

CAPITAL MARKETS DAY

JUNE 14-15, 2018 | PARIS CAMPUS, FRANCE



3DEXPERIENCE®

Olivier SAPPIN

Vice President, Transportation & Mobility

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3DEXPERIENCE®

**3DEXPERIENCE Value |
Transportation & Mobility:
Electric Vehicles**

FT FUTURE OF **THE CAR** SUMMIT 2018

What are Transportation & Mobility executives saying about the future of their industry ?



FT FUTURE OF **THE CAR** SUMMIT 2018

London | 15 - 16 May 2018

“Autonomous Car has to be **simulated with billion of cases** in computer ...”

*Håkan Samuelsson,
President & CEO, Volvo Car Group*

“Car will no longer be a car: the car will be a **robot, a data centre, a service, a digital companion**”

*Padmasree Warrior,
NIO US CEO*

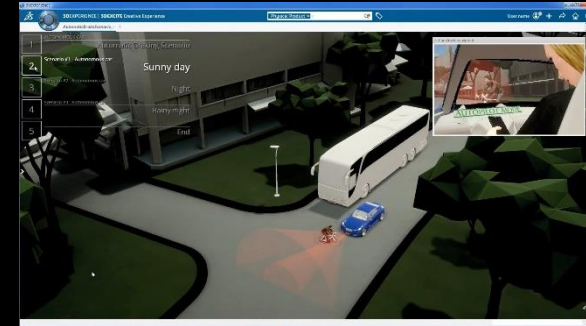
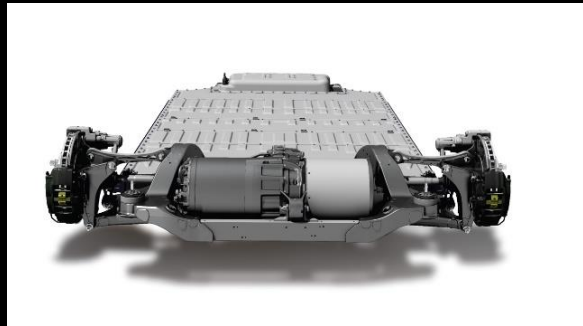
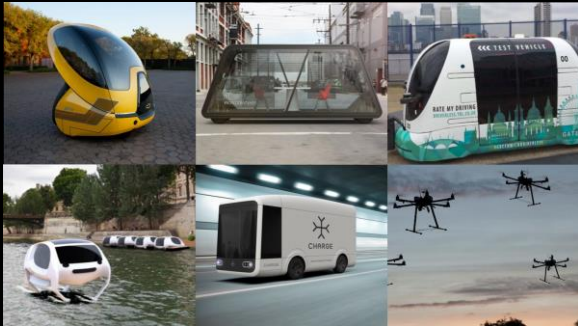
“Depending on where you are in the world, the technical solution for autonomous driving will be different,”

*Karl Iagnemma,
cofounder & president of nuTonomy*

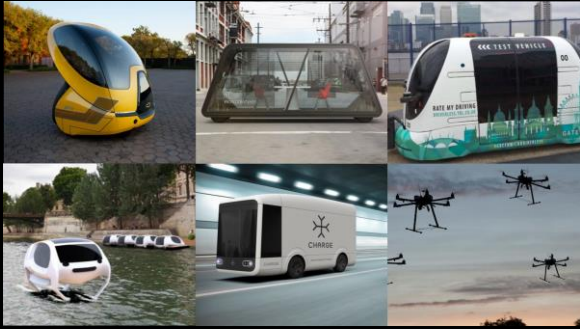


Major impacts on Transportation & Mobility sector :

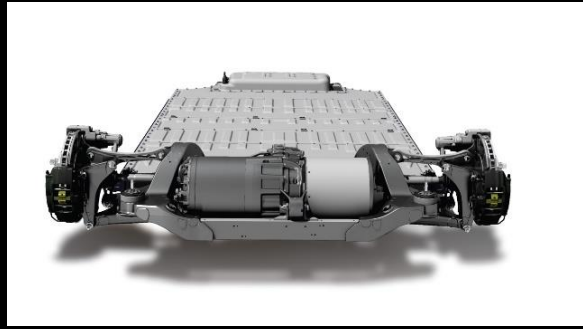
1. Increasing numbers of **New companies & New innovations** in the domain of Transportation & Mobility
2. Major **impact on existing Vehicle Architecture & technologies**
3. A **new approach** is required to develop **Mobility system** such as Autonomous Driving



1. Increasing numbers of **New companies & New innovations** in the domain of Transportation & Mobility



2. Major impact on existing Vehicle **Architecture & technologies**

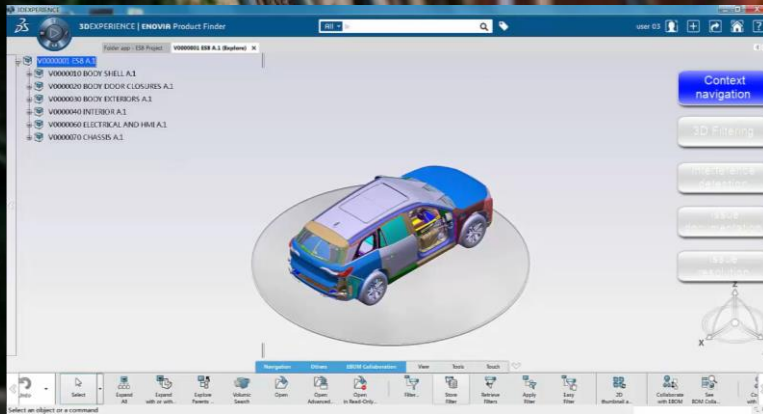


3. A **new approach** is required to develop **Mobility system** such as Autonomous Driving



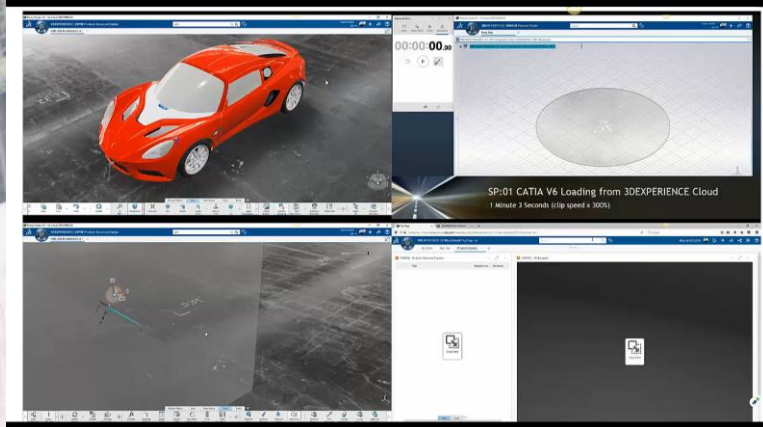


- Starting **from scratch** in 2016
- Complete Engineering team up and running with 3DEXPERIENCE platform
 - **Global** : 3 Geos
 - **Online** : double digit **performance** improvement
 - **End to End** Engineering Coverage





- 3DEXPERIENCE Cloud selected to provide a **global, secured and unified platform**
- **2 weeks** for 10 users to get acquainted with 3DEXPERIENCE
- **better performance, data more secured, easy collaboration, data accessible from anywhere**

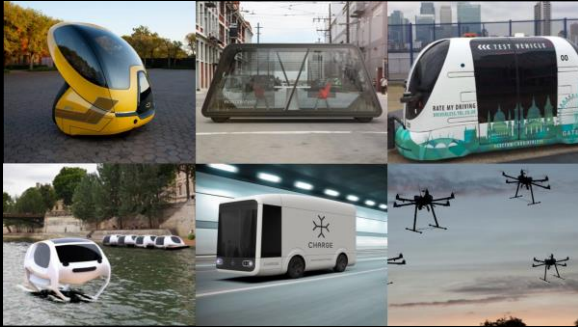


Emblematic EV Startups are **adopting**
3DEXPERIENCE platform

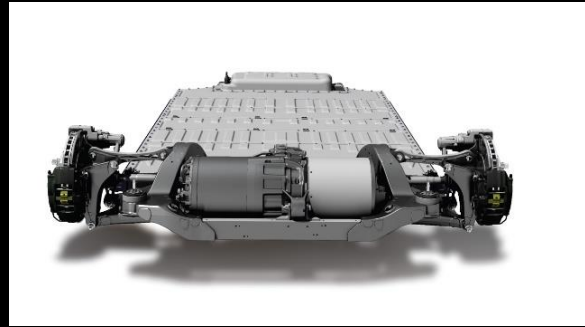
100+ Startups created
in **4** years



1. Increasing numbers of **New companies & New innovations** in the domain of Transportation & Mobility



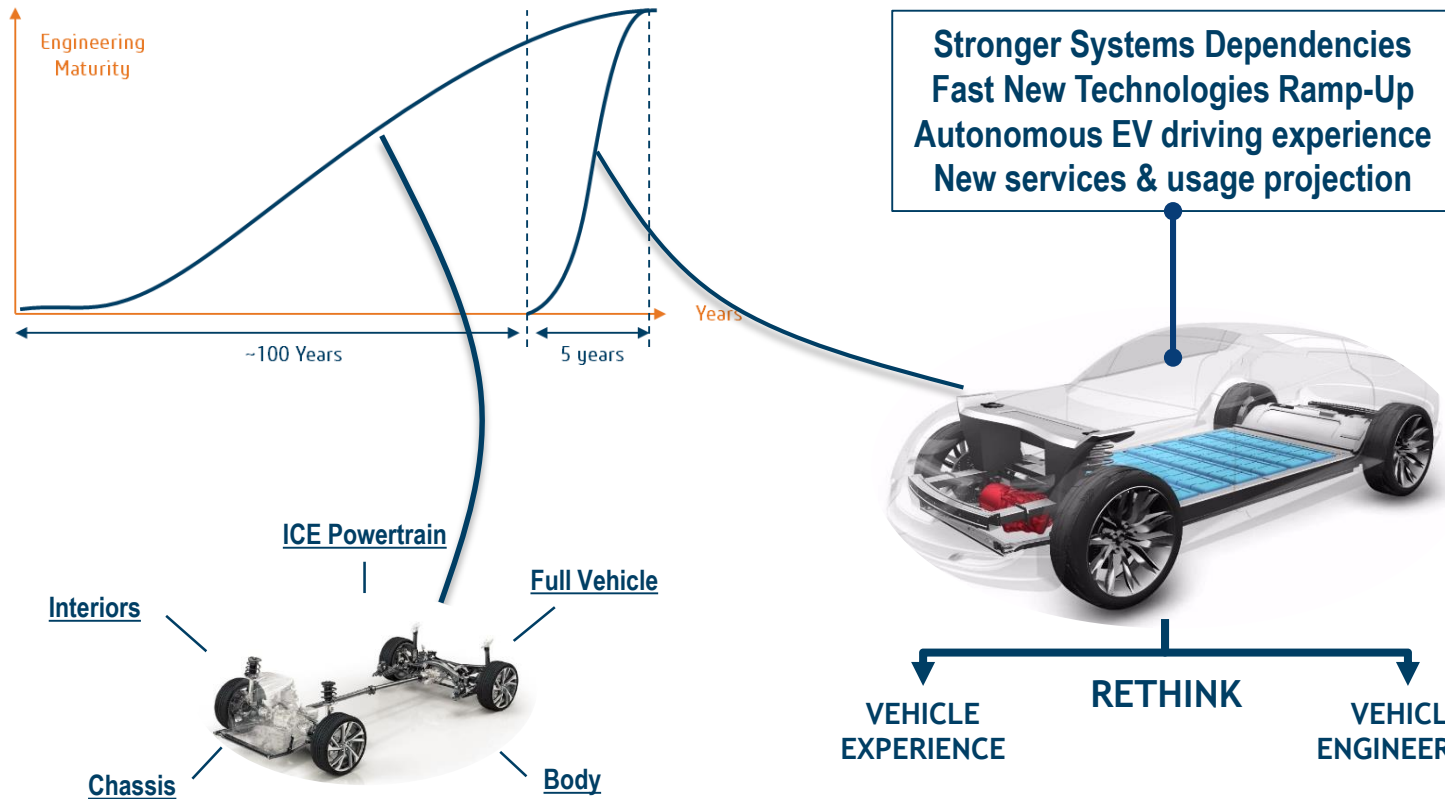
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VEHICLE ELECTRIFICATION | NEW TECHNOLOGICAL CHALLENGES



New systems represents new technological challenges

Battery

- Maintain temperature gradients $< 2^\circ$
- Predict aging to keep low warranty costs
- New safety requirements

Electric Drive

- Thermal requirements
(20k+ rpm, 800V)
- Electric ripples
- Packaging
- Manufacturability

Power Electronics

- DC/DC Dual tension in vehicle (high voltage + 12V)
- Mechanical and thermal stress
- Power and Signal Integrity: Electrical ripples

HVAC

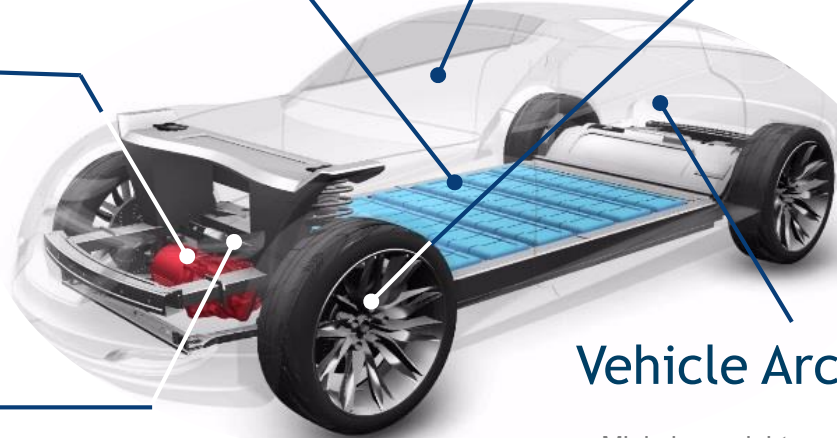
- Optimize energy required to preserve battery charge
- Optimize entire vehicle thermal behavior

Chassis

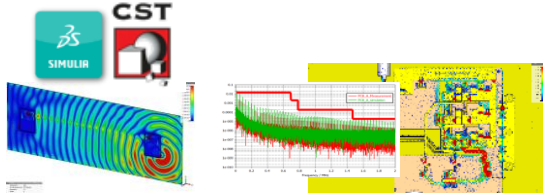
- New vehicle dynamics due to low center of gravity
- High modularization opportunities (battery modules, motors by axle or at wheels)

Vehicle Architecture / Body

- Minimize weight
- New configuration and packaging opportunities



3DS is investing in key technologies for Vehicle Electrification

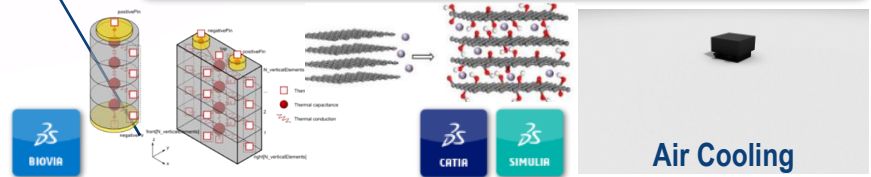
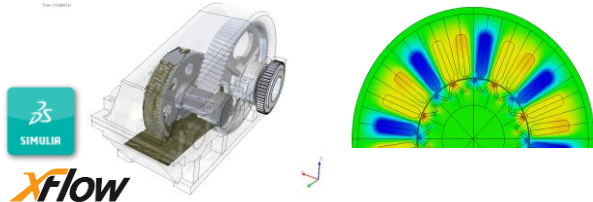


Power Electronics Engineering

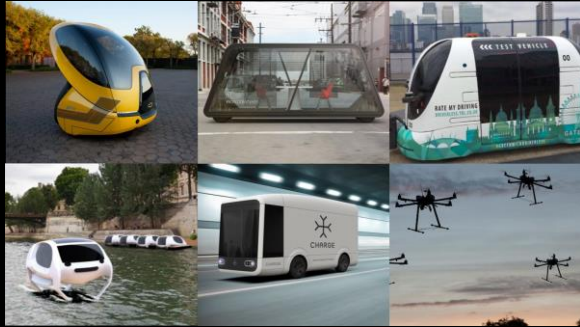
Full Vehicle Integration

Electric Drive Engineering

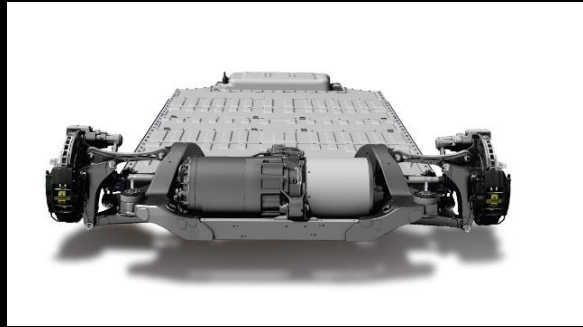
Battery Engineering



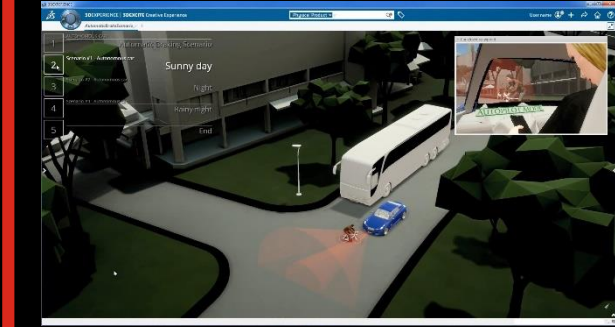
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Transportation & Mobility System Architecture

System of Systems

Mobility Architecture

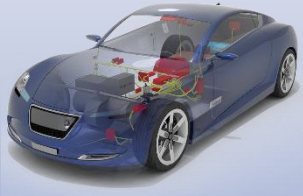
Transportation & Mobility context and usages




System

Vehicle Architecture

Car systems
Structure, powertrain, surrounding camera...




Embedded software systems
Autonomous intelligence, sensing & responsive systems



Sub-systems

Hardware centric sub-system



Software centric Sub-systems



Imagine, Test & Deliver new Mobility Experiences



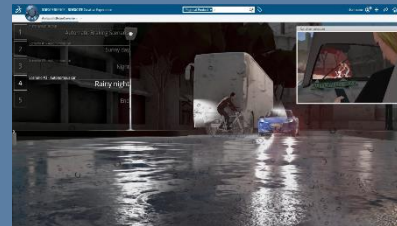
Vehicle Electrification



>> Improve electric car performances from material modeling to battery to vehicle



Driving Automation



>> Deliver safe driving experience by connecting software & hardware disciplines



Connected & Shared Mobility



>> Learn from product usage data to continuously improve products & services





3DEXPERIENCE

Thank you



“ *Dassault Systèmes provides business & people with 3DEXPERIENCE universes to imagine sustainable innovations capable of harmonizing product, nature and life.* ”

 DASSAULT
SYSTEMES

