

QCMobility

Optimizing transportation via quantum computing

Exploring the potential of quantum computing for future mobility!

- Applications
- Quantum algorithms
- Optimization



Goals

- 1 We are researching the **potential of quantum computers** for critical use cases in the field of mobility
- 2 We are developing **toy-models** and **specialized quantum algorithms**
- 3 We are implementing **prototypes** on **quantum computing hardware**
- 4 We are building a **roadmap** for the deployment of **quantum computing** for mobility-related problems



Air transport

Tactical use cases (short-term planning)

- Flight path and slot optimization
- Optimization of flight cancellation

Strategic use cases (long-term planning)

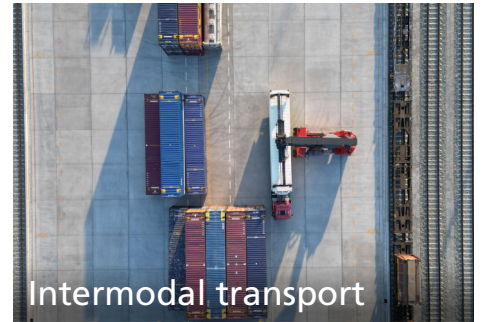
- Aircraft (tail) assignment optimization
- Crew scheduling and disruption management



Road transport

Optimization of **new mobility services**

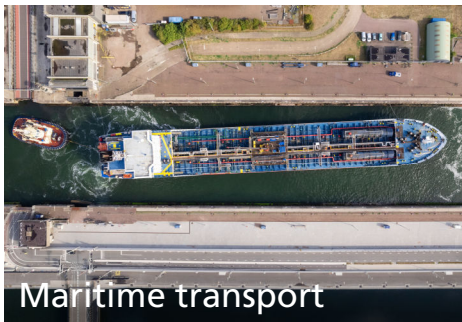
- Localization of virtual stops for demand-sensitive passengers and delivery services
- Tour optimization according to passenger demands (curbside pooling)



Intermodal transport

Control of **intermodal logistics chains**

- Optimal routing for ad-hoc bookings through freight terminal networks
- Central optimization of entire transport logistics chain



Maritime transport

Verification and validation of **automated/** highly **autonomous systems**

- Water lock optimization
- Fleet management
- Route/trajectory optimization



Rail transport

Verification and validation of **planning** and **scheduling processes**

- Short-term scheduling in rail traffic
- Strategic and tactical train path bookings
- Condition-based monitoring of track superstructure

Quantum Computing

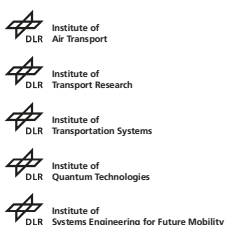
Quantum computing offers novel approaches to tackle **NP hard** problems. Therefore we

- identify **mutual problem classes** across different mobility domains
- implement **quantum algorithms** on **quantum computing simulators** and **hardware**
- apply **validation** and **benchmarking** schemes to quantum-based solutions using an application-oriented **software framework**

More information about the project on our website



A project of



Contractors



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