



AKOS

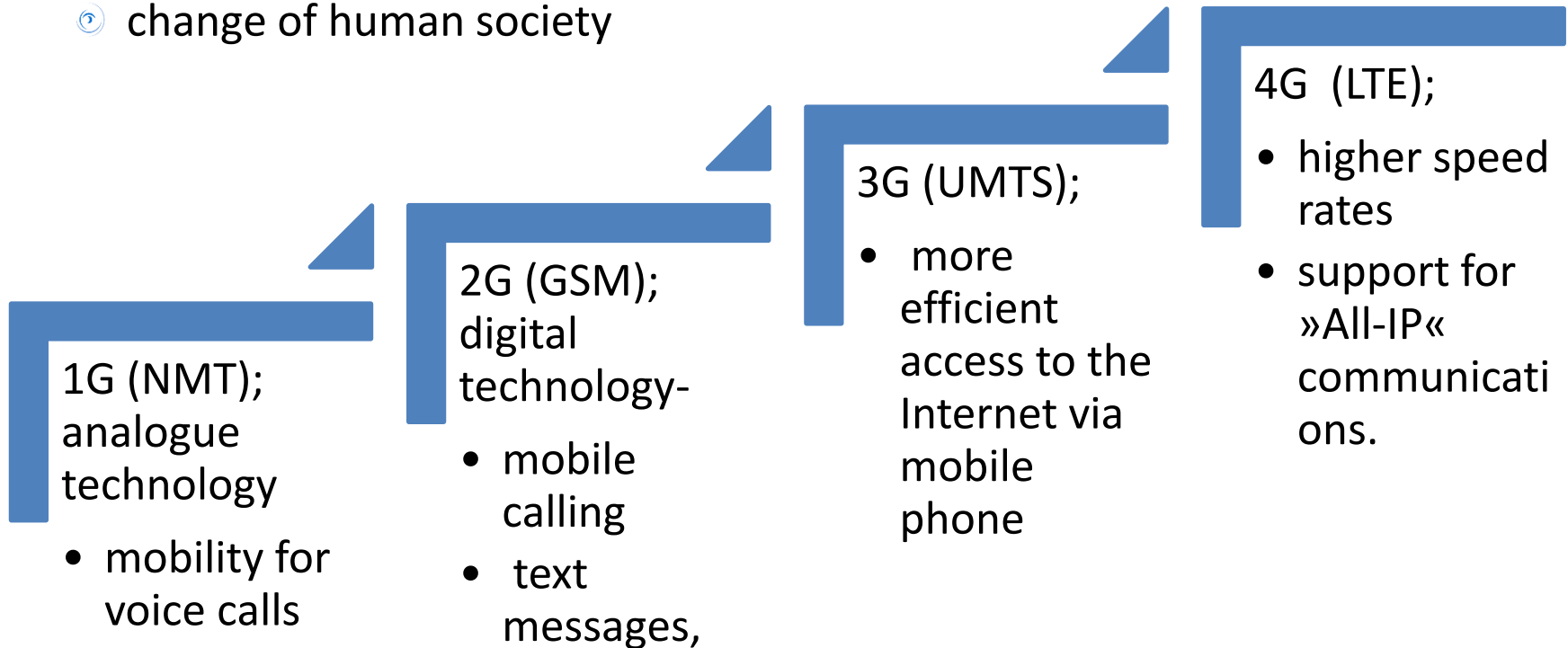
# 5G Project in Slovenia

Janja Varšek

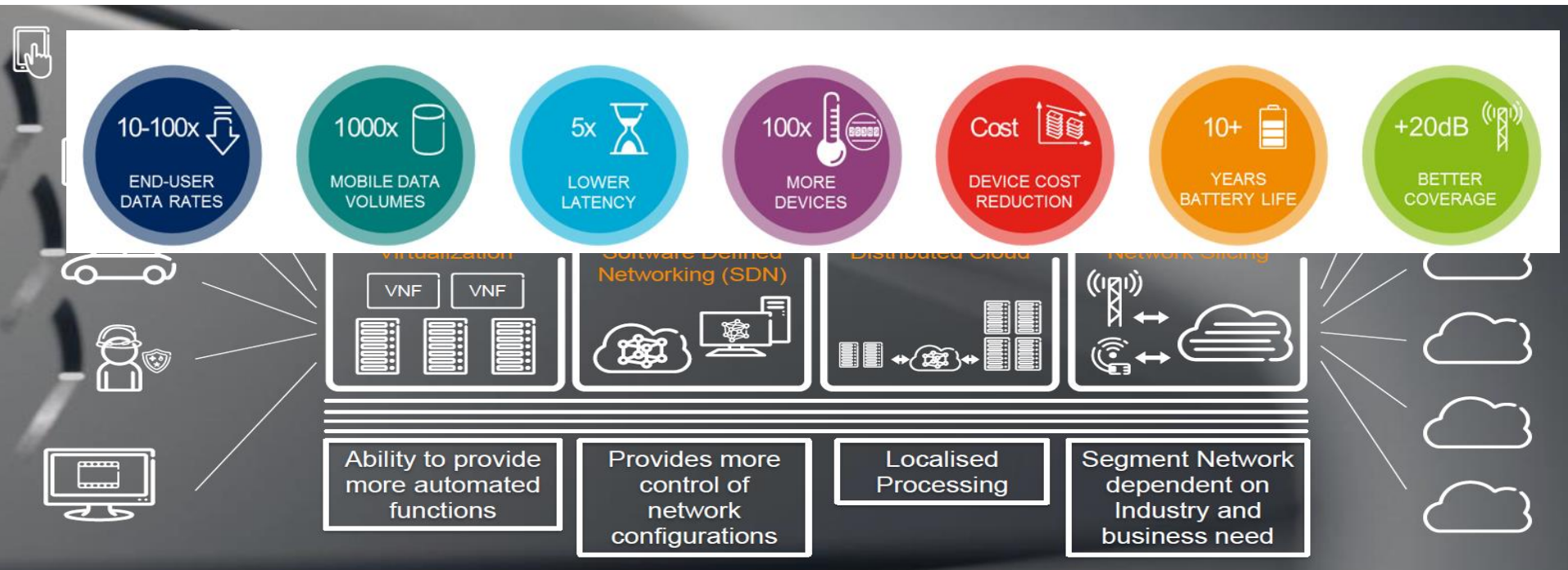
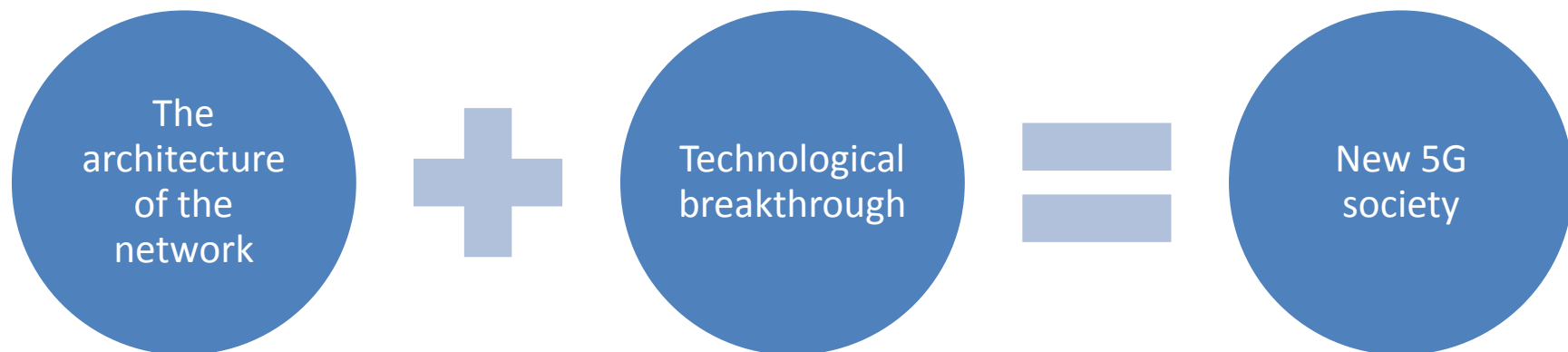


## 5G – revolutionary technology

- upgrade of previous technologies
- change of human society



# 5G – Technological breakthrough





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

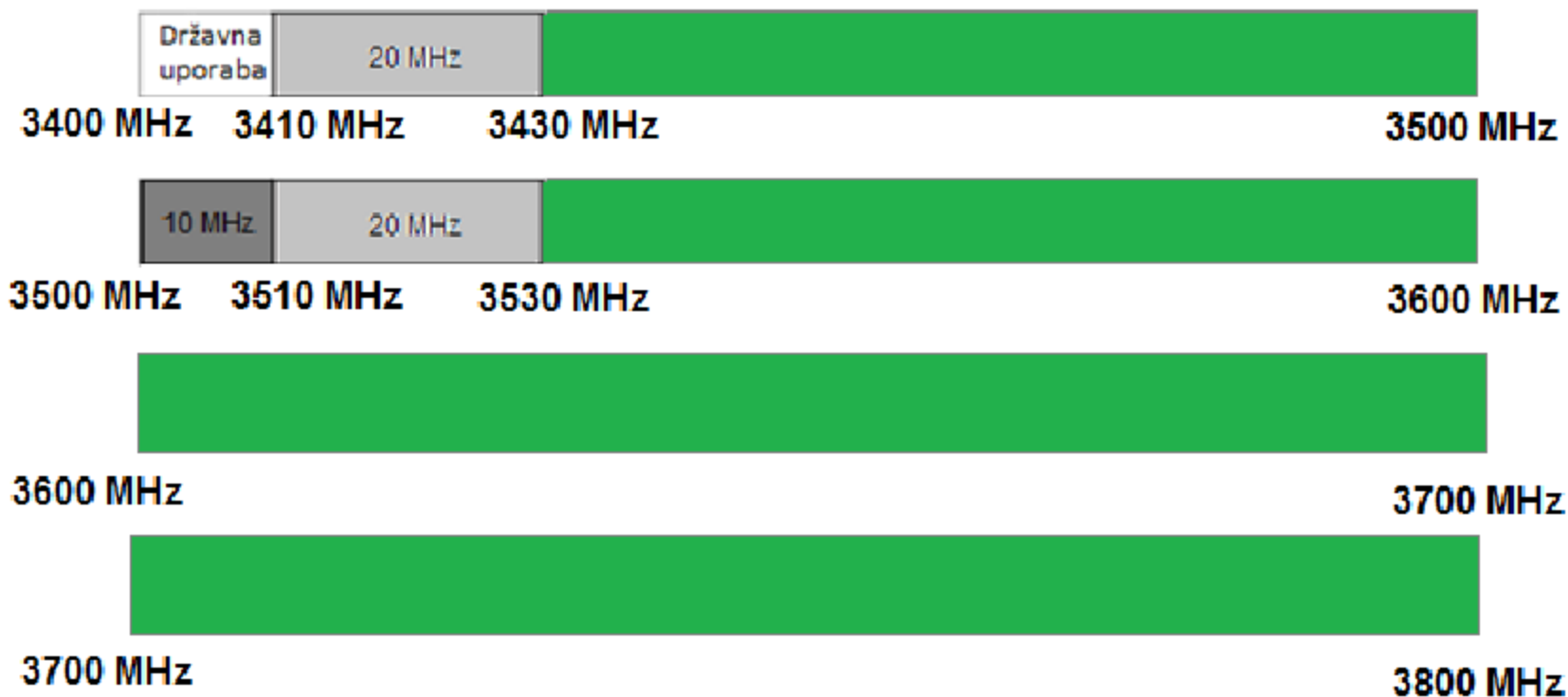
Slovenia: one of priority verticals BB PPDR

- ④ On 22 December 2015, the Agency, in cooperation with the Ministry of Public Administration, welcomed the 5G initiative of the European Commission and 13. 1 2017 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.
- ④ 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.



## Spectrum for testing of 5G projects

3400 - 3800 MHz





- ④ 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;
- ④ promotion of development in all segments of the economy and, consequently, investment and the creation of new jobs;
- ④ provide access to modern mobile communications and modern services also in other areas of life to the widest possible range of the population;
- ④ to maintain the development of effective competition in the markets for mobile electronic communications services;
- ④ to maintain technological and service neutrality in the use of spectrum in line with European frameworks



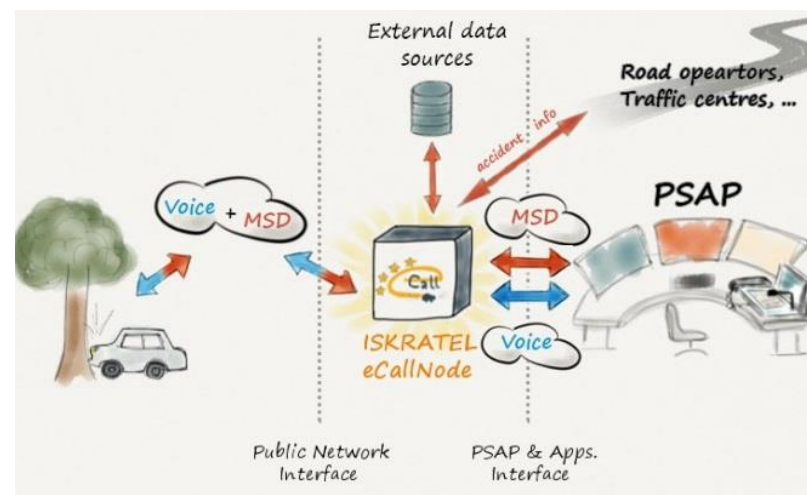
# AKOS Incentives for 5G PPDR pilot project



- ④ 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)
- ④ Public safety challenges: southern state (Schengen) border
- ④ 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
- ④ The collaboration will constantly evolve and seek further partners that will add additional value to the workstreams and also global insights and support
- ④ Key players from all areas within Slovenia will enhance current Public Safety and Emergency Services within 2-3 years
- ④ Long term consolidation of existing TETRA and DMR networks
- ④ Input for MVNO as possible future model for PPDR needs



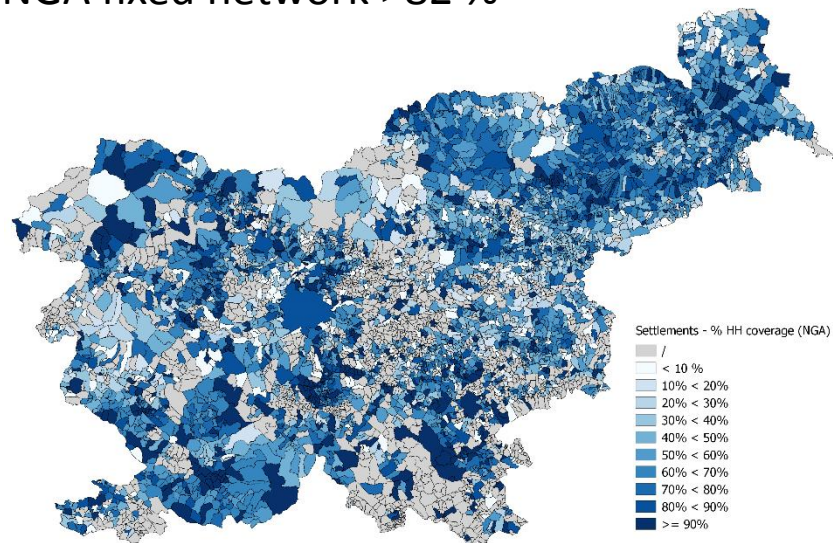
- ④ First fully operational nationwide eCall in 2015
- ④ All functionality of the first generation eCall standard are included
- ④ The smart routing of the calls to the appropriate PSAP is enabled
- ④ Re-used for any other purposes (smart cities) is planned
- ④ System is fully extensible to the functionality of the second generation of the eCall



# THE TERRITORIAL ORGANISATION OF 112 SERVICE IN SLOVENIA



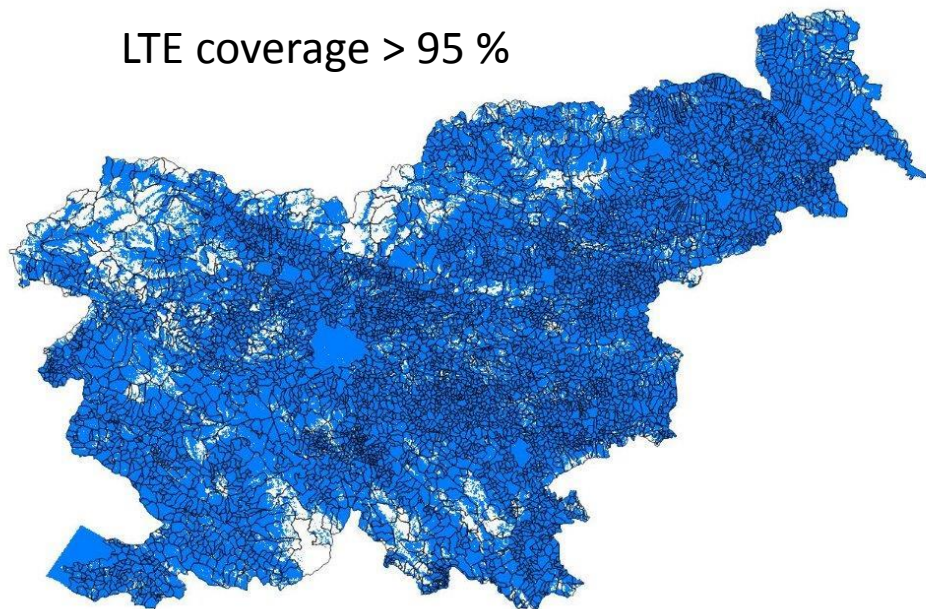
NGA fixed network >82 %



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 %



- ➊ Already established collaborative environment
- ➋ High technical expertise
- ➌ Well skilled users of new technologies





Ericsson

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



Iskratel

ISKRATEL

- System Integrator
- Expertise towards Operating Centres
- Developer of

LTFE

- Research and Development
- Knowledge transfer/education to others

LIFE

LIMFE

Telekom Slovenije

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



Telekom Slovenije

## 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

Strong leadership and ambition towards working collaboratively



## 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

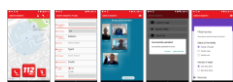
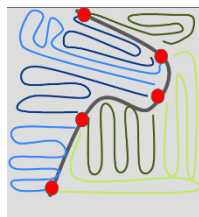
Collaborate to cover a specified area with video feed+ ad hoc BS



EPC-IN-A-BOX



**massive Machine Type Communications - coverage**



## 3. Command & Control

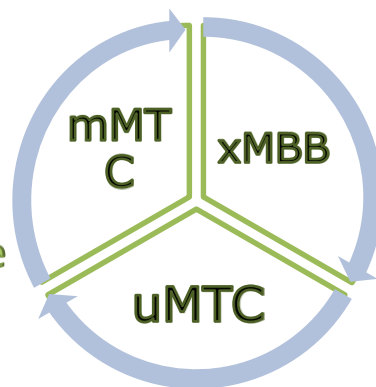
### Real time drones control / „remote driving“/ng112

- 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



**ultra reliable Machine Type Communications - Latency**

## 1.Security of mass event /border/

### 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



**extreme Mobile Broadband - capacity**

## 4. Operational information

Alarm button from officers  
**First Responders Support**

- When activated **100% delivered to CCC**
- Good Cell Edge Performance



- ④ Better system for PPDR in 2 – 3 years.
- ④ New technical and regulatory features:
  - ④ Technically through the PPDR project a 5G plug in will be developed for existing LTE commercial networks, which means:
    - ④ on core site virtualization and a new network slice
    - ④ and on radio access site new 5G features.
  - ④ 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.
  - ④ Regulatory:
    - ④ 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



AKOS

# The role of AKOS in 5G Initiative



- ④ 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 )
- ④ Proposed changes of Electronic Communications Act – temporary licenses for 5G testing in EU projects – from 90 days to 3 years
- ④ Technical and regulatory conditions for QoS.
- ④ Support in preparing regulatory framework on government level for:
  - ④ Traffic prioritisation for First responders in emergency situations.
  - ④ Regulation of drones used in emergency situation



## 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.



