PriMO-5G

On the role of 5G NPNs for mission critical services

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Introduction to EU-KR PriMO-5G project

- Goal
  - To demonstrate an *end-to-end 5G system providing immersive video services for moving objects*.

EUROPEAN PARTNERS

Aalto University
(Project Coordinator)

Cumucore

Ericsson AB

King's College London

KTH Royal Institute of Technology

National Instruments Dresden GmbH

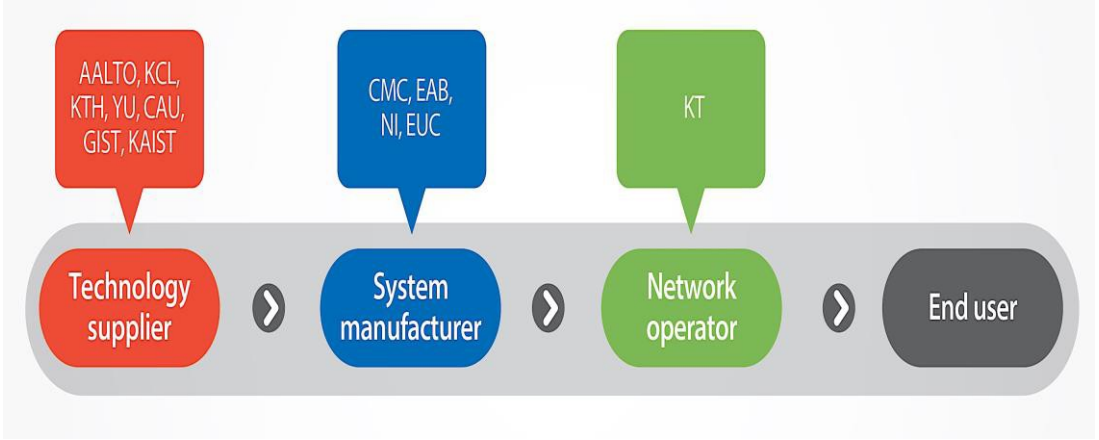
KOREAN PARTNERS

Yonsei University
(Project Co-Coordinator)

Korea Advanced Institute of Science and Technology

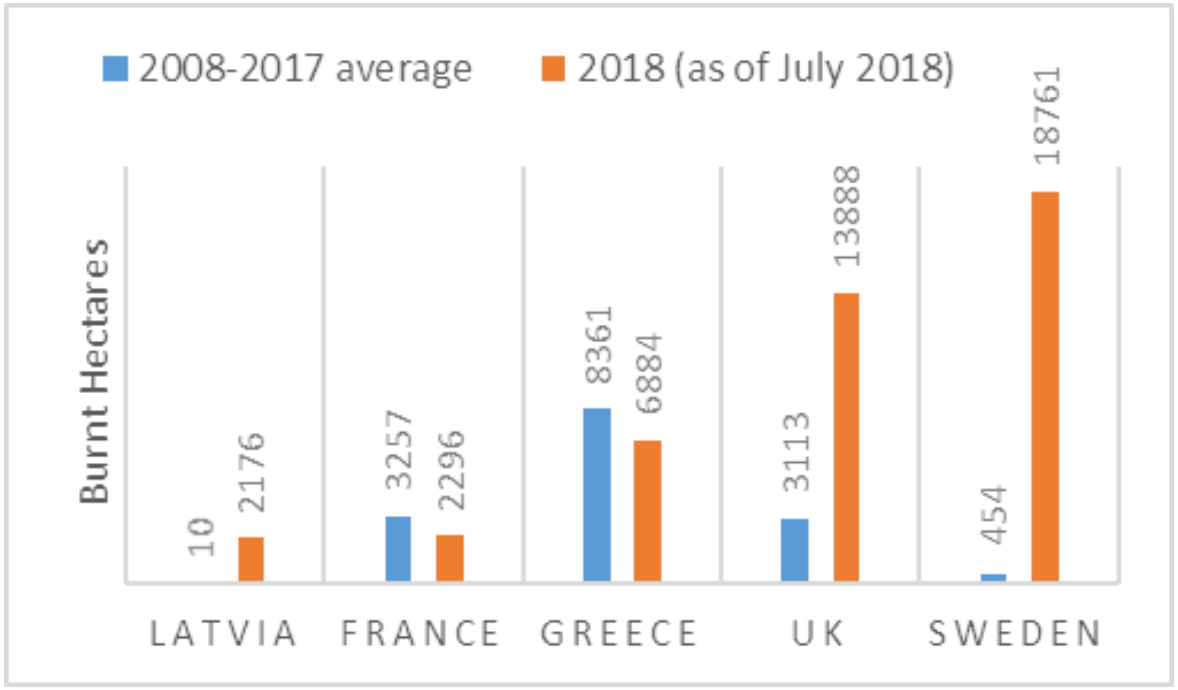
KT Corporation

EUCAST



PriMO-5G use cases: firefighting (1/2)

- Fires are a growing challenge to modern society



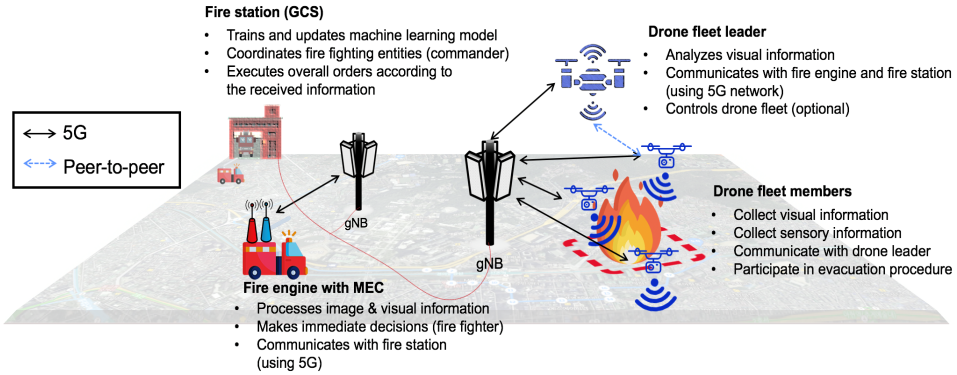
Estimated burnt land hectares in European countries

Source: European Forest Fire Information System (EFFIS) of the European Commission Joint Research Centre, http://effis.jrc.ec.europa.eu

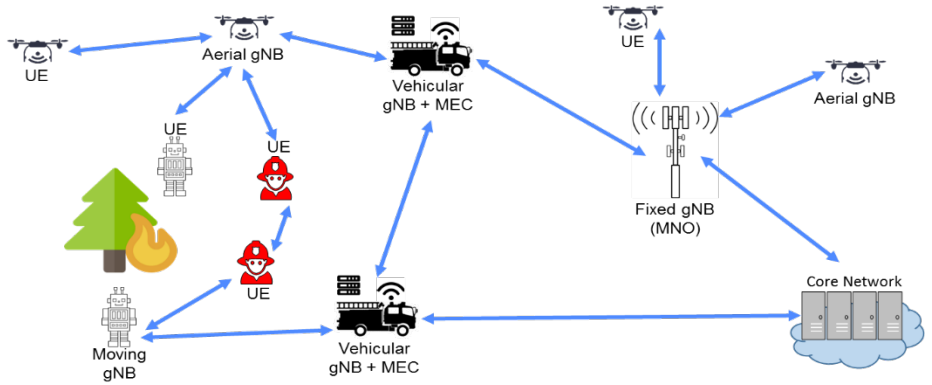
PriMO-5G use cases: firefighting (2/2)

- Public safety communications (PSC) is moving from voice-centric to **data-centric paradigm** enabled by LTE, 5G, and the ongoing 3GPP evolution

Urban firefighting



Rural firefighting



- **Usage of drone**
  - Preparatory actions
  - Visual information
  - Sensory information

- Challenges
  - Urban: complexity
  - Rural: lack of infrastructure
  - Maintaining reliable high data-rate link
  - Trade-off between communication and computing
  - AI assistance
  - Network slicing
  - Dynamic drone fleet management
  - Location awareness
  - …

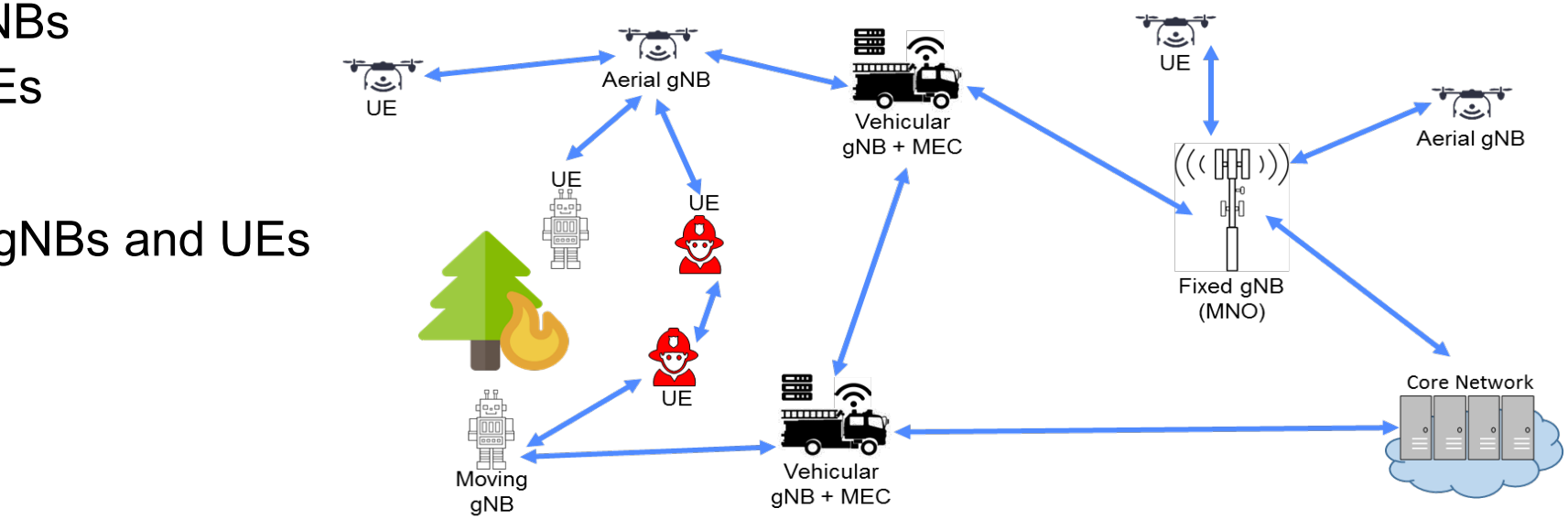
Source: PriMO-5G Deliverable D1.1, PriMO-5G Use Case Scenarios, https://primo-5g.eu/project-outcomes/deliverables/

Challenges for rural firefighting

- Lack of existing infrastructure
  - Incident site can be out of the reach of existing mobile network except for traditional voice and low data rate services
  - **Fast deployment and setup** of communications is essential for the smart firefighting operations
  - **Radio spectrum access** and backhauling are another challenges

Technical solutions for rural firefighting

- Fire trucks
  - Vehicular gNB with mmWave backhaul
  - MEC for supporting AI-assisted functions and slicing
- UAVs
  - Aerial gNBs
  - Aerial UEs
- Robots
  - Both as gNBs and UEs



Source: PriMO-5G Deliverable D1.2, End-to-end PriMO-5G network architecture, https://primo-5g.eu/project-outcomes/deliverables/

Regulatory and business questions

- Radio spectrum access
  - Which spectrum is to be used?
  - Under which arrangement?
- Network operation
  - Who will own the equipment?
  - Who will operate the network?
- Use of the services
  - Who can use the network?

Spectrum access

- **Licensed 4G/5G spectrum** is the most preferred option!

- ~~Spectrum dedicated for public safety~~
  - Spectrum demand for emerging mission critical services far exceeds the currently allocated spectrum for public safety

- ~~License-exempt spectrum~~
  - does not satisfy the priority access requirements
  - difficult to achieve low-latency access

Source: PriMO-5G Deliverable D1.3, Spectrum Options and Economic Study, https://primo-5g.eu/project-outcomes/deliverables/

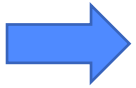
Network operation and services

- Who are the users of the network?
  - Primarily, the safety agencies will use the network
    - First responders, incident commander, UAVs and robots
  - However, the public should be able to use it as well
    - For example, people to be evacuated or rescued

- Who owns the equipment and operates the network?
  - MEC and gNBs can be integrated into the equipment of safety agencies
  - The safety agencies may want to have control of the network
    - For timely slice management
    - For better security

Non-public network

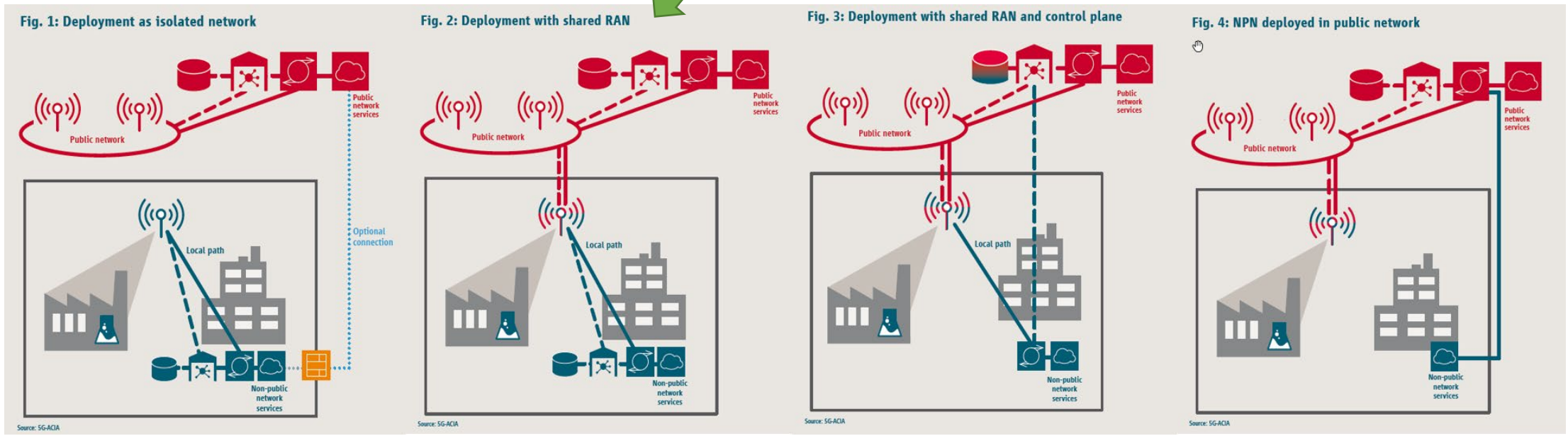
- In summary, rapid deployment and set-up of a network for rural firefighting requires
  - Access to 4G/5G licensed spectrum
  - Communication devices integrated into firefighting equipment
  - Ability of safety agencies to control the network



Non-public network (NPN) is a promising solution!

NPN deployment scenarios

- Which deployment scenario suits PriMO-5G use cases?
  - Deployment with shared RAN (or its variant) is plausible



Source: 5G-ACIA white paper, 5G Non-Public Networks for Industrial Scenarios, https://www.5g-acia.org/publications/5g-non-public-networks-for-industrial-scenarios-white-paper/

See more at

https://primo-5g.eu/ info@primo5g.com @PriMO5G

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Thank you!