austriatech

AWARD

Scaling autonomous logistics

Aggelos Soteropoulos, AustriaTech

JP-EU Bi-lateral meeting, Tokyo 11/17/2023

AWARD has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement No 101006817.

The content of this presentation reflects only the author's view. Neither the European Commission nor the CINEA is responsible for any use that may be made of the information it contains.

The AWARD project - overview

AWARD
Scaling autonomous logistics

AWARD = All Weather Autonomous Real logistics operations and Demonstrations

- **Project Coordinator :** EasyMile
- **Partners:** 29 Partners from 12 countries (Austria, Belgium, Denmark, Finland, France, Germany, Israel, Norway, Spain, The Netherlands, Switzerland, United Kingdom)
- **Timeline of the project:** 1st of January 2021 – 30 of June 2024

Ambition 1

AWARD ADS architecture **offers a unique set of sensors that enables 24/7 availability** (night and day, good or bad weather conditions), **within an extended ODD**

Ambition 2

By addressing 24/7 availability, the fully automated HDV will be **deployed over key pilot projects that are highly scalable and replicable** over warehouses, factories, airports and ports, **in mixed traffic in confined areas and on public roads**

Ambition 3

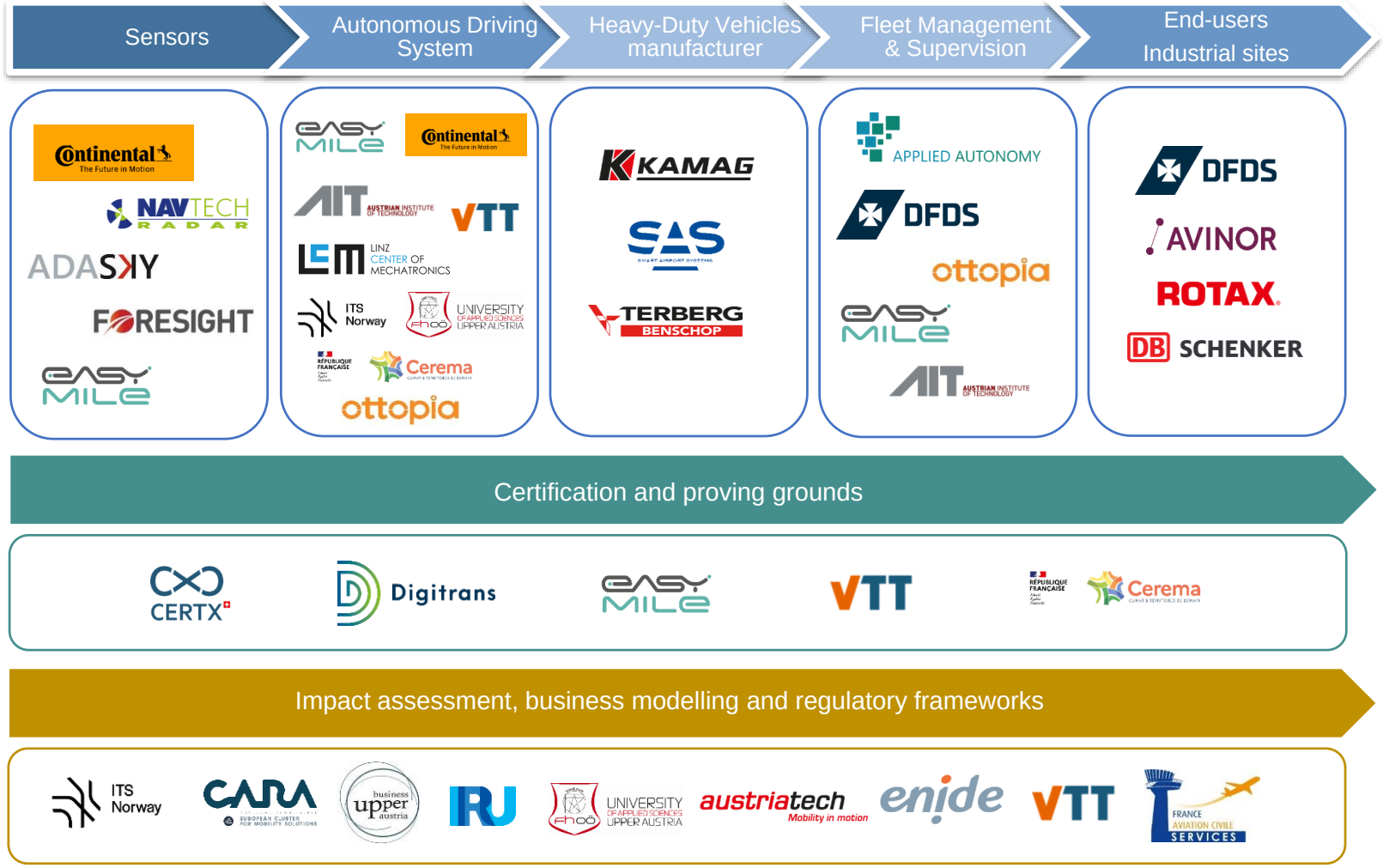
The new **fleet management system** will integrate **data from vehicles, logistics systems and the road infrastructure**, coordinating exchanges with different data providers to ensure economic viability of data-related business models, **while providing high-reliable and secured tool that optimizes logistics flows and ensures safety for other road users**.

AWARD © - H2020, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

Complementary skilled Consortium

AWARD
Scaling autonomous logistics



AWARD © - H2020, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

Approach and Use Cases

AWARD
Scaling autonomous logistics

Development of the ADS for Heavy Duty Vehicles (HDV)

Able to **handle adverse environmental conditions** such as heavy rain, snowfall, fog

Targeting compliance with **ISO 26262** and taking into consideration **SOTIF recommendations**

Integrating **multiple sensor modalities and an embedded teleoperation system to address 24/7 availability**

Optimized fleet management & supervision system for logistics use cases

Integration of the ADS into the vehicle platforms

AIT

Manufactured by PALFINGER

KAMAG

TLD

TERBERG

Demonstration in concrete use cases

Industrial autonomous loading & unloading operations

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

Hub to hub autonomous logistics on public roads

ROTAX AIRCRAFT ENGINES BRP

DB SCHENKER

Airport autonomous ground support equipment

AVINOR OSL

Port Trailer autonomous transfer operations

DFDS

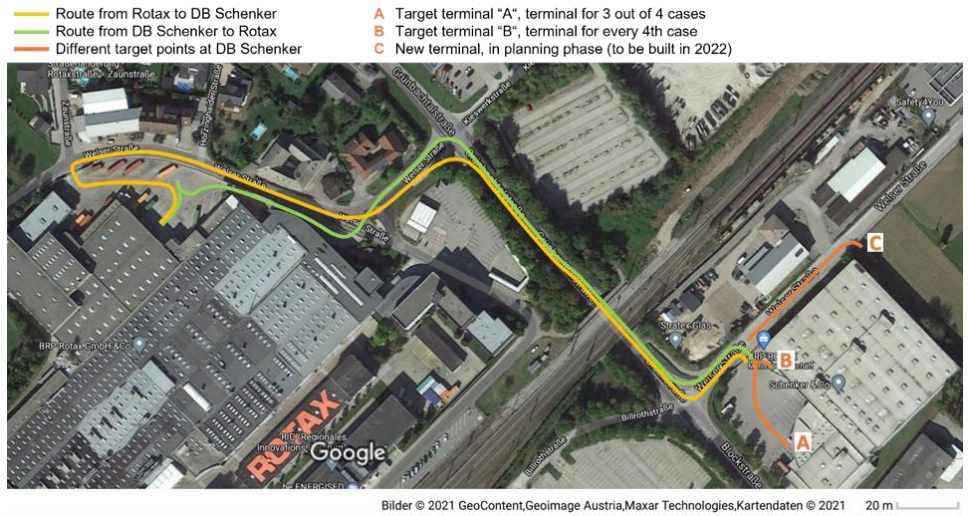
AWARD © - H2020, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

Use Case Hub to Hub autonomous logistics on public roads in Austria

- **Objective:** To demonstrate highly automated, continuous, hub-to-hub freight transportation between Engine Factory of BRP-Rotax (production site) and Logistic Hub of DB Schenker, which are connected via public side roads, public crossing areas and a public main road.

- Testing with Safety driver onboard



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

Use Case Hub to Hub autonomous logistics on public roads in Austria

AWARD © - H2020, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

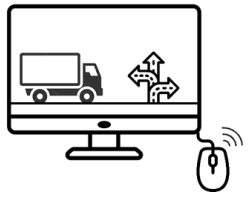
Teleoperation in AWARD

- What role will **different modes of teleoperation** play in future deployments of fully automated vehicle in real logistics?
- Testing Teleoperation setup on the proving ground, integrated in a Fleet Management System
- Developing recommendations for regulatory and governance frameworks to ensure safe deployment
- **Clear distinction** between different modes of teleoperation for stakeholders and in regulatory frameworks is needed

Remote/direct driving

- drivers outside the vehicle in a remote control centre perform tasks like **steering (lateral control), braking, releasing or accelerating (longitudinal control)** as well as monitoring the vehicle or driving environment
- view to immediate and safety-critical intervention in the way the vehicle drives
- for conventional vehicles but also automated vehicles outside their Operational Design Domain

Remote intervention and the approval of manuoevres/ paths with ADS



- commonly used as a complementary feature to fully automated driving systems
- remote intervention operator **does not take direct control** of the vehicle's movement
- advising the vehicle to execute manoeuvres, activating or deactivating the automated driving system, or providing specific assistance to passengers in particular situations.
- **EU implementing regulation 2022/1426:** The remote intervention operator **shall not drive** the fully automated vehicle and the ADS shall continue to perform the DDT (dynamic driving task) !

Supervision/ monitoring only

- only **monitoring** the vehicle or driving environment (with a view to immediate and safety-critical intervention in the way the vehicles drives), but not to perform lateral or longitudinal control of the vehicle

AWARD © - H2020, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

Teleoperation tests in Hub-to-Hub Use Case

- Operations of Hub-to-Hub Use Case on public roads showed:
  Intervention by the on-board safety operator was necessary for several minutes per operational hour
- **Testing different scenarios on proving ground:**
  - Which situations could be solved by a **Teleoperator**?
  - What are the requirements for **remote driving** being a viable solution to assist?
- **Teleoperation setup** integrated into **Fleet Management System:**
  - **Manual Takeover:** The fleet management system (FMS) notifies the teleoperator that the vehicle needs assistance. Only then, he can assume control of the vehicle.
  - **Logging Teleoperating Status:** The fleet management system receives and records the teleoperating status for each instance of teleoperation. This logging mechanism allows for an overview of all teleoperation activities.

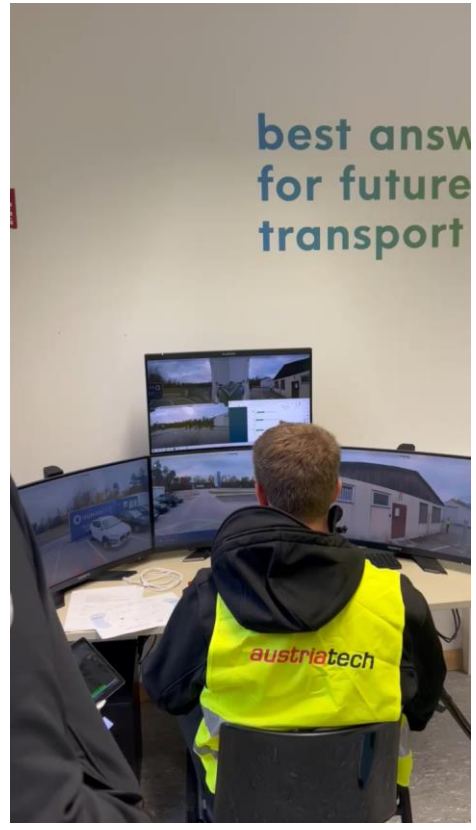
AWARD © - H2020, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

Outlook

Based on the experience from Teleoperation tests on the proving ground:

- Unveil specific issues and relevant topics **specifically for logistics operations** (in contrast to passenger mobility) and different use cases besides experience with same vehicle type (e.g. load securing)
- Define specific requirements and qualifications with regard to different modes of teleoperation
- Formulating **recommendations** for the **setting the operational frameworks** for different modes of Teleoperation, e.g. regarding:
  - Qualification of Teleoperators
  - Roles and responsibilities of involved parties in Teleoperation (ensuring the safe movement of the individual vehicles and monitoring of a whole fleet)
- Relevant Deliverables will be finalised until June 2024



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101006817. The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.

SCAN ME

AWARD on LinkedIn

Happy to exchange with similar projects!

What are the experiences on these topic from Japan?

Contact:
Aggelos.Soteropoulos@austriatech.at
Dominik.Schallauer@austriatech.at

austriatech
Mobility in motion

AWARD has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement No 101006817.

The content of this presentation reflects only the author's view. Neither the European Commission nor the INEA is responsible for any use that may be made of the information it contains.