commission and publicly invited potential investors to report projects for testing and future use of 5G technology - indicating for which segment of the economy this project would be primarily intended.

Since preference is given to projects, which involve partners from neighboring and other European countries, the Agency could support such initiative using international connections to find appropriate partners.
Slovene 5G initiative - spectrum

- Spectrum for testing of 5G projects
- 3400 - 3800 MHz

![Diagram showing spectrum allocation](image-url)
use the radio frequency spectrum to achieve the greatest possible socioeconomic progress - 5G is crucial in all areas of social life: transport, transport, health and energy;

promotion of development in all segments of the economy and, consequently, investment and the creation of new jobs;

provide access to modern mobile communications and modern services also in other areas of life to the widest possible range of the population;

to maintain the development of effective competition in the markets for mobile electronic communications services;

to maintain technological and service neutrality in the use of spectrum in line with European frameworks
Incentives for 5G PPDR pilot project

- 5G for Europe: An Action Plan: Preliminary trials (Action 1), Spectrum bands for the 5G services (Action 2), 5G infrastructure to improve the performance of public communications services (Action 7)
- Public safety challenges: southern state (Schengen) border
- The 5G Public Safety Development Eco-system will bring expertise from all areas within Slovenia to create and develop new services and applications that will benefit both the Public Safety and Emergency Services and the wider society
- The collaboration will constantly evolve and seek further partners that will additional value to the workstreams and also global insights and support
- Key players from all areas within Slovenia will enhance current Public Safety and Emergency Services within 2-3 years
- Long term consolidation of existing TETRA and DMR networks
- Input for MVNO as possible future model for PPDR needs
eCALL Slovenian solution

- First fully operational nationwide eCall in 2015
- All functionality of the first generation eCall standard are included
- The smart routing of the calls to the appropriate PSAP is enabled
- Re-used for any other purposes (smart cities) is planned
- System is fully extensible to the functionality of the second generation of the eCall
AKOS

Development environment

NGA fixed network >82 %

- Fast implementation of the project

Free internationally harmonised and spectrum (3400 – 3800 MHz)

- Prolonged period for duration of temporary licences in Electronic Communications Act

LTE coverage > 95 %
Partners

- Already established collaborative environment
- High technical expertise
- Well skilled users of new technologies
Competence and drivers

**AKOS**

**Strong leadership and ambition towards working collaboratively**

**Ericsson**
- Equipment provider and integrator
- Global 5G expertise
- Specialists in service and application use cases

**Iskratel**
- System Integrator
- Expertise towards Operating Centres
- Developer of

**LTTE**
- Research and Development
- Knowledge transfer/education to others

**Telekom Slovenije**
- Network provider (mobile/fixed)
- Verification and Testing
- Service Operations and Big Data
- Analytic Expertise

**Society towards Public Safety**
- Create environment for ecosystem development
- Increase impact and opportunities through collaboration with others

**Secure operations**
- Be recognised as the reference point for public safety and emergency services in the domestic market via successful pilot implementation

- Build a 5G centre of excellence for the public safety domain

- Transfer the model to other countries and gain further insights to develop and enhance services/applications through the cooperation with international partners
- Proactively secure operations competence to maintain and develop existing and future networks

- Establish relevance in future of European Industry and Society towards Public Safety
- Create environment for ecosystem development
- Increase impact and opportunities through collaboration with others
2. Situational Awareness
Multimedia/ HD video UL
Large No. of drones carrying cameras
within a geographic area will
-navigate themselves automatically,
-taking care of obstacles, weather,
charged batteries - exchanging each other
Collaborate to cover a specified area with video feed+ ad hoc BS

3. Command & Control
Real time drones control / „remote driving“/ng112
– Integration to Event Command & Control Centre CCC
–URLLC (Real time / haptic responsiveness) + GPS,MPS+NLoS C

1&2 Fire extinguishing in the garage object
Video over sensors
Forming ad hoc network IoT communications

1.Security of mass event
Traffic Control & Incidents
Use case: Multimedia/ HD video uplink
Up stream from worn body cams+ video from helicopter/drones
UL to Edge Cloud – pre-processed
UL to central cloud/DB - processed
If anomaly then alarm

4. Operational information
Alarm button from officers
First Responders Support
- When activated 100% delivered to CCC
– Good Cell Edge Performance

5G pilot scenarios
What will 5G BB PPDR offer?

- Better system for PPDR in 2 – 3 years.
- New technical and regulatory features:
  - Technically through the PPDR project a 5G plug in will be developed for existing LTE commercial networks, which means:
    - on core site virtualization and a new network slice
    - and on radio access site new 5G features.
  - Among other functionalities the 5G BB PPDR project will offer next generation 112 and MVNO connectivity over 5G core as well with DMR/TETRA/ GSM-R networks.
- Regulatory:
  - National roaming for PPDR MVNO. This MVNO should have traffic prioritization for the „First responder“ in case of fire or other emergency cases – like blue light in road traffic
The role of AKOS in 5G Initiative

- To offer frequencies for testing: 3400 – 3800 MHz (3430 – 3500 MHz/3530 – 3800 MHz); 26 GHz band (24,549 – 25,053 GHz / 25,557 – 26,061 GHz)

- Proposed changes of Electronic Communications Act – temporary licenses for 5G testing in EU projects – from 90 days to 3 years

- Technical and regulatory conditions for QoS.

- Support in preparing regulatory framework on government level for:
  - Traffic prioritisation for First responders in emergency situations.
  - Regulation of drones used in emergency situation
5G-PPDR in phases and timeframe:

**Phase 0:**
- Demonstration of a basic example of prioritizing data transfer in 4G / LTE
- Time frame: 1 month.

**Phase 1:**
- PPDR in the test environment 4G / LTE
- Time frame: 9 months.

**Phase 2:**
- PPDR in the test environment 5G and in the limited production environment 5G
- Time frame: 24 months
- Tender

**Phase 3:**
- Implementation and production in 5G implementation
- Timeframe: 36 months
- The desired time frame for the concession: 15 years.
Conclusions

- Extensive technical knowledge and PPDR best practice cases
- PPDR users
  - Police
  - Military
  - Public protection
- PPDR Interest
  - Commercial interest

Financial support?

- 5G pilot project
- PPDR
- Cooperation
  - Industry
  - Government
  - NRA AKOS
  - Faculty
- Future consolidation of TETRA and DMR via MVNO 5G network slice

- Regulatory environment
  - Electronic Communications Act
  - Harmonised frequencies
  - Prioritisation for first responders

- Development environment
  - Good LTE coverage
  - Good NGA networks