Leveraging ODD and Metrics for ADS Development and Testing

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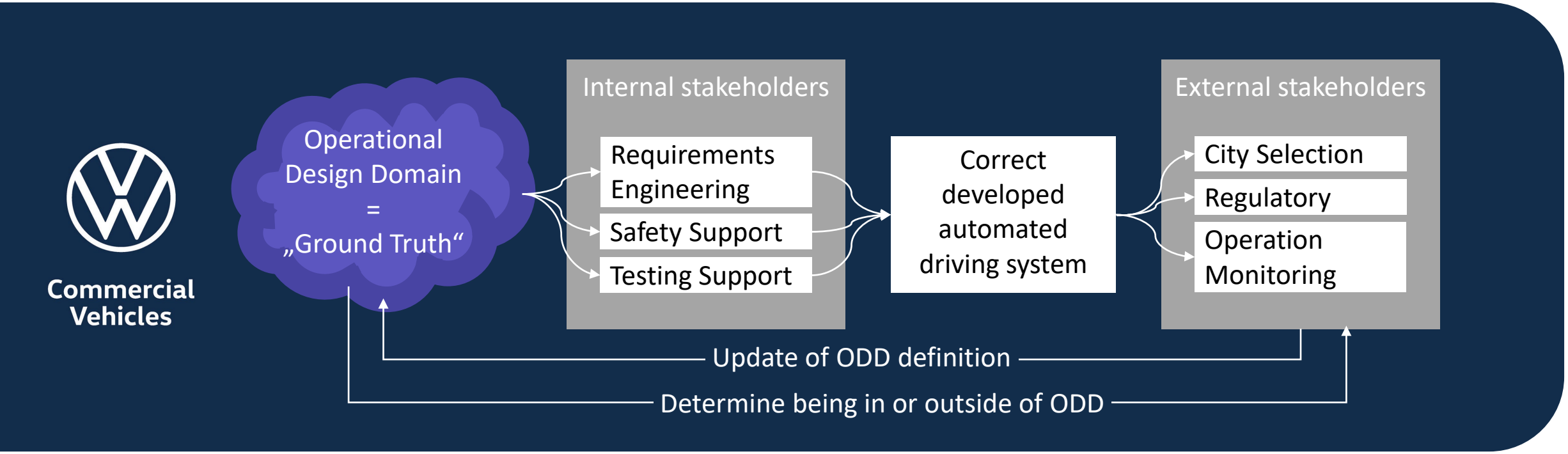
Stakeholders of ODD Use Cases

- Internal and external stakeholders for deploying automated driving systems.
- The **ODD** is the required comprehensive knowledge representation.



External ODD Use Cases

- City Selection
  - Modeling of city ODD requirements
  - Modeling of city conditions (Operational Domain)
  - Defining coverage metrics
- Operation Monitoring Support
  - Analyzing of driving logs and sensor data
  - Validation of compliance with ODD requirements
- Regulatory
  - Communicate ODD and metrics with officials
  - Quantify compliance with ODD requirements

→ Standardization of communication language and metrics

→ Human and machine-readable language for both ODD and metrics

Internal ODD Use Cases

- Requirements Engineering
  - Modeling of supported ODD for each ADS version and city/region
  - Modular language which enables assembling libraries from multiple sources
- Safety Support
  - Scope of HARA
  - Modeling of hazards
  - Formal specification of hazardous scenarios
- Testing Support
  - Modeling of test scope
  - Scenario generation and variation (ODD-specific, city/region variations)
  - Results interpretation (metrics)

→ Human and machine-readable formal and modular requirement specifications

→ Shared taxonomy across all departments and vendors

Need for Standardization

- Items to standardize:
  - Detailed taxonomy and modeling guidelines
  - ODD rule and metrics specification language
  - Circumstance and situation specification language (for Operational Domains)
- The standards need to provide:
  - Support both external and internal communications
  - Modular and extensible
  - Human- and machine-readable
  - Readable by non-technical stakeholders (e.g., public authorities)

Further Public Information

- Papers and documents available for the public:
  - ASAM OpenODD concept project
  - Irvine, et.al. “A Two-Level Abstraction ODD Definition Language: Part I”
  - Schwalb, et.al. “A Two-Level Abstraction ODD Definition Language: Part II”
  - Rohne, et.al. “Implementing ODD as single point of knowledge to support the development of automated driving”
  - Schwalb, et.al. “Validating Autonomous Behaviors using Partially Specified Ambiguous Requirements”