COLLABORATIVE INNOVATION DAY

4th October 2022 | Virtual Event

5G- Blueprint

Rakshith Kusumakar

V-Tron

ORGANIZED BY:

5GLOGINNOV

alice | Alliance for Logistics Innovation through Collaboration in Europe

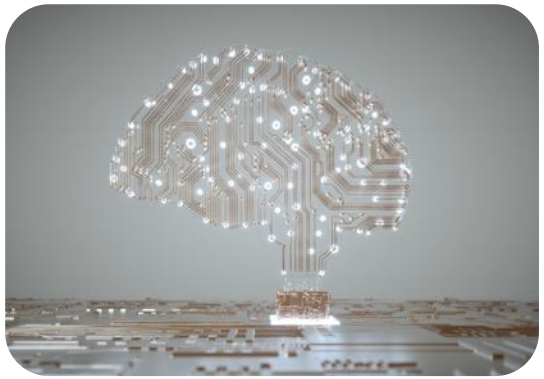
Co-funded by the European Union

5G-BLUEPRINT IN A NUTSHELL

Driven in autonomous mode:
98.2 % of the trajectory*

27 years of R&D later …

2% issue



Edge & corner cases

5G-Blueprint approach

* https://www.cs.cmu.edu/~tjochem/nhaa/

5G-BLUEPRINT ULTIMATE GOAL

5G-Blueprint designs and validates **technical architecture, business,** and **governance model** for uninterrupted cross-border teleoperated transport based on 5G connectivity.

TECHNOLOGICAL

BUSINESS

REGULATORY

OBJECTIVES

TECHNOLOGICAL

- Design and implement a **5G network for CAM services**
- Develop and implement the **prototype of a TO system**
- Implement and deploy enabling functions **guaranteeing safety** and increasing value
- Validate the **end-to-end TO transport** solution supported by 5G in real-life cross-border scenarios

BUSINESS

- 5G TO transport **market analysis**
- **Commercial possibilities**
- Positions the **possible role** of TO transport based on 5G **in CAM**
- TO transport based on 5G connectivity **market adoption**

REGULATORY

- Identify regulatory issues
- Recommended actions

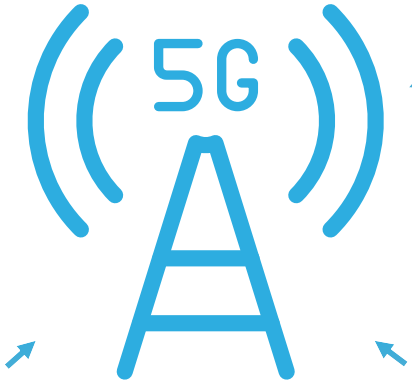
USE CASES

UC1: Automated barge control

Vlissingen

UC4: Remote take over

NL – BE Cross border



UC2: Automated docking

Vlissingen and Antwerp

Teleoperated crane

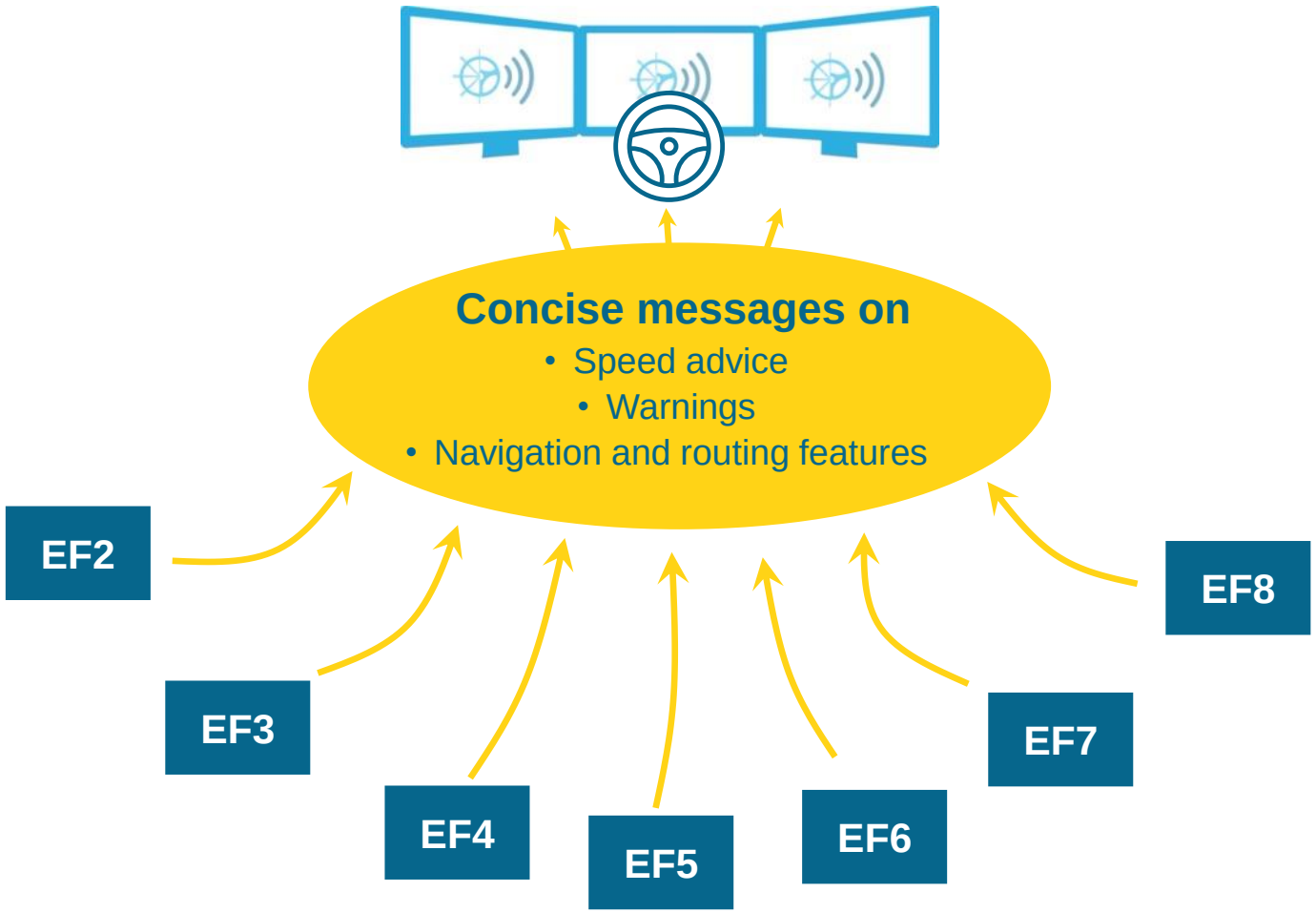
UC3: CACC-based platooning

NL – BE Cross border

ENABLING FUNCTIONS

EF1	Enhanced awareness dashboard
EF2	Vulnerable Road User interaction
EF3	Timeslot reservation at intersections
EF4	Distributed perception
EF5	Active collision avoidance
EF6	Container ID recognition
EF7	ETA sharing
EF8	Scene analytics

TELEOPERATION COCKPIT



5G PILOT SITES

VLISSINGEN

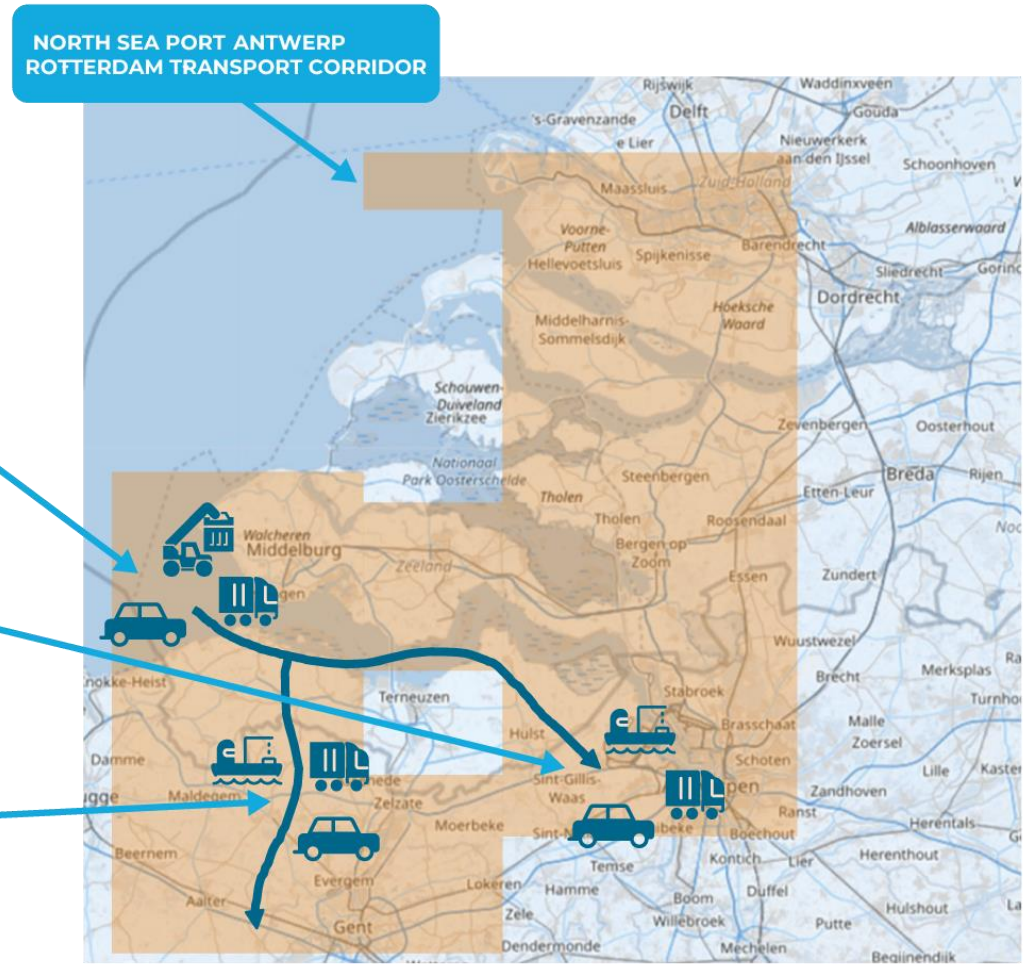
- 5G enhancements for: direct-control teleoperation on roadways, docking, and platooning
- Enabling functions support:
  - Estimated Time of Arrival
  - Timeslot reservation at intersections
  - Container ID recognition
  - Active collision avoidance
  - Enhanced awareness dashboard

ANTWERP

- 5G enhancements for: direct-control teleoperation on roadways/waterways, and platooning
- Enabling functions support:
  - Estimated Time of Arrival
  - Distributed perception
  - Scene analytics
  - Active collision avoidance
  - Enhanced awareness dashboard

ZELZATE (cross-border site)

- Seamless roaming
- 5G enhancements for: direct-control teleoperation on roadways/waterways, and platooning
- Enabling functions support:
  - Estimated Time of Arrival
  - Vulnerable Road User interaction
  - Timeslot reservation at intersections
  - Active collision avoidance
  - Enhanced awareness dashboard



5G-BLUEPRINT CHALLENGES

Technical challenges

Network requirement

- Low latency
- High throughput
- High availability
- At cross-borders

Safe direct control TO

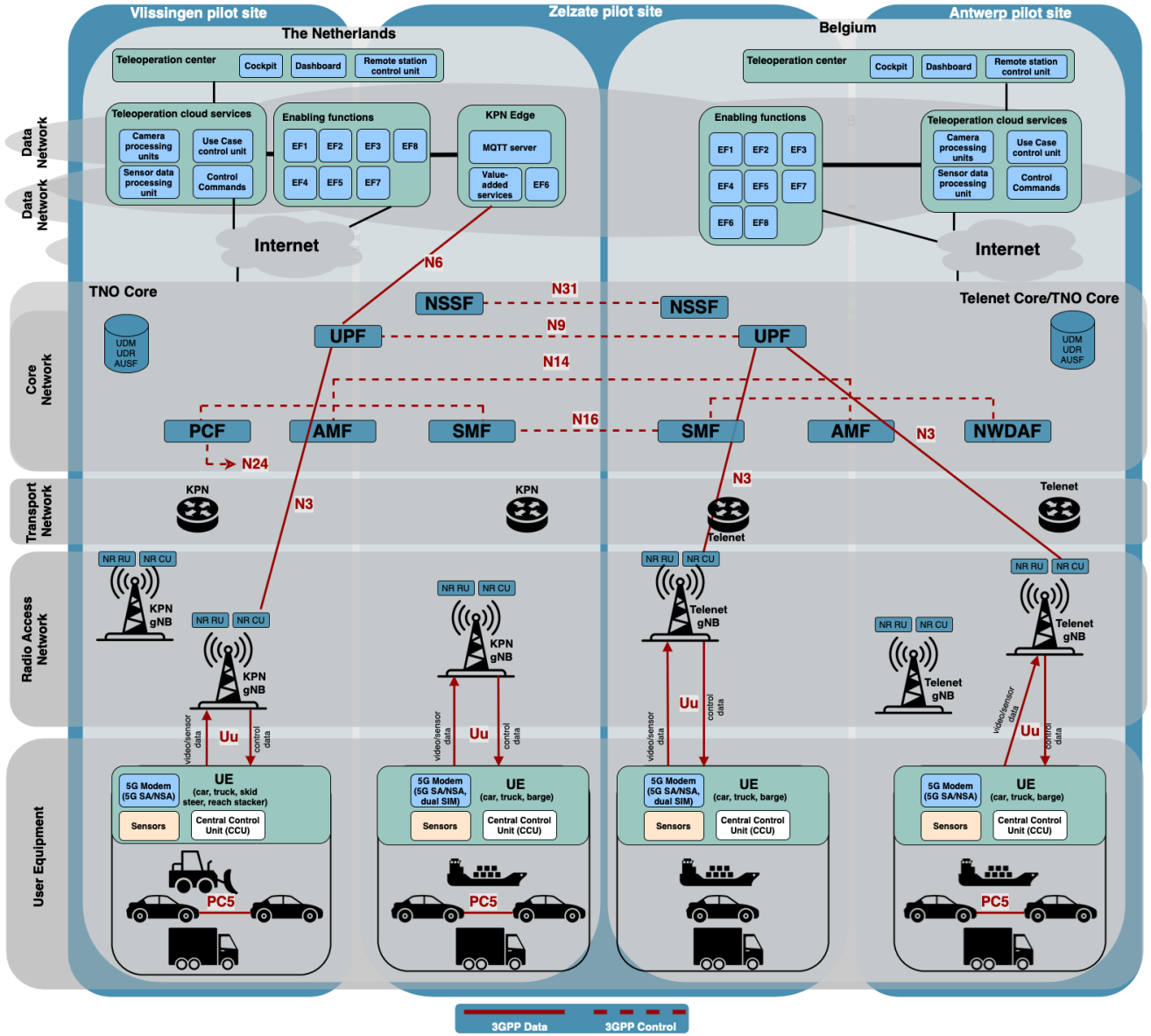
- Vehicle safety fallback at ASIL
- Security on all levels
- Sufficient situational awareness operator
- Safe operator handover during active ToD session
- Applicability on public road

Autonomous mobility

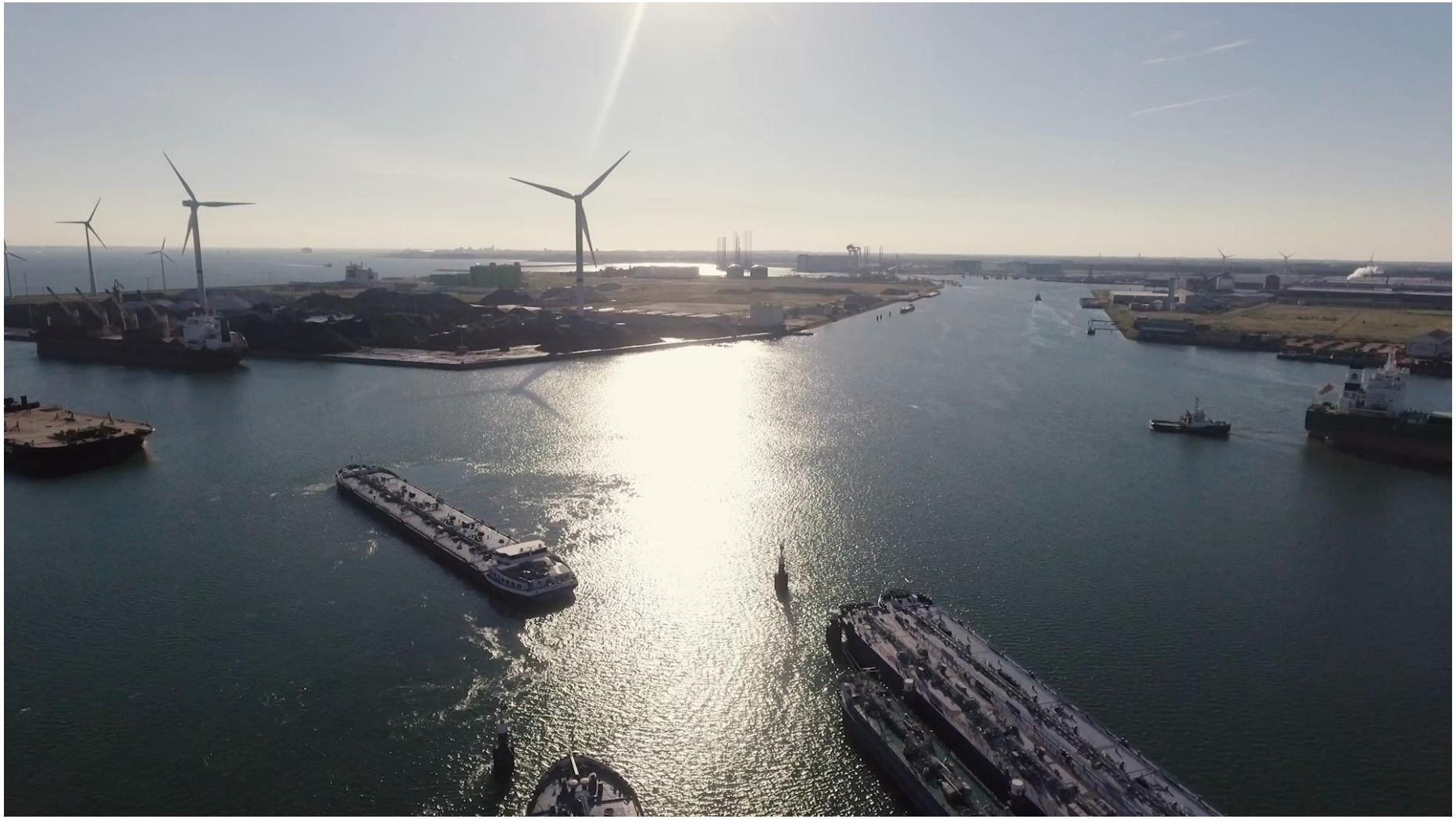
- Automated docking
- CACC

5G-BLUEPRINT CHALLENGES

NETWORK ARCHITECTURE



DEMOS



CONSORTIUM AS A WHOLE

5G BLUEPRINT

Network operators

kpn

eurofiber

Vehicle OEMs

TOYOTA

Teleoperation OEMs

v-tron

roboauto

SEAFAR

Logistics

Transport

VERBRUGGE INTERNATIONAL n.v.

TRANSPORT Roosens

Ports

Port of Antwerp

North Sea Port

Software

[sentors]

room 40

NxtPort

Research institutes

imec

HAN_UNIVERSITY OF APPLIED SCIENCES

UNIVERSITY OF APPLIED SCIENCES

TNO innovation for life

Connected Mobility sector

locatienet

swarco The Better Way. Every Day.

BEMOBILE a revolution in traffic

Business accelerator

MARTEL innovate

Impuls Zeeland

Governments

Ministry of Infrastructure and Water Management

Flanders State of the Art

ADVISORY BOARD

5G BLUEPRINT

Regional government

Provincie Zeeland

STAD ANTWERPEN

Agentschap Telecom
Ministerie van Economische Zaken en Klimaat

Vehicle OEMs

FORD OTOSAN

DAF

Logistics sector

TTN

Port of Amsterdam International

ICBO
INTERNATIONAL CONTAINER BARGE OPERATORS

Port of Rotterdam

Associations

here

FACTS & FIGURES

Project Acronym: 5G-Blueprint

Project Name: Next generation connectivity for enhanced, safe & efficient transport & logistics

Funded Under: H2020-ICT-2018-20

Topic: ICT-53-2020: 5G PPP *(5G for Connected and Automated Mobility)*

Call for proposal: H2020-ICT-2019-3

Starting Date: 01/09/2020

Duration: 36 Months

Total cost: EUR 13,9 M

EU contribution: EUR 10 M

Project Coordinator: Dr Wim Vandenberghe, *Ministerie van Infrastructuur en Waterstaat*

Technical Coordinator: Prof. Johann Márquez-Barja, *Interuniversitair Micro-Electronica Centrum*

5G BLUEPRINT

THANK YOU FOR YOUR ATTENTION

5GBlueprint.eu

THIS PROJECT IS PART OF THE 5G PUBLIC AND PRIVATE PARTNERSHIP

5G PPP WWW.5G-PPP.EU

5GBlueprint project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 952189