



5G BLUEPRINT

ENHANCED TELEOPERATED TRANSPORT AND LOGISTICS: A 5G CROSS-BORDER USE CASE

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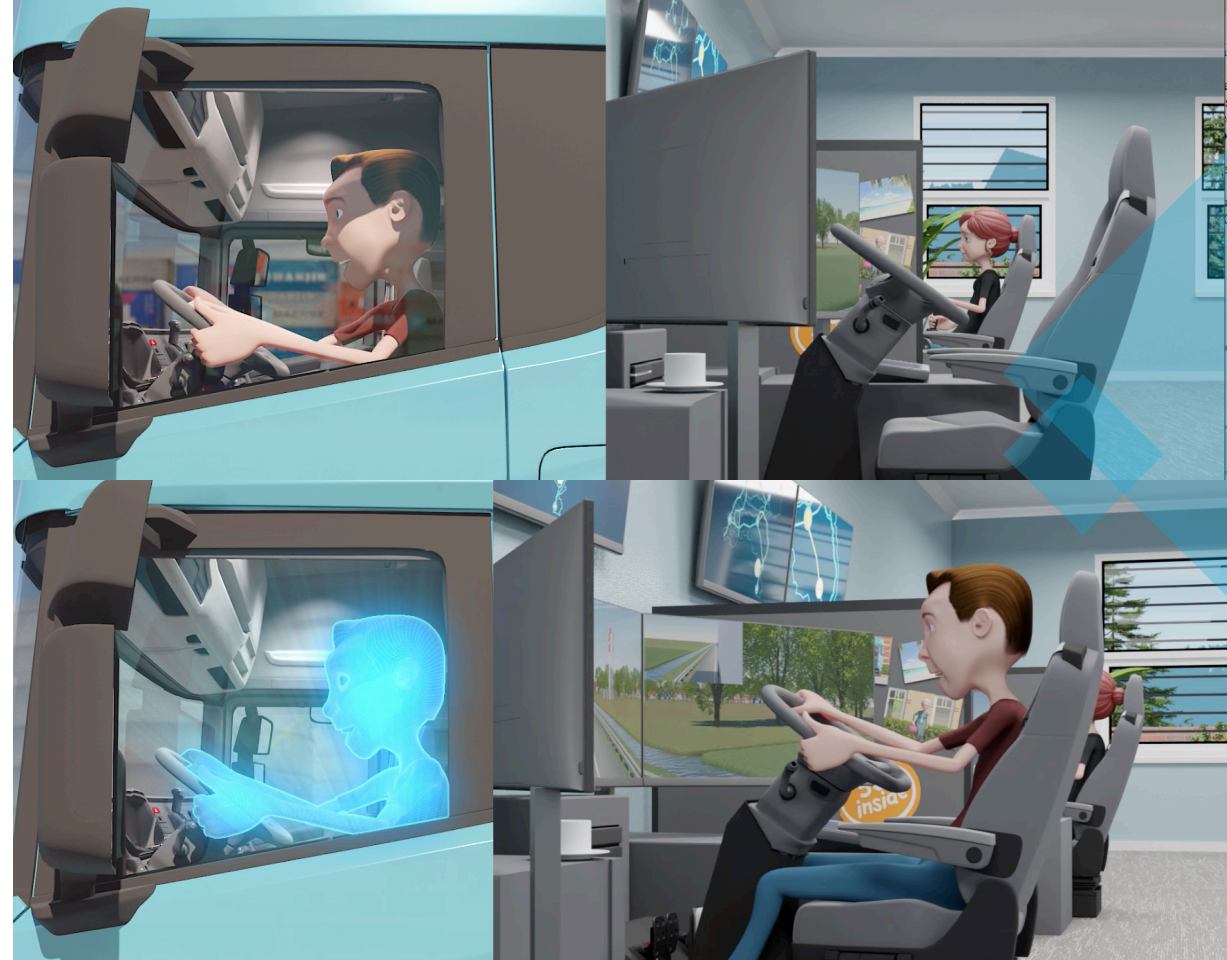
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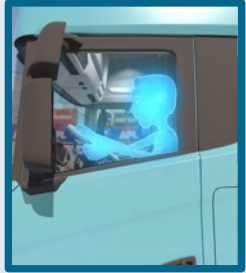
- ~ **5000 vacancies** in the NL, similar in BE
- **Gender disbalance:** 2% female
- **Waiting times** at container terminals: **25-50 milion euro / year NL alone**
- **Is fully autonomous cars a solution?** Yet to come to T&L

Teleoperated driving as the next big thing, as a mature phase before a more distinct future with automated/autonomous vehicles,

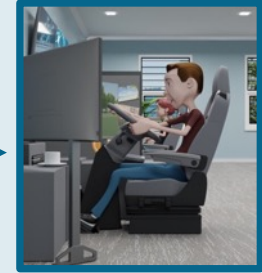
5G-Blueprint designs and
validates a **technical
architecture, business
and governance model**
for uninterrupted **cross-
border Tele-Operated**
transport based on **5G
connectivity**



5G BLUEPRINT



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

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



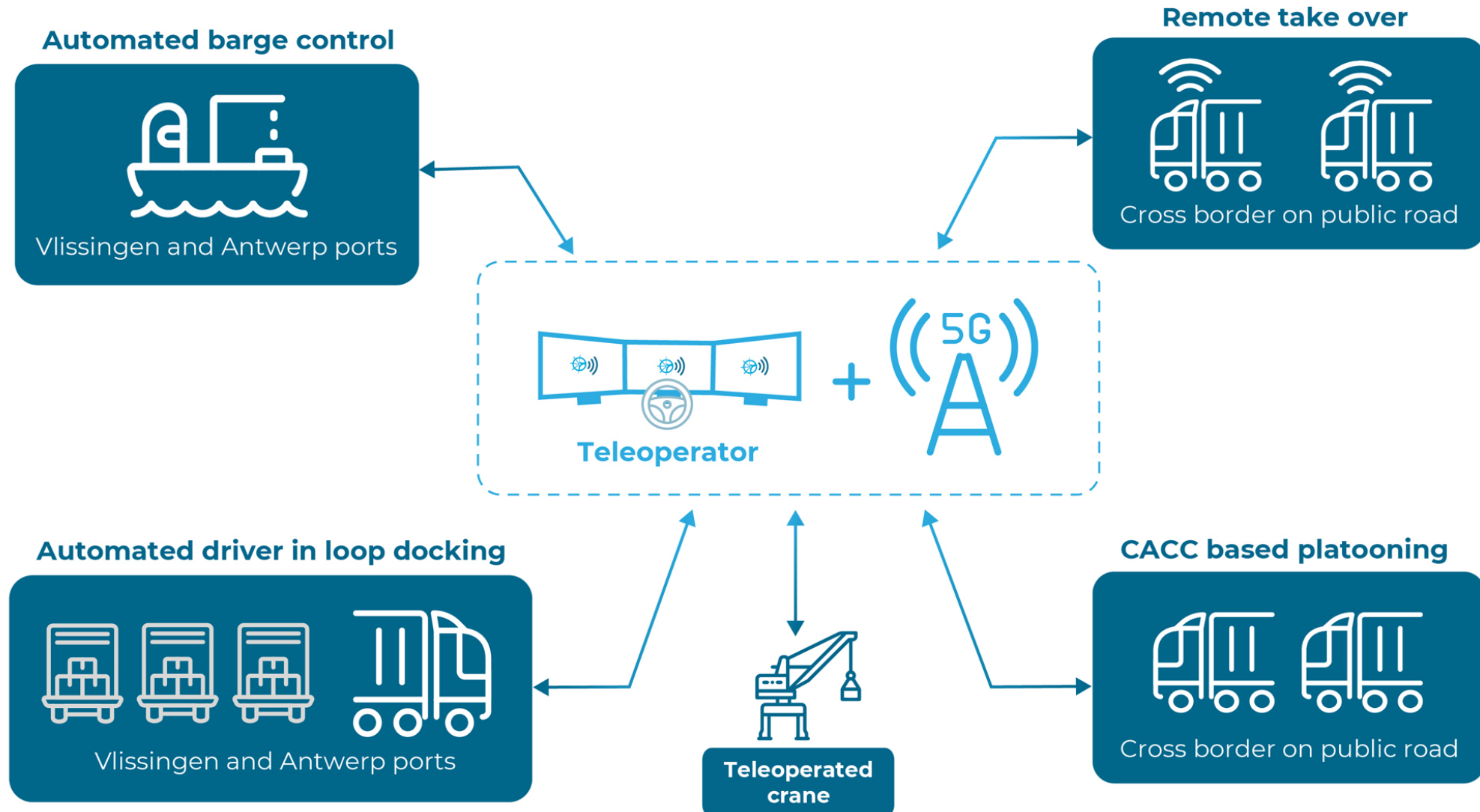
- 5G T-O transport **market analysis**
- **Commercial possibilities**
- Positions the **possible role** of T-O transport based on 5G **in CAM**
- TO transport based on 5G connectivity **market adoption**

REGULATORY



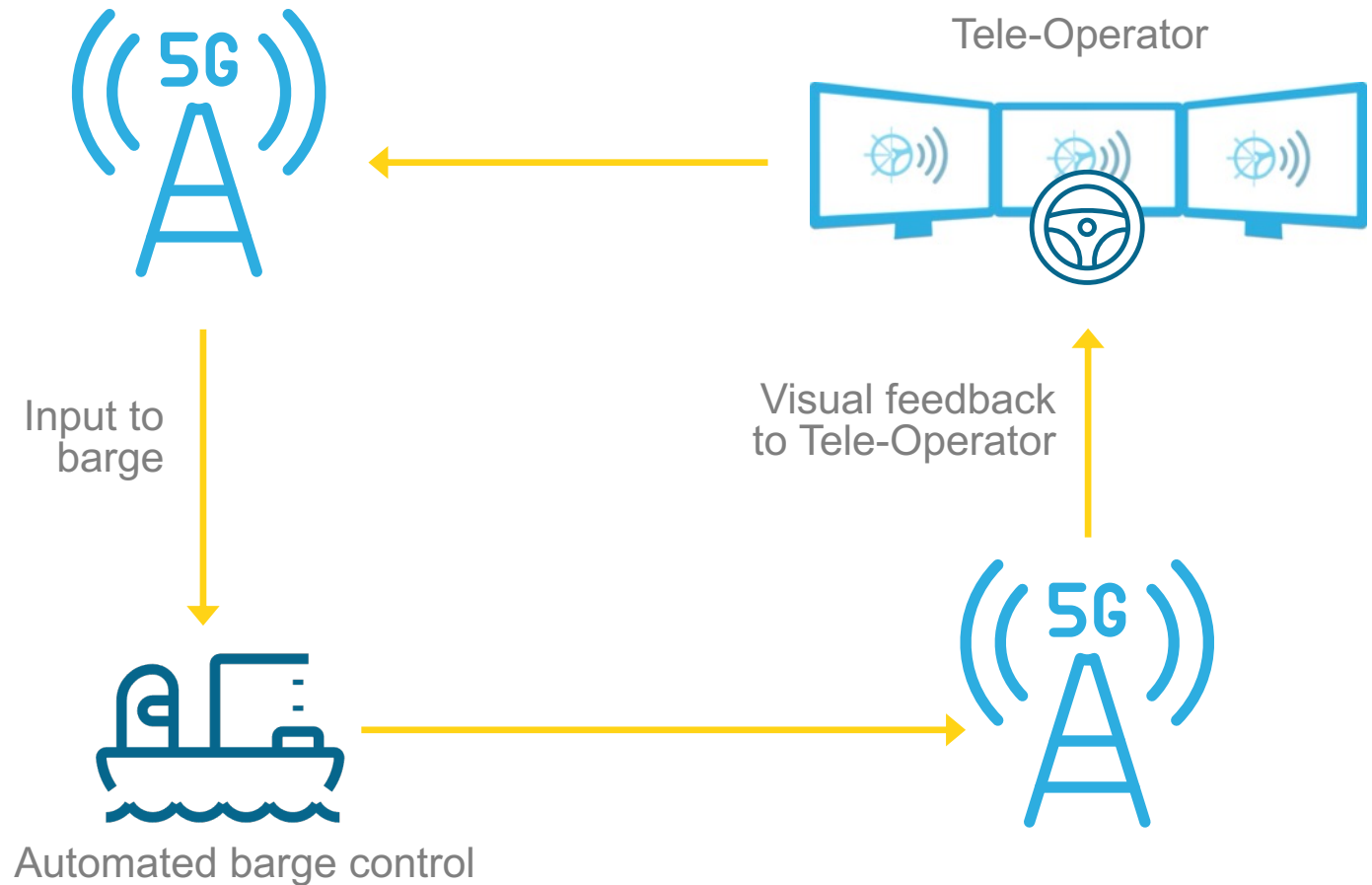
- Identify **regulatory issues** and **identify recommended actions**

USE CASES



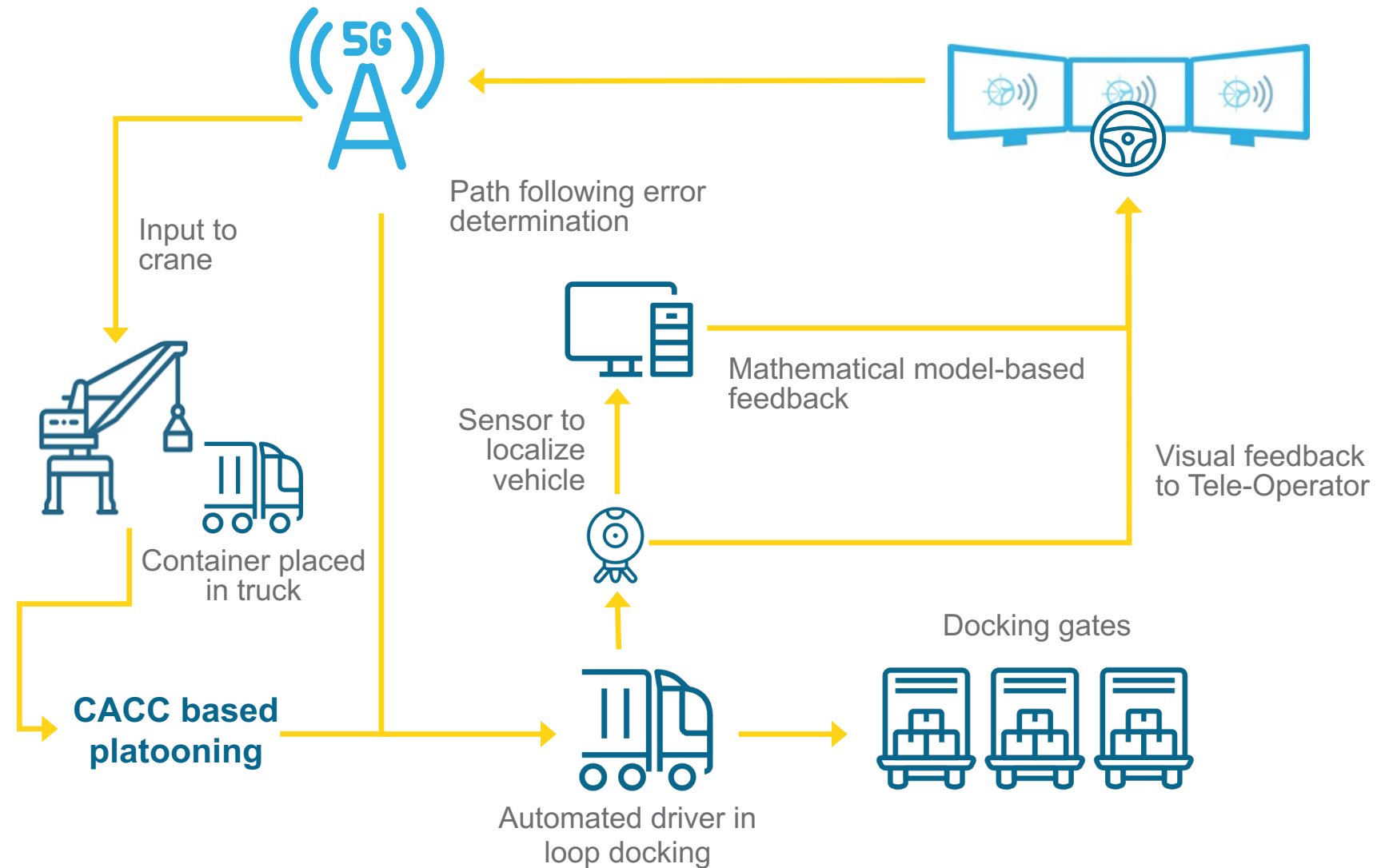
USE CASES

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



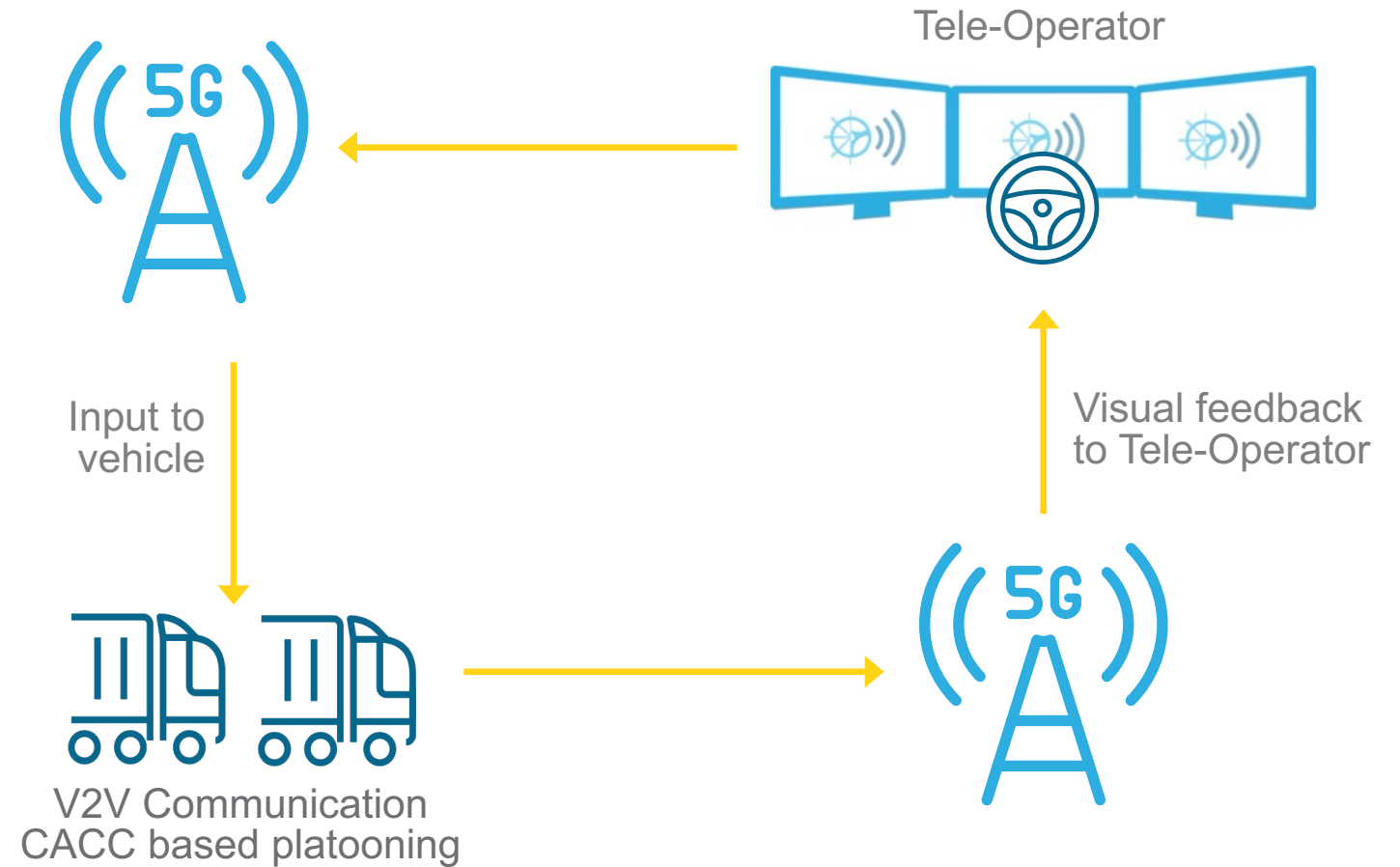
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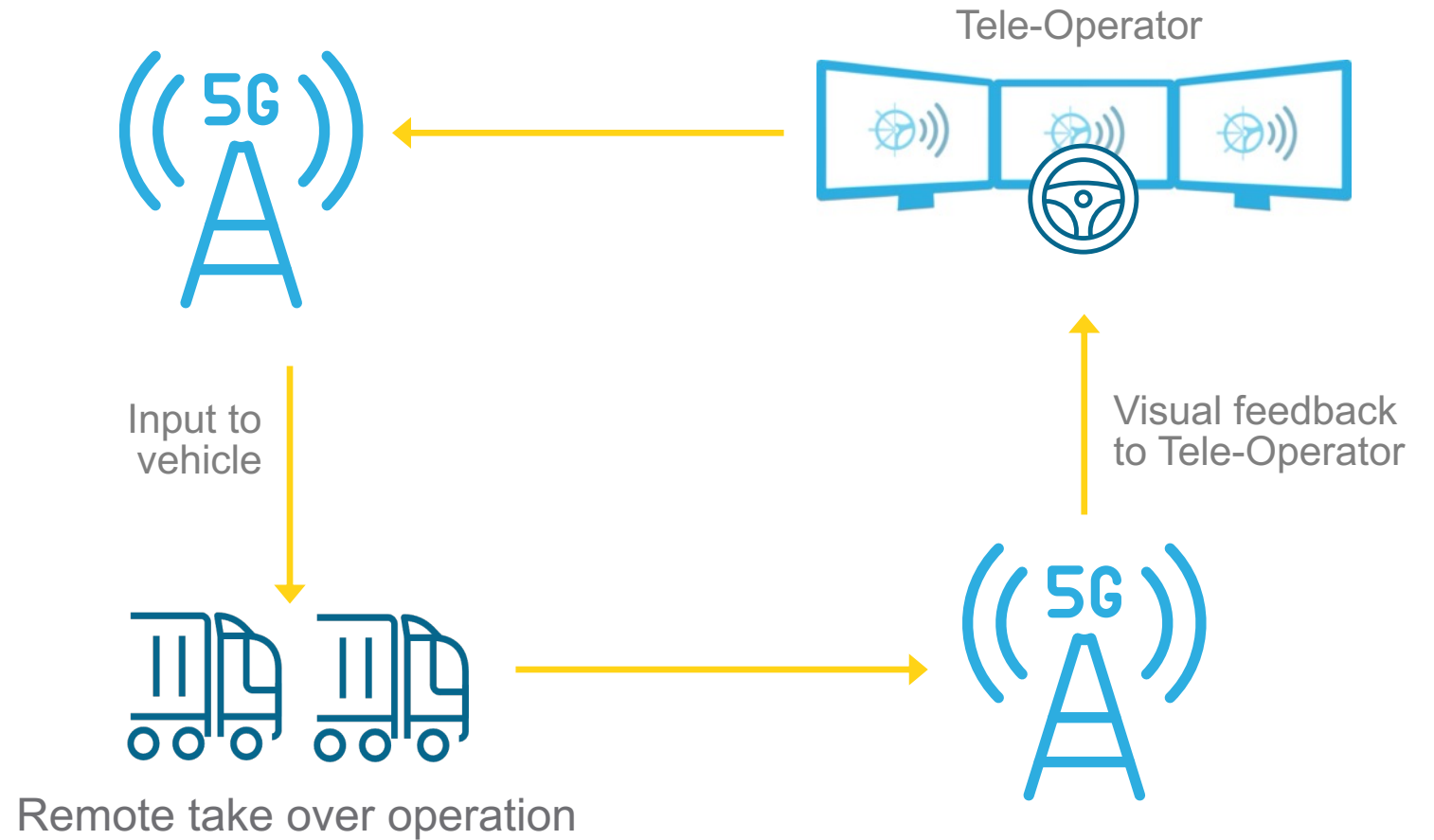
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PILOT AREA

NORTH SEA PORT-ANTWERP- ROTTERDAM TRANSPORT CORRIDOR

VLISSINGEN SITE

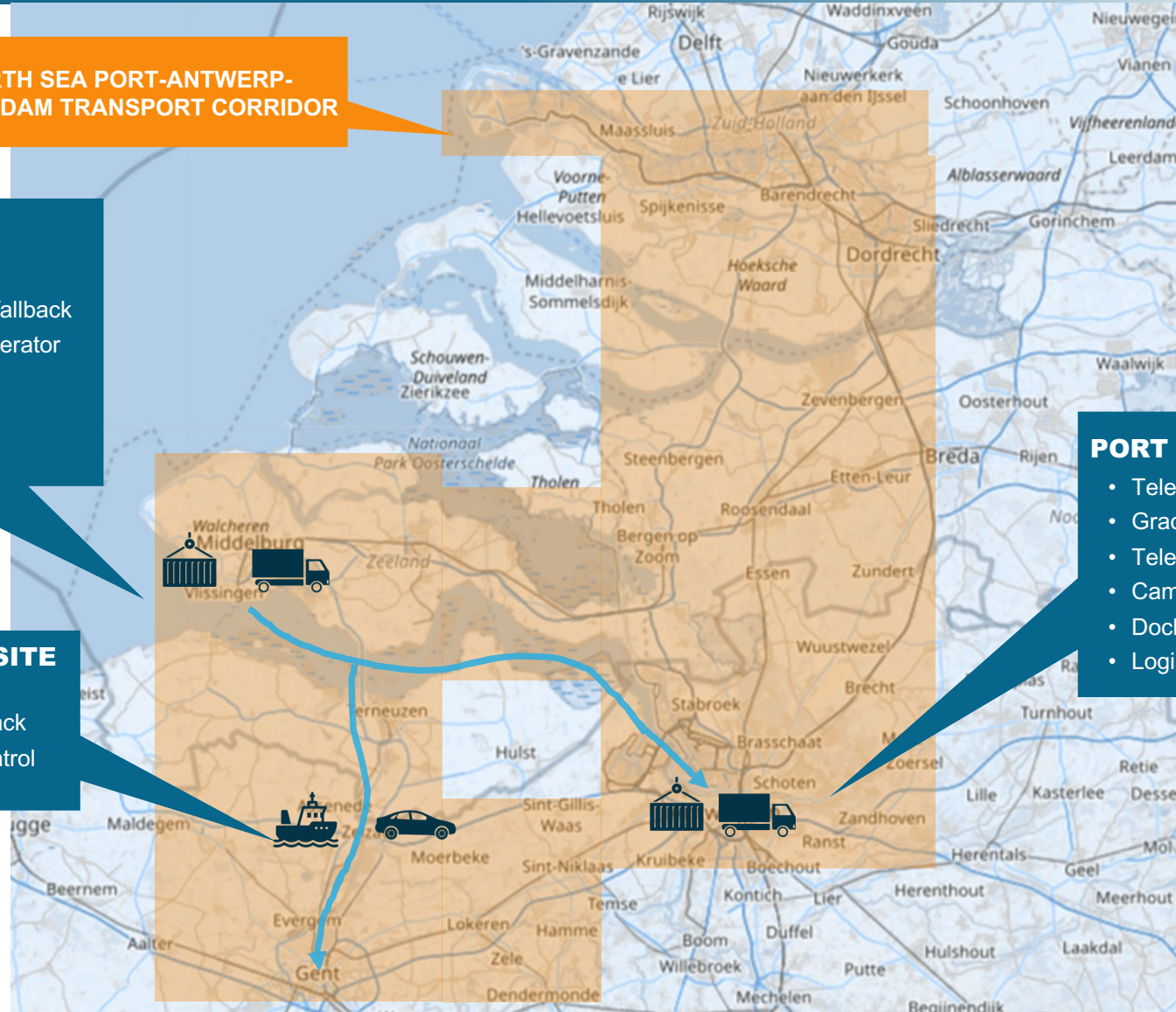
- Tele-Operation
- Gracefully degrading safety fallback
- Tele-Operation station for operator
- Cameras at terminal
- Docking service
- Logistics chain optimization

ZELZATE CROSS-BORDER SITE

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

PORT OF ANTWERP SITE

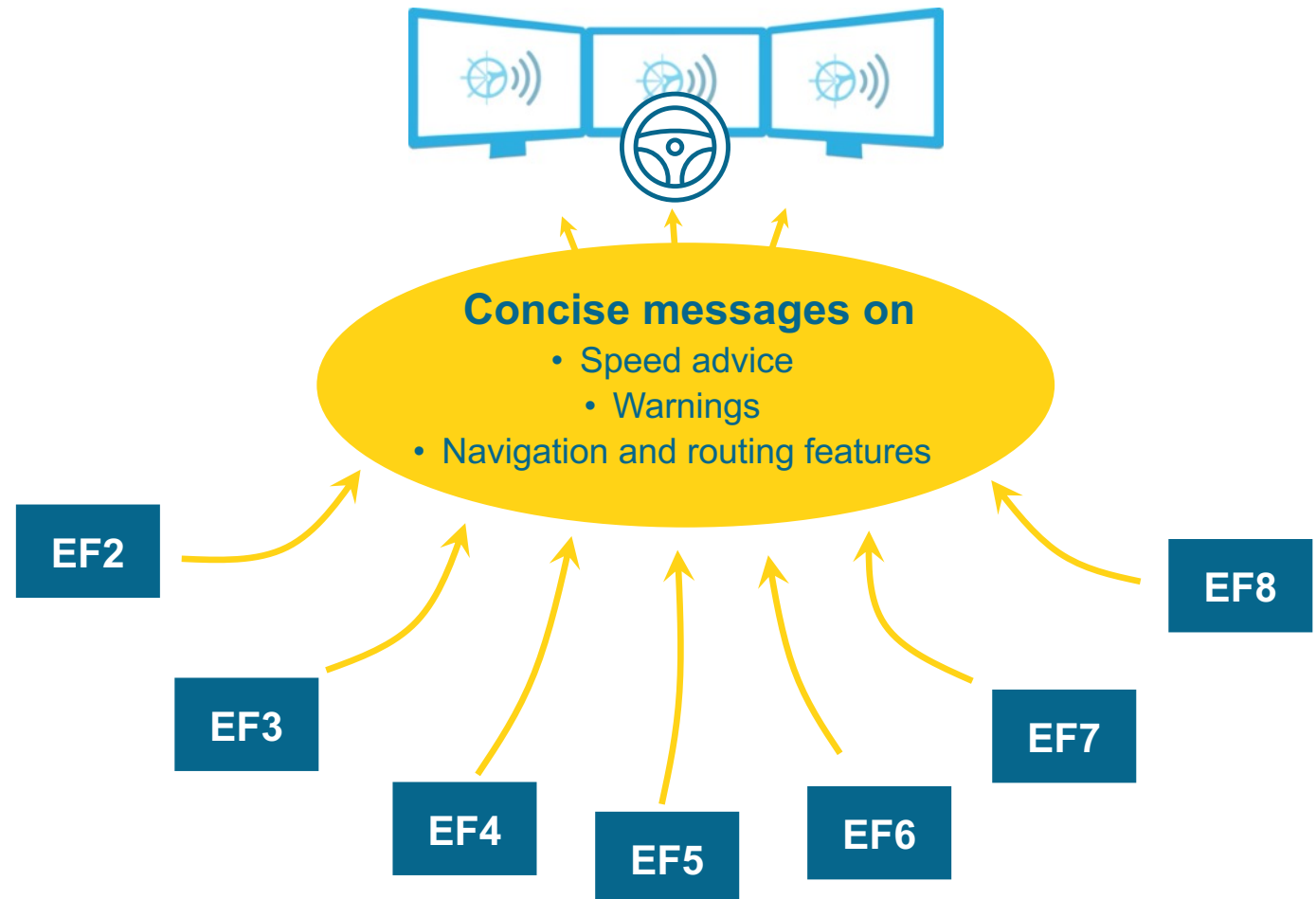
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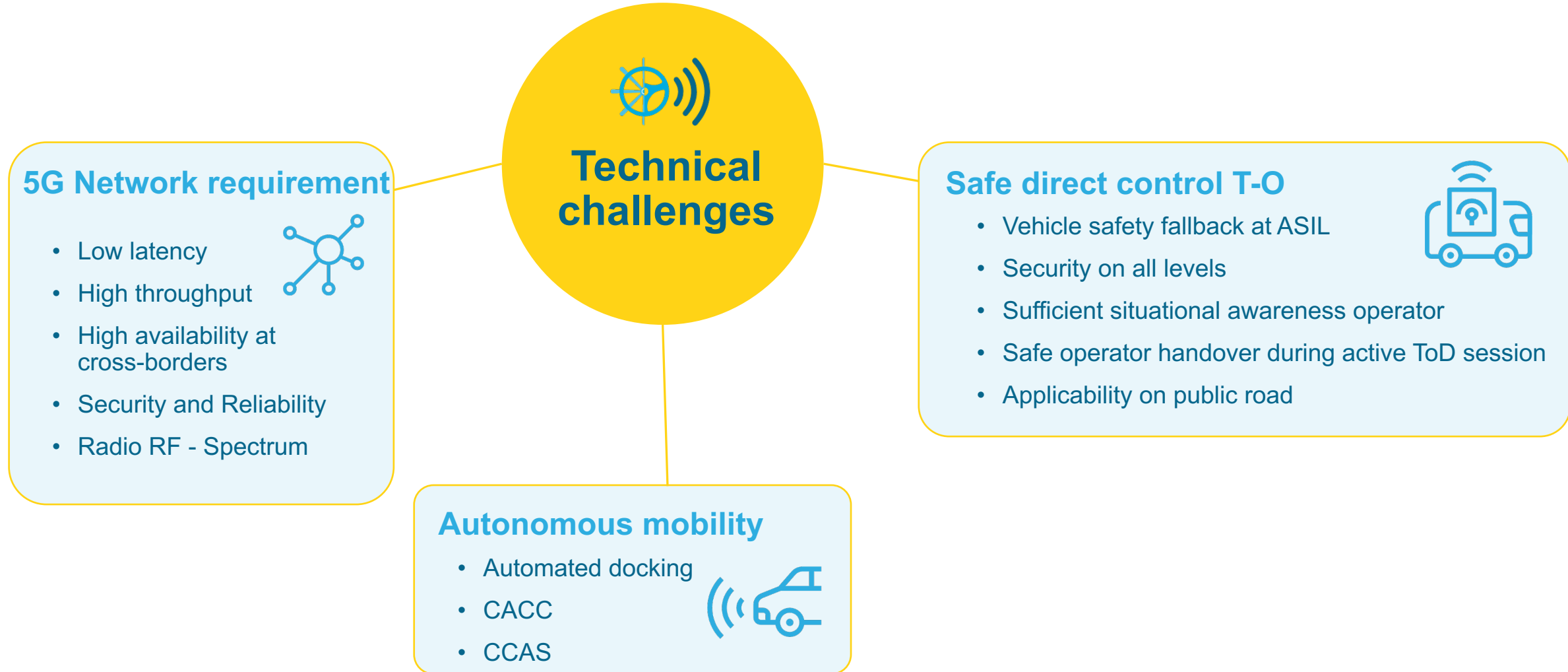


ENABLING FUNCTIONS

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	Scene analytics

TELE-OPERATION COCKPIT








5G-BLUEPRINT CHALLENGES



CONSORTIUM AS A WHOLE

Network Operators

Vehicle OEM




Tele-operation OEMs







National governments




Connected Mobility sector



Research institutes








Business accelerator






Logistics




Transport

Ports

Software

Advisory Board (Consortium Ring 2)

Regional governments	Insurance company	Logistics sector
 	 <p>Emergency service operator</p> 	    

LESSONS LEARNT SO FAR...

- Benefits and Risks for Teleoperation. (Survey outcome)
 - Benefits:
 - Cost decrease
 - Reduction of the waiting times and resting hours
 - Less fuel consumption as the smart dashboard will optimize speed (eco-driving)
 - Payload may increase, as the driver cabin may decrease
 - Safety increase
 - Extended sensing in vehicles and roads will increase safety
 - Drivers/Shippers safety increased (e.g. hazard material, remote locations)
 - Fewer people on site decreases the risk of accidents
 - Job Market compatibility
 - Solving the shortage of drivers and shippers
 - Work-life balance improved

LESSONS LEARNT SO FAR...

- Benefits and Risks for Teleoperation
 - Risks:
 - Lack of legal framework
 - Teleoperation on public roads and water ways is not yet allowed (commercially)
 - Technology readiness
 - 5G coverage
 - Cross-border / Cross-operator agreements. (SLAs)

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BUSINESS



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- TO transport based on 5G connectivity **market adoption**

REGULATORY



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

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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