VIRTUAL PRESENCE IN MOVING OBJECTS THROUGH 5G

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Outline

- Project goals
- Use case: Public safety/emergency response
- Testbeds and testing scenario

Project Goal

- PROJECT GOAL
  - To demonstrate an *end-to-end 5G system providing immersive video services for moving objects*. This will be done by *cross-continental testbeds* that integrate radio access and core networks developed by different PriMO-5G project partners.

- OBJECTIVES
  - **Objective 1**: To demonstrate an end-to-end 5G system providing immersive video services for moving objects
  - **Objective 2**: To develop technologies of mmWave access, 5G core networks, and AI-assisted communications fulfilling requirements for Objective 1
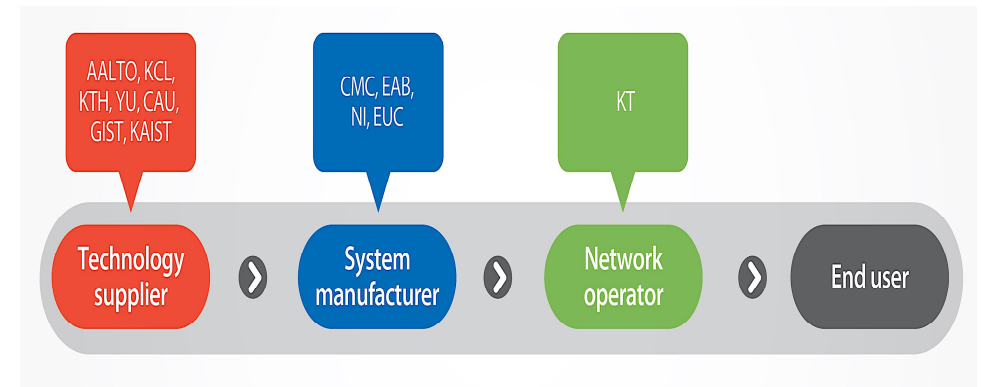 - **Objective 3**: Input to 5G standardization and spectrum regulation activities
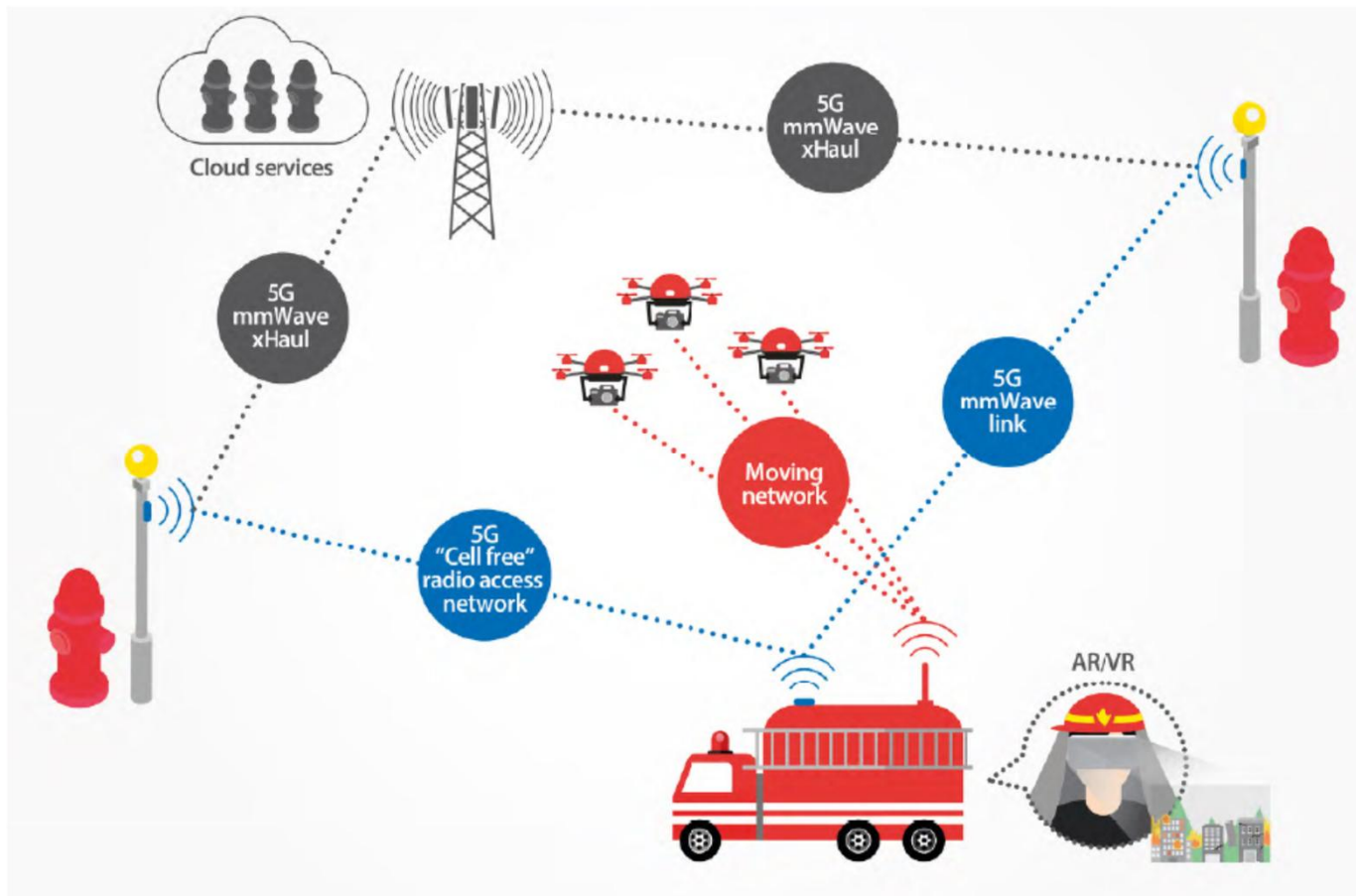
Consortium

PriMO-5G

EUROPEAN PARTNERS

Aalto University
Aalto University
(Project Coordinator)

Cumucore
Cumucore

ERICSSON
Ericsson AB

KING'S College LONDON
King's College London

KTH Royal Institute of Technology

NATIONAL INSTRUMENTS
National Instruments Dresden GmbH

KOREAN PARTNERS

Yonsei University
(Project Co-Coordinator)

KAIST
Korea Advanced Institute of Science and Technology

GIST
Gwangju Institute of Science and Technology

CAU
Chung-Ang University

KT Corporation

EUCAST
EUCAST

AALTO, KCL, KTH, YU, CAU, GIST, KAIST → Technology supplier

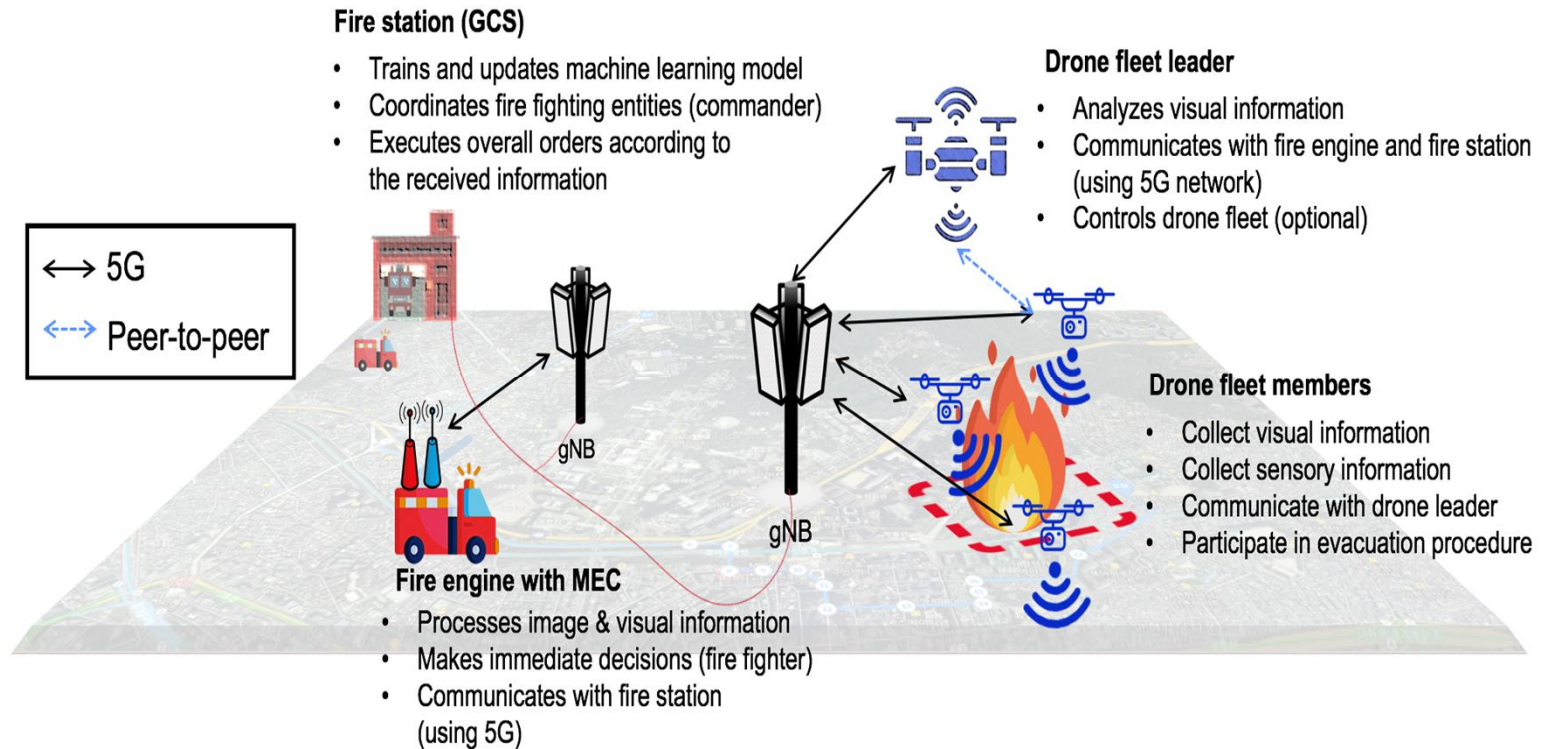CMC, EAB, NI, EUC → System manufacturer

KT → Network operator

End user

Value chain of 5G industry and the representation by PriMO-5G consortium

Use Case: Public safety/emergency response

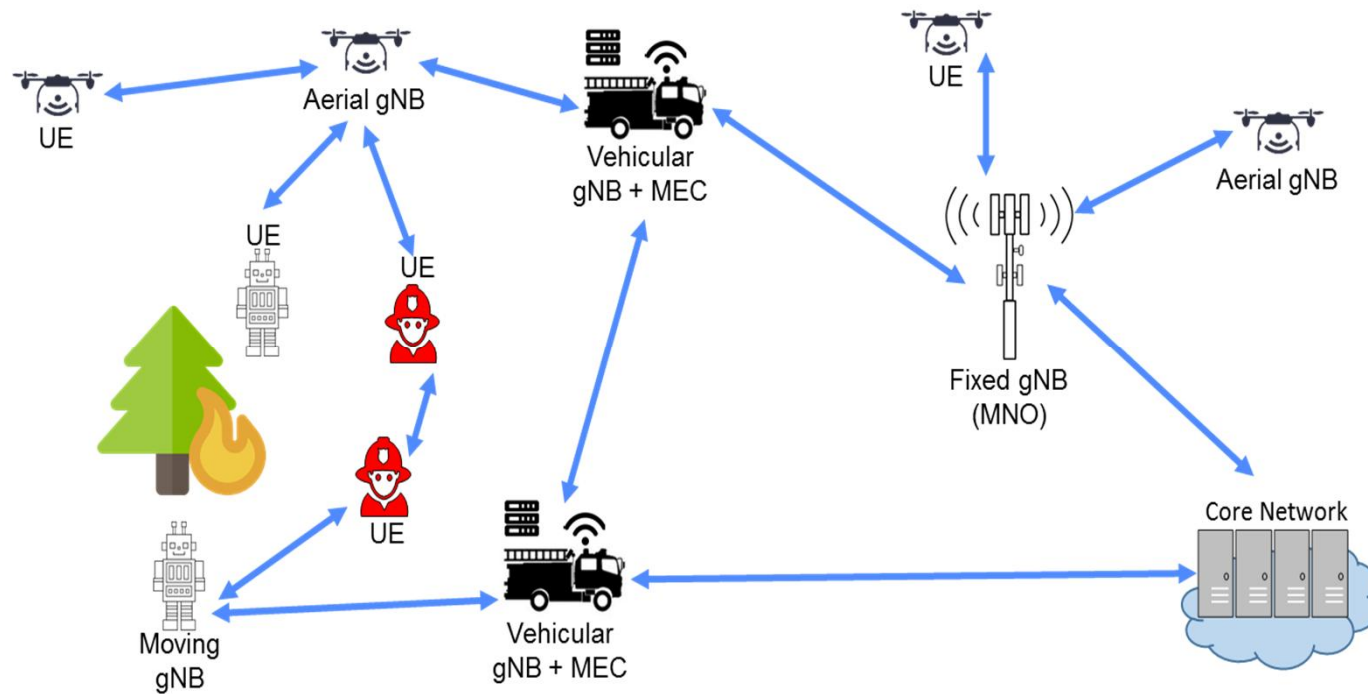# Use Case: Firefighting in urban areas

Fire station (GCS)
- Trains and updates machine learning model
- Coordinates fire fighting entities (commander)
- Executes overall orders according to the received information

Drone fleet leader
- Analyzes visual information
- Communicates with fire engine and fire station (using 5G network)
- Controls drone fleet (optional)

⟷ 5G
⟵--→ Peer-to-peer

gNB

gNB

Drone fleet members
- Collect visual information
- Collect sensory information
- Communicate with drone leader
- Participate in evacuation procedure

Fire engine with MEC
- Processes image & visual information
- Makes immediate decisions (fire fighter)
- Communicates with fire station (using 5G)

Use Case: Firefighting rural areas

Infrastructure may not be present. The network must be deployable.

Testbed components

EU
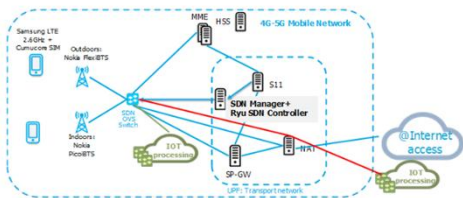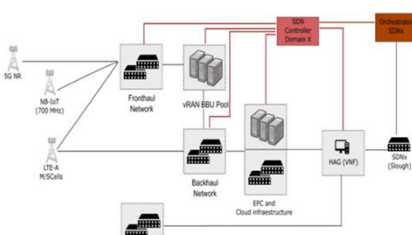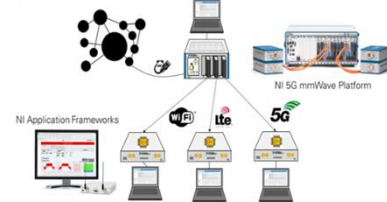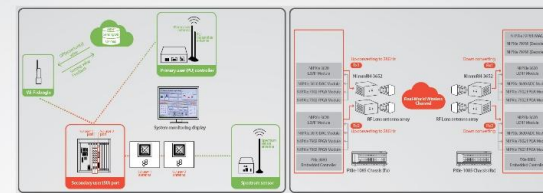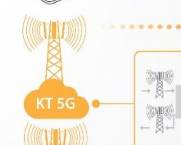
Korea

Testbeds – 5G OPEN

- Yonsei University in Seoul, Korea has announced its launch of the world's first 5G OPEN (Open Platform for Evolved Networks) in partnership with KT.

- 5G OPEN is an R&D platform based on a 5G commercial network established as part of an agreement signed by Yonsei University and KT last October.

- It is the Korean testbed of the Korea-Europe joint research initiative PriMO-5G Project*, a joint research consortium of European and Korean universities and industry partners with the initiative to demonstrate an end-to-end 5G system providing immersive video services for moving objects. .

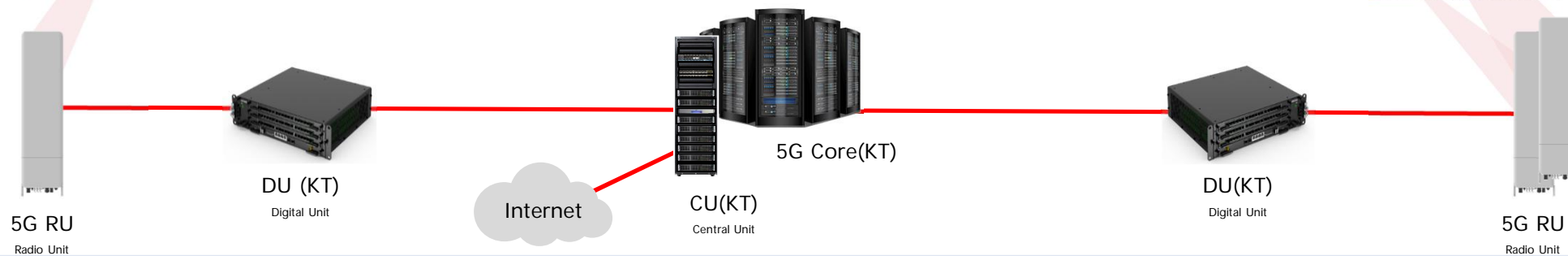# YONSEI UNIVERSITY - KT
5G R&D TEST NETWORK CONFIGURATION

5G 3.5㎓ 3 RUs open, / YU global campus 28㎓ RU will be opened until 2019

Yonsei International Campus (Song-do, Incheon)

Yonsei Main Campus (Sinchon, Seoul)

Yonsei-KT
5G OPEN

파워플랜트

제2공학관

공학원

5G RU
Radio Unit

DU (KT)
Digital Unit

Internet

CU(KT)
Central Unit

5G Core(KT)

DU(KT)
Digital Unit

5G RU
Radio Unit

KT 5G base station (3.5GHz, YU Global Campus, Incheon, Korea, 2018.11.30)

PriMO-5G/Yonsei/SLKIM

Ground Control Station (YU, Seoul, Korea, 2018.11.30)

PriMO-5G/Yonsei/SLKIM

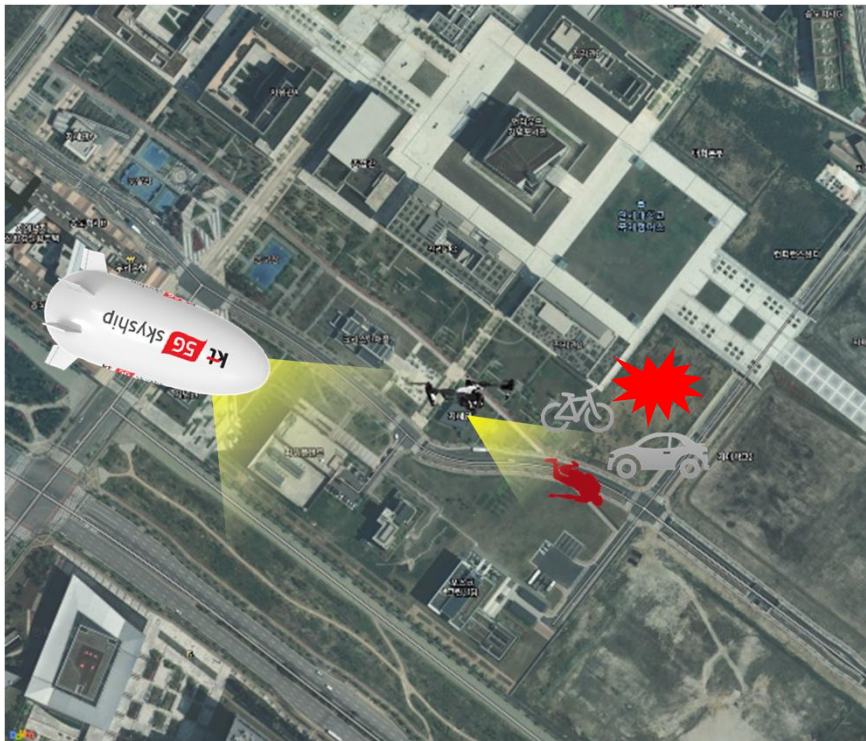# GPU-based mobile computation server (Seoul, Korea, 2018.11.30)

TESTING SCENARIO

1. Traffic accident (Incheon)

2. Arial surveillance & recording (KT skyship & YU drone)

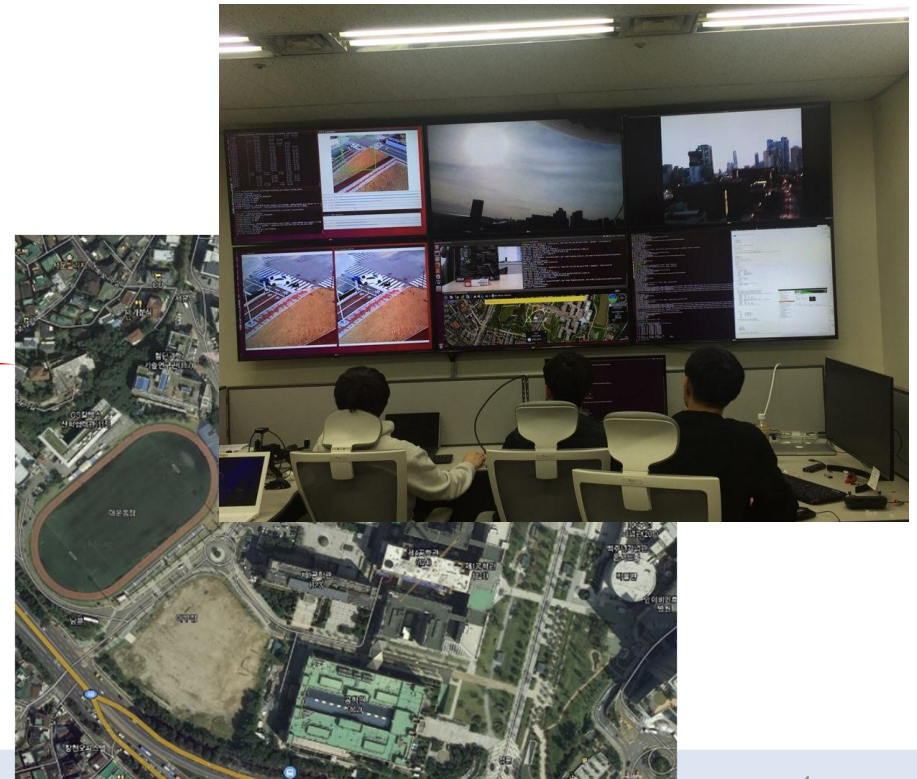3. Video real-time streaming through 5G network and processing (Seoul)
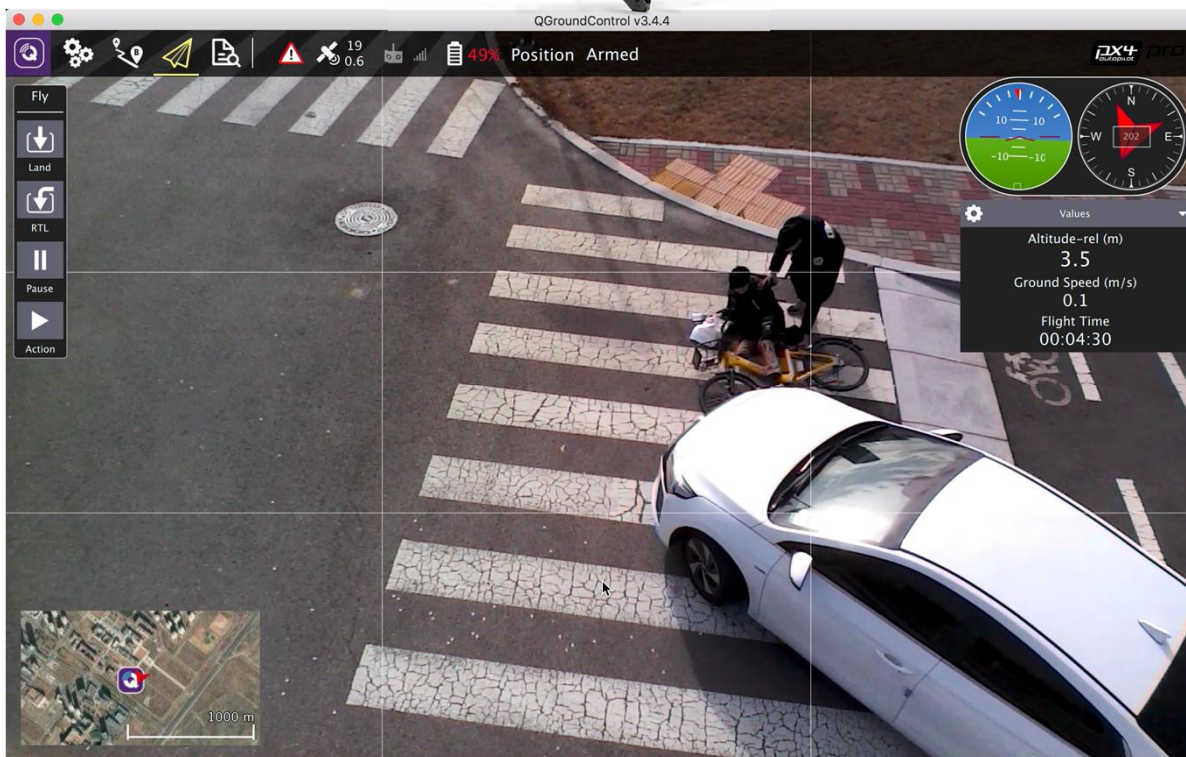
International Campus (accident spot)

Yonsei Main Campus (Ground Control Station)

5G

Autonomous UAV Control System

KT 5G Skyship application

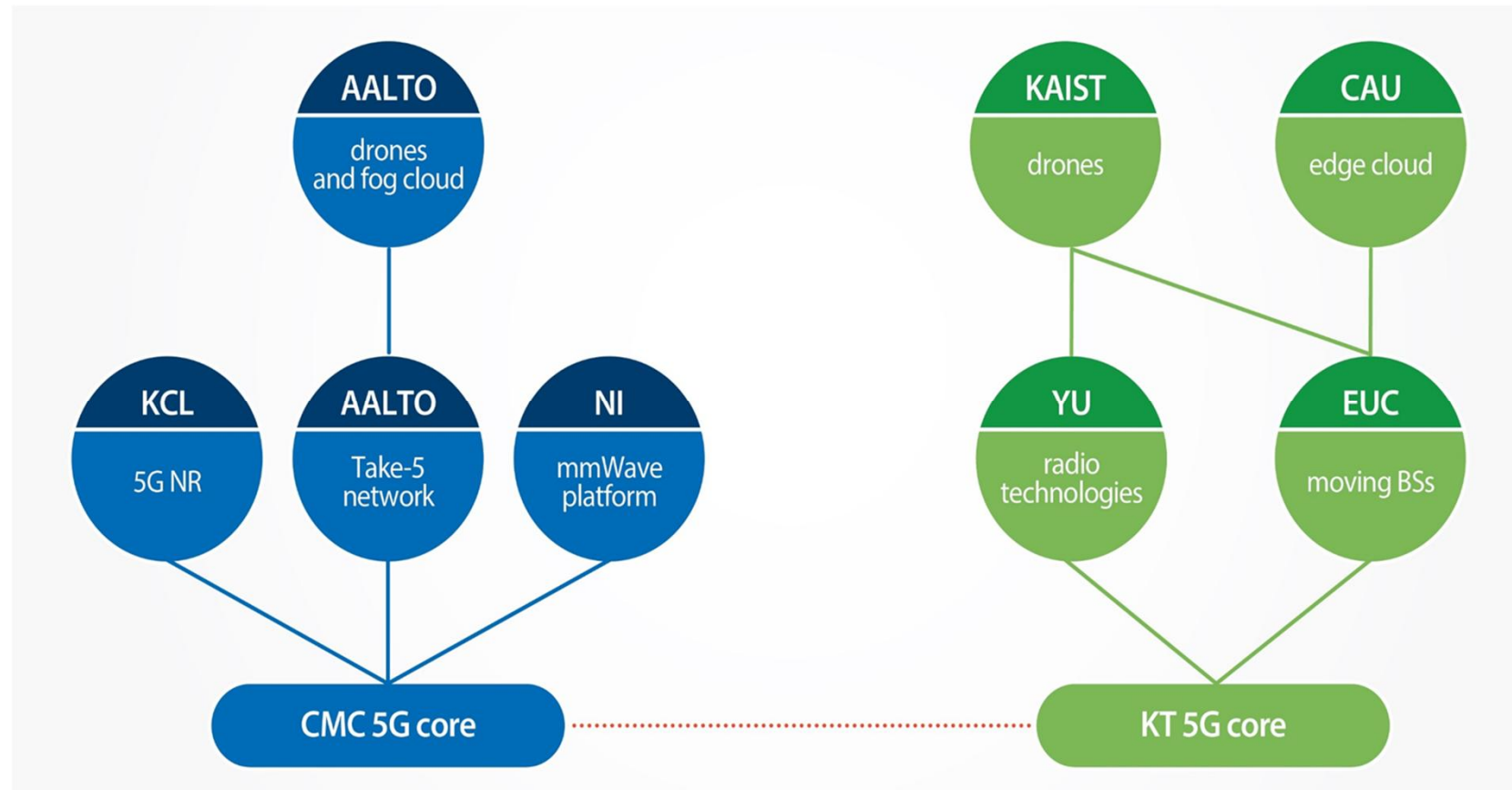| Event surveillance	Disaster surveillance	Sports event streaming

Cross-continental testbed integration

AALTO: Aalto University (Finland)
CAU: Chung-Ang University (Korea)
CMC: Cumucore (Finland)
EUC: EUCAST (Korea)
KAIST: Korea Advanced Institute of Science and Technology (Korea)
KCL: King's College London (UK)
KT: Korea Telecom (Korea)
NI: National Instruments (Germany)
YU: Yonsei University (Korea)

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