



ZPS 2025: How Driving Simulators Accelerate Alpine's Product Line-up Development

AGENDA

Context & Ambition

From Task Force to Simulation Strategy

A Unique Simulation Sprint

Compact FSS & DIM250 Use Cases

A Connected Simulation Ecosystem

Conclusion – Simulation as a Backbone

CONTEXT & AMBITION

- ✓ **Alpine**

Premium sports brand within the Renault Group

- ✓ **From Icon to Line-up**

From the A110 to a full range of high-performance vehicles

- ✓ **Ambition**

Build a sustainable, innovation-driven brand that delivers excellence in performance and customer experience



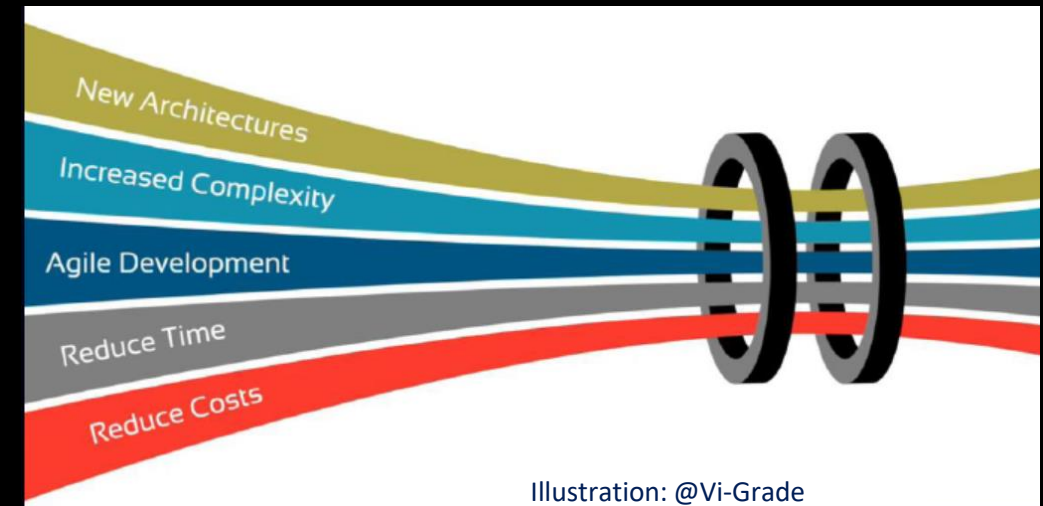
CONTEXT & AMBITION

✓ Development Challenges

- Strong pressure to reduce development **time**
- Reduced **physical support** and resources
- Integration of multiple breakthrough **innovations**

✓ Strategic Shift

→ Need for new methods to **accelerate**, **de-risk**, and **converge earlier**



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FROM TASK FORCE TO SIMULATION STRATEGY

✓ Internal Task Force

Lead time reduction / Limited physical support

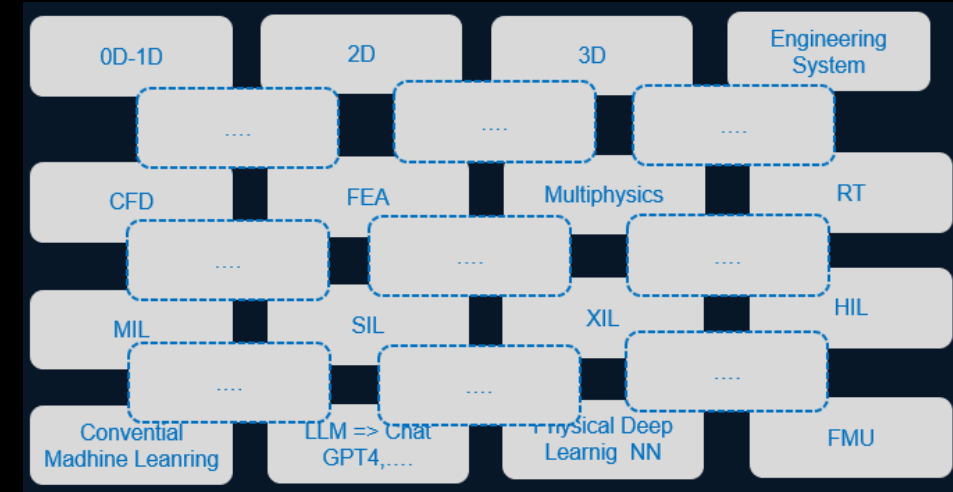
- Increasing system complexity & innovation load

✓ Strategic Approach

→ Shift from test-driven to simulation-led development

✓ Simulation Levers Identified

- Xil, ...
- **Driver-in-the-Loop (DiL)** ← focus of this presentation



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A UNIQUE SIMULATION SPRINT

✓ A Fast-Track Initiative

- Deploy Driver-in-the-Loop capabilities **quickly**
- Build methods, tools, and team capabilities

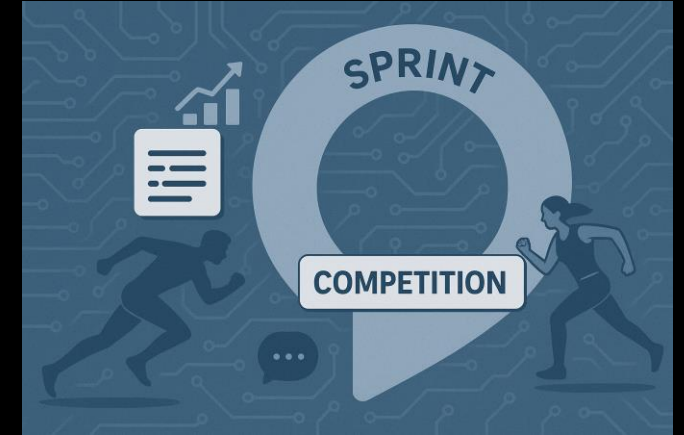
✓ Simulators Installed

- Compact FSS
- Static Simulator → DIM250

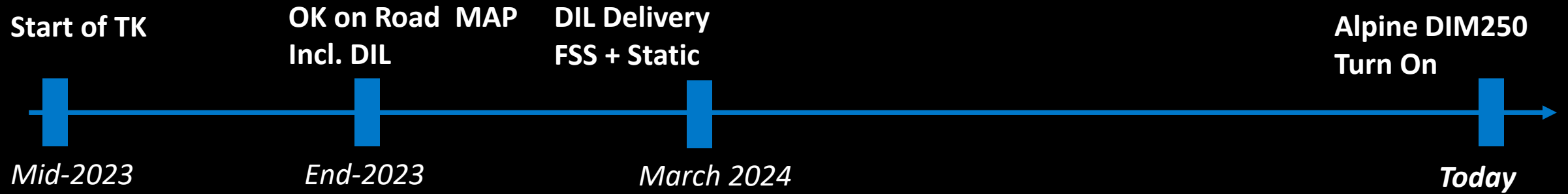
✓ Dual-Track Strategy

✓ Outcome

- Operational simulators **in record time**
- Simulation embedded into decision loops **from day one**



FROM AUDIT TO OPERATIONS: THE TIMELINE



FFS Training (*NVH Team*)



Static Training (*Dyn Vehicle Team*)

Dynamic DIM250 Training (*Dyn Vehicle Team*)



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SIMULATOR USE CASES

✓ Compact FSS – NVH Use Cases

- **Target Consolidation & Benchmarking**
 - Digital twins of competitors
 - Definition of realistic NVH load case and targets setting
- **Glazing Selection**
 - Aeroacoustic impact on interior noise and perceived comfort
- **IPT Mounting System**
 - Rubber isolator typology & stiffness tuning
 - Key decisions without prototypes



SIMULATOR USE CASES

✓ DIM250 – Dynamics & Handling Use Cases

•Virtual Tire Development (with Michelin)

- Joint virtual tests to assess grip, steering feel, ...
- Early convergence on tire specs

•Chassis Geometry Definition & Loop-Back Validation

- Evaluation of toe, camber, caster & linkage effects
- CAD design re-tested in simulator → fast iteration with design office



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FACILITY LAYOUT & INTEGRATION

- ✓ **Strategic Co-location of Validation Tools**
 - Simulators installed in a dedicated zone, alongside:
 - HiL benches (Hardware-in-the-Loop),...
 - Other key real-time test systems

- ✓ **Purpose-Built Environment**
 - Shared infrastructure
 - Physical proximity to engineering teams

- ✓ **Why It Matters**
 - Short feedback loops
 - Facilitates multi-domain
 - Immediate debugging & iteration across disciplines

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CONCLUSION: SIMULATION AS A BACKBONE

✓ **Simulation supports the entire development cycle**

- Not just upstream: complements physical tests throughout the V-cycle
- Enables robust, data-driven decisions from concept to final validation

✓ **Short-loop collaboration with engineering teams**

- Iterative workflows with design office & suppliers
- Faster convergence on shared KPIs (NVH, dynamics, UX)

✓ **Accelerating Innovation**

- Simulation enables earlier exploration of breakthrough ideas
- Reduces risk when integrating disruptive technologies

✓ **From reactive to predictive development**

- Anticipate issues before they arise
- Shift mindset: simulate to define, not just to confirm

