AUTOMOTIVE SUMMIT 2015

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DRIVING EMBEDDED EXCELLENCE

ETAS

Content	
1	Introduction to ETAS
2	Virtualization Technology
3	Current Situation in Regulatory Testing
4	Case Study

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Leading Provider of Solutions and Services for Embedded Systems

- ETAS with over 850 associates is part of the Bosch Group
- ETAS is truly international – with 23 offices in 13 countries around the world
- ETAS subsidiary ESCRYPT is a specialist for embedded systems security

ETAS Customers and Domains	ESCRYPT Customers and Domains
Trusted by OEMs, tier one and ECU suppliers, as well as engineering service providers:	The ESCRYPT customer base includes:

ETAS Customers and Domains

Commercial Vehicles

Automotive Heavy Duty Engines

Railway **Powertrain**

Construction Machines

Consumer Electronics

Off-Highway

ESCRYPT Customers and Domains

Automotive

Mobile Machines & Transportation

Energy

Consumer Electronics   Mobile Devices

Industrial Automation

Financial & Government Logistics

Health Care

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Software Engineering	Test and Validation	Measurement, Calibration, Diagnostics	Embedded Security escrypt	Real Time Applications

ETAS Products

Consulting and Engineering Services

Virtualization Technology

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1st Class Aero Plane vs Hi-End Vehicle

MLOC

B-787 Dreamliner	Hi-End Car	Estimation
14	100	300
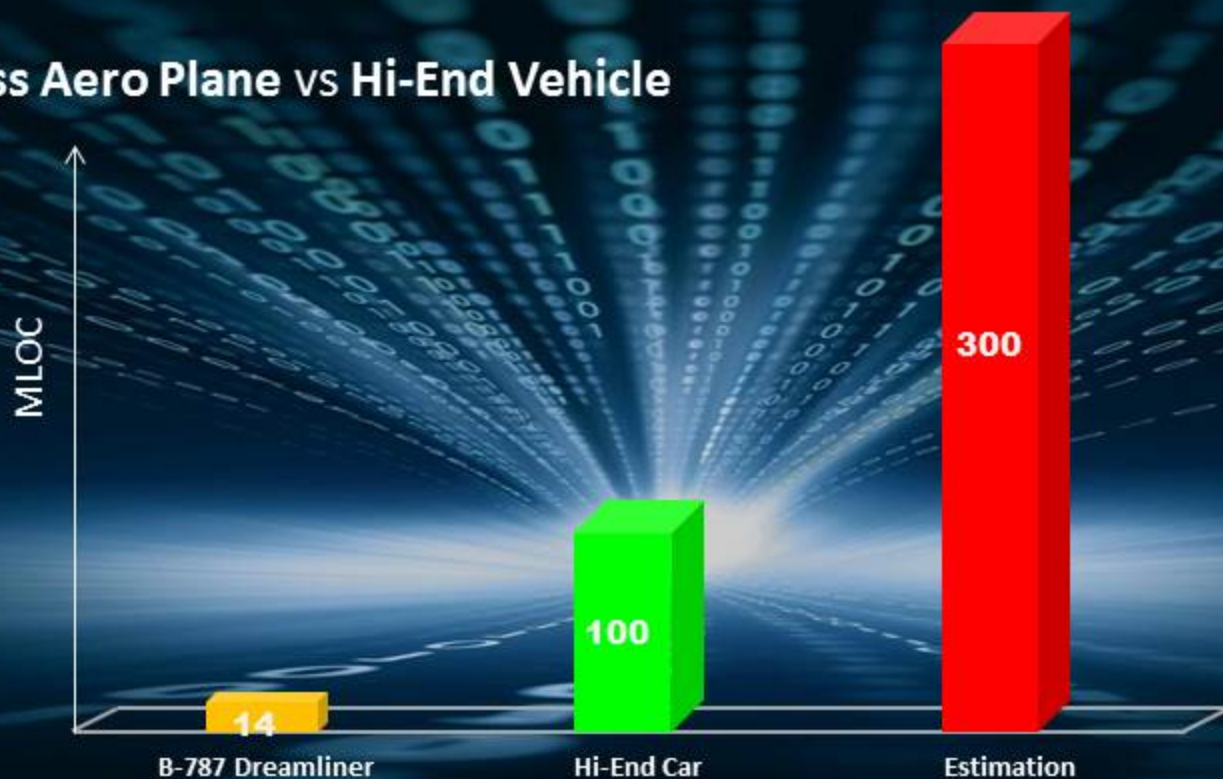
Source:
"Codebases", Information
is Beautiful, Nov 2014

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Feedback Loops in the standard V-Model ...

Specification, design & implementation

Virtual integration, test & validation, calibration

Integration, test and validation, calibration

System & ECU Network

long reaction time

Sub-System & ECU Network

long reaction time

ECU

long reaction time

Function / Composition

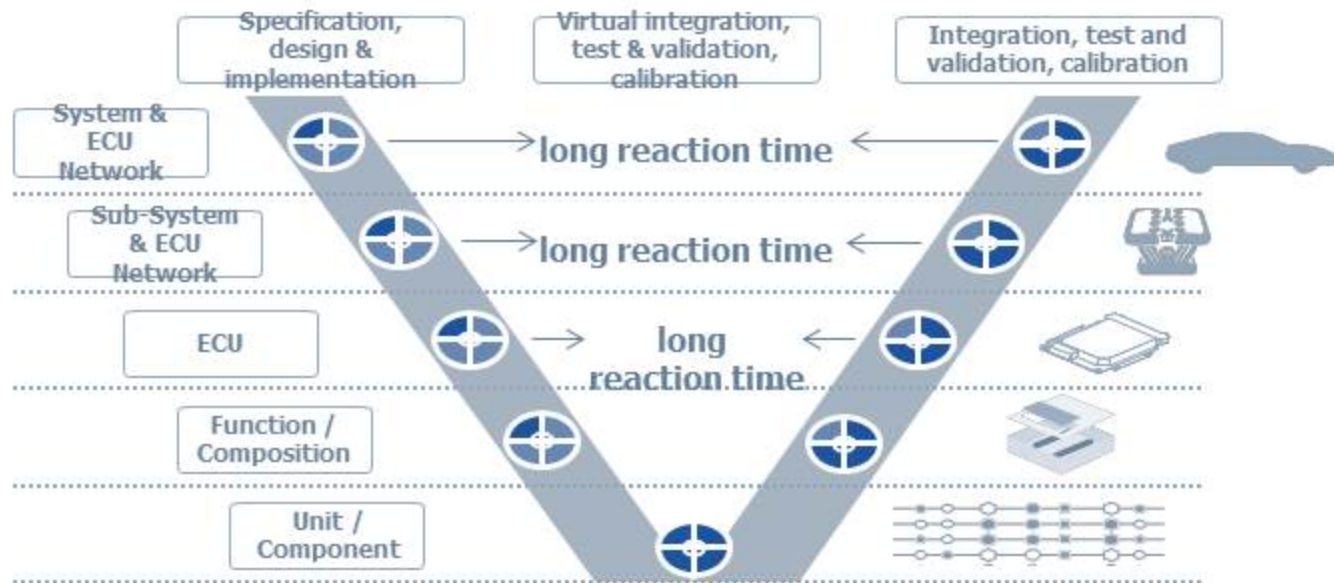Unit / Component
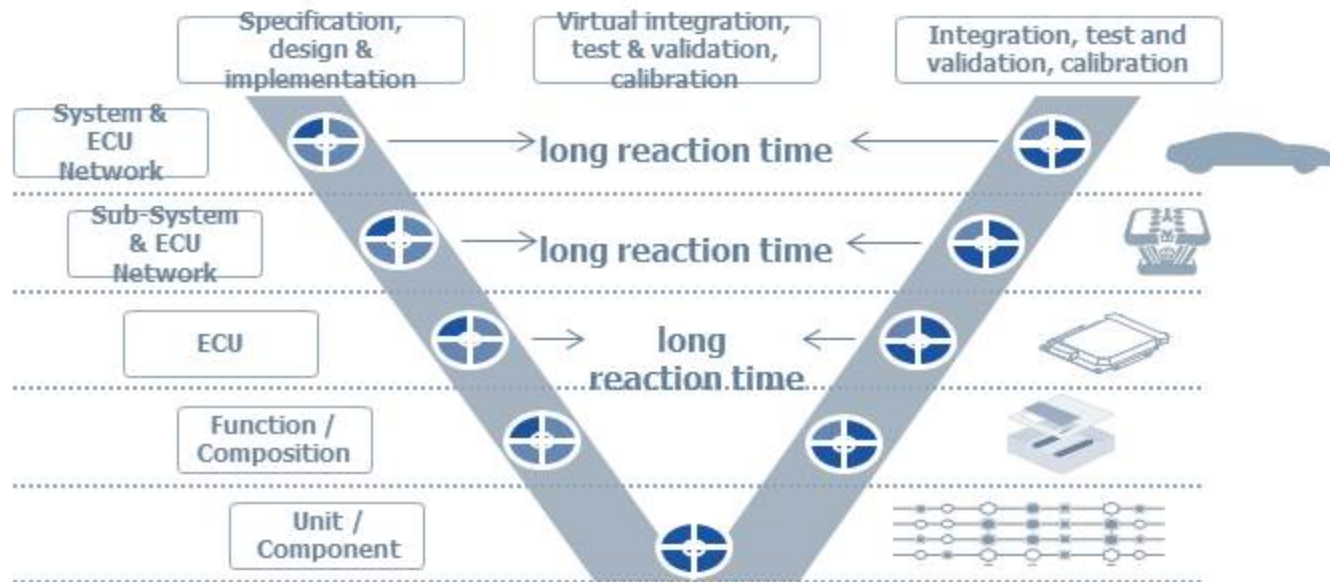
... require **hardware prototypes** for validation purposes

... result in **long reaction times** through late validation

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Solution approach "Virtualization" ...

Specification, design & implementation

Virtual integration, test & validation, calibration

Integration, test and validation, calibration

System & ECU Network — long reaction time

Sub-System & ECU Network — long reaction time

ECU — long reaction time

Function / Composition

Unit / Component

... object under test can be verify **without prototype**

... reduce reaction time, increase quality

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Solution approach "Virtualization"

– **Frontloading** through **early** execution of **debugging, validation, verification and calibration without** complete target **hardware** being available.

– Object under test and its environment can be **simulated** through different phases of the **V-cycle.**

– Target is to **increase development efficiency** by
  • **reducing** development and reaction **time**
 • **reducing** development **costs**
  • **increasing quality**

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LABCAR
— a powerful and flexible test system.

LABCAR

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Regulatory Testing

REAL Car & REAL Environment
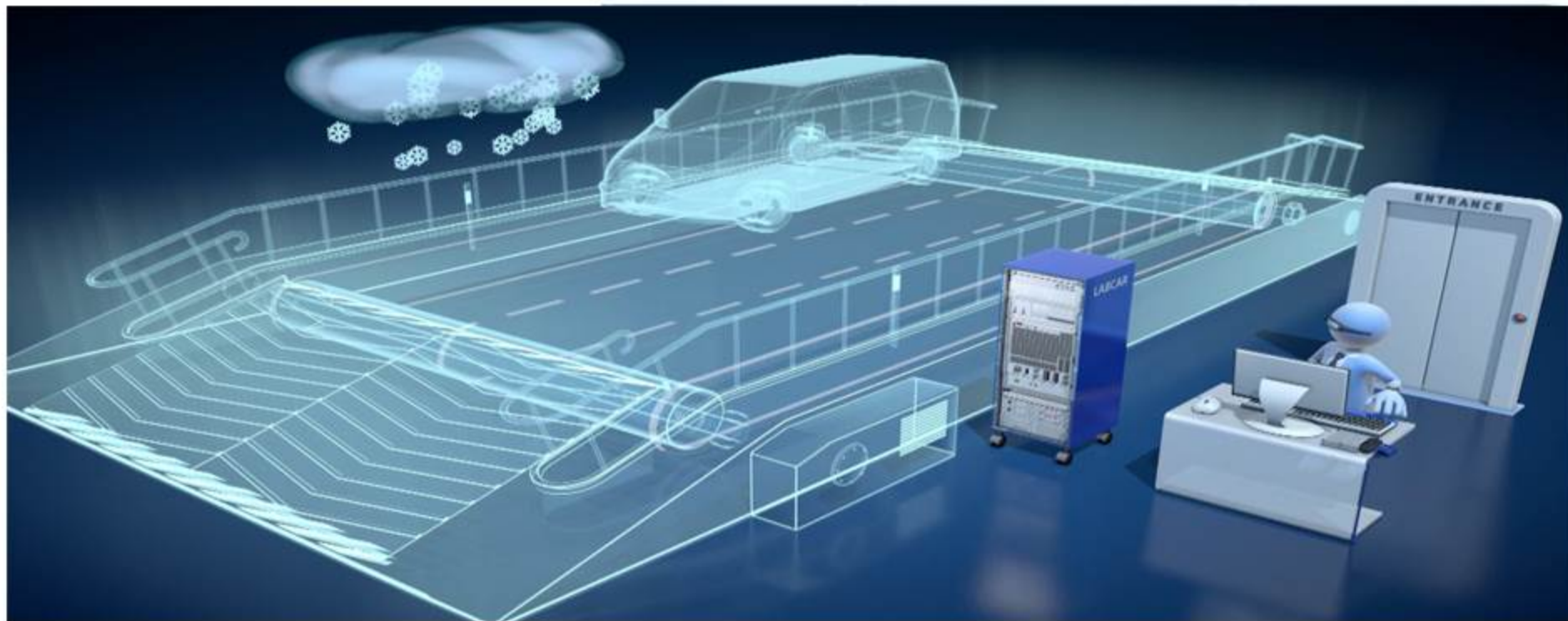
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Since the end of 2009, ECE regulations have allowed the use of CAE methods for ESC homologation, and in North America, the exemption from FMVSS126 compliance for aftermarket parts was phased out in 2012. Following these legislative changes, several original equipment manufacturers, aftermarket companies and ESC suppliers are using vehicle dynamics computer simulation methods to predict ESC performance and homologate vehicles.

http://papers.sae.org/2015-01-0021/

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Simulation dataset vs In-vehicle testing result
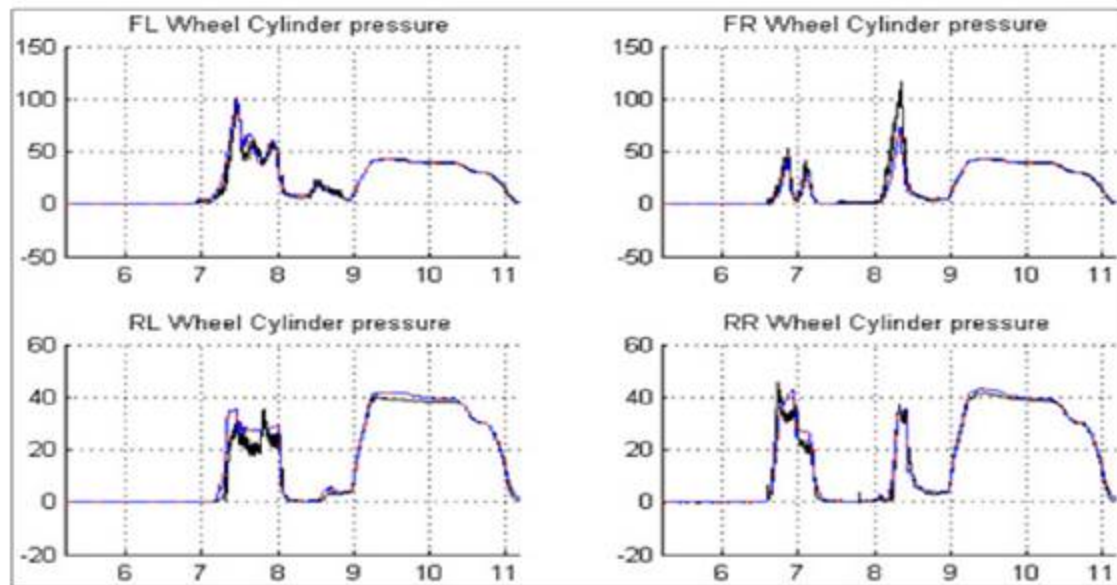
Brake line pressures during double lane change at 100 kph
(In-vehicle test = black/blue, simulation = red).

http://papers.sae.org/2015-01-0021/

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Summary

Virtualization Technology can improve efficiency of the regulatory testing by

- **Reduce Time,** no need to wait for testing prototype

- **Reduce Costs,** reduce number of hardware

- **No Compromise on Quality**

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Thank you

Q & A

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