
UNIVERSITY OF LEICESTER
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Edge AI for 5G and Beyond (6G) Network Applications
Prof. Qi Wang
AI for Good Global Summit
8-11 July 2025 - Geneva, Switzerland

Agenda

01 Edge AI Scenarios

02 AI at Network Edge

03 AI at Device Edge

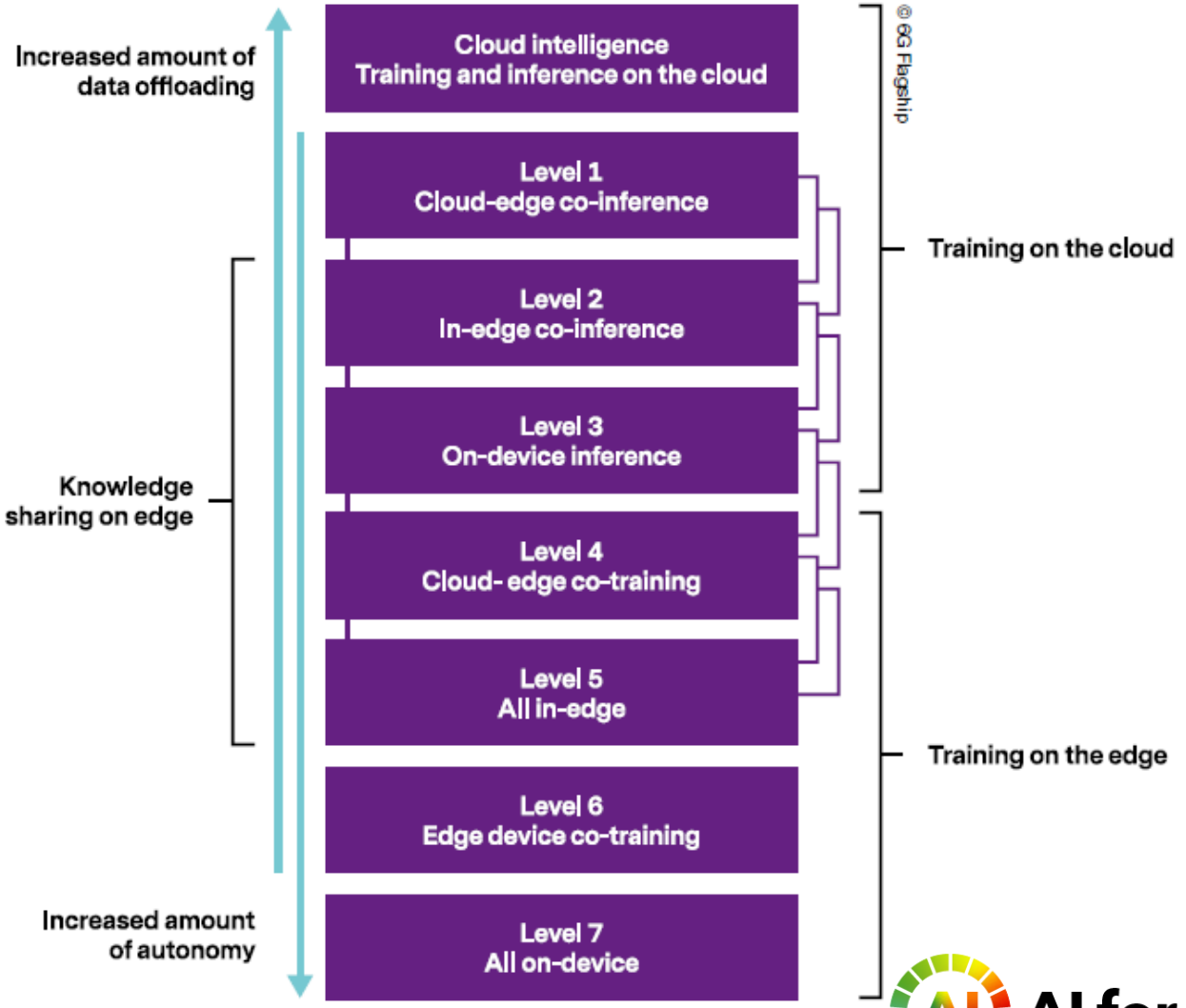
04 Summary & Standardisation Potential

Edge AI Scenarios

Various Edge AI Levels

- Various levels of edge AI scenarios across Cloud, (Network) Edge and Device

- AI at Network Edge (Edge)
  - 5G/6G Mobile/Multi-access Edge (MEC) and other edge servers
- AI at Device Edge (Device)
  - Resource-constrained network devices



Source: 6G Flagship

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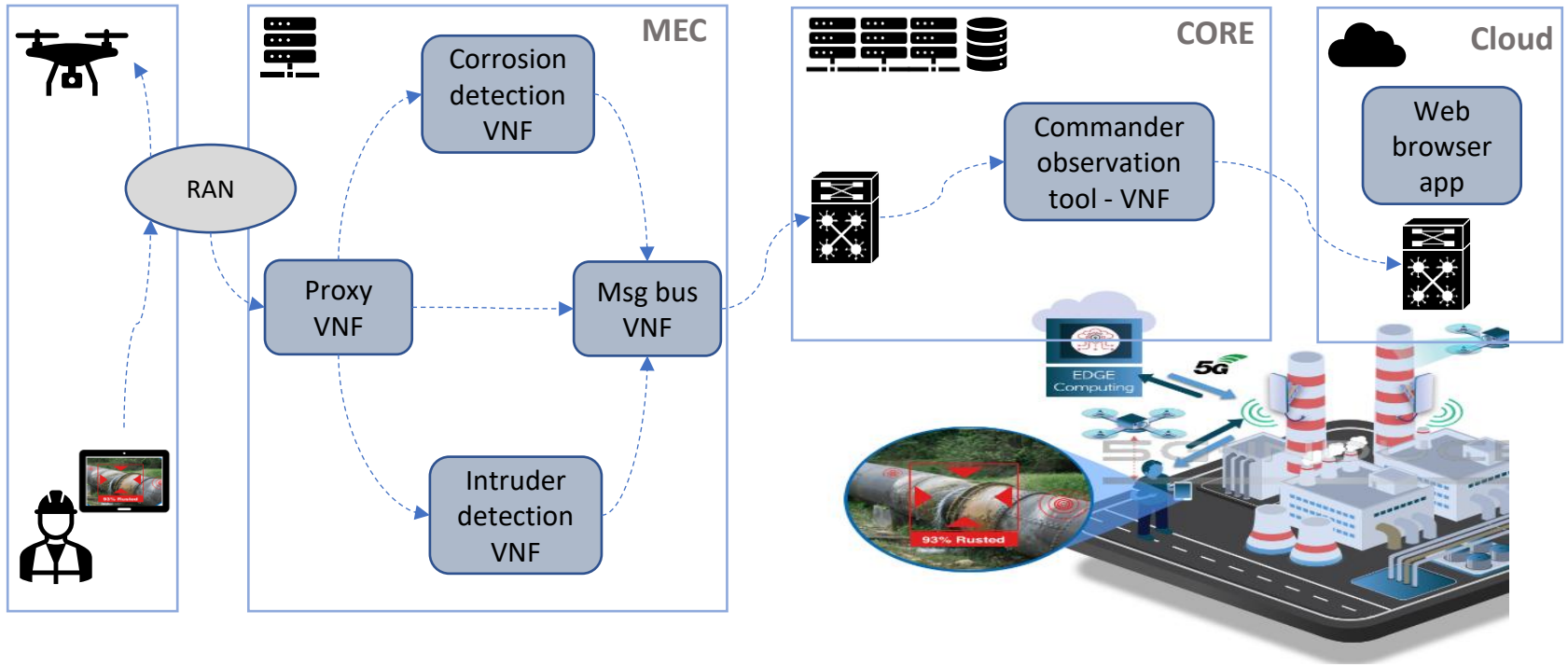
AI at Network Edge

Infrastructure Inspection

5G INDUCE



- Complex NetApp service deployment with AI intelligence running in the edge

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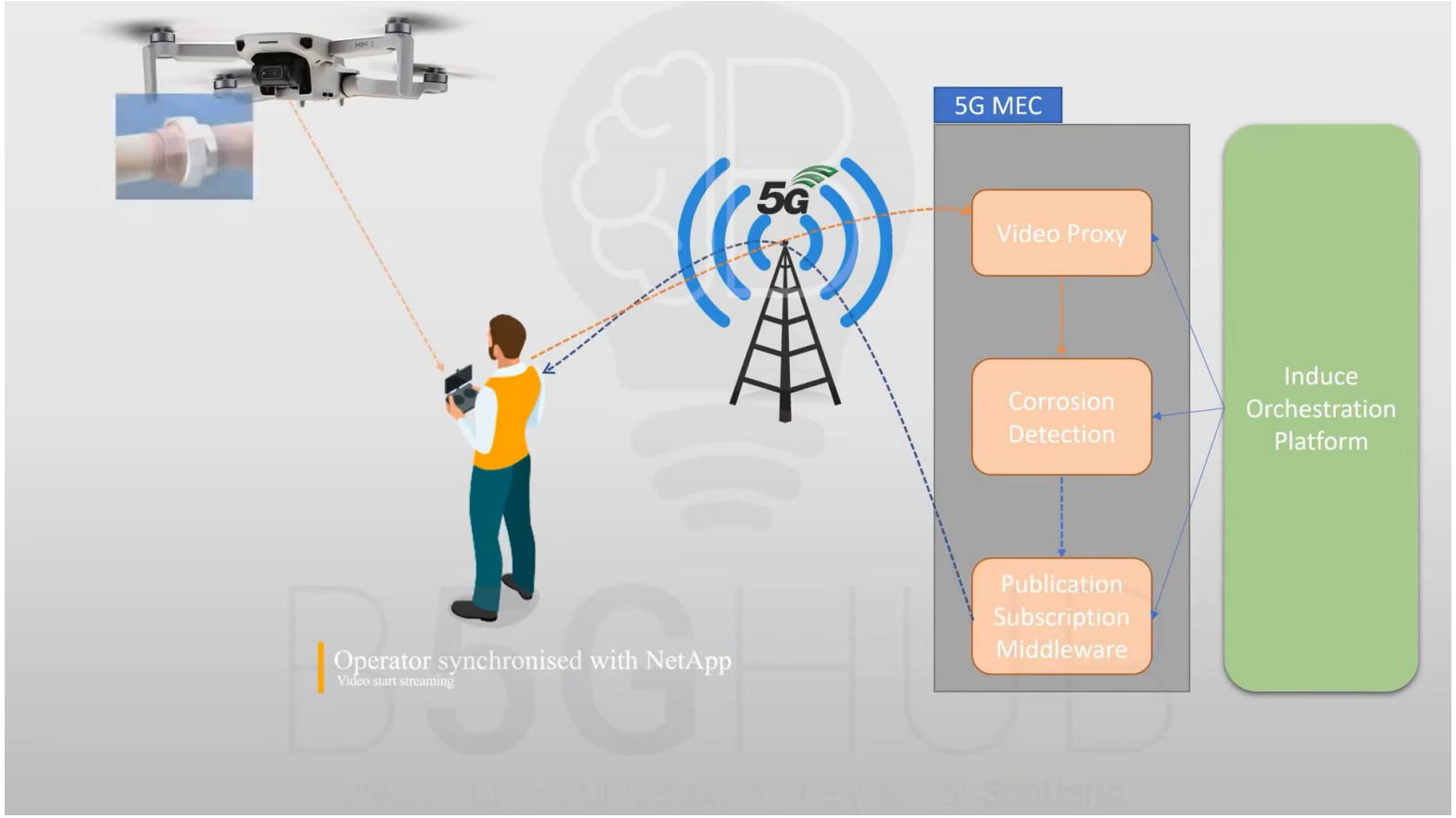
Infrastructure Inspection

5G INDUCE



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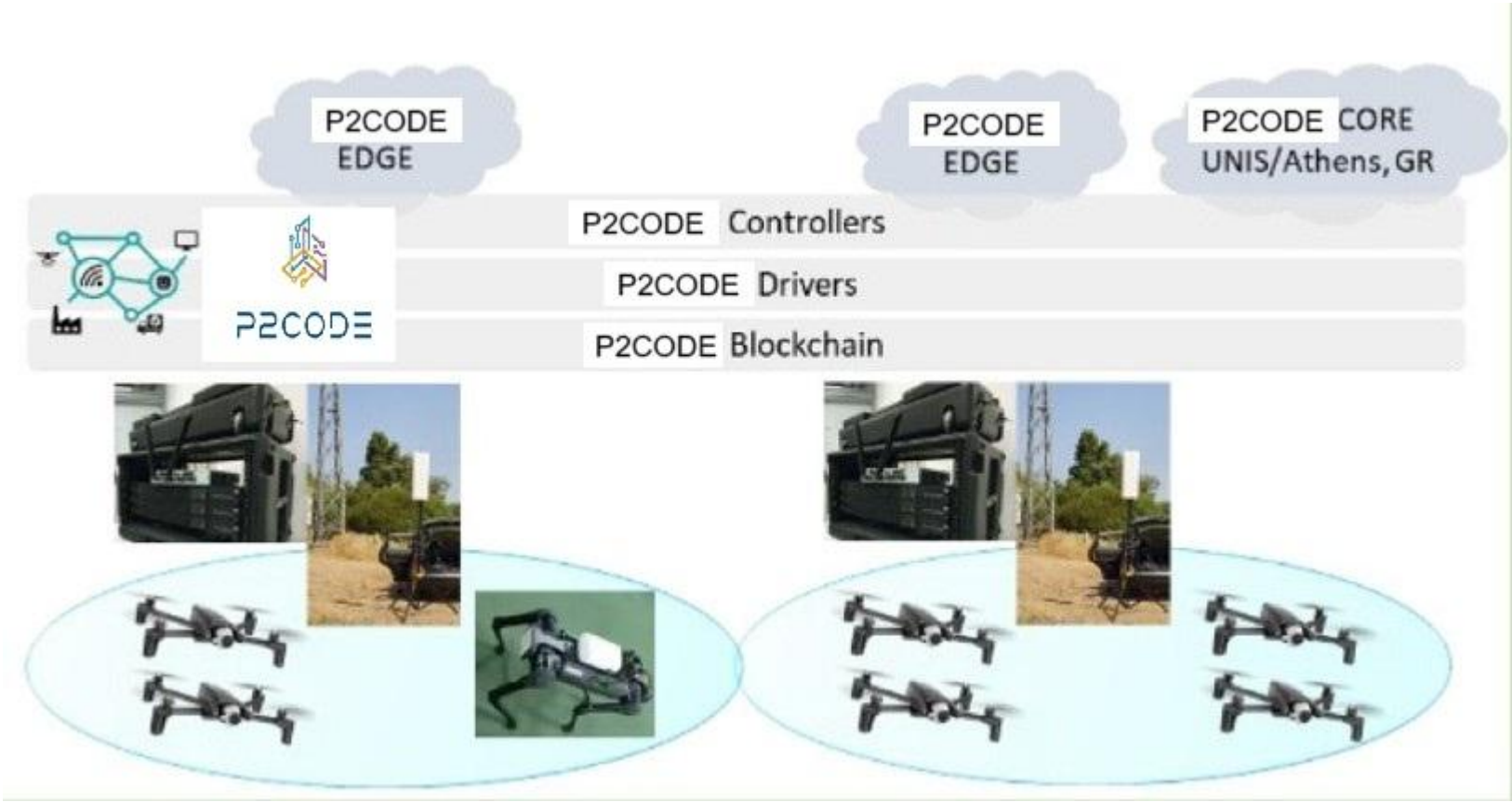
Swarm Intelligence



Horizon Europe

P2CODE

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Edge AI as a Service

Use Cases & Trials

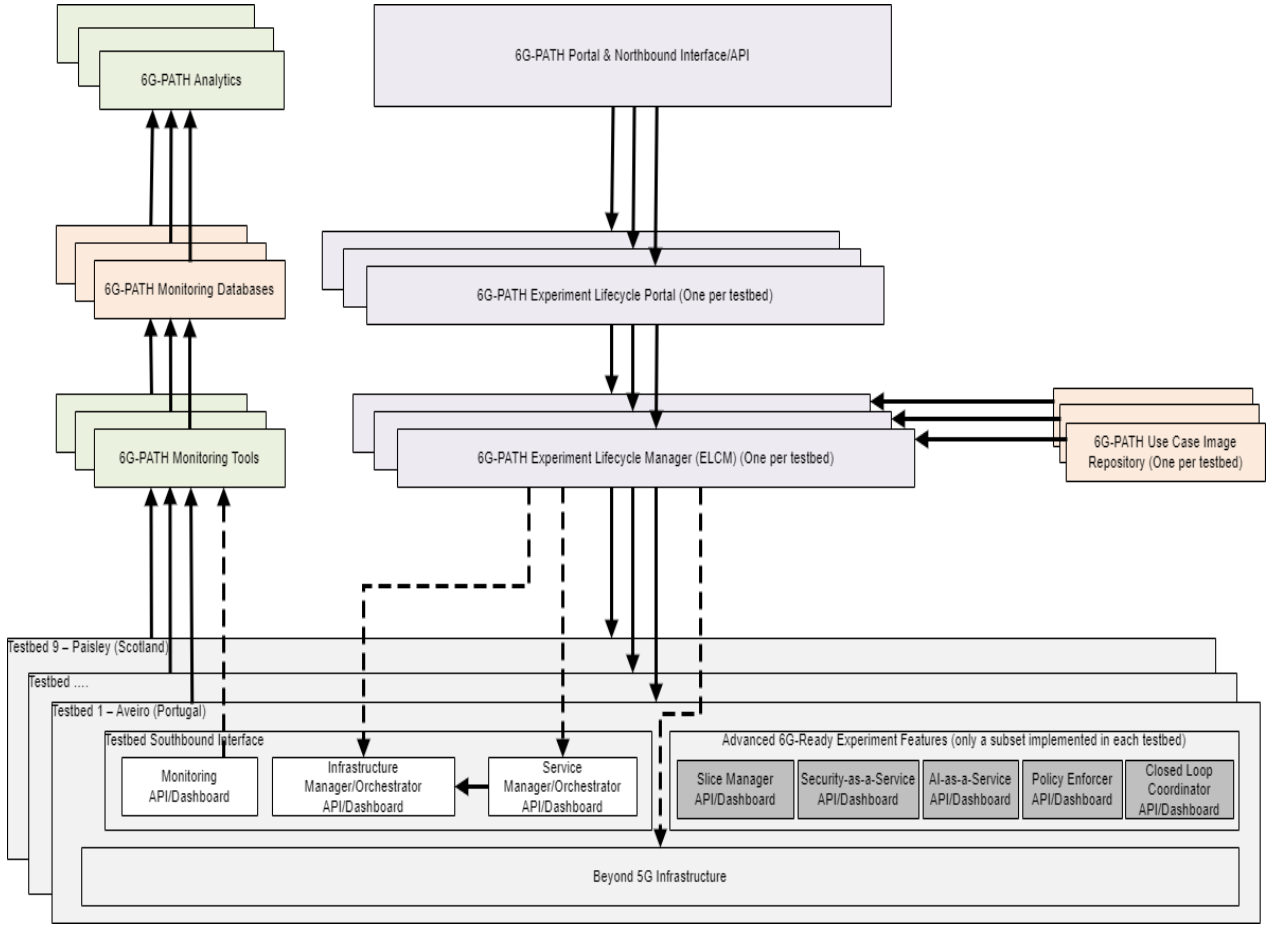
A series of 10 different UCs will cover the identified key verticals:

Farming
- UC FARM 1 - Water saving
- UC FARM 2 - Smart vineyards

Education
- UC EDU 1 - XR rural school
- UC EDU 2 - Classroom of Future
- UC EDU 3 - XR health training

Health
- UC HEALTH 1 - 3D hydrogel patches
- UC HEALTH 2 - Elderly monitoring

Smart Cities
- UC CITIES 1 - Connected and sensing city
- UC CITIES 2 - Automated logistics
- UC CITIES 3 - Security coordination



European Commission
Horizon Europe

6G-Path

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AI at Device Edge

Public Safety

THALES CENSIS

POLICE SCOTLAND Keeping people safe POILEAS ALBA

VICTORIA POLICE

Image C/O Police Scotland

Video C/O BBC

- High detection speed and portability in a resource-constrained device (cell phone)
- High adaptivity to operational environments (around clock)
- High detection accuracy: 90% at up to 150m far and 50m high

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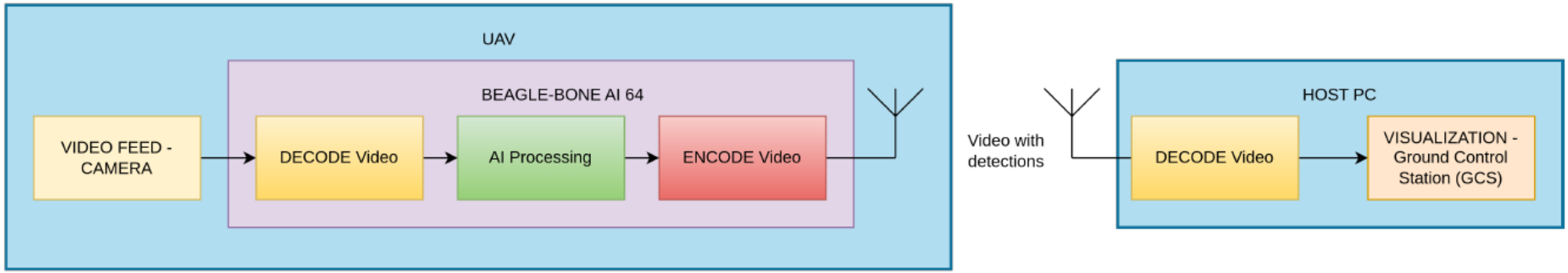
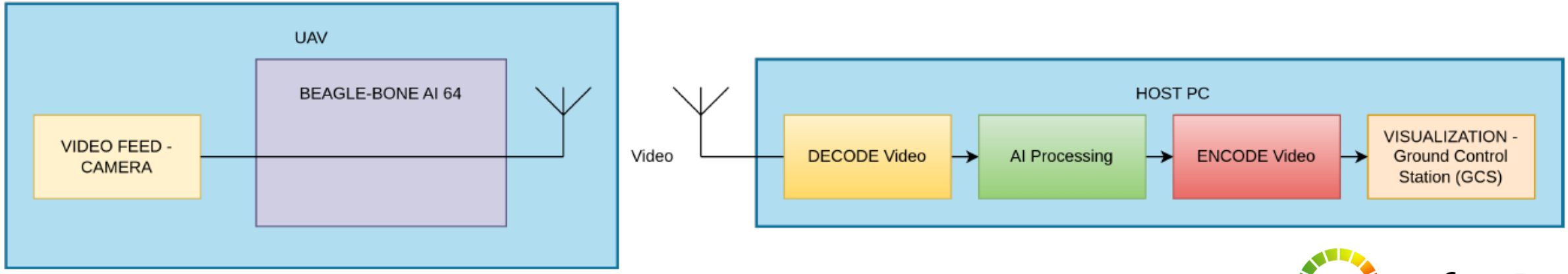
AI@Device vs. Edge

Scenario 1



Scenario 2



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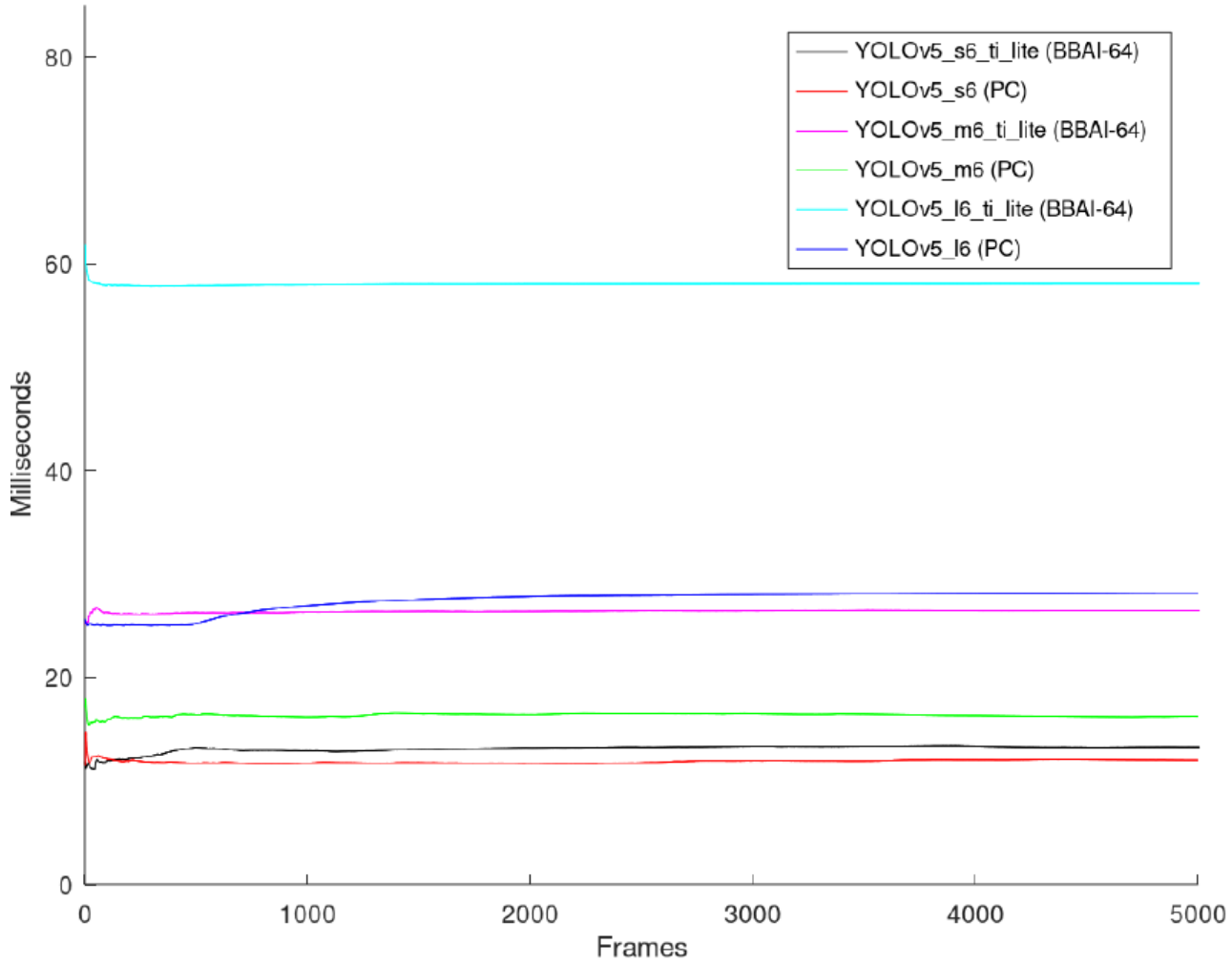
AI@Device vs. Edge



Cumulative average inference time of AI models in both scenarios

- AI algorithms executed in Edge Server are faster than in Device (UAV based on BBAI-64).
- The gap is clear for heavier models: 10ms in YOLOv5 m6 and 30ms in YOLOv5 l6.
- The gap diminishes for lighter model: only 1ms in YOLOv5 s6.

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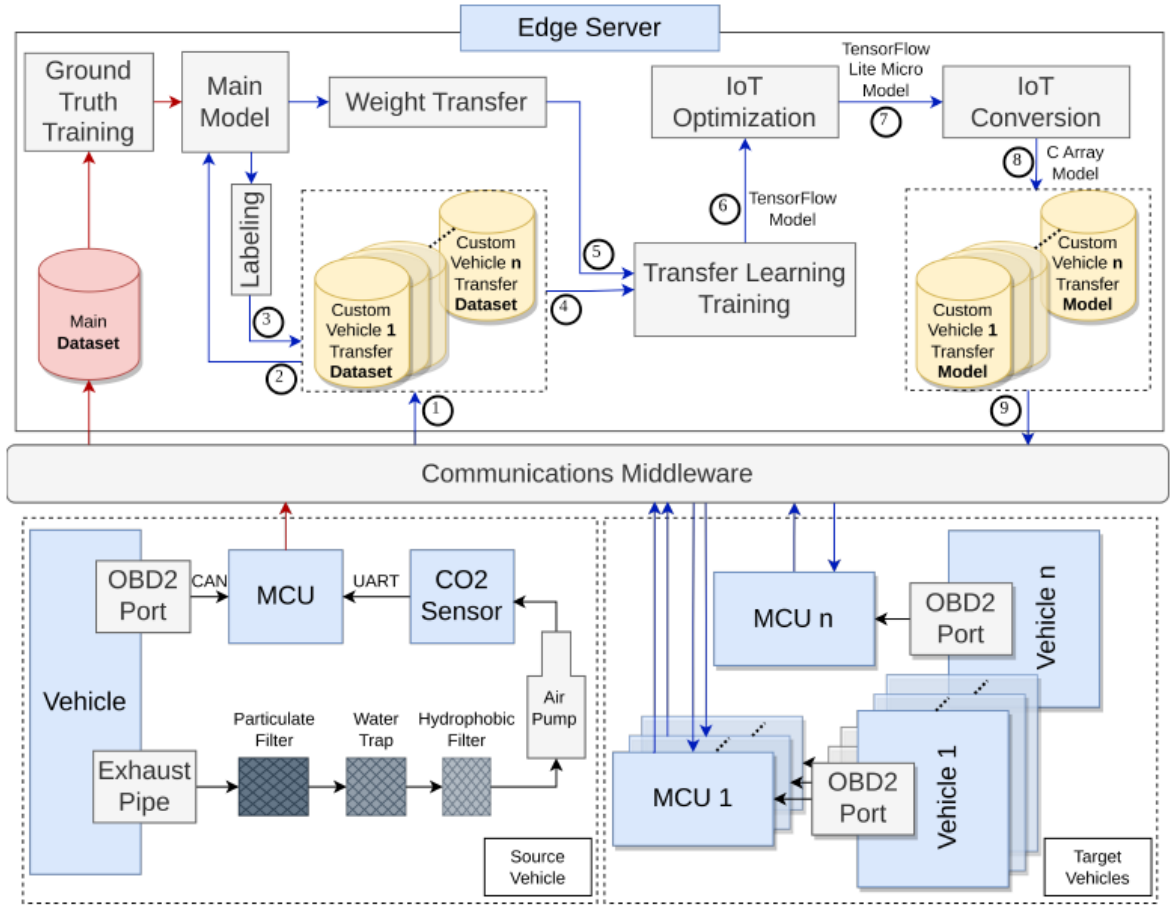
Autonomous vehicle



EPSRC

National Edge AI Hub

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Autonomous vehicle

National Edge AI Hub

EPSRC

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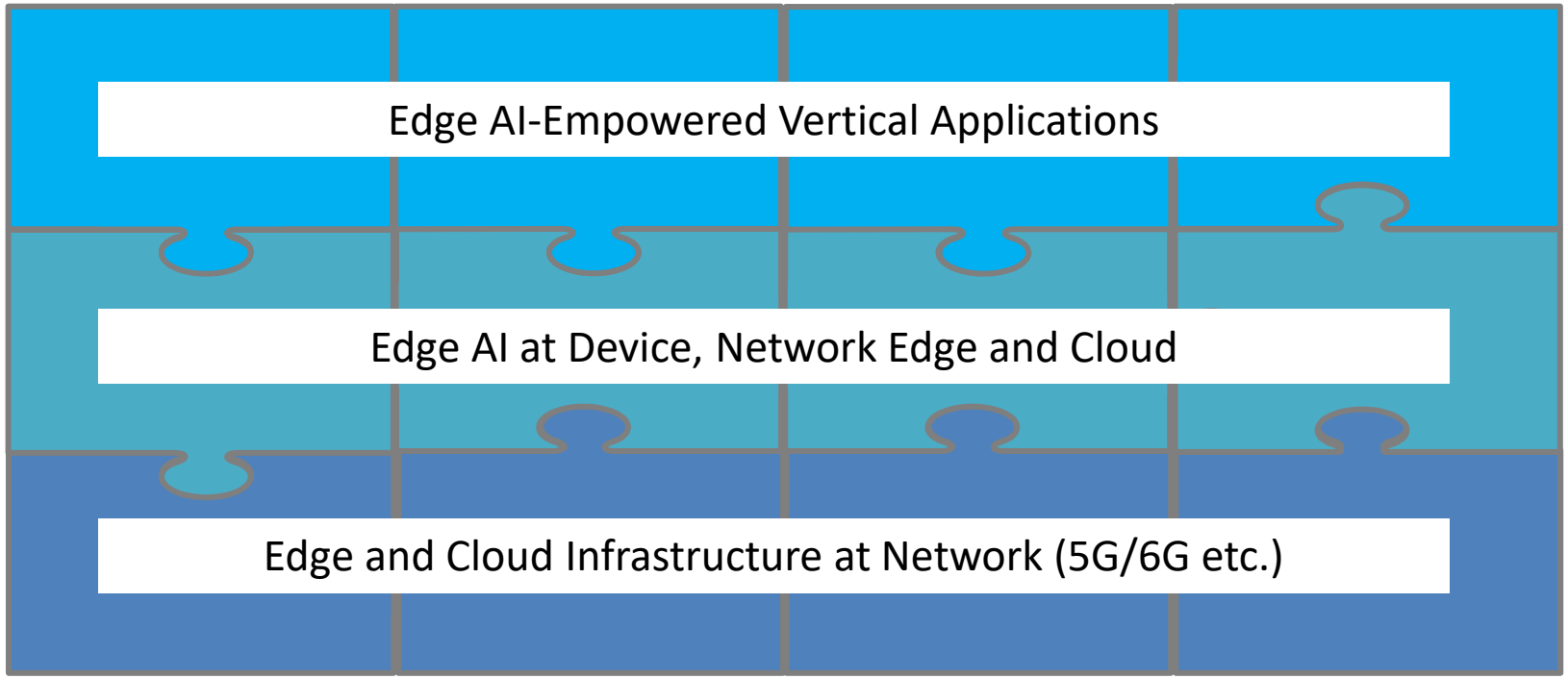
Summary & Standardisation Potential

Summary



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Standardisation Potential

- Unified terminology clarifying different levels/scenarios of edge AI in 6G architectures and applications
- AI at Network Edge (Edge) for 6G networks (6G MEC) beyond 5G MEC and for AI-nativeness
- AI at Device Edge (Device) requirements, architectures, use cases etc. as 6G AI is expected to be ubiquitous
- Overall framework(s) for AI at Network Edge and Device Edge in 6G

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Thank you very much!

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