Real-Life Measurements as Precondition for realistic Test bed Tests

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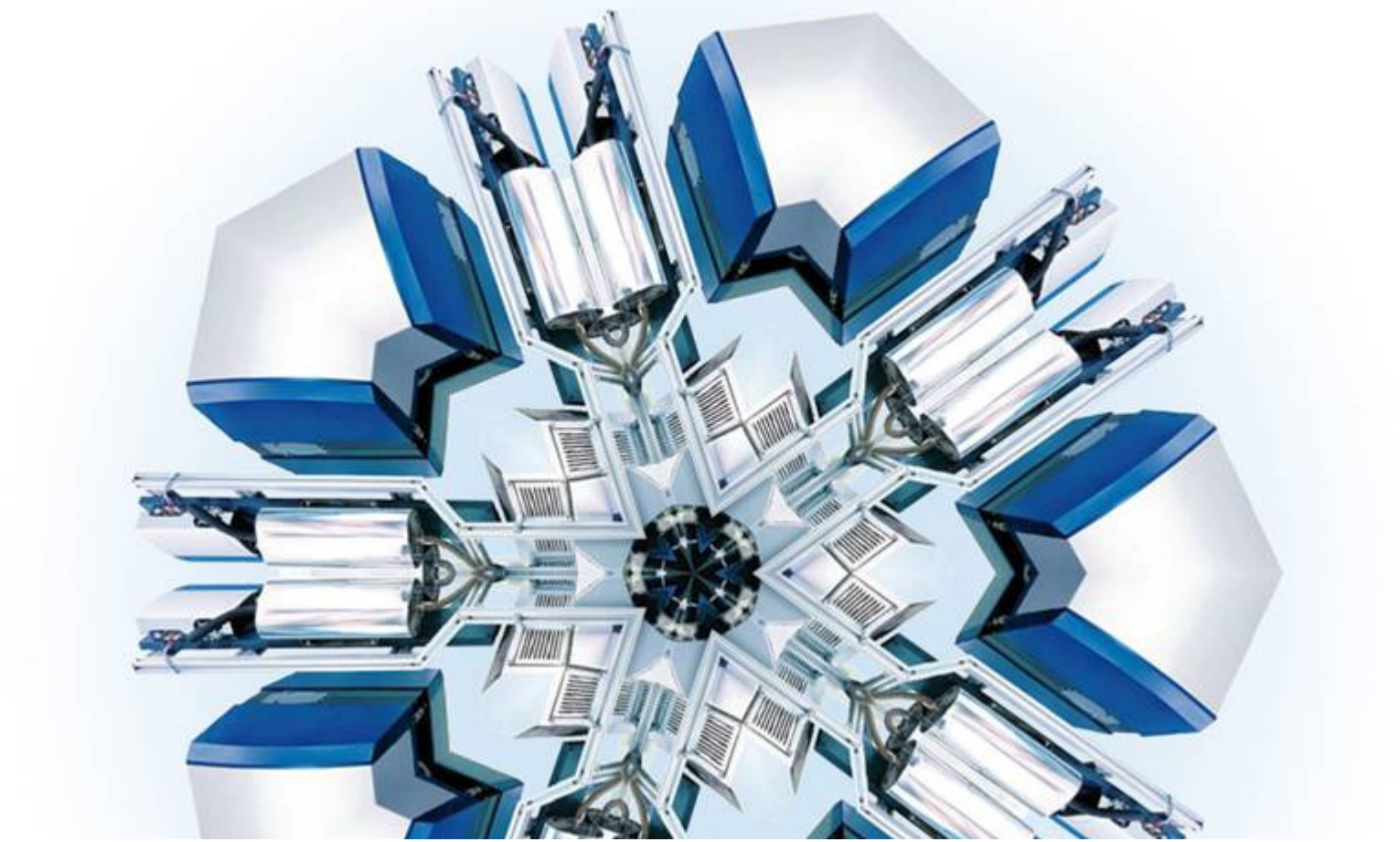


Everybody knows it...

Choose Make of Vehicle

ACURA RECALLS (113)
ALFA ROMEO RECALLS (32)
AM GENERAL RECALLS (21)
AMERICAN MOTORS RECALLS (46)
ASTON MARTIN RECALLS (35)
AUDI RECALLS (356)
AUSTIN HEALEY RECALLS (10)
BENTLEY RECALLS (221)
BMW RECALLS (707)
BUICK RECALLS (441)
CADILLAC RECALLS (337)
CHECKER RECALLS (6)
CHEVY RECALLS (1919)
CHRYSLER RECALLS (422)
CITROEN RECALLS (4)
DAEWOO RECALLS (81)
DAIHATSU RECALLS (9)
DELOREAN RECALLS (4)
DODGE RECALLS (1285)
EAGLE RECALLS (84)
FERRARI RECALLS (156)
FIAT RECALLS (25)
FORD RECALLS (2586)
GEO RECALLS (34)
GMC RECALLS (1279)
HONDA RECALLS (282)
HUMMER RECALLS (30)
HYUNDAI RECALLS (246)
INFINITI RECALLS (127)
ISUZU RECALLS (130)
JAGUAR RECALLS (184)
JEEP RECALLS (407)
KIA RECALLS (89)
LAMBORGHINI RECALLS (13)
LANCIA RECALLS (2)
LAND ROVER RECALLS (142)
LEXUS RECALLS (80)
LINCOLN RECALLS (252)
LOTUS RECALLS (25)
MASERATI RECALLS (34)
MAZDA RECALLS (246)
MERCEDES RECALLS (391)
MERCURY RECALLS (482)
MERKUR RECALLS (1)
MG RECALLS (17)
MINI RECALLS (15)
MITSUBISHI RECALLS (451)
NISSAN RECALLS (447)
OLDSMOBILE RECALLS (365)
OPEL RECALLS (10)
PEUGEOT RECALLS (30)
PLYMOUTH RECALLS (415)
PONTIAC RECALLS (507)
PORSCHE RECALLS (183)
RANGE ROVER RECALLS (3)
RENAULT RECALLS (72)
ROLLS-ROYCE RECALLS (200)
SAAB RECALLS (141)
SATURN RECALLS (187)
SCION RECALLS (4)
SUBARU RECALLS (198)
SUZUKI RECALLS (115)
TESLA RECALLS (1)
TOYOTA RECALLS (619)
TRIUMPH RECALLS (55)
VOLVO RECALLS (422)
VW RECALLS (542)
YUGO RECALLS (3)
ZIMMER RECALLS (11)

Recalls

Everybody knows it...


Learning
Improving
Experience

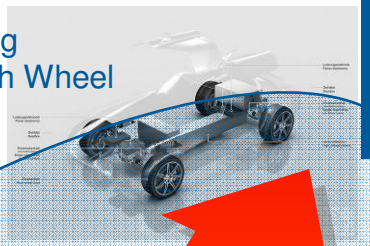
Learning

Improving  Recalls

Experience

Is there a possibility to reduce recalls in future?

Electrical Driving
e-Motor for each Wheel

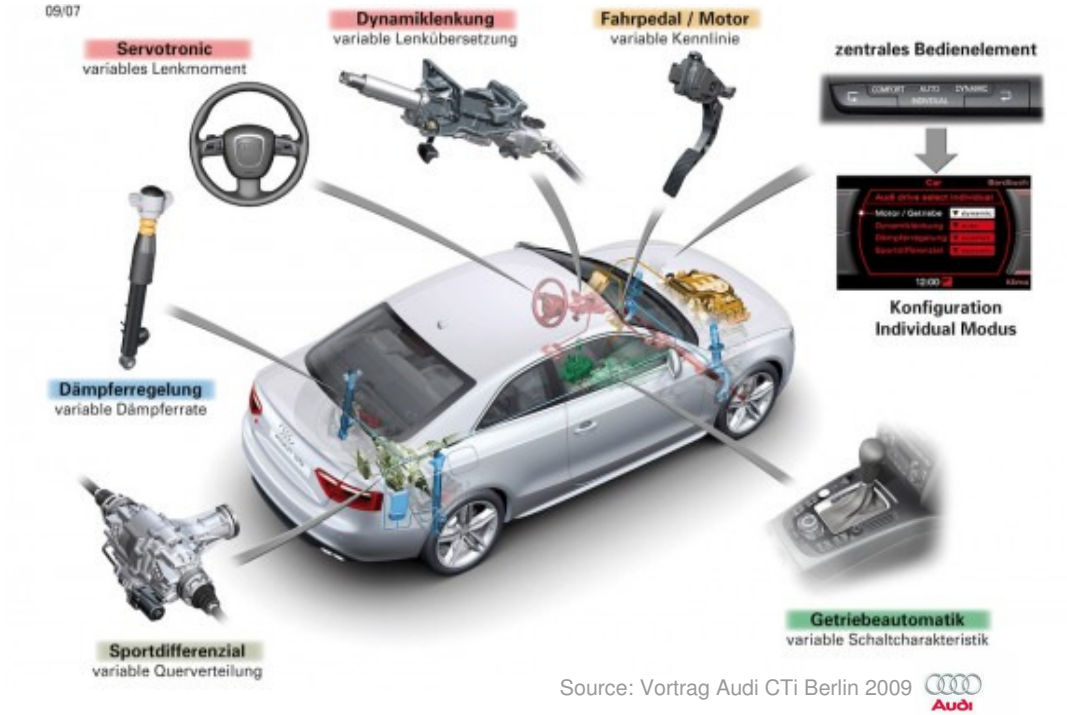


Powertrain Complexity

Powertrain Complexity

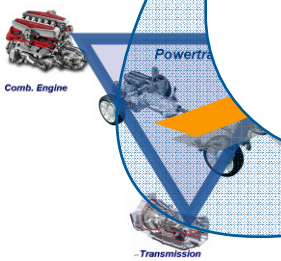
Integration Work

Example Audi Controlling Sportdifferential (Torque Vectoring)



Source: Vortrag Audi CTi Berlin 2009

Standard Config



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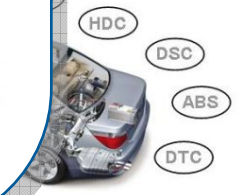
Systems

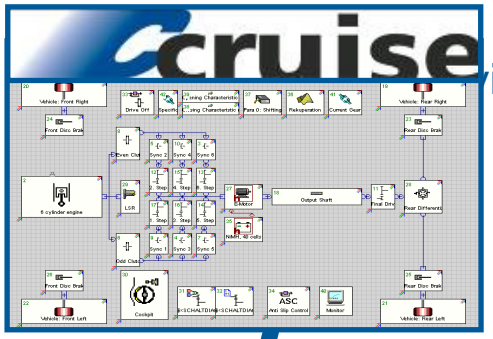


Development time and costs

1980 2000 2010 20xx

Calendar Year

Maneuver Based Testing with AVL InMotion



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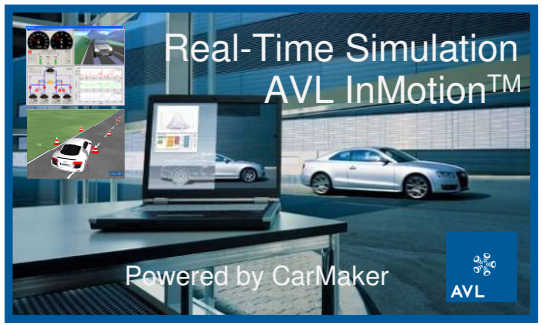
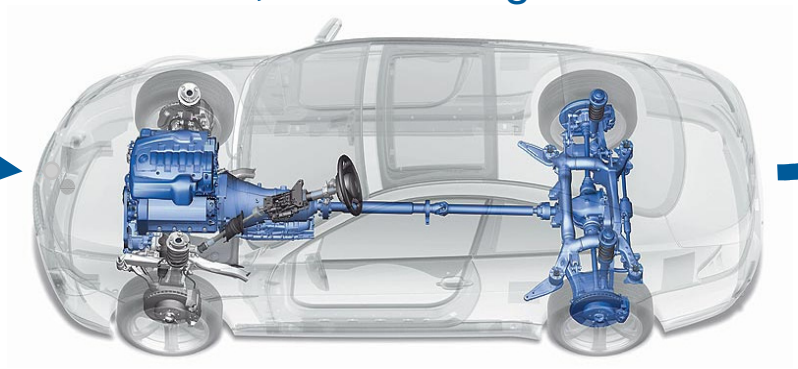


Simulation

comparable measurements and real boundary conditions

ViL-, PiL - Configuration



Vehicle REAL
Powertrain REAL

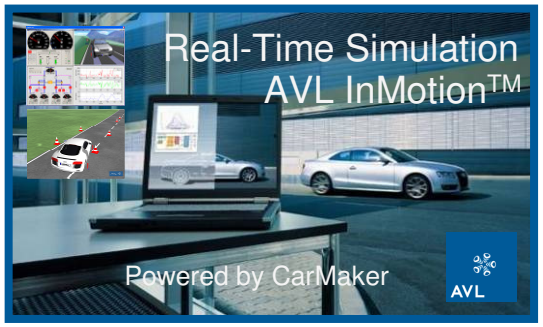
Hardware on Testbed

Real:

- ❑ Stiffness of all Components
- ❑ Inertia of all Components
- ❑ Switching delay of all Components

Maneuver Based Testing with AVL InMotion

AVL InMotion
"Virtual Test Driving"



Simulation

comparable
measurements
and
real boundary
conditions

ViL – Vehicle-in-the-Loop Testbed

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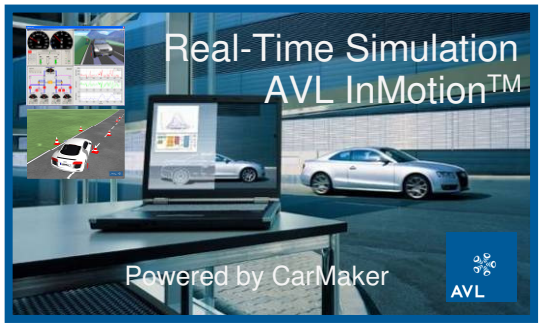
- ❑
- ❑
- ❑

Maneuver Based Testing with AVL InMotion

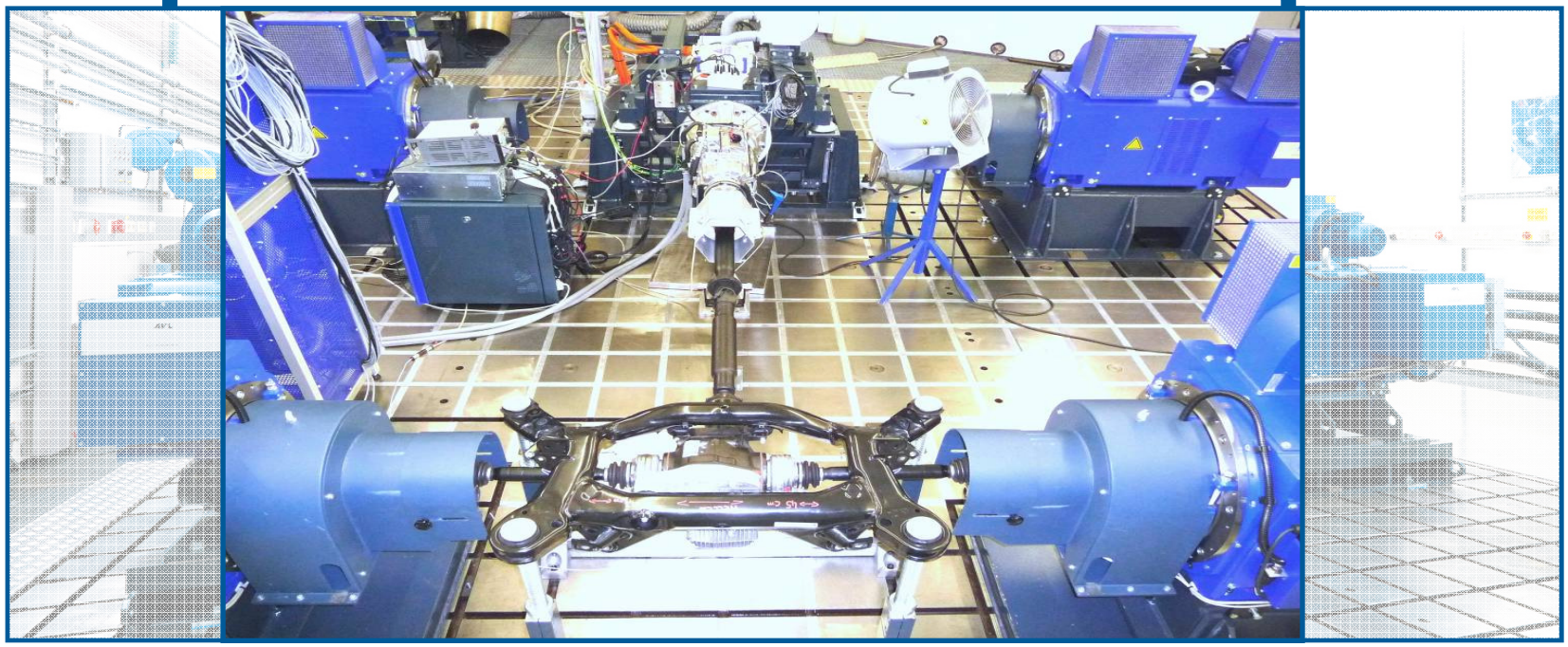
AVL InMotion
"Virtual Test Driving"



Simulation

comparable measurements and real boundary conditions

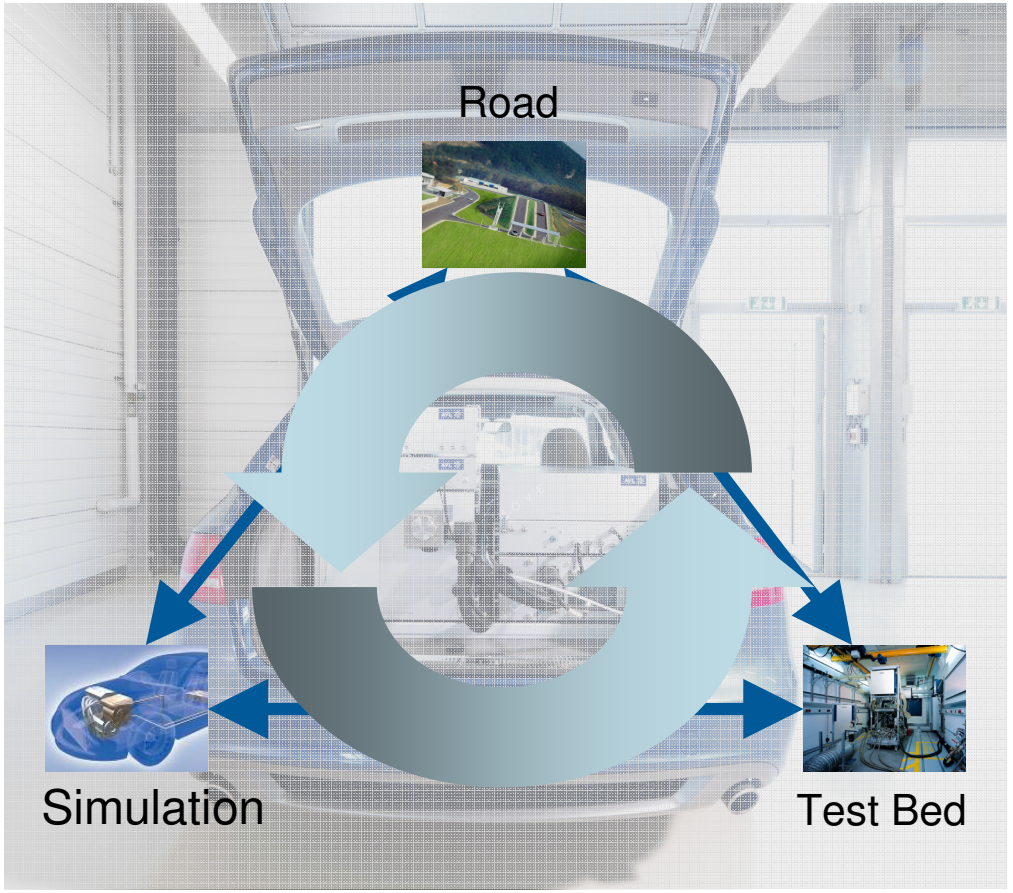
PiL – Powertrain-in-the-Loop Testbed



Values from On Road Testing to Simulation and Test Bed

Source: Mercedes Benz

The mobile measurement platform AVL M.O.V.E brings real-life values from ROAD TO RIG



AVL M.O.V.E – The Products

- AVL M.O.V.E SYTEM CONTROL
- AVL M.O.V.E DRICON
- AVL M.O.V.E SMART-FEM
- AVL M.O.V.E PM PEMS
- AVL M.O.V.E GAS PEMS
- AVL Concerto PEMS
- AVL M.O.V.E IndiMicro
- AVL DRIVE
- AVL KMA Mobile

The Benefit – An Example

BMW M3 Recalled Due to DCT Transmission Issue

November 20, 2008 by Larry Leave a Comment

Filed under Automotive, BMW, News

Okay, so this is very reminiscent of the big recall BMW had on the previous generation E46 BMW M3 for a rod bearing in the years 2001 to 2003.5. Now all new BMW M3's with a DCT Transmission have been recalled which tally's to about 2500 cars. Although this is not near as big as the E46 recall, many enthusiasts who purchased or ordered a new BMW M3 with the DCT Transmission will now have "that feeling" in their gut on whether or not this car is "reliable". The issue occurs when the car is in a near panic stop/breaking. The transmission will attempt to downshift several times to the point where it causes the engine to stall. The good news about this recall is that it is resolved with a software update. You would think that automakers would get the DCT/Dual Clutch setup right by now; it is not as if about half of the automakers are coming out with their own version of a dual clutch setup.

http://www.automotiveaddicts.com/707/bmw-m3-recalled-due-to-dct-transmission-issue

Real-Life-Measurements at the Test Bed

simulated reality

Exact repeatability of maneuvers

real maneuvers
real measurements

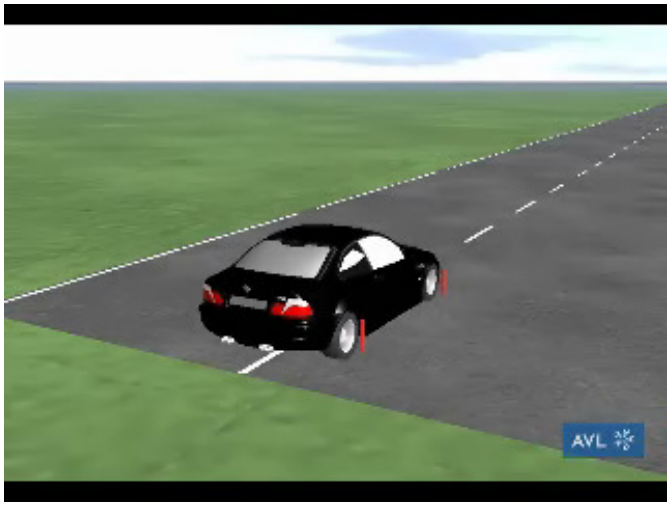
AVL InMotion

Test Bed

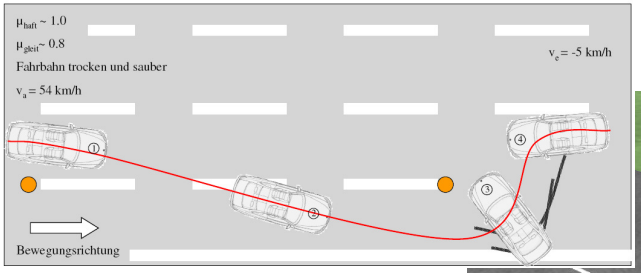
AVL M.O.V.E

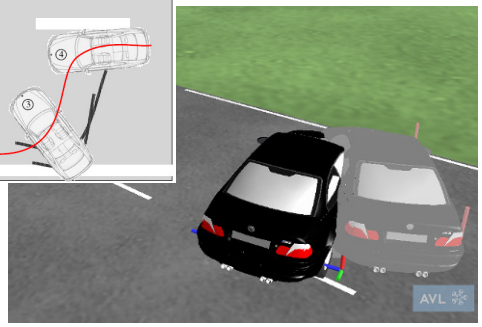
DCT Transmission - Handbrake U-Turn

Important Test for the Checking of the clutch management of a DCT



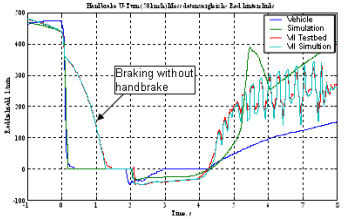
Maneuver Definition



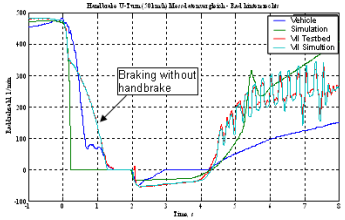


Results Vehicle vs. Testbed

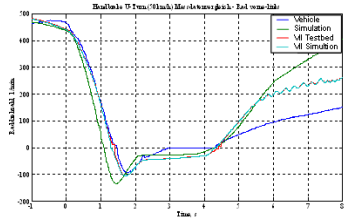
Rear wheel left



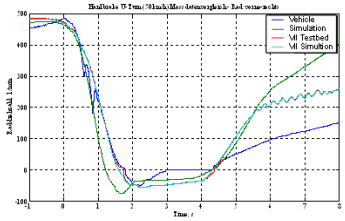
Rear wheel right



Front wheel left



Front wheel right

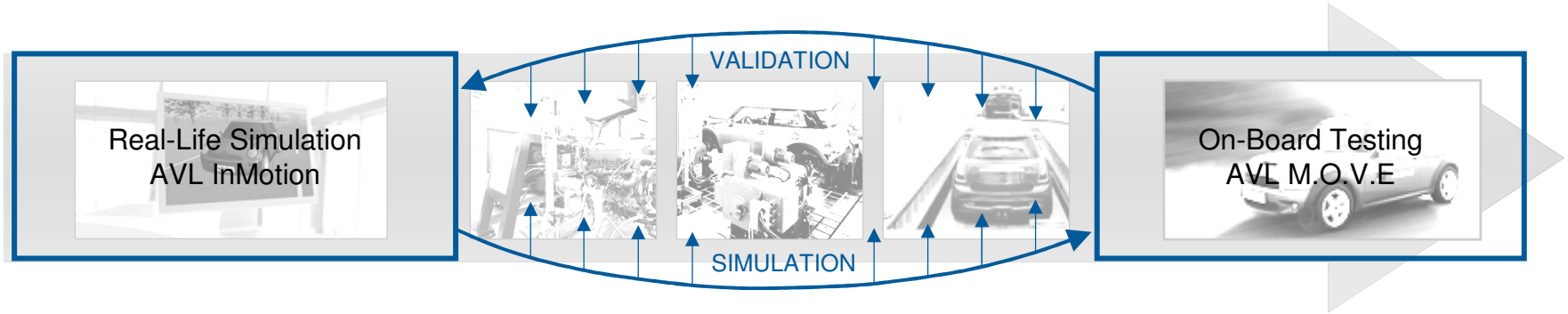


- ❑ Checking of the Clutch Controlling
- ❑ Results at early Stages in the Development Phase
- ❑ No Driver Effect
- ❑ 100% Reproducibility

Is there a possibility to reduce recalls in future?

Yes!

AVL REAL-LIFE TESTING:
TURNING KNOWLEDGE INTO KNOW-HOW.



AVL Real Life Testing **closes the loop** between simulation and reality.

Step-by-step simulation results are validated by **integrating real-life data from on-board measurement**.

The new integrative learning platform AVL Real-Life Testing builds **a continuous framework** over the **complete vehicle development process** for systematically turning simulation knowledge into validated know-how.