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The Future of Shock Absorbers Tuning:

An Ultimate Technology for Excellence

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Advanced Chassis Engineer
Suspension BU
Hitachi Astemo Americas, Inc.
October 12th, 2022

Hitachi Automotive Systems

KEIHIN

SHOWA

NISSIN

are integrated to be

Hitachi Astemo

Powertrain Systems

Chassis Systems

Motorcycle Systems

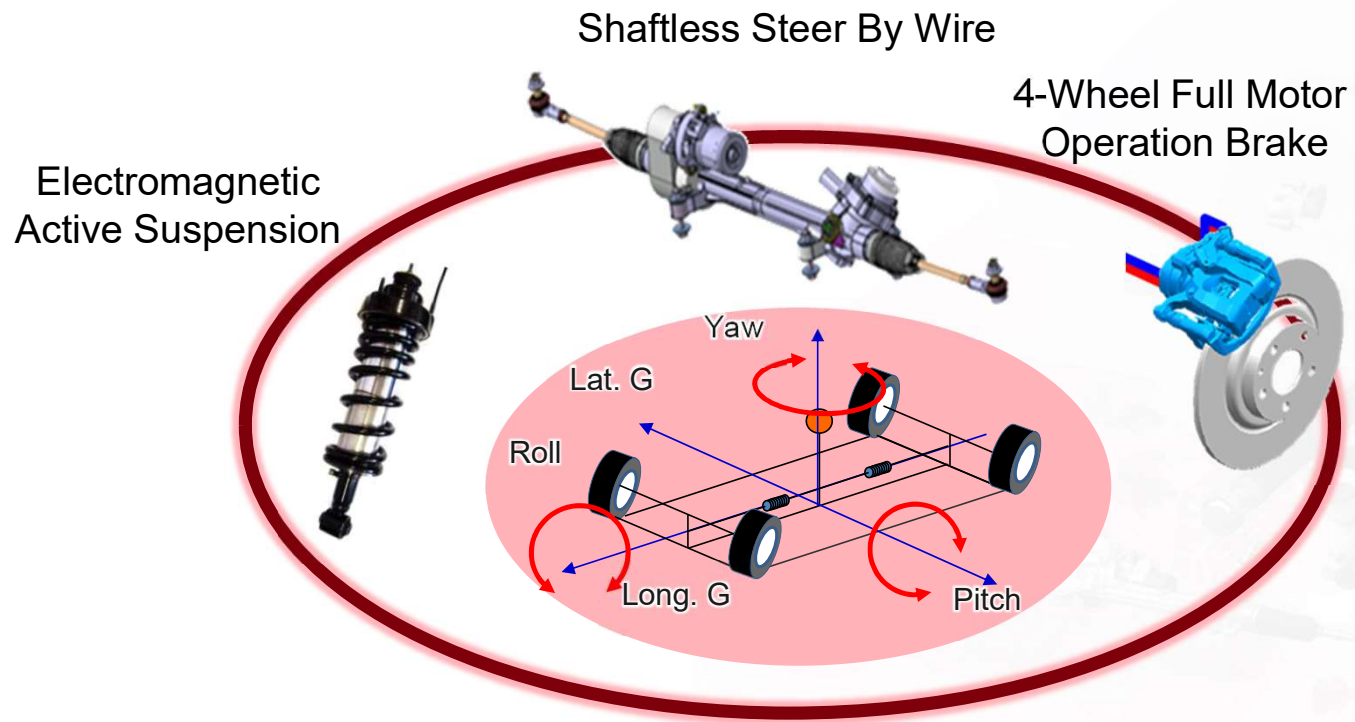
Autonomous Driving/Advanced Driver Assistance Systems

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**Advanced
Sustainable
Technologies
for Mobility**

The Future

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The Future

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- Long Wait Time for Prototypes
- Crescent demand for a quicker RFQ responses
- Possibility of exploring new technologies and evaluate best solution for our clients



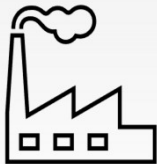
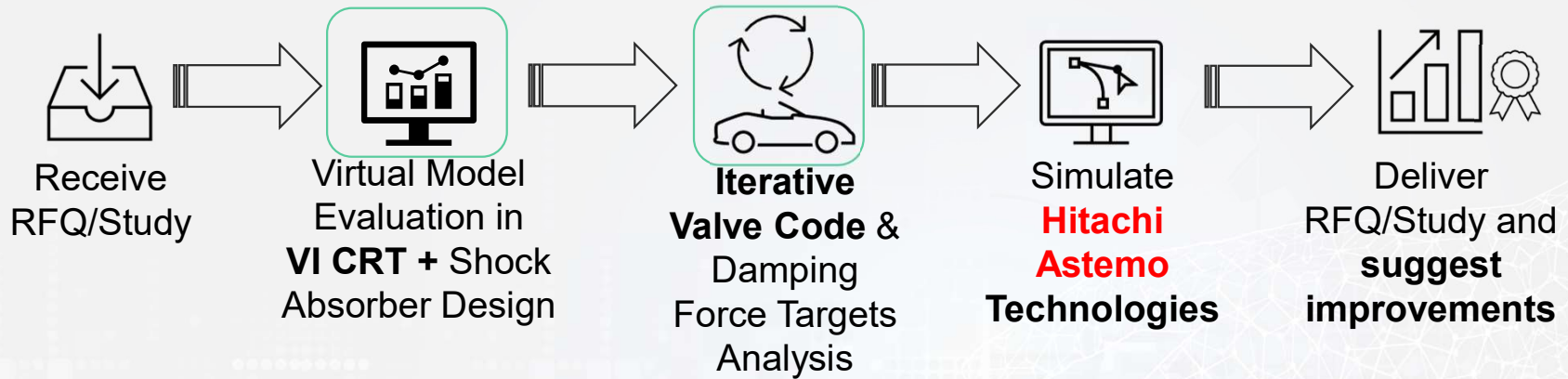
- Shock Absorbers Virtual Tuning
- Increased Efficiency and Precision During Tuning Phase
- Reduction of TAP needed

Hitachi **Astemo** has the capability and technology to make the future happen!

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Hitachi Astemo Process

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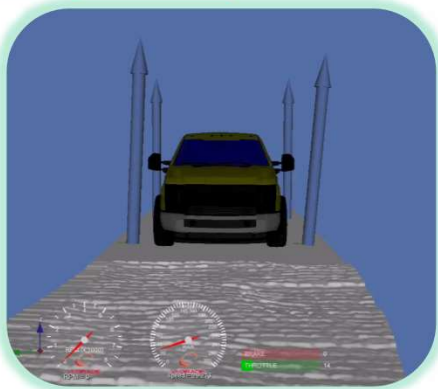


- Improved Response Time
- Reduction of Prototypes during RFQ/Development Phases
- **Sustainable**: Reduction of **+100 TAPs** each corner
- Reduced Carbon Footprint by virtual design and integration
- Reduced Travels

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New Techs + Simulations

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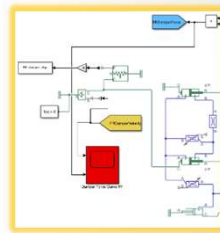
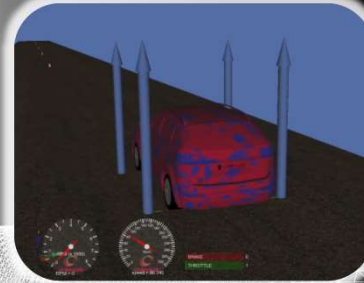


Belgian Blocks

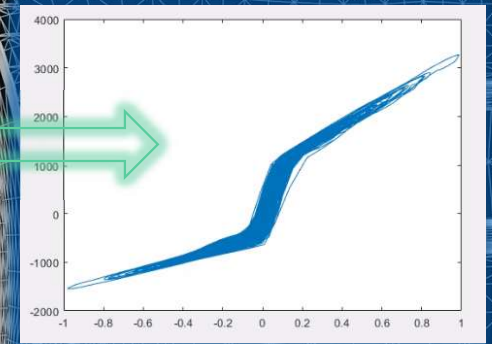
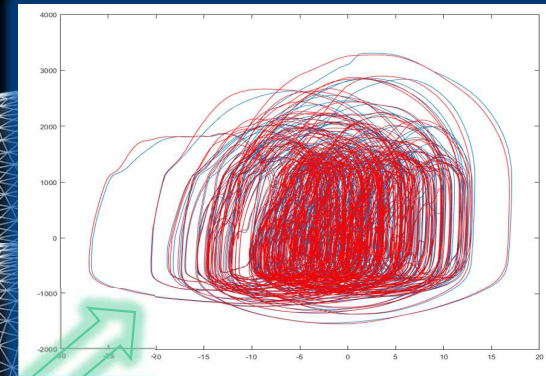


Primary Ride

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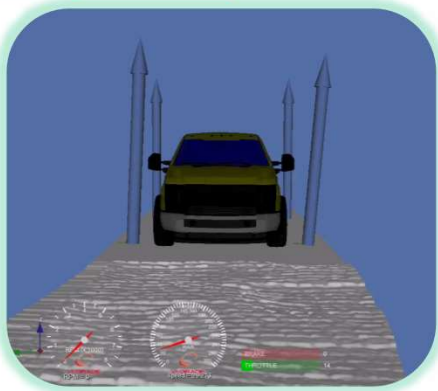
1D Damper
Models +
Hitachi Techs



Results Frequency
Reactive Dampers

New Techs + Simulations

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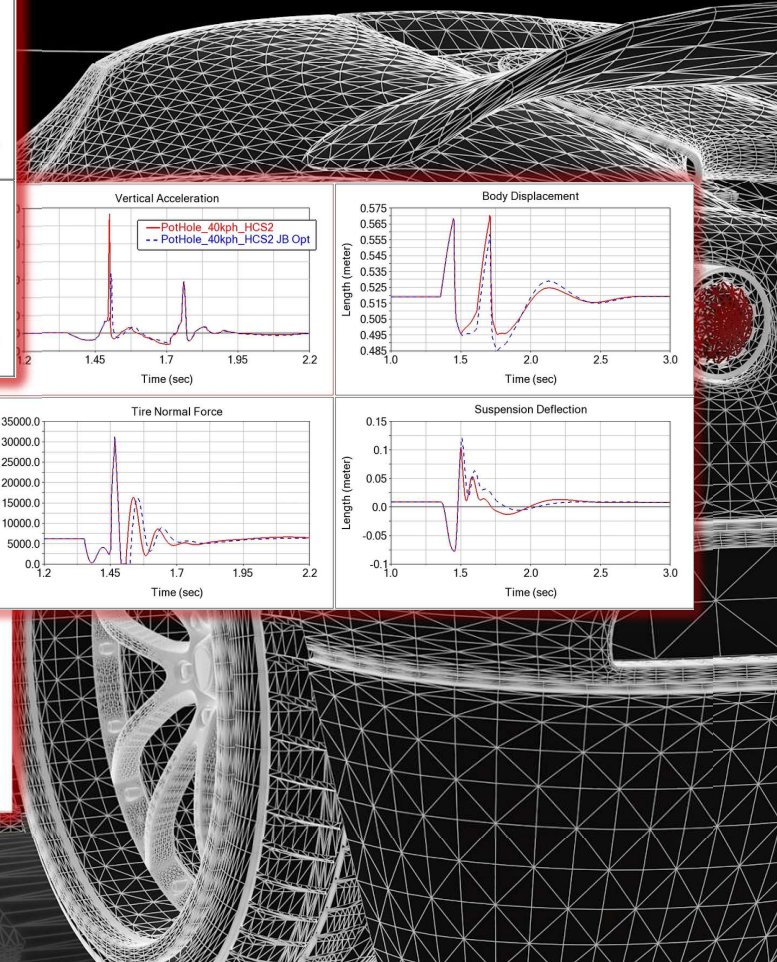
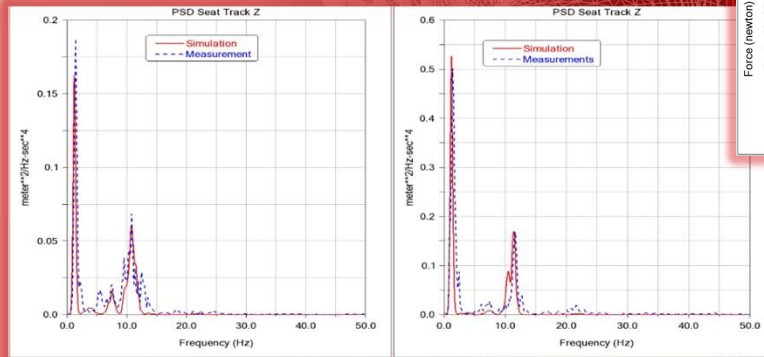
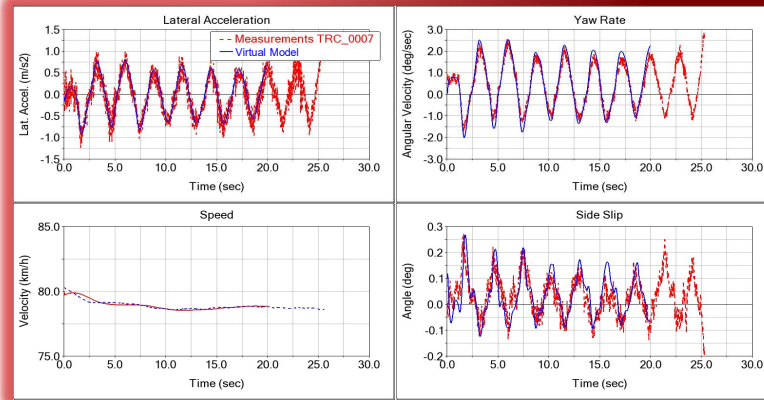


Belgian Blocks



Primary Ride

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DiL + HiL FCD System (Cloud)

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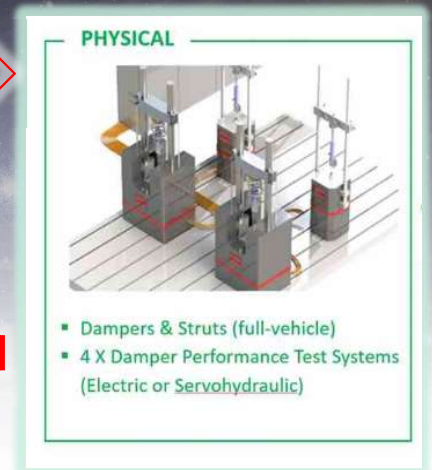


Vehicle

Model



Driving Simulator



- Dampers & Struts (full-vehicle)
- 4 X Damper Performance Test Systems (Electric or Servohydraulic)

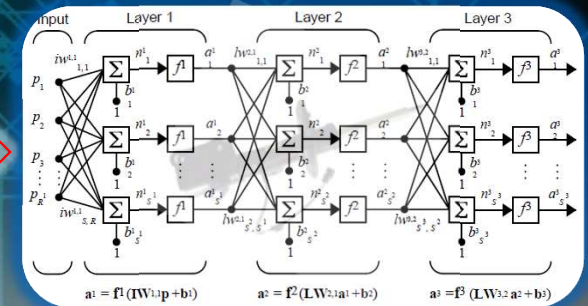
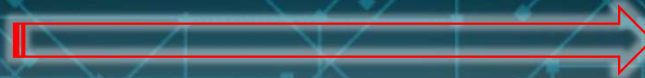
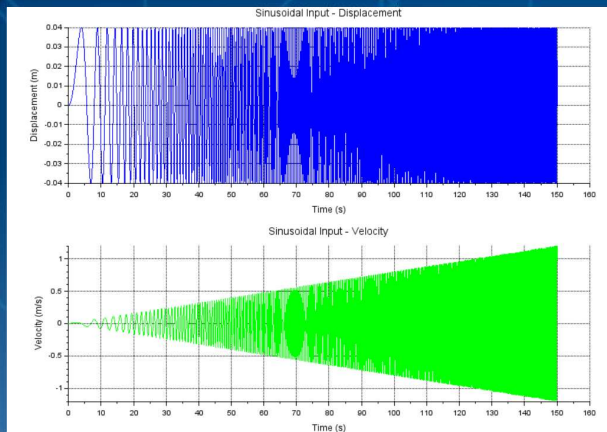
Signals (x , v_x)

Signals (Force)

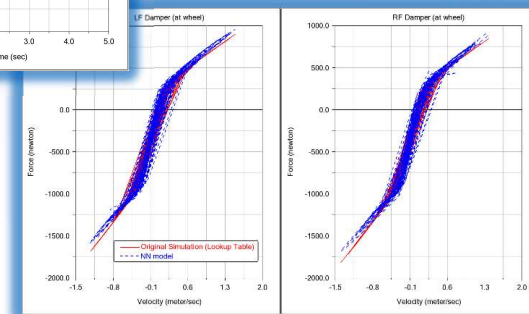
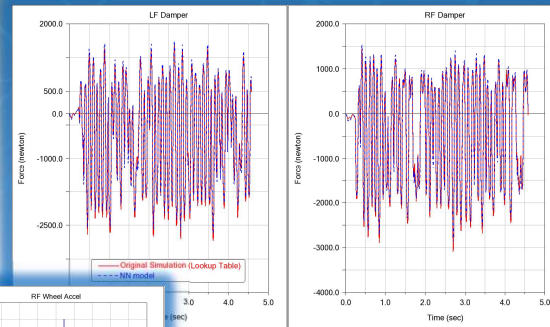
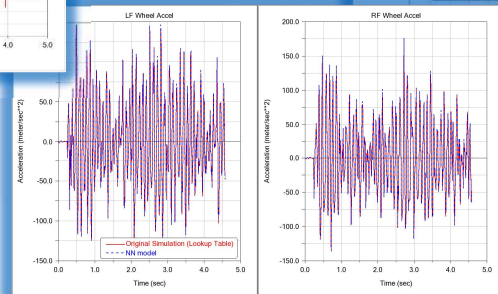
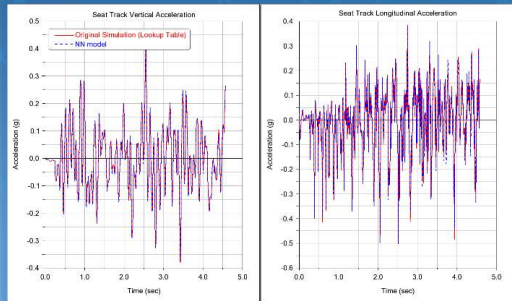
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Deep Learning + Shock Absorbers

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Neural Network



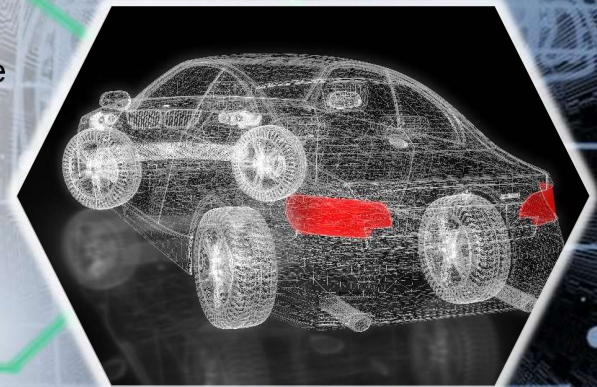
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Deep Learning + Shock Absorbers

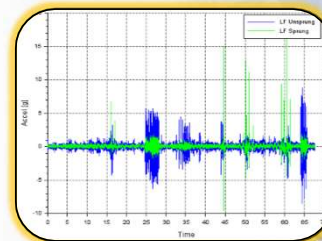
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Fully Integrated Vehicle
With **High End**
Products Developed
With
Artificial Intelligence



Semi-Active Technologies
aligned with Machine
Learning for ultimate
performance both virtually
and in real life



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Caio Avanzini, Advanced Chassis Engineer

Murilo Junqueira, Lead Engineer, Chassis Development / Dynamics

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Markus Steeb, Chassis Development/ Dynamics Senior Manager