Drive-by-wire kit from e:fs Techhub

Transform any vehicle into a **testbed for innovation**

Seamlessly integrate the LeanDRA drive-by-wire kit with your existing hard- and software to develop, prototype, and validate automated driving functions faster and safer.

THE PROBLEM

The future of automotive testing will be defined by fast, data-driven, and software-centric practices that span the entire lifecycle of the vehicle

Current tools for testing and validating advanced driving functions are fragmented and outdated, hindering efficient development.

OUR SOLUTION

A comprehensive solution designed for development, prototyping, and validation of driving functions. Using existing hardware, software and connectivity, allowing by-wire control over every aspect of the vehicle.

THE CHALLENGES

Six critical challenges shaping the future of automotive testing

Accelerated Cycles

How can we keep pace with shrinking development timelines without compromising quality?

Early Stage Testing

How can features be tested while still being in development?

Showcase upcoming features

How can cutting edge vehicle functions be presented to the public in a production-like setup?

F&E Application

How can we develop, test and showcase the vehicle functions of tomorrow?

Customer Experience

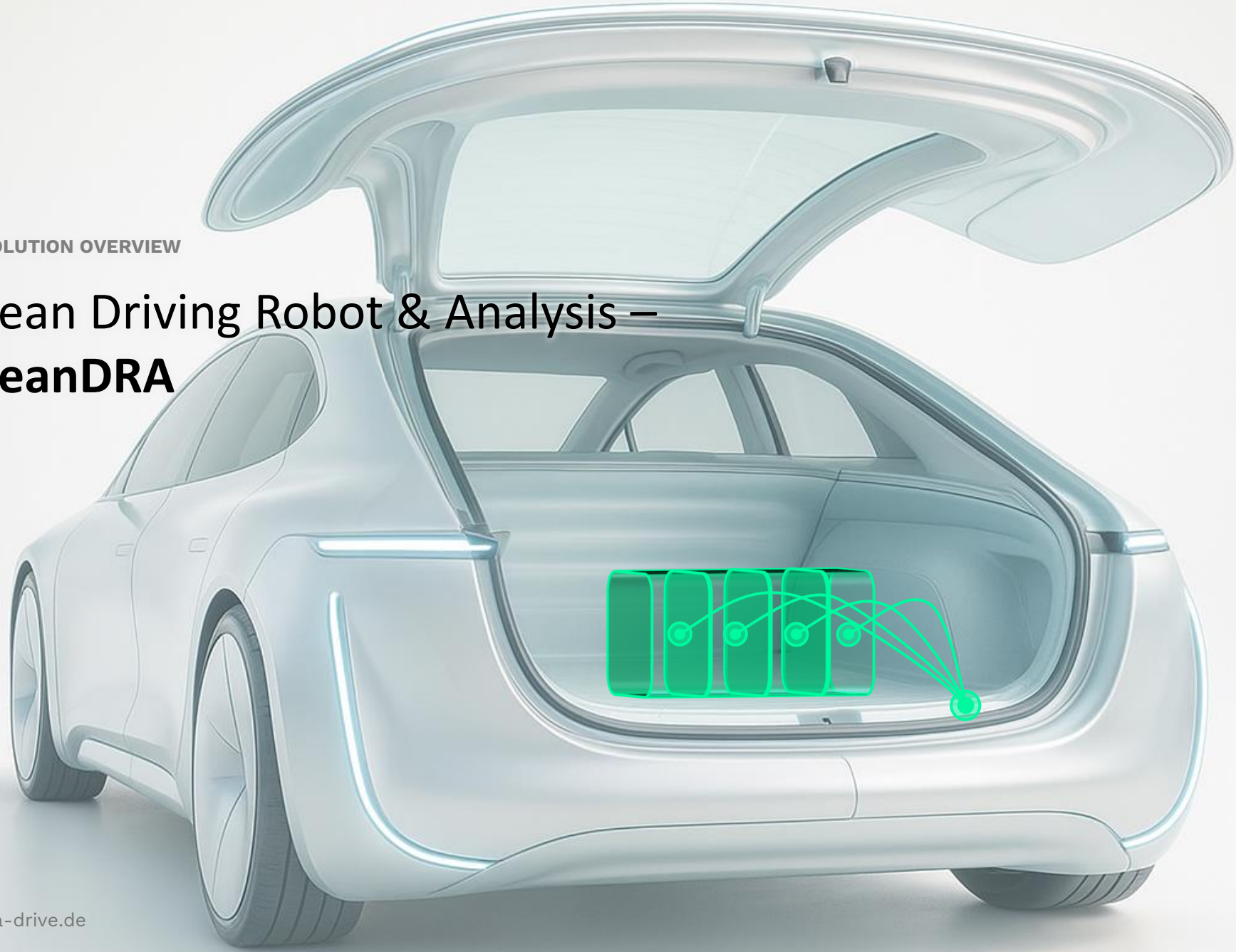
How can we assure a great customer experience with newly developed automated driving features?

Continuous Validation

How can we maintain ongoing, holistic testing throughout a vehicle's lifecycle, especially post-launch?

SOLUTION OVERVIEW

Lean Driving Robot & Analysis – **LeanDRA**



FEATURE OVERVIEW

LeanDRA

Leverage our efficient, cost-effective drive-by-wire solution to quickly and safely convert vehicles into autonomous test platforms.

Quick Setup

Transforms any car into a test vehicle in minutes

Compatibility

Works with most VW-group vehicles

Full Control

Manage gears, lights, indicators and more

Precision control

Precise acceleration, dynamic steering and emergency stop control

Data Recorder

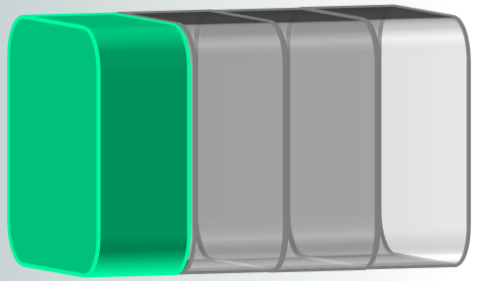
Record and automatically evaluate repetitive testing tasks

Trajectory

High-accuracy path tracking

COMPONENT DEEP DIVE

by-wire Vehicle Interface



Robustness

Integrated deeply into the vehicles bus systems

Great Control

Supports all of the vehicles driving functionalities

Extended possibilities

Manage gears, lights, indicators and even HMI and acoustic driver feedback

Safety

LeanDRA offers a robust safety system. The driver can take control in any situation

Seamless integration

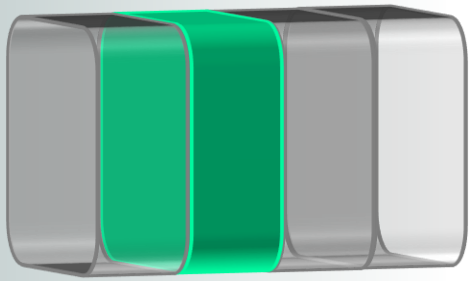
Easily integrate LeanDRA into your existing equipment.

Easy access

Communication with the LeanDRA System via open CAN or Ethernet Interface

COMPONENT DEEP DIVE

Software platform



Build for ROS

Includes ROS Nodes for easy connection with your existing driving stack

High performance

Precise and almost unlimited control of the vehicle

Vehicle health

Offers real time vehicle diagnostics and system health checks

Adpative

Can be integrated with every existing infrastructure

Path following

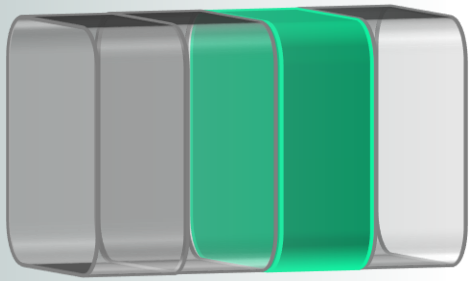
Includes a high-performance MPC path follower for optimized control

Record and playback

Easily record manual scenarios and playback with LeanDRA

COMPONENT DEEP DIVE

Easy Data Managament



Continuous recording

Continuously records all relevant driving and system data

Automation

Data processing can be automated with test analysis and pdf export

Post Test

Enables post-test insights without additional effort

Secure

No external data transfer. All data processing is local

Time-to-decision

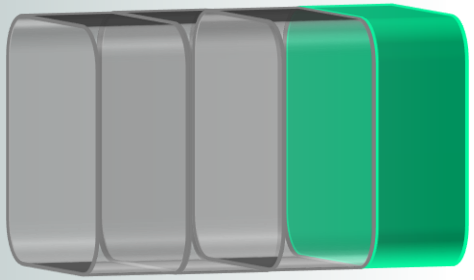
Reduces time-to-decision for test results through continuous and automated processing

Data Logging

Can be used passively to record vehicle and driver data

COMPONENT DEEP DIVE

Compact and extendable



System size

Small system that can be install almost everywhere within the vehicle

Upgradable

Offers on-demand development service for specific use-cases.

Show case ready

System can be installed completely invisible

Product Support

System is installed by e:fs and includes test runs and customer training

Extendable

Additional features can be developed as per customer request

Cost effective

Cost effective solution for a large scope of applications

LeanDRAs value in a nutshell

Seamless Integration and Control

Easily transform any production vehicle into a test vehicle. Connect via CAN or Ethernet to control all vehicle functions with your own software

Comprehensive Customization and Analysis

Tailor the system to your use case and gain insights into driver interaction and vehicle behavior to make data-driven decisions.

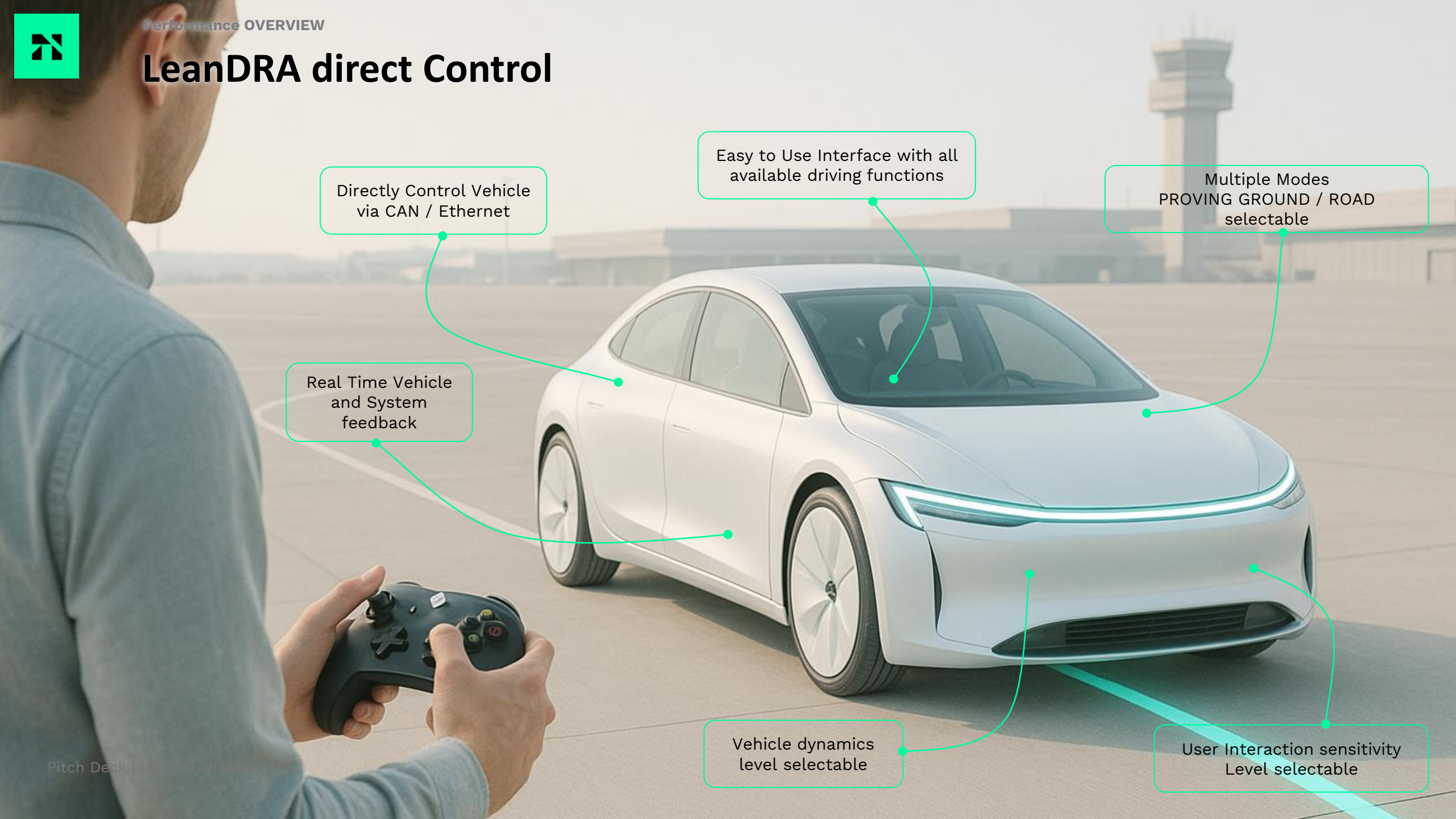
Compact and User-Friendly Design

A modular setup that fits discreetly in the vehicle, providing a seamless, production-like experience for new driving functions.

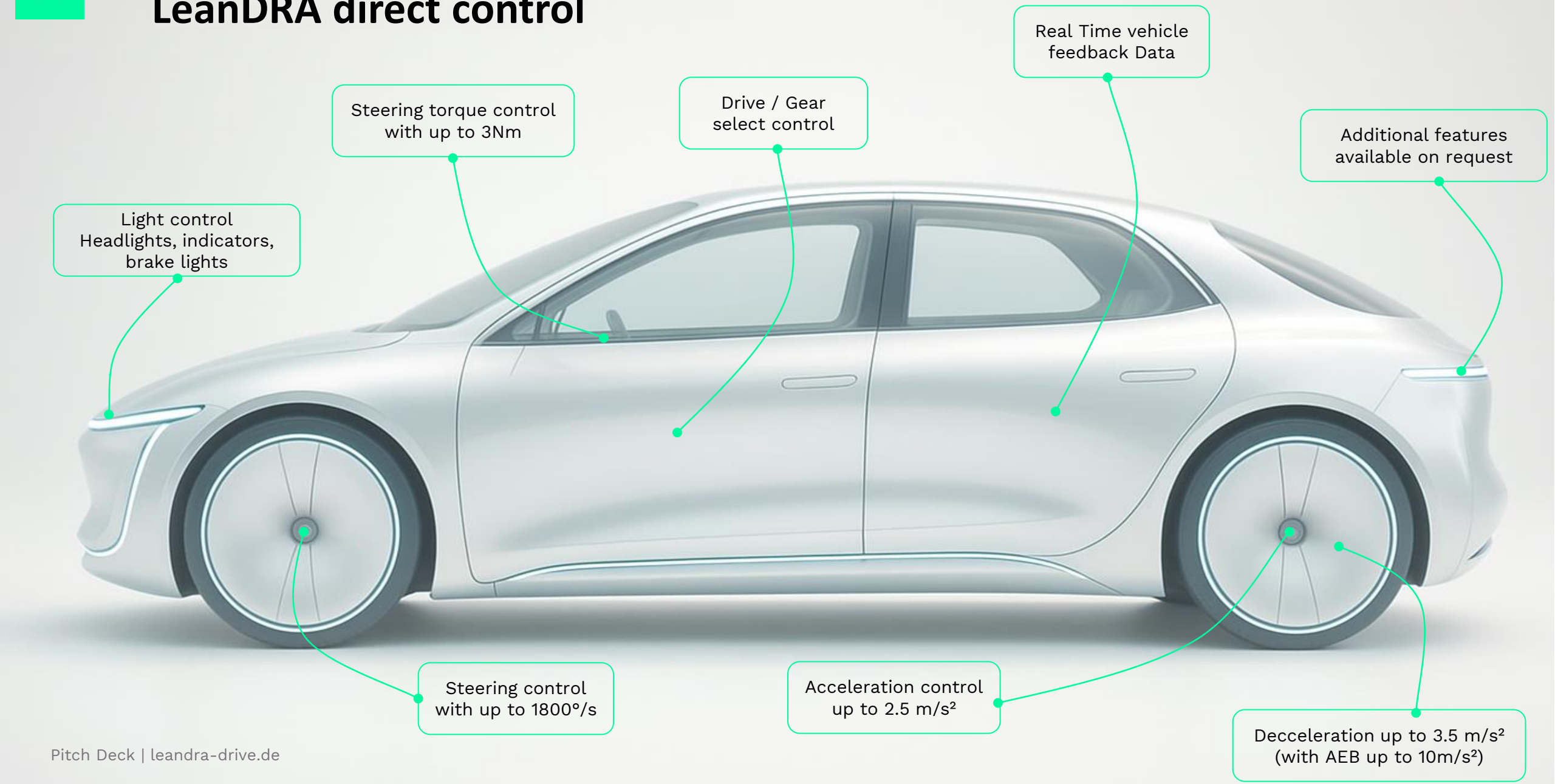
LeanDRA

Performance & Feature Overview

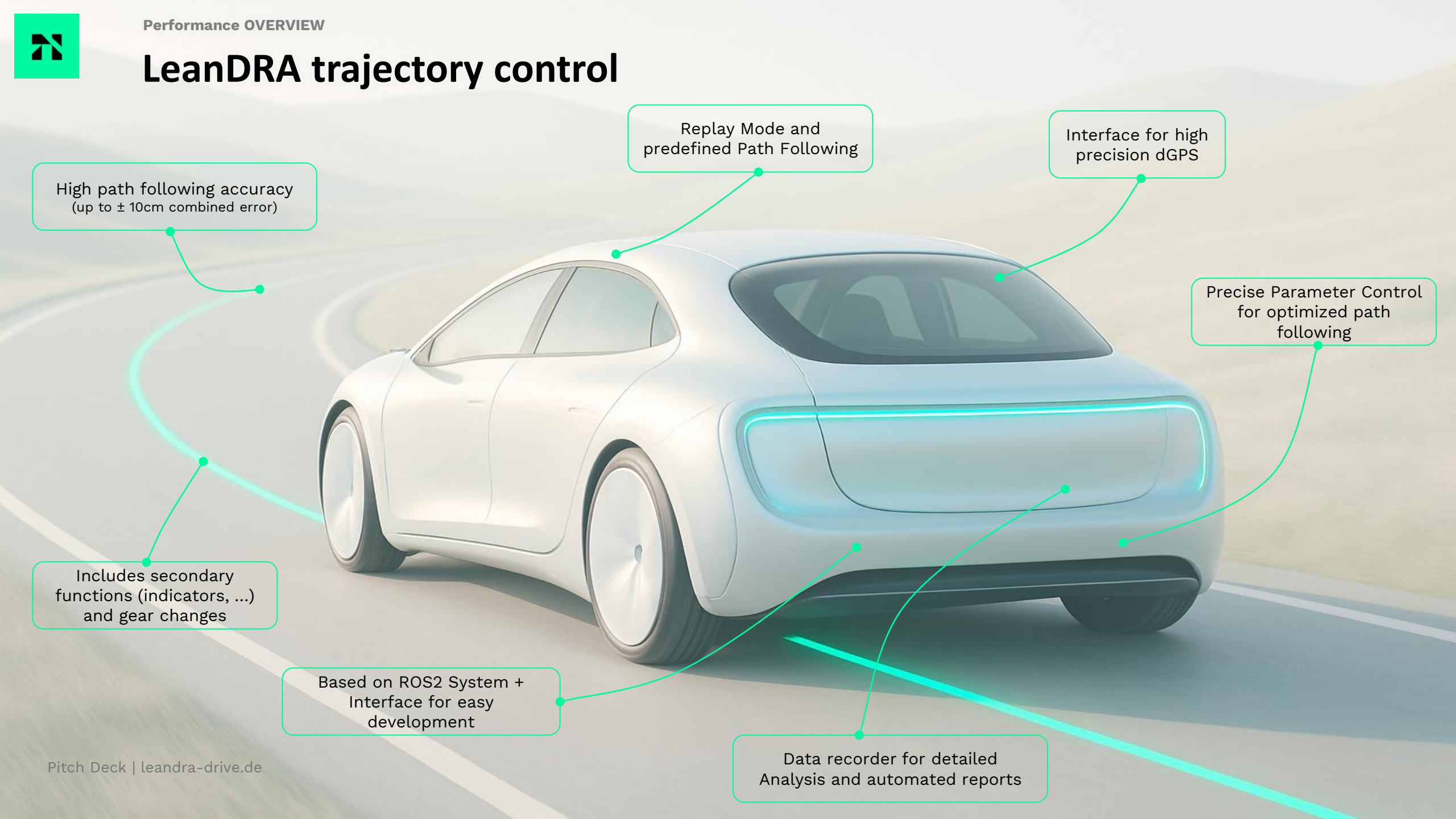
LeanDRA direct Control



LeanDRA direct control



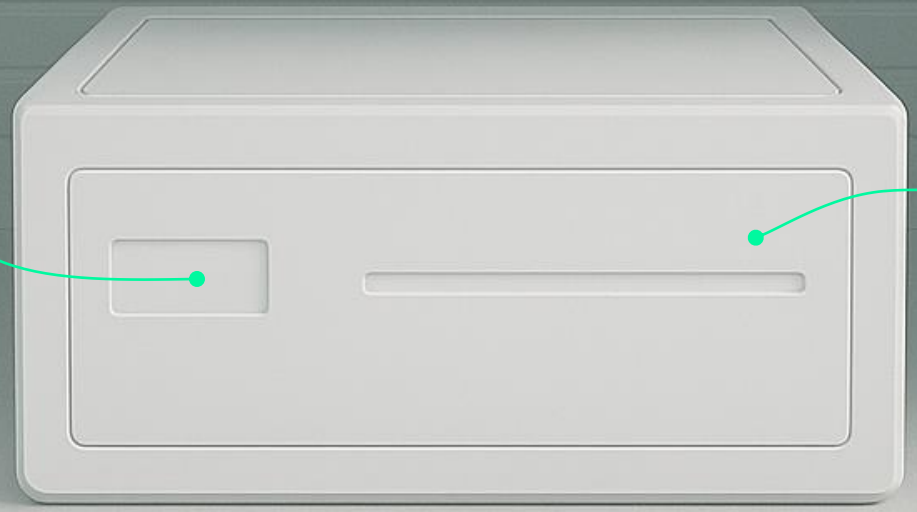
LeanDRA trajectory control



LeanDRA system overview

Real-time System

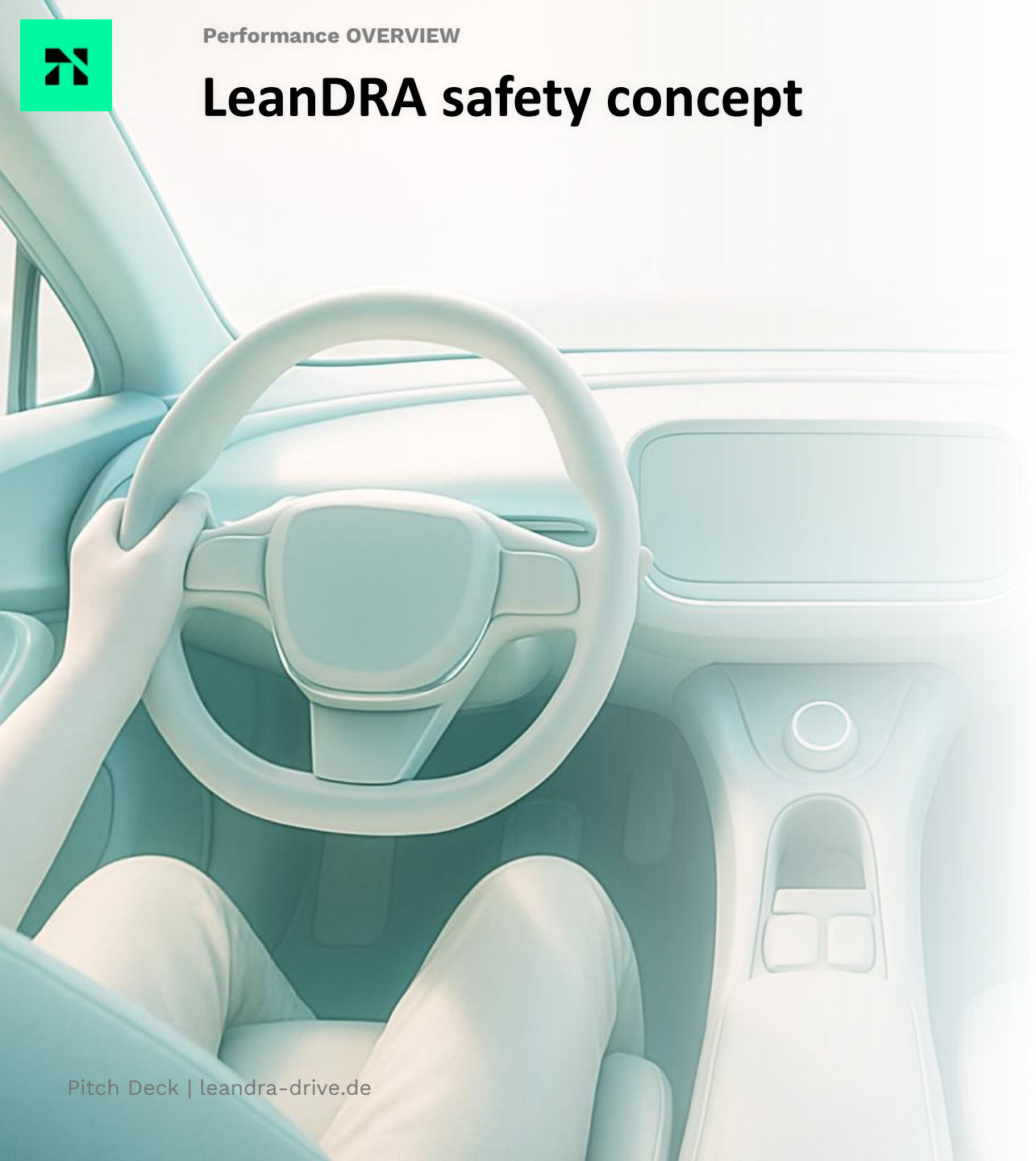
- Safety focused design
- Handles all communication with the vehicle
- Calculates control Commands
- Monitors vehicles response to ensure safe operation
- Monitors vehicle data and error handling
- Ensures driver commands always have priority
- Extensive safety concept



Linux-based ROS2 System

- High processing power for Application Layer
- Handles high level Path following with MPC (model predictive control)
- Provides User Interface via Web-GUI
- Provides Interface for Map selection and Replay Mode
- ROS2 Interface for customer application
- Data Analysis and Reporting

LeanDRA safety concept

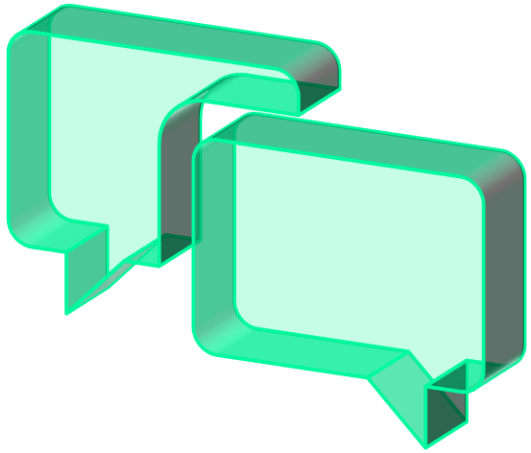


- Constant monitoring of all relevant system values for safe application

- Fallback to manual drive possible at any time:
  - As soon as the driver interacts with the vehicle, the system will turn passive and the driver hast full control.
  - Disconnect of the LeanDRA System from the vehicle automatically possible
  - External e-Stop Systems can be connected*
  - Redundant brake robots can be controlled via LeanDRA*

* Feature availabe on request and dependant on hardware

Questions?
Your LeanDRA Contacts



PRODUCT MANAGER LEANDRA

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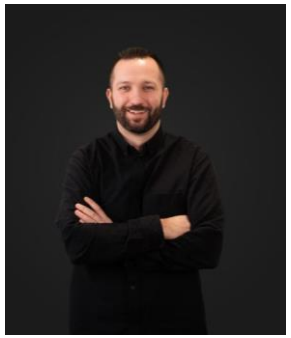
Contact me



HEAD OF PRODUCTS AND INNOVATION

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