

# Holo's presentation

**Nordic+**

**29.11.2023**

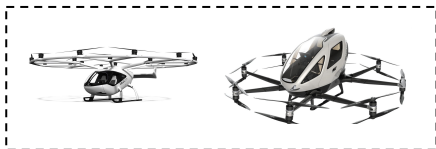


holo

# Holo implements autonomous software in different segments - some more mature than others...

holo Air

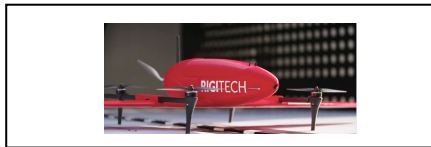
## People transportation



**Low priority** - Not currently pursuing projects - technology and market not yet mature



## Freight transportation



**High priority** - Technology available and customers willing to invest



## Other (Cameras, sensors and more)



**High priority** - Specialized use-cases being discussed with vendors and customers



holo Ground



**Medium priority** - Delivering Grorud Valley with Ruter and Mobileye - awaiting more mature legislation, vendors and customers before expansion



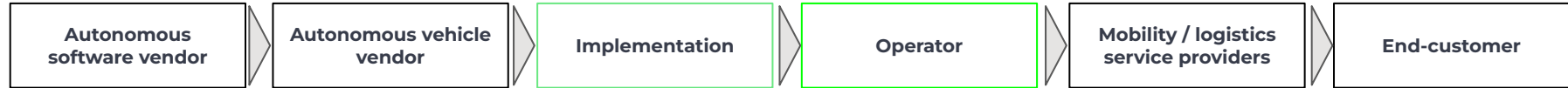
**High priority** - Technology available and customers interested in pilot projects



**Medium priority** - Looking for vendors and projects



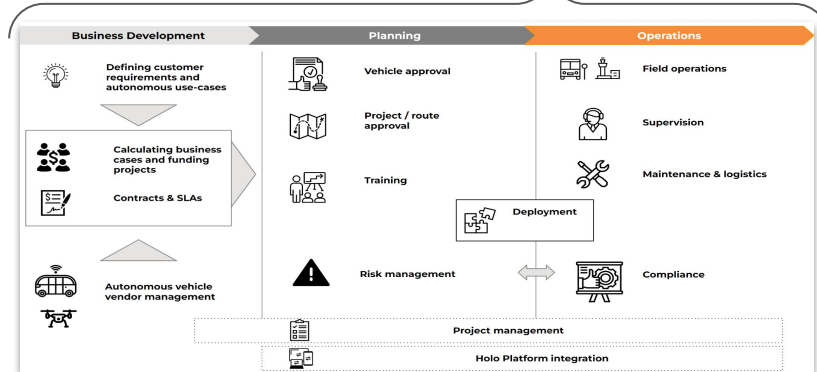
# Holo's role is becoming increasingly important - as autonomous software and vehicles mature, they need to be implemented and operated



- Running pilot projects to test and develop
- Increasing competition leads to more focus
- Are looking (or will be looking) for implementation partners

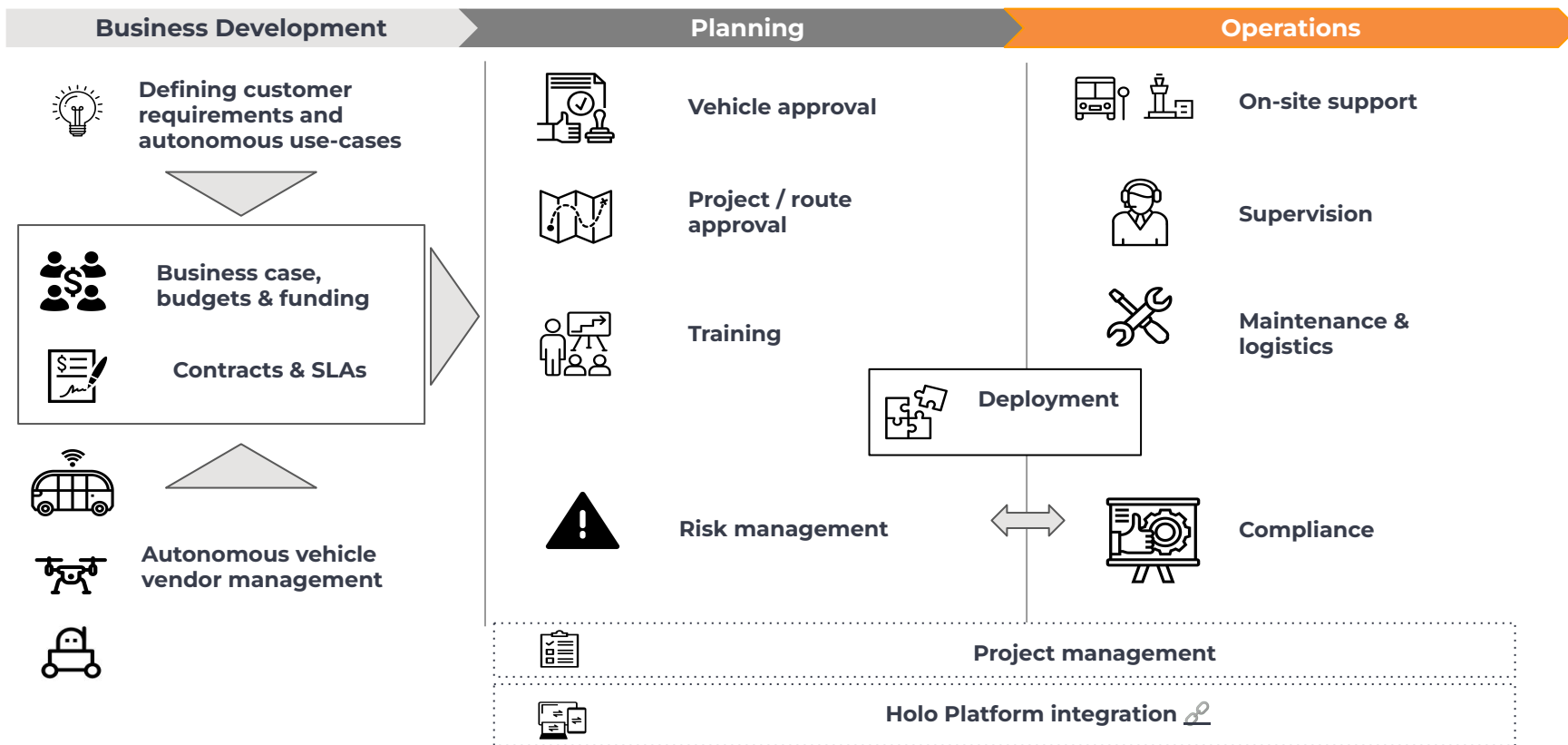
See breakdown below.

- Operating or sourcing fleets of vehicles for mobility or logistics today
- Deep experience within their industry, but less or no experience implementing autonomous systems
- Managing legacy systems and existing workforce slows down development



Specialised implementation services - that may lead to Holo taking on the role of an operator

# Holo has deep experience in all the processes needed to implement and operate autonomous mobility and logistics projects





# Holo has extensive and unique operational experience from different projects across the Nordics and the Baltics

Being planned

In operation

Completed



**Grorud Valley (2023)**

*Passenger vehicles*



**Gothenburg - Chalmers University**

*Passenger vehicles*



**Gothenburg - Lindholmen phase 1**

*Passenger vehicles*



**Køge - SUH Køge Hospital (indoors)**

*Passenger vehicles*



**Helsinki - Aurinkolahti**

*Passenger vehicles*



**Tallinn - Sohoja Baltic**

*Passenger vehicles*



**Oslo - Akershusstranda / Kongens Gate / Ormøya**

*Passenger vehicles*



**Aalborg - Aalborg East**

*Passenger vehicles*



**Oslo - Ski**

*Passenger vehicles*



**Copenhagen - Nordhavn**

*Passenger vehicles*



**Slagelse Hospital**

*Passenger vehicles*

## Project description

# One of the leading autonomous projects in Europe



### Members of the project

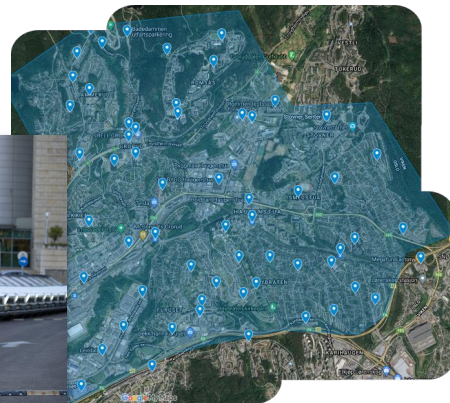
- Holo is responsible for project approvals, implementation and operating the vehicle
- Ruter is public transport authority responsible for delivering the service and customer experience to end-customers
- Mobileye is supplying the autonomous software and modification of the NIO vehicles with sensors for autonomous operations

### Basic facts about the project

- Location: Grorud Valley, Oslo, Norway
- Route type: Mixed traffic in a suburban environment
- Project duration: 3 years (Early 2023 to late 2025)
- Number of vehicles: 5 NIOs - with more to come?

### Special characteristics

- Collaboration with market-leading vendor of autonomous software, letting a 3rd party implementer manage locally
- More than a pilot project - ambitions to scale
- Contract commitment from all parties to go level 4 and remove the safety driver



## Project description

# Project partners and responsibilities



Vehicle provider

- Vehicle provider
- Maintenance contract
- Local vehicle contact point



Autonomous software provider

- Autonomous software provider
- ES8 retrofitted with autonomous sensory systems (lidar, radar, camera)
- Autonomous capability provider (decision engine, redundant safety systems)
- Deployment & data collection + validation
- Ongoing route changes
- Vehicle support tools



Implementation & operation

- Vehicle and route approvals
- Operations preparations, planning and execution
- In charge of safety profile and operations safety
- Daily supervision and remote steering (SAE level 2 and 4)
- Operational intelligence
- Data analytics



Public transport provider

- Public transport provider and owner of the service
- User journey / customer experience
- Route/area definition
- PUDO definition
- Pricing of service
- Marketing of service



Customer interface

- Passenger booking application
- Mission dispatch management
- Mission changes
- Ride pooling
- Mission support tool (Management dashboard)
- Direct integration with ME AV



Passenger in public transport

- User of autonomous public transport services
- User journey feedback (via Ruter)
- Technology adopter
- First public transport passengers in the northern parts of Europe to drive green and autonomous!

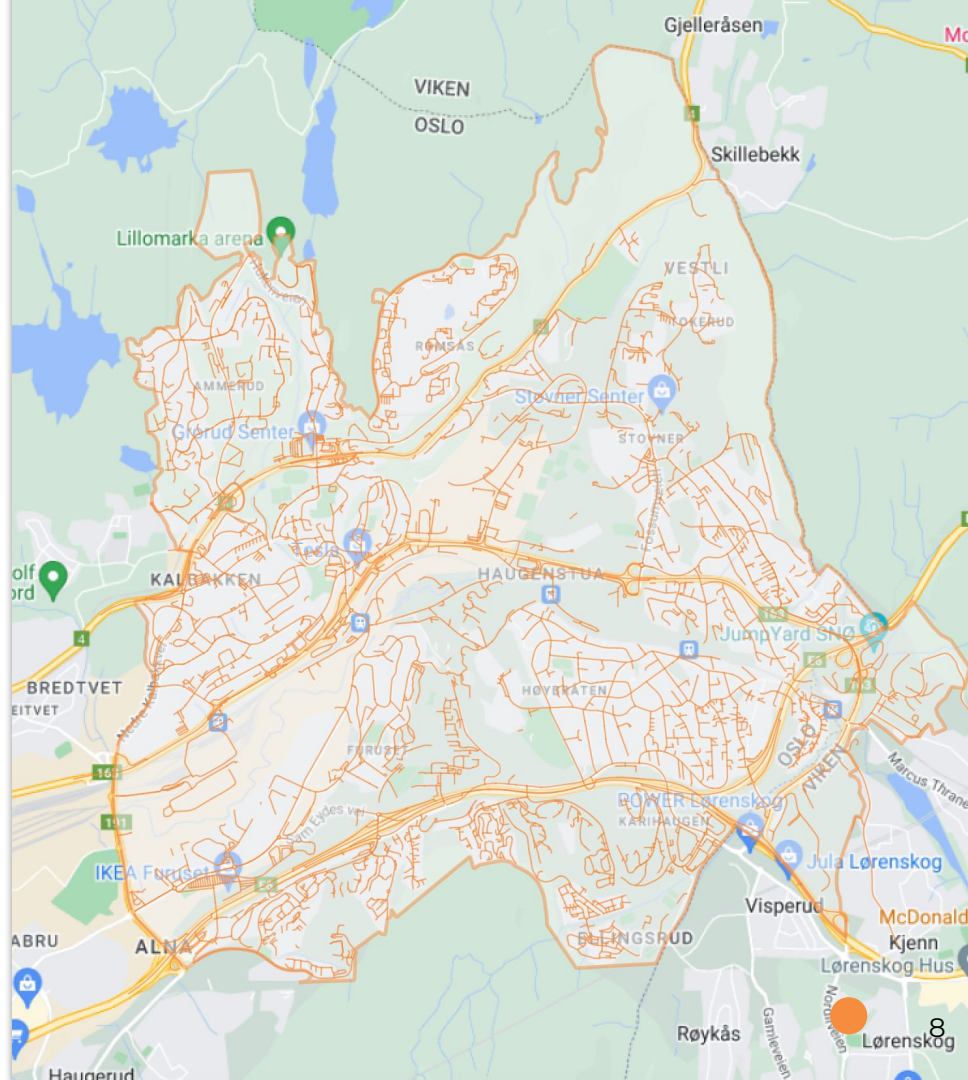
## Area Service area

### Local service provided

- Shared vehicles that can be ordered through an app
- Bookings are handled and executed continuously
- Ride sharing is based on received bookings along similar routes
- Detours for handling multiple customers at a time is based on an algorithm in the on-demand service

### Pre-defined geofenced area

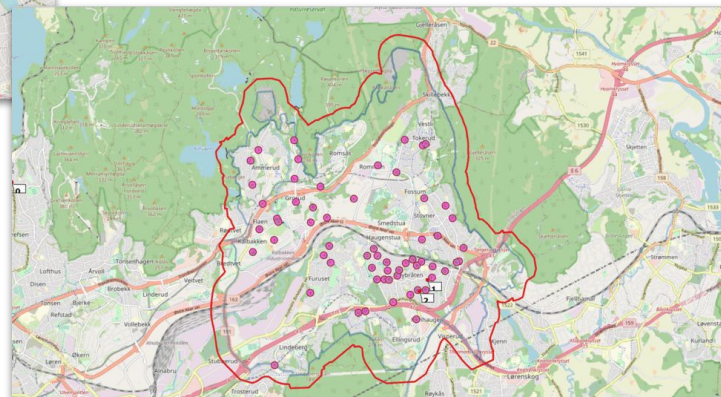
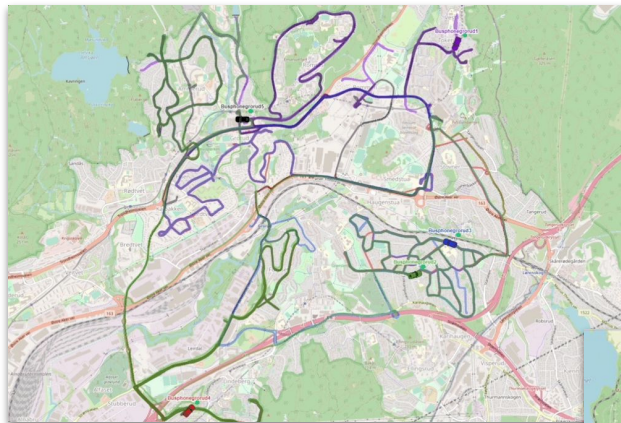
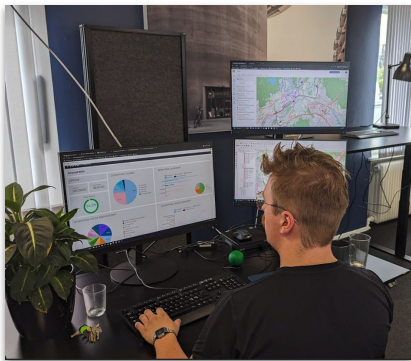
- 50 virtual pick up/drop off point (PUDOs) pre-defined throughout the area





## Deployment

# Data validation/collection phase



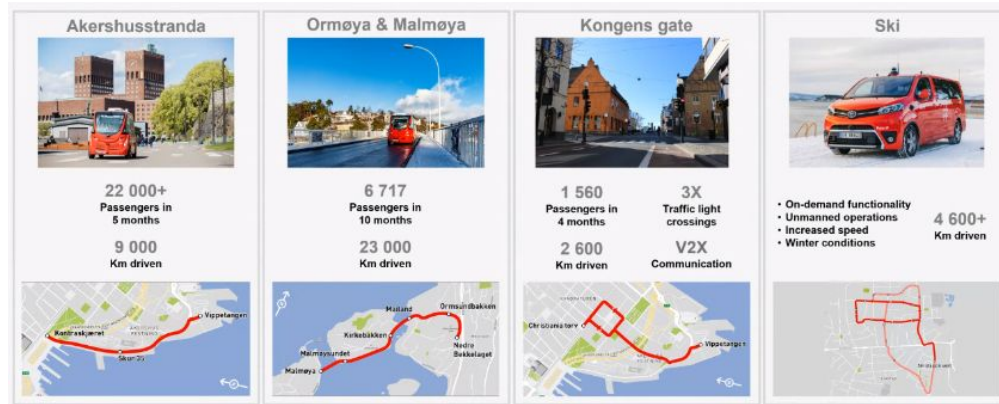
## Permits and applications

# Holo's history with Norwegian regulation

Holo has so far received permits in Norway for 5 independent projects with over 20 individual permits issued.

Some important learnings from that work:

- There is a one stop shop for approval with the NPRA (Norwegian Public Road Administration)
- Interactions with the authorities is dialogue based allowing for guidance, negotiation and faster resolutions.
- Authorities take on some on the responsibility
- The Norwegian approach is effective: Our NIO project is now first in Europe. It has overtaken efforts to get a permit in Germany



# Update on key projects 15.11.2023

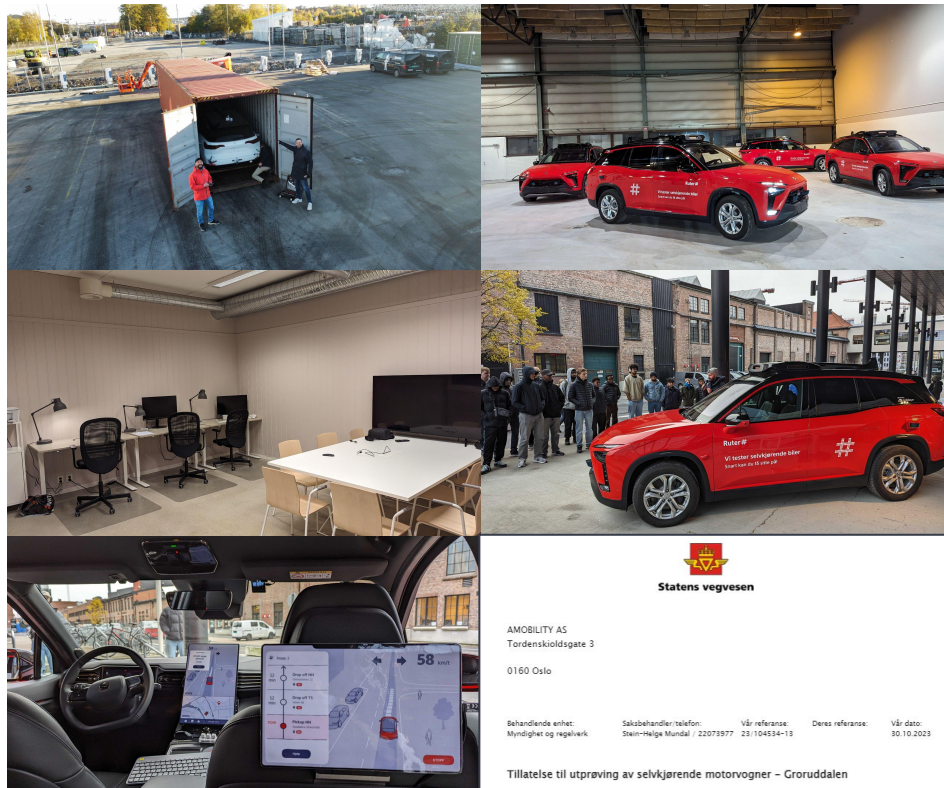
## Grorud Valley

### Recent events

- Arrival of vehicles in Norway
- Wrapping
- Garage ready
- Launch event
- Level 2 permit
- First safety operator hired
- Moovit LOS analyses (Level of service area)
- Upbringing

### Next steps

- Safety driver training
- Validation driving



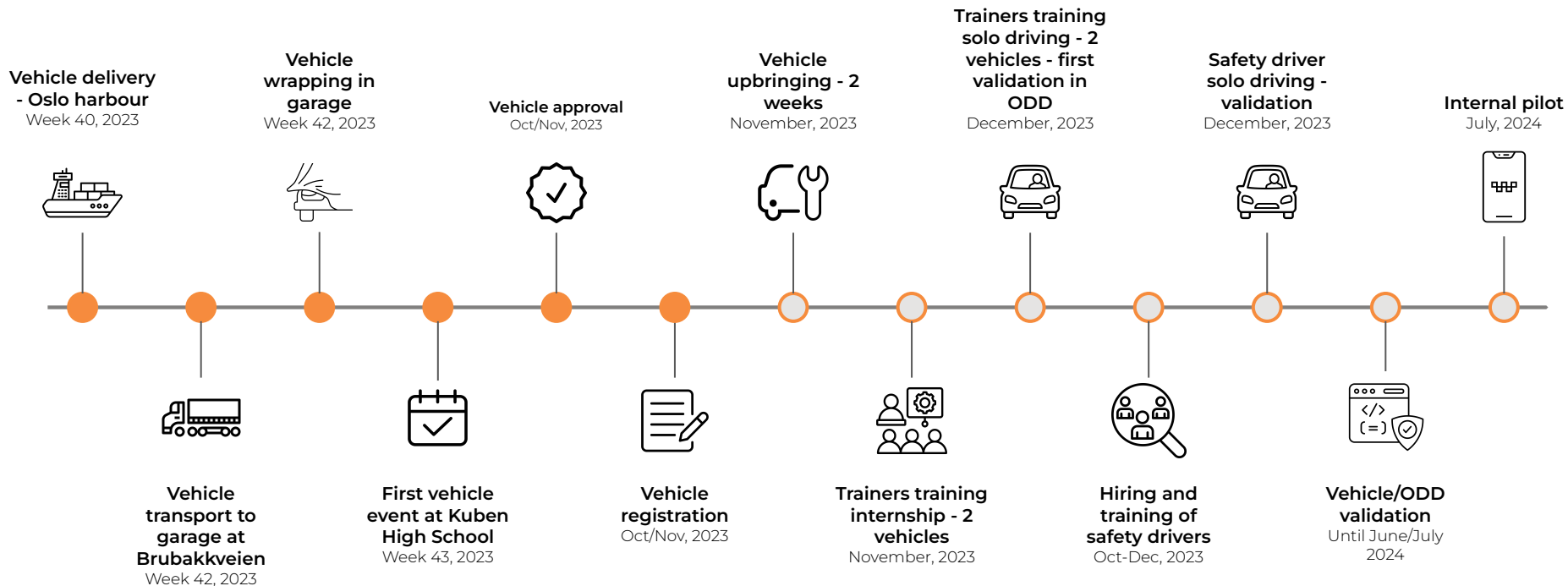
AMOBILITY AS  
Tordenskioldsgate 3  
0160 Oslo

Behandlingsenhet: Sakshandling/telefon: Vår referanse: Deres referanse: Vår dato:  
Myndighet og regelverk: Stein-Helge Mundal / 22073977 23/10/4534-13 30.10.2023

Tillatelse til utprøving av selvkjørende motorvogn - Groruddalen

# Timeline

## Vehicle upbringing in progress





# Vehicle Mobileye's software



*Urban environment*



*High-speed*



*Roundabout*

## Area

# Future developments in Grorud and greater Oslo

## Technological demonstration

A pilot project to establish the technological capabilities and future possibilities.

**Total AVs:** 4-20  
**Total area:** 22 km<sup>2</sup>

## Business viability

An established use case and economic sustainability allows for expansion

**Total AVs:** 20-250.  
**Total area:** 480 km<sup>2</sup>

## Demonstrated scaling

Successfully scaling in local municipalities will spread through the Oslo region.

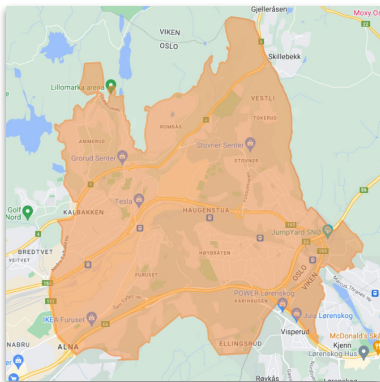
**Total AVs:** 20.000  
**Total area:** 6.920 km<sup>2</sup>

## Future possibilities

From Oslo, the service could expand through greater Oslo and Norway.

**Total AVs:** 30.000+  
**Total area:** 8.890 km<sup>2</sup>

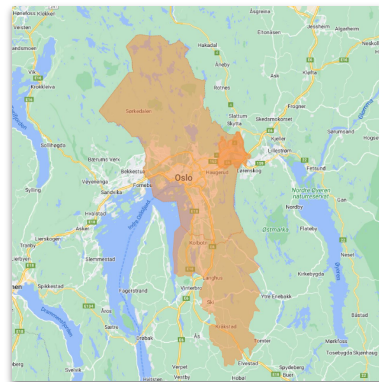
### 2022-2024



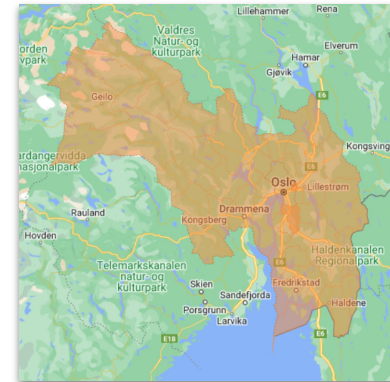
### 2023-2025



### 2024-2030

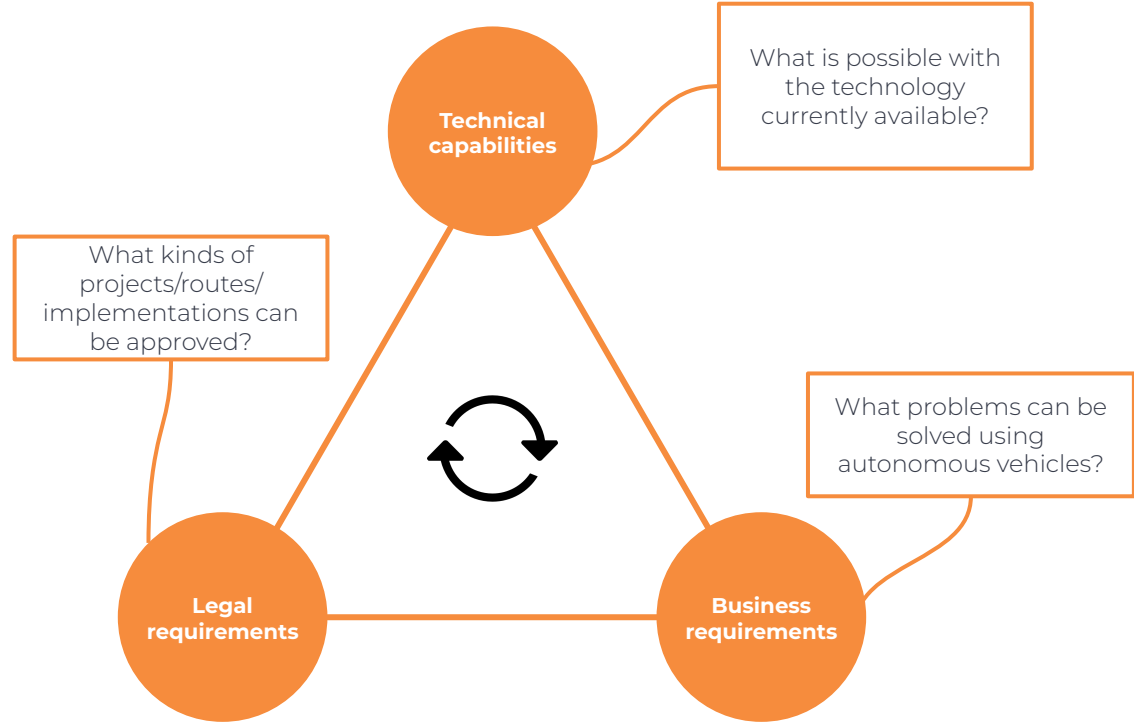


### 2030+



## Next steps - finding the right balance between technology, approvals and use cases

In order to move forward in creating a project or establishing a route or service, a balance between different considerations has to be found - what is possible vs. what is required?





## Contact

Christian Bering Pedersen  
CEO

[chbe@letsholo.com](mailto:chbe@letsholo.com)  
+45 21579342

