



Advancing All-Weather Autonomous Logistics: Insights and Future Prospects for Industrial Trucks

SIS63

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AWARD

Scaling autonomous logistics

AWARD : All Weather Autonomous Real logistics operations and Demonstrations

Project Coordinator : EasyMile **Partners** : 29 **Budget**: €26,4m

Timeline of the project : January 2021 – 2024

- Ambitions:
 - Develop a unique automated driving architecture with all-weather 24/7 capability
 - Deploy fully automated heavy-duty vehicles in scalable and replicable pilots
 - Integrate a new fleet management system for optimized logistics flows.
- Demonstrations:
 - Hub-to-hub shuttle service between BRP-Rotax engine factory and DB Schenker logistic hub, Austria. A related demonstration on automated loading/unloading with a forklift.
 - Automated baggage tractor at Oslo Gardermoen airport, Norway
 - Container transfer operations and automated boat loading in Rotterdam port terminal, the Netherlands



Automated Industrial Trucks

– General Lessons

- Several ongoing studies worldwide, where potential end-users are testing automated transfers of a couple of kilometres. Their questions: price and reliability
- Ideal candidates: Airports, ports, and sites with existing fleet management systems. Smaller sites could make contracts with 3rd parties for remote operations?
- The most difficult routes remain manually driven. Challenges with automating large trucks on narrow roads due to lack of safety margins, driving inside ships, infrastructure support.
- Weather conditions: Heavy rain and snow continue to impact automated vehicles, sensor protection is a research topic. Industrial sites would need plans for reserve drivers for extreme weather days?
- Broader automation and integration for further benefits: Hitching trailers, loading/unloading cargo, and integration with other systems



Safety testing

- Establishing test success criteria based on existing traffic laws, calculating minimum safety margins.
 - Input for discussion on mathematical traffic laws. Pedestrian max speed/acceleration cannot be decided by a single programmer
- Maintaining low speeds (15–30 km/h) for safety, despite other drivers overtaking



Oslo airport started tests with an automated baggage tractor

- Initial tests covered 50 hours of driving in 2022. Operators reported feeling safe and no critical situations were observed. Moderate rain or darkness did not impact the testing.
- The automated vehicle was fast enough to complete tasks during plane turnaround time, despite being slower than human-driven vehicles.
- Safety stops required intervention for about 5 minutes per operational hour. The most common reasons for safety stops were "no obstacle" or "route blocked", often caused by baggage carts left by human drivers.
- Improved coordination between human and automated operations will reduce the frequency of safety stops.
- In the future, one teleoperator could feasibly oversee multiple vehicles.

