5G-BLUEPRINT PROJECT

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5G PPP Webinar: 5G for Cooperative, Connected and Automated Mobility (CCAM)

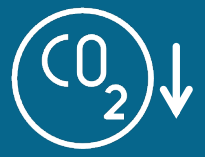
6th November 2020

EUROPEAN CONTEXT

Long term Vision and priorities

STRATEGIC RELEVANCE OF CONNECTED AND AUTOMATED MOBILITY

SAFETY
(No road accidents)



EFFICIENCY
(Reduced Pollution)

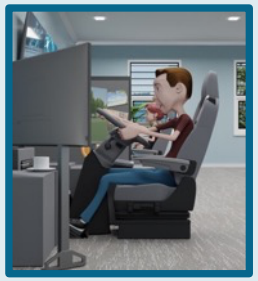
INNOVATION & GROWTH
(Global Competitiveness)

INTEROPERABILITY
(Technological Neutrality)

5G Coverage in Pan-European Corridors

5G-BLUEPRINT IN A NUTSHELL

TELE-OPERATED TRANSPORT



TECHNOLOGY – 5G NETWORK & ENABLING FUNCTIONS

Fast | **Reliable** | **Secure** | **Guaranteed** | **Cross-border**

C H A L L E N G E S

ECONOMICS

- Reduction of waiting time
- Reduction labour shortage
- Economic growth
- Safer driving
- Facilitator automated mobility
- Complex business model

GOVERNANCE

- MNO SLA's
- ToD service SLA's
- Legislation
- Certification
- Liability
- Data sharing and GDPR

5G-BLUEPRINT ULTIMATE GOAL OF THE PROJECT

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

TECHNOLOGICAL

BUSINESS

REGULATORY

OBJECTIVES

TECHNOLOGICAL

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

BUSINESS

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

REGULATORY

- Identify **regulatory issues and identify recommended actions**

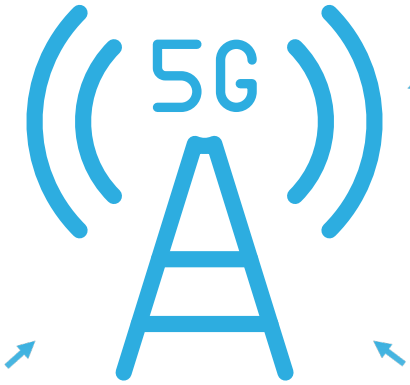
USE CASES

UC1: Automated barge control

Vlissingen and Antwerp port

UC4: Remote take over

Cross border on public road



UC2: Automated driver in loop docking

Vlissingen and Antwerp port

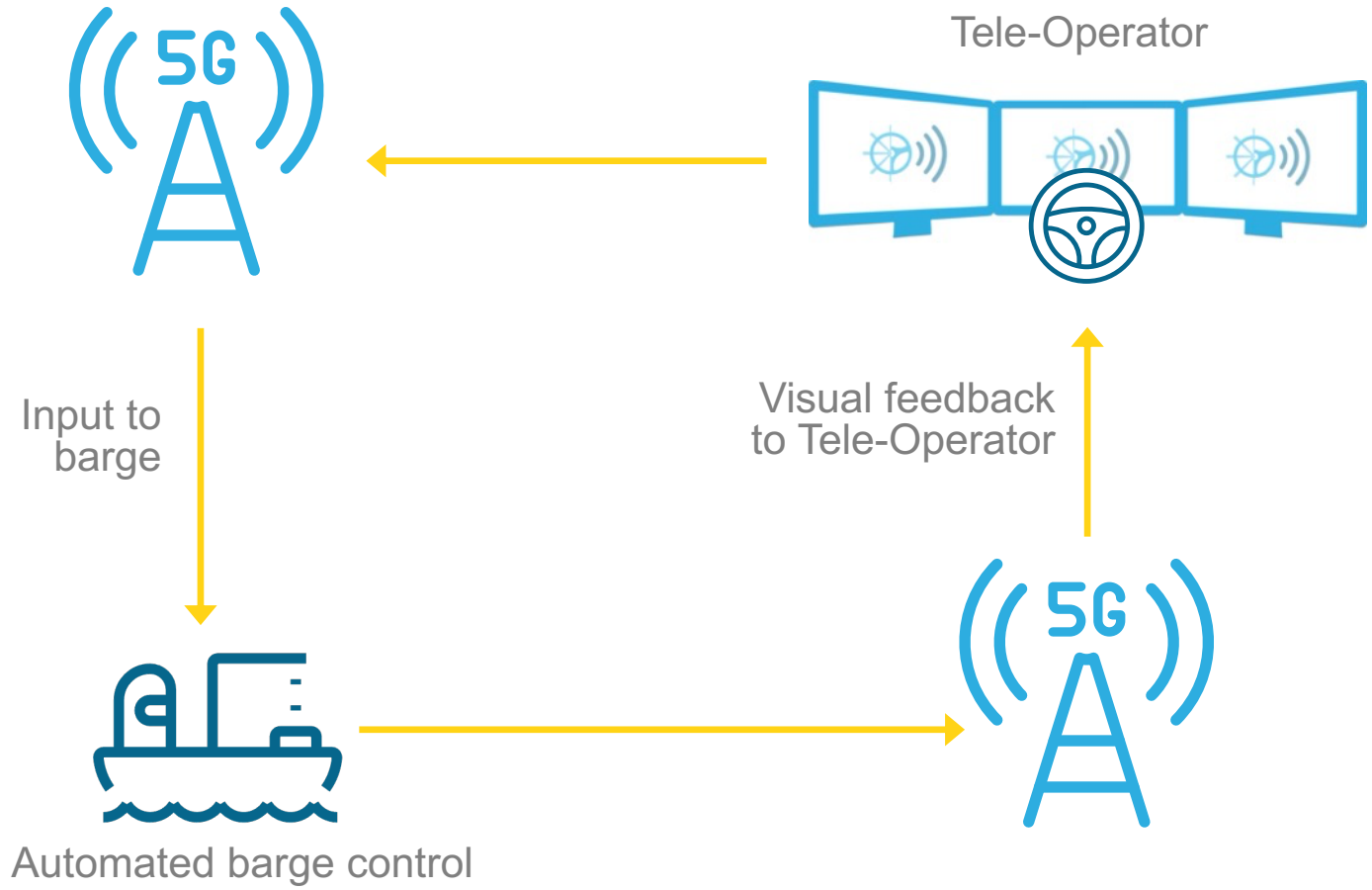
UC3: CACC based platooning

Cross border on public road

Tele-Operated crane

USE CASES

UC1	Automated barge control
UC2	Automated driver in loop docking
UC3	CACC based platooning
UC4	Remote take over



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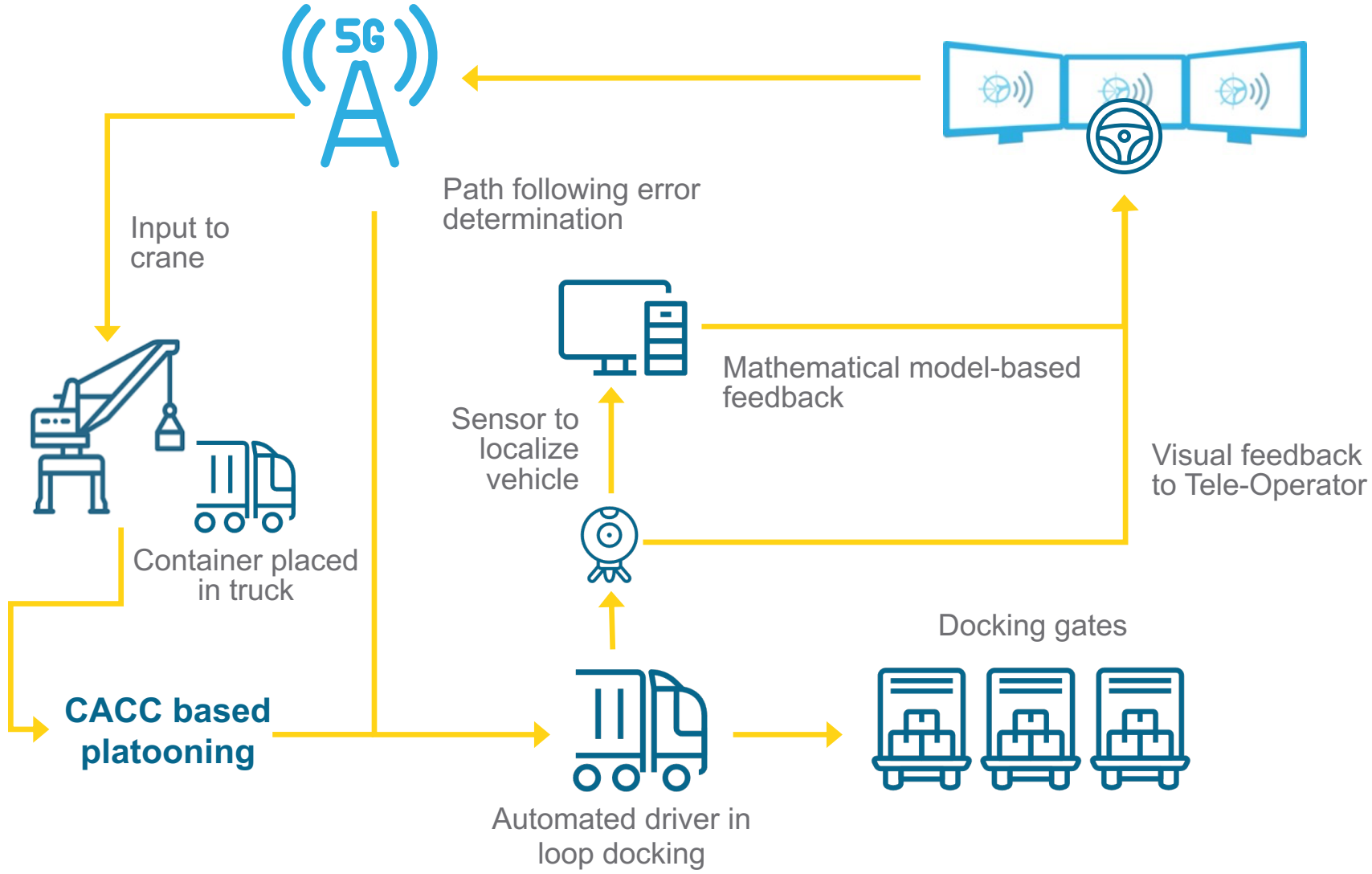

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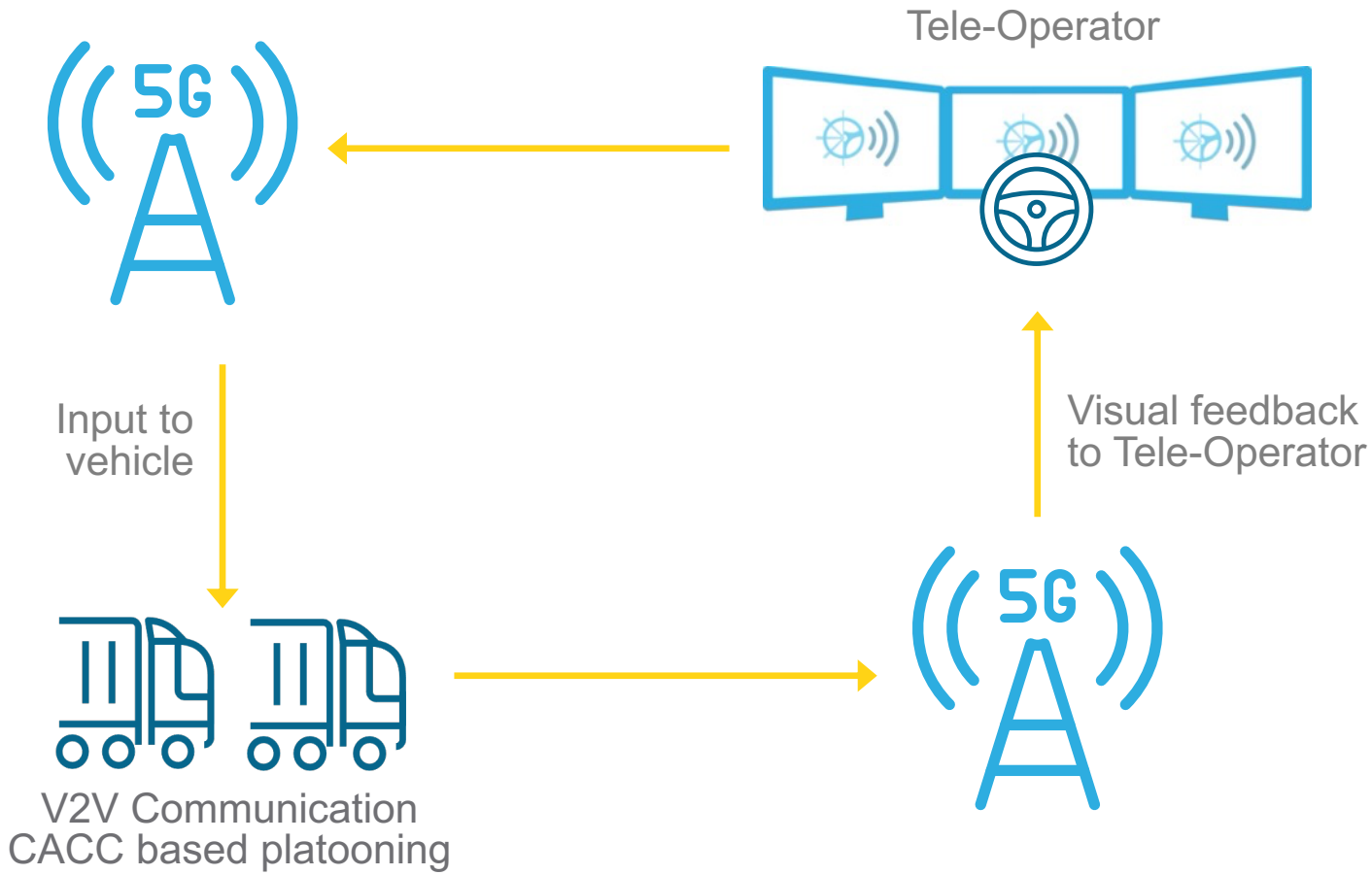

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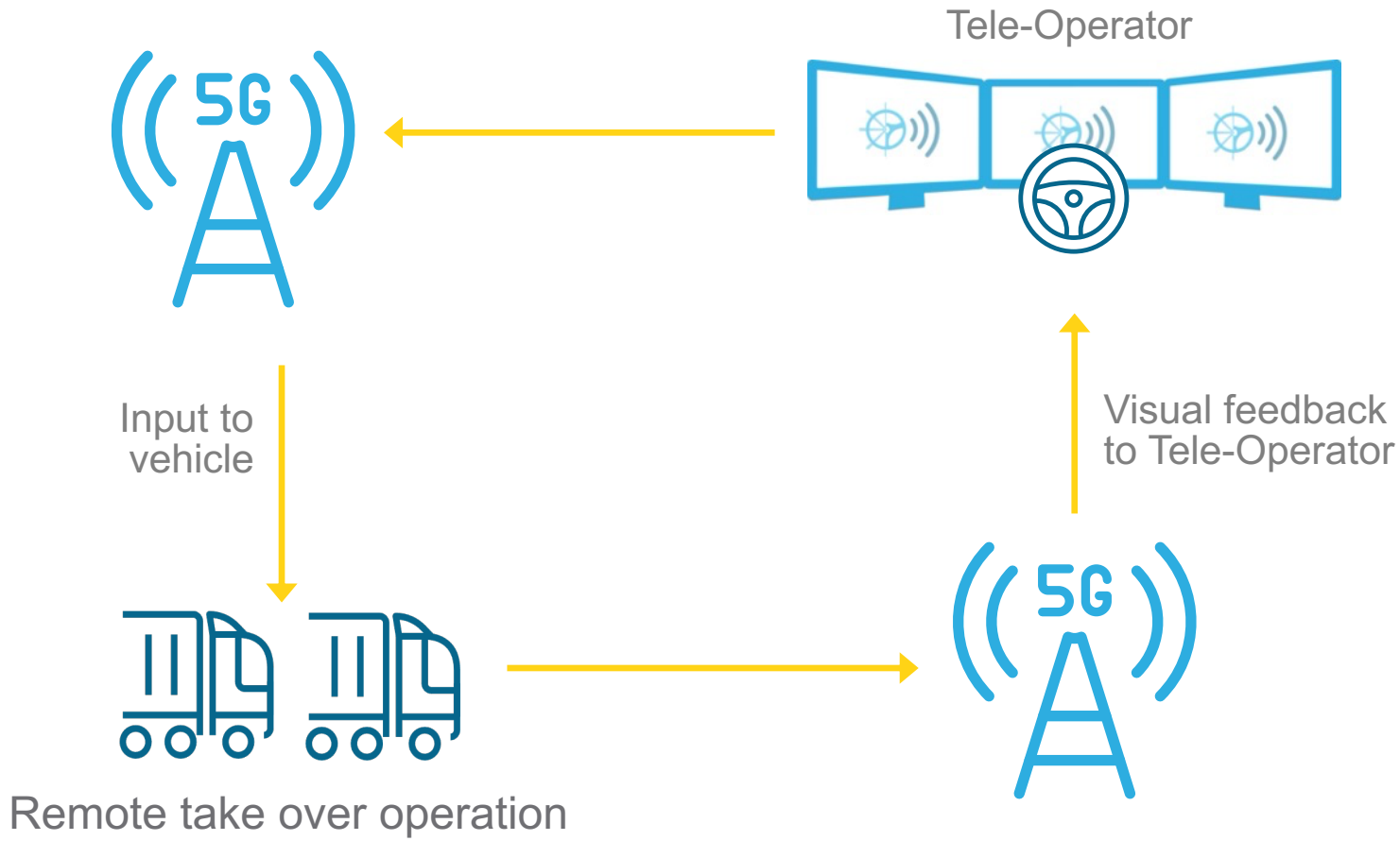
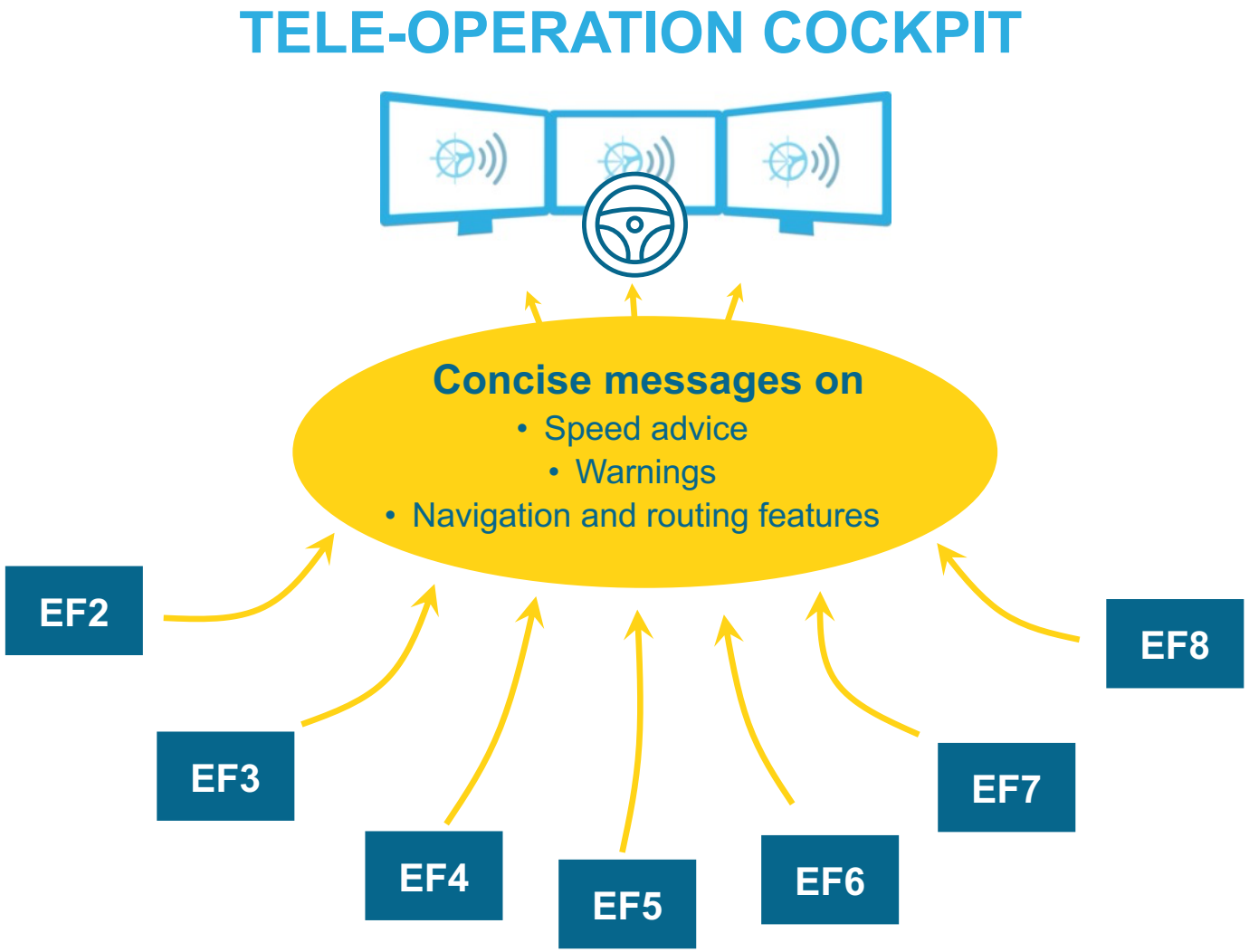


ENABLING FUNCTIONS

EF1	Enhanced awareness dashboard
EF2	Vulnerable Road User (VRU) interaction
EF3	Timeslot reservation at intersections
EF4	Distributed perception
EF5	Active collision avoidance
EF6	Container ID recognition
EF7	ETA sharing
EF8	Logistics chain optimization



PILOT AREA

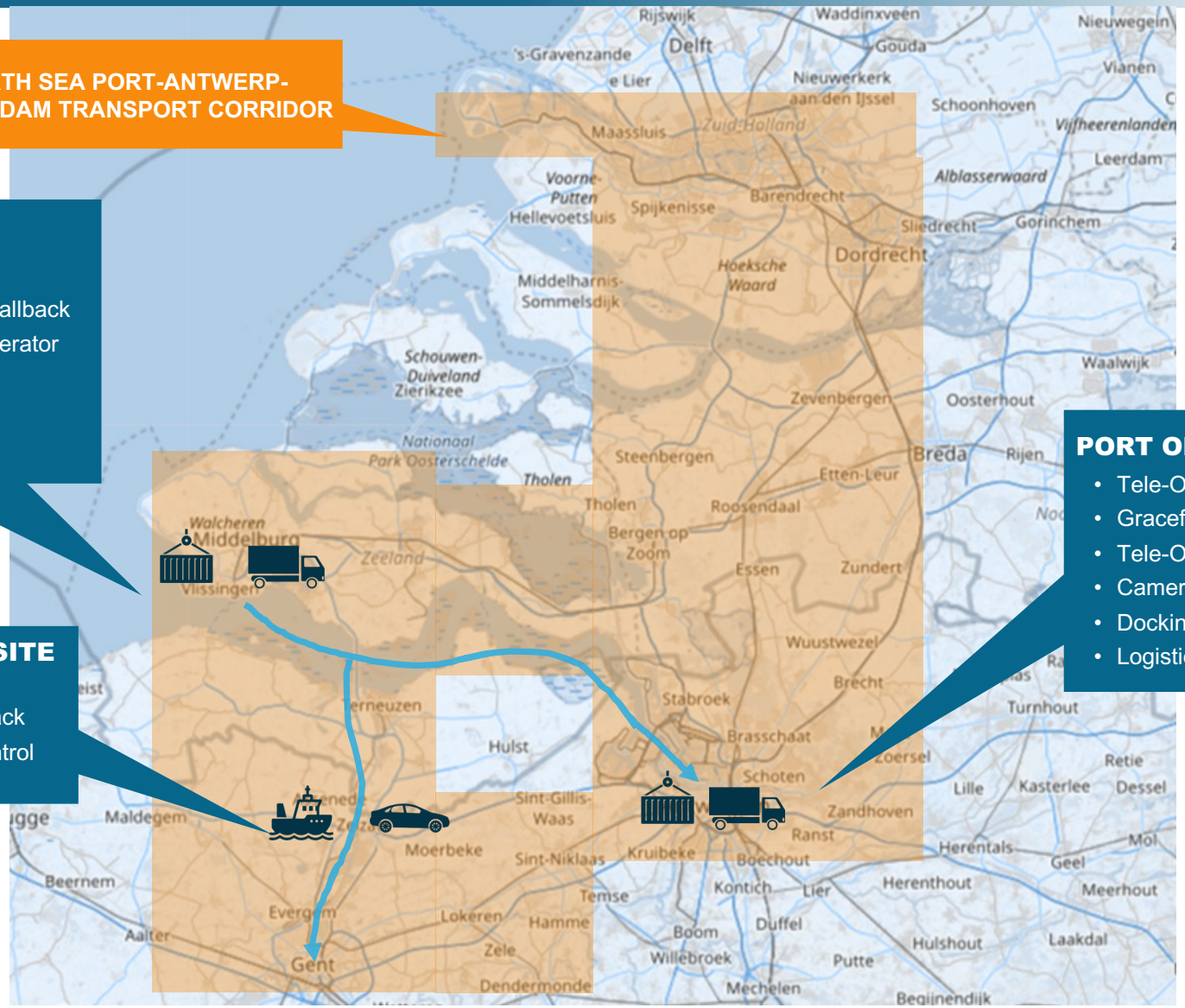
NORTH SEA PORT-ANTWERP-ROTTERDAM TRANSPORT CORRIDOR

VLISSINGEN SITE

- Tele-Operation
- Gracefully degrading safety fallback
- Tele-Operation station for operator
- Cameras at terminal
- Docking service
- Logistics chain optimization

ZELZATE CROSS-BORDER SITE

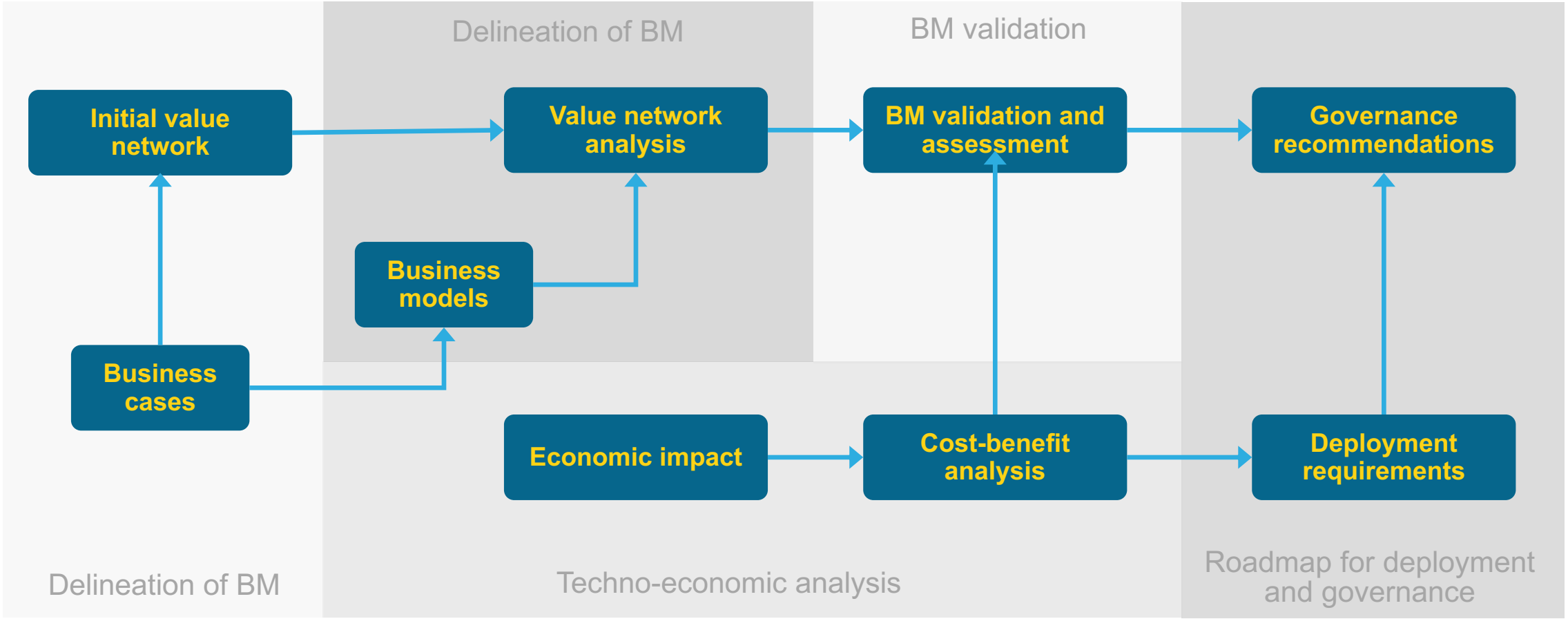
- Tele-Operation
- Gracefully degrading safety fallback
- Cooperative Adaptive Cruise Control (CACC)



PORT OF ANTWERP SITE

- Tele-Operation
- Gracefully degrading safety fallback
- Tele-Operation station for operator
- Cameras at terminal
- Docking service
- Logistics chain optimization

CAM GOVERNANCE AND BUSINESS MODELS



CONSORTIUM AS A WHOLE

5G BLUEPRINT

Network Operators

kpn

eurofiber

Vehicle OEM

TERBERG SPECIAL VEHICLES

TOYOTA

Tele-operation OEMs

v-tron

roboauto

MWLC More work less carbon

SEAFAR

National governments

Ministry of Infrastructure and Water Management

Flanders State of the Art

Connected Mobility sector

BEMOBILE a revolution in traffic

SWECO

swarco The Better Way. Every Day.

locatienet

Research institutes

imec

HAN_UNIVERSITY OF APPLIED SCIENCES

HZ UNIVERSITY OF APPLIED SCIENCES

Logistics

Transport

Kloosterboer

VERBRUGGE INTERNATIONAL n.v.

GROUP JOOSEN ANTWERP

Ports

Port of Antwerp

North Sea Port

Software

[sentors]

room 40

NxtPort

Business accelerator

MARTEL innovate

Impuls Zeeland

Advisory Board (Consortium Ring 2)

Regional governments

Provincie Zeeland

STAD ANTWERPEN

Insurance company

ALD Automotive

Emergency service operator

VeiligheidsRegio Zeeland

Logistics sector

Matrixian

TLN

MSP onions

Capgemini

Port of Rotterdam

5G-BLUEPRINT CHALLENGES

Technical challenges

5G Network requirement

- Low latency
- High throughput
- High availability at cross-borders
- Security and Reliability
- Radio RF - Spectrum

Safe direct control T-O

- 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
- CCAS

5G-BLUEPRINT CHALLENGES

5G BLUEPRINT

https://www.youtube.com/watch?v=QWuSltJGvXo

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)*

Type of action: Innovation action (IA)

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 Marquez-Barja, *Interuniversitair Micro-Electronica Centrum (IMEC)*

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

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