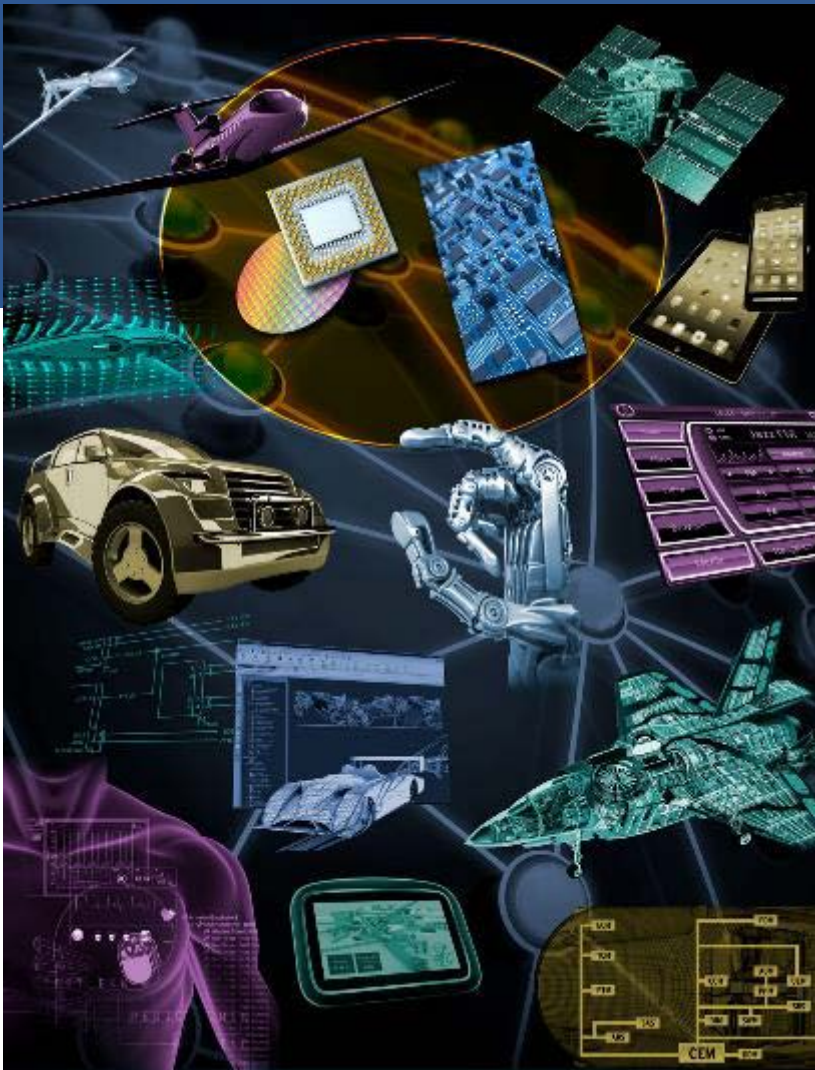


**SIEMENS**

*Ingenuity for life*



# Continuity of the functional verification from the integrated circuit to the final system

Eric Seloisse

Vice President & General Manager  
Mentor Emulation Division

TERATEC, June 19<sup>th</sup> 2018

**Mentor**<sup>®</sup>  
A Siemens Business

# Creating The Software Leader For the Product Lifecycle

THE JOURNEY TO REALIZE DIGITALIZATION

AUTOMATION #1

SIMATIC Totally Integrated Automation

UGS

SOFTWARE #1

10 YEARS  
\$10 BILLION

Vistagy

Perfect Costing

Kineo

LMS

Tesis

CD-adapco

Polarion

Bentley

Mentor

TASS

Infolytica

Solido

Sarokal

ORSI

ELAN

VRConnect

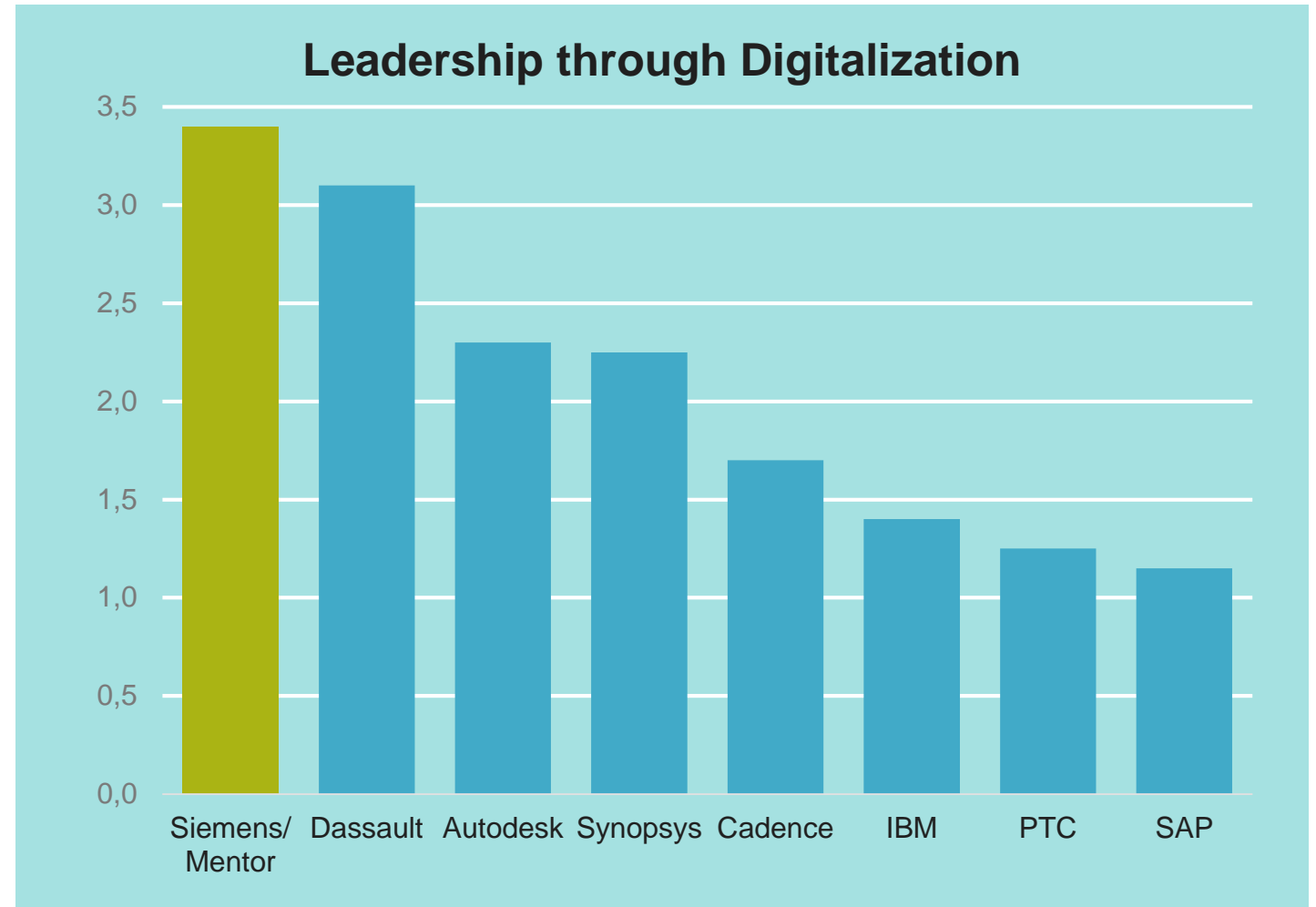
IBS  
Active

Camstar

<1998 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 | 2012 | 2014 | 2016 | 2017 | 2018



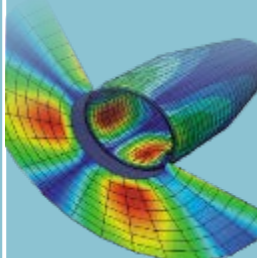

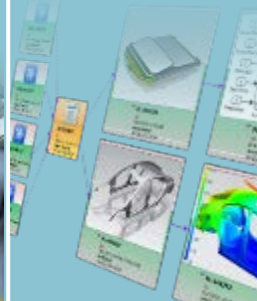



# Industrial Software Companies Accelerate Growth Based Upon IC Design Technology

#1



# Unique with the Most Comprehensive Portfolio

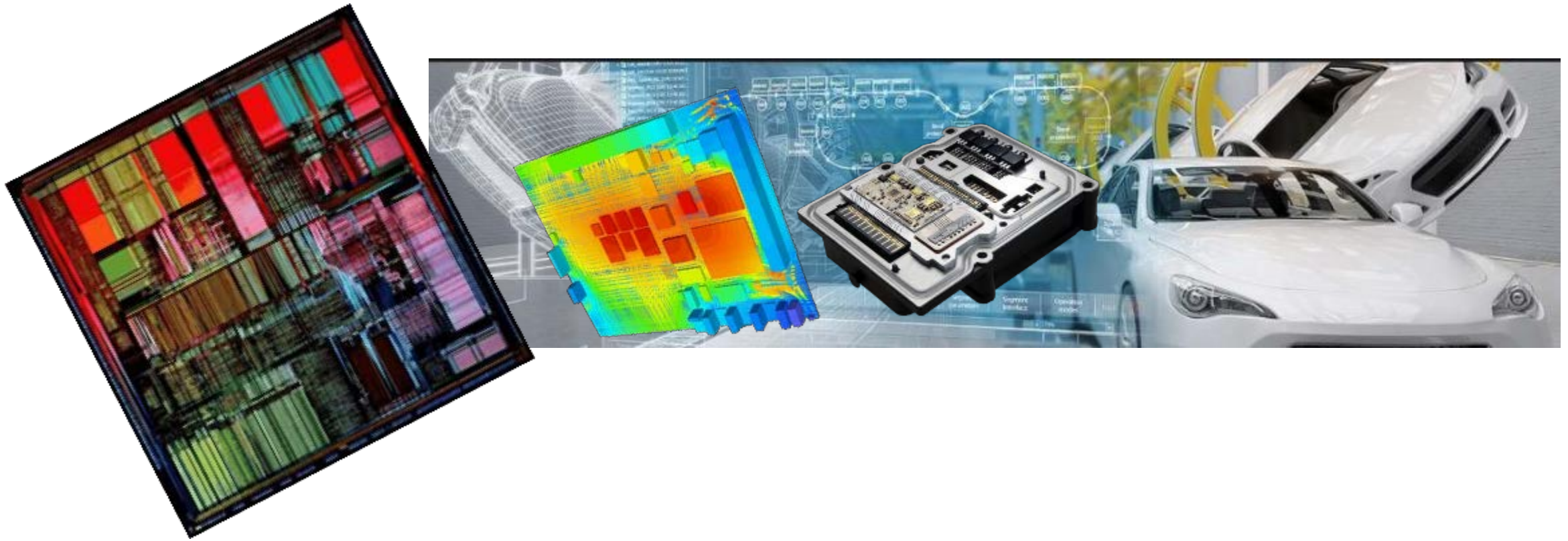
## From Design through Manufacturing and Lifecycle

Segments	Mechanical Product Engineering	Mainstream Engineering	Mechanical Simulation and Test Solutions	Manufacturing Engineering	Lifecycle Collaboration	Manufacturing Operations Management	Cloud Application Services	Electronic Design
Technology, Solution	End-to-end design and mechanical engineering	Development, Simulation, Engineering	Simulation, Test und Systems Engineering	Process design and simulation; NC programming	Collaboration; Process, Change and BOM Management	MES, Quality, HMI and Production	Plant and Product Analytics	IC Design IC Verification Design for Test Physical Verf Embedded SW PCB Design Harness design
								

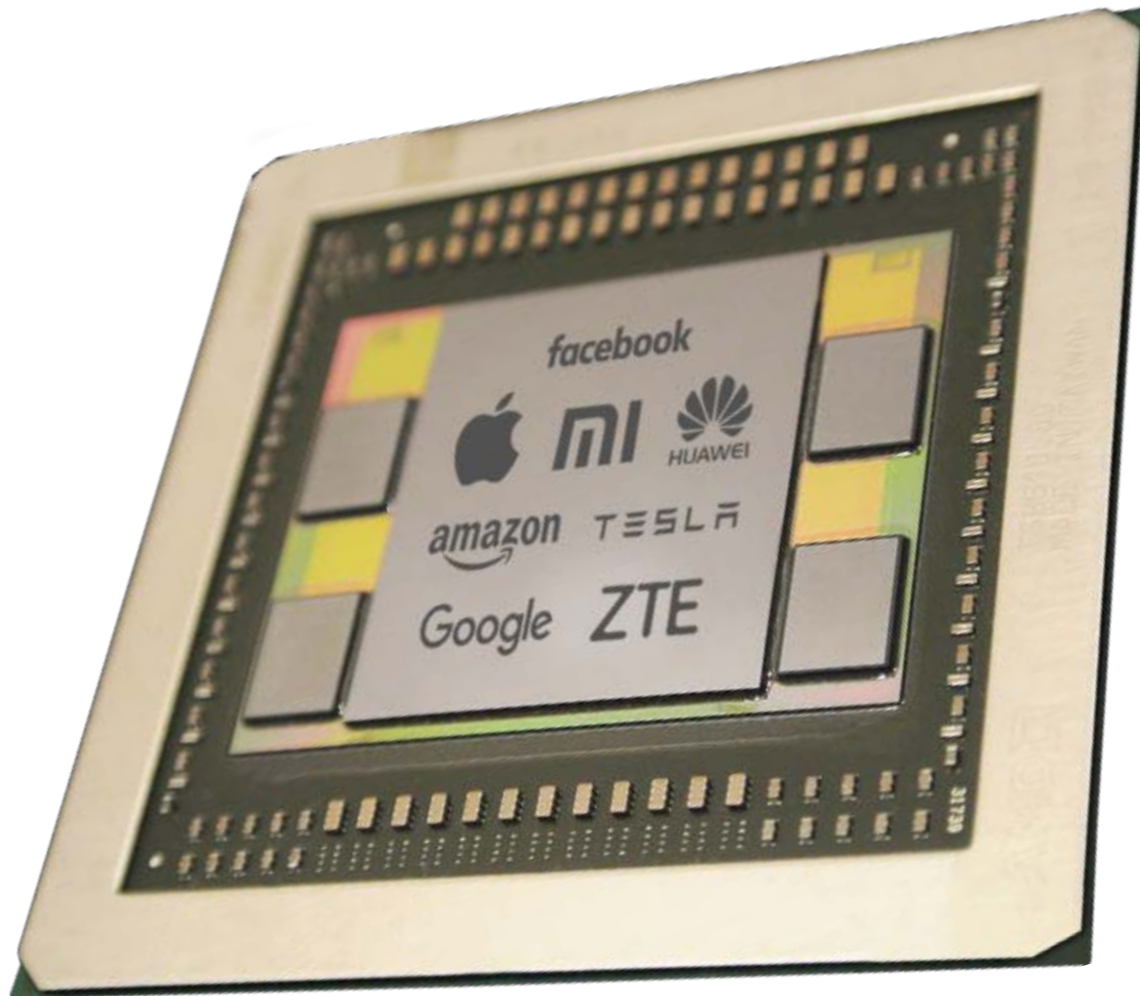


# New Market for Siemens PL

Expanding the digital design portfolio with IC design and verification tools



# Leading-Edge Systems Companies Are Becoming the New System-on-Chip Designers and Manufacturers



**FASTCOMPANY**

**Amazon Has Just Become A Chip Maker**

**EE Times**

News & Analysis

**Bosch opens billion-dollar wafer fab**

**Forbes**

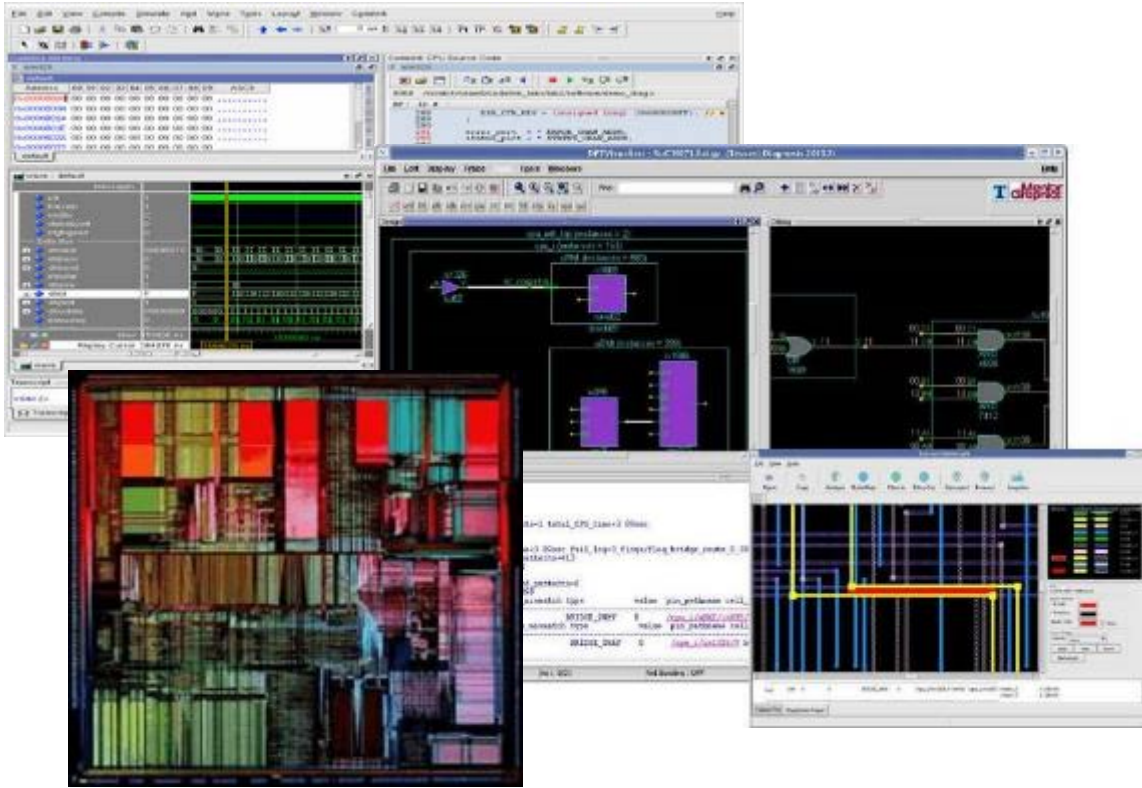
**Google Builds Its First Chip Just For Machine Learning**

**THE WALL STREET JOURNAL**

**Facebook Plans to Build Its Own Chips as Part of Hardware Push**



# Continuity From Chip to System Designs



**Build it, test it, build it again  
doesn't work anymore... need for new methods**

# Hardware Emulation

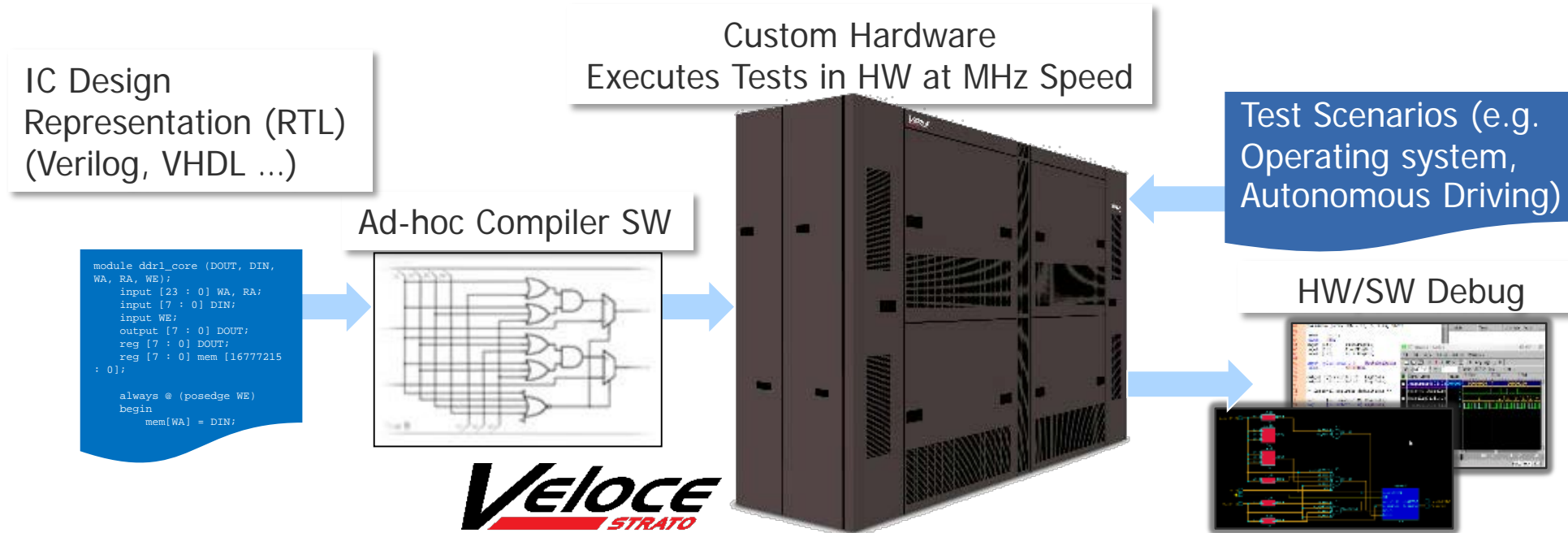
## Addresses The IC-System Continuity Needs



- Enables new design methodologies from chips to systems
- Virtual system for pre-silicon software and hardware verification
- Full visibility into hardware design for efficient debug
- Fault injection, monitoring, results analysis for safety-critical applications



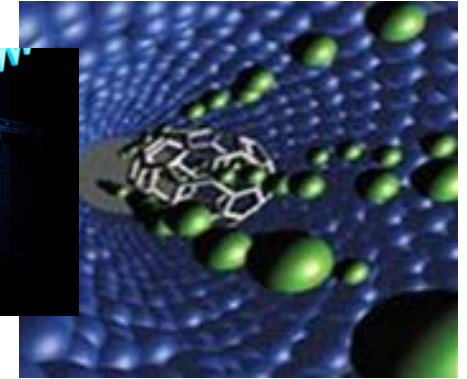
# Hardware Emulation: HPC Custom Engine for Verification



- An emulator is a special purpose supercomputer for modeling digital integrated circuits
- It includes a HW system supercomputer-like, OS SW and applications
- Emulators typically run 1000 to 10,000 times faster compared to a SW simulator running on general purpose computer

# HPC Specialization and Custom Architectures Proliferate

- Traditional applications requiring ever increasing performance
  - Trading algorithms
  - Biotechnologies and cosmetics
  - Oil research
- Emerging new revolutionary applications require innovative HPC approaches
  - Artificial Intelligence, Deep-Learning
  - Crypto currency mining



# Autonomous Vehicles Require a Virtual System Environment Early in the Design Cycle

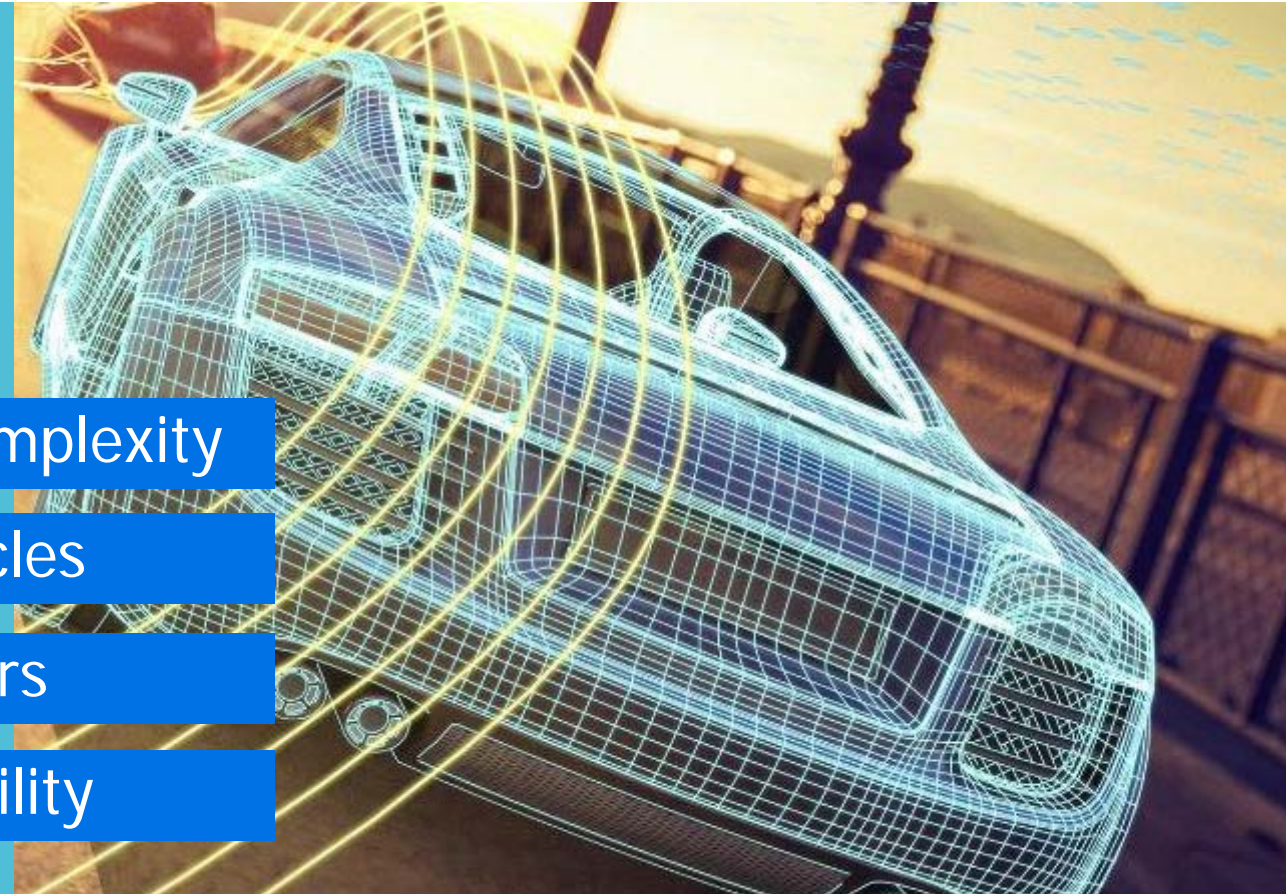
## Rethink the vehicle development processes

Increasing software and hardware complexity

Massive validation and verification cycles

Growing number and variety of sensors

Reconciling agility with better traceability



Without compromising energy efficiency, comfort and drivability features



# Autonomous Car: A Hardware Emulation Application

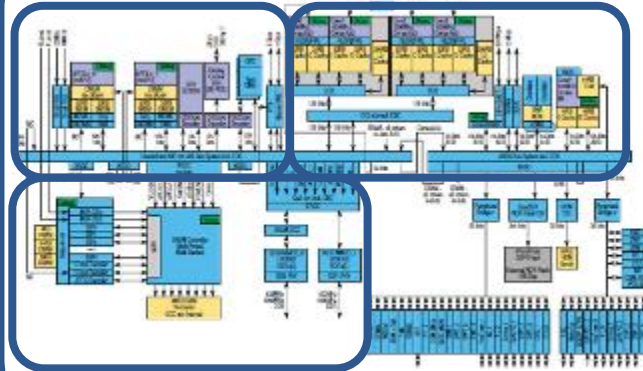
## Sense

Siemens & TASS  
PreScan



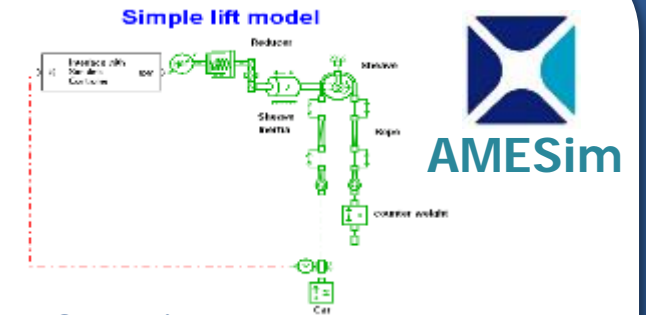
## Compute

Mentor  
Hardware Verification Platform



## Actuate

Siemens  
AMESim



Steering

Braking

Drivetrain

# Validation and Verification

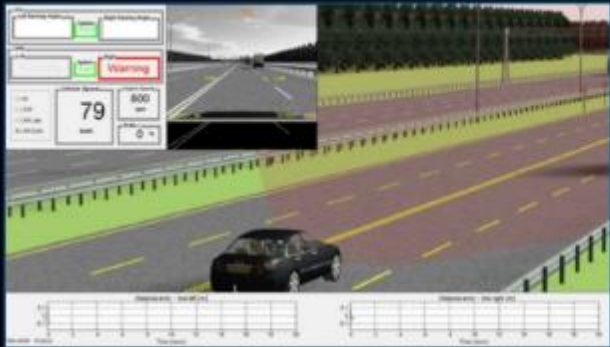
## Virtual Testing of Autonomous Driving Functions



Adaptive Cruise Control



Pedestrian AEB  
based on radar-camera fusion



Lane Keeping Assist



Active Human Model

- World modeling and scenario building
  - Road sections, bridges, etc.
  - Trees, buildings, traffic signs
  - Cars, trucks, pedestrians
  - Weather conditions
- Sensor model library
  - Camera
  - Radar
  - Lidar
  - Ultrasonic
  - Infrared
  - V2X
  - GPS



**Mentor**<sup>®</sup>  
A Siemens Business

## EMULATION SERVICES

Unique Offer Combining  
Leti & Mentor's HW Design Expertise

### LETI OFFERS

- Emulation for **Innovation**
- **Engineering Support** at Each Step
- HW Emulation Quickstart
- Verification Flow & **Optimisation**
- Hosted Design Service
-  **Secured** Database Management

### LETI COMPETITIVE ADVANTAGE

- Highly Flexible Business Model
- A Decade of Veloce Experience
- HW/SW Co-design Expertise
- A Mix of Emulation Service & Time-based Access
- Home Grown Transactors
- Unimake™ Co-emulation
- HW Extensions (USB, PCIe etc.)

\*\* **Easy Online Reservation** \*\*

**Interested?**

Contact: [caroline.arnaud@cea.fr](mailto:caroline.arnaud@cea.fr)



200 Mgate **Veloce2** platform



# Virtualization of System Design Will Follow Chip Design Path

