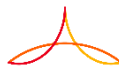# Evolutions of Automotive EE&SW technology

ERTS2020- Renault keynote
A. Corjon - EE&S Engineering Alliance Global VP

Jan. 2020

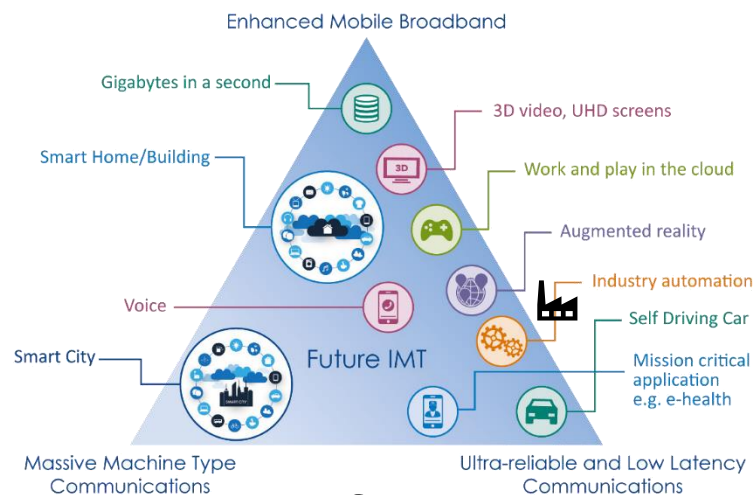# Connectivity, autonomous car, ... The world is moving

V2X

CONNECTIVITY AND SERVICES

AUTONOMOUS DRIVING

Enhanced Mobile Broadband

Gigabytes in a second

3D video, UHD screens

Smart Home/Building

Work and play in the cloud

Augmented reality

Voice

Industry automation

Self Driving Car

Smart City

Future IMT

Mission critical application e.g. e-health

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications
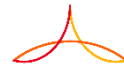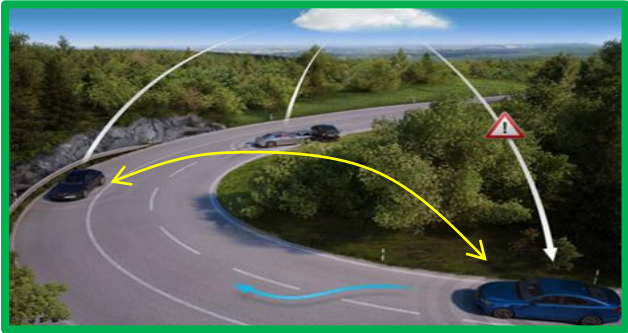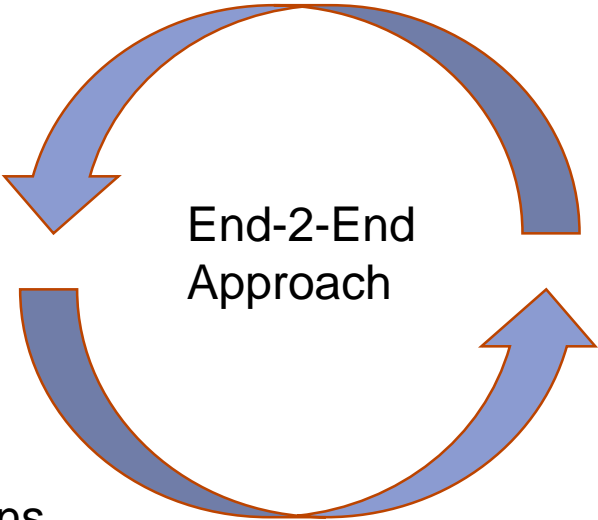
5G

Connected Vehicles

C-ITS, Enablers for Connected ADAS/AD & Ecodriving (V2X, eHorizon, 5G, …)
Connected Vehicle Technologies

Connected services roadmap
Scalable access to vehicle data
Legal compliance

End-2-End
Approach

Digital Connected Cockpit
Intelligent (AI enabled) functions
Augmented & Virtual Reality

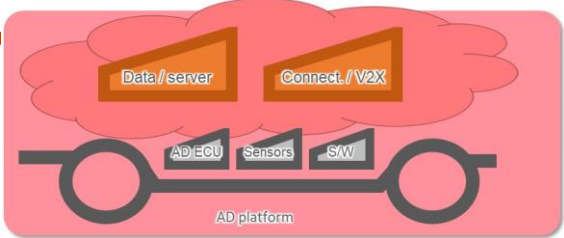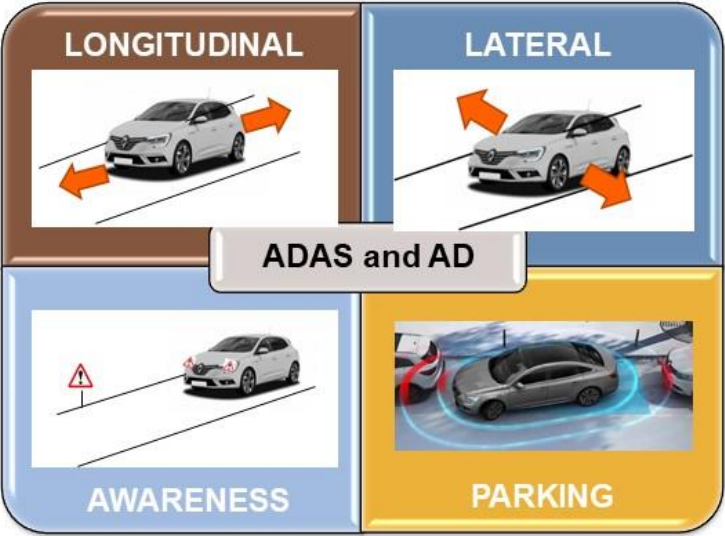Service Oriented Functional Architecture
& Methodologies

ADAS / Autonomous Drive
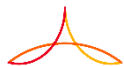
AD Scalable through platform approach
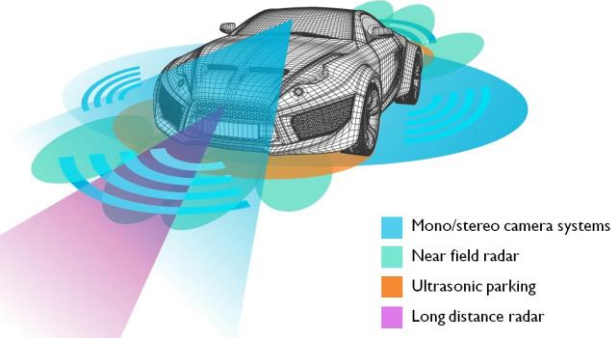
Mono/stereo camera systems
Near field radar
Ultrasonic parking
Long distance radar

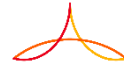✓ 2016
✓ 2018
2020
2022
2024

ADAS GSR Phase 2
AD L3 UN WP29

Safety

Benchmark

Regions

Artificial Intelligence Technologies

Knowledge Representation & Reasoning
- E.g. Product Configuration & Variant Management

Data Science
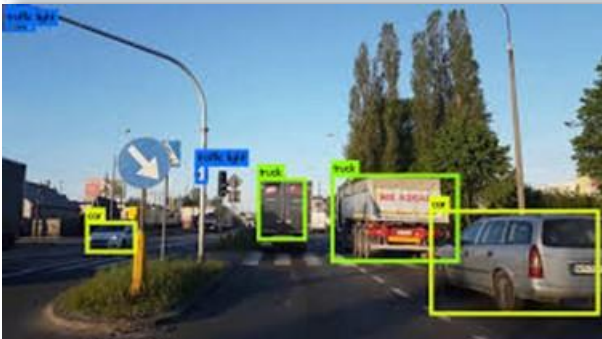- E.g. Usage-based Maintenance

Deep Learning for Autonomous & CC
- E.g. Robustness and validation of AI in critical systems (ANITI – Toulouse ; Grand Défi Certification de l'IA)
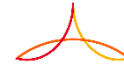- E.g. On-board Personal Assistant

Combinatorial Optimization
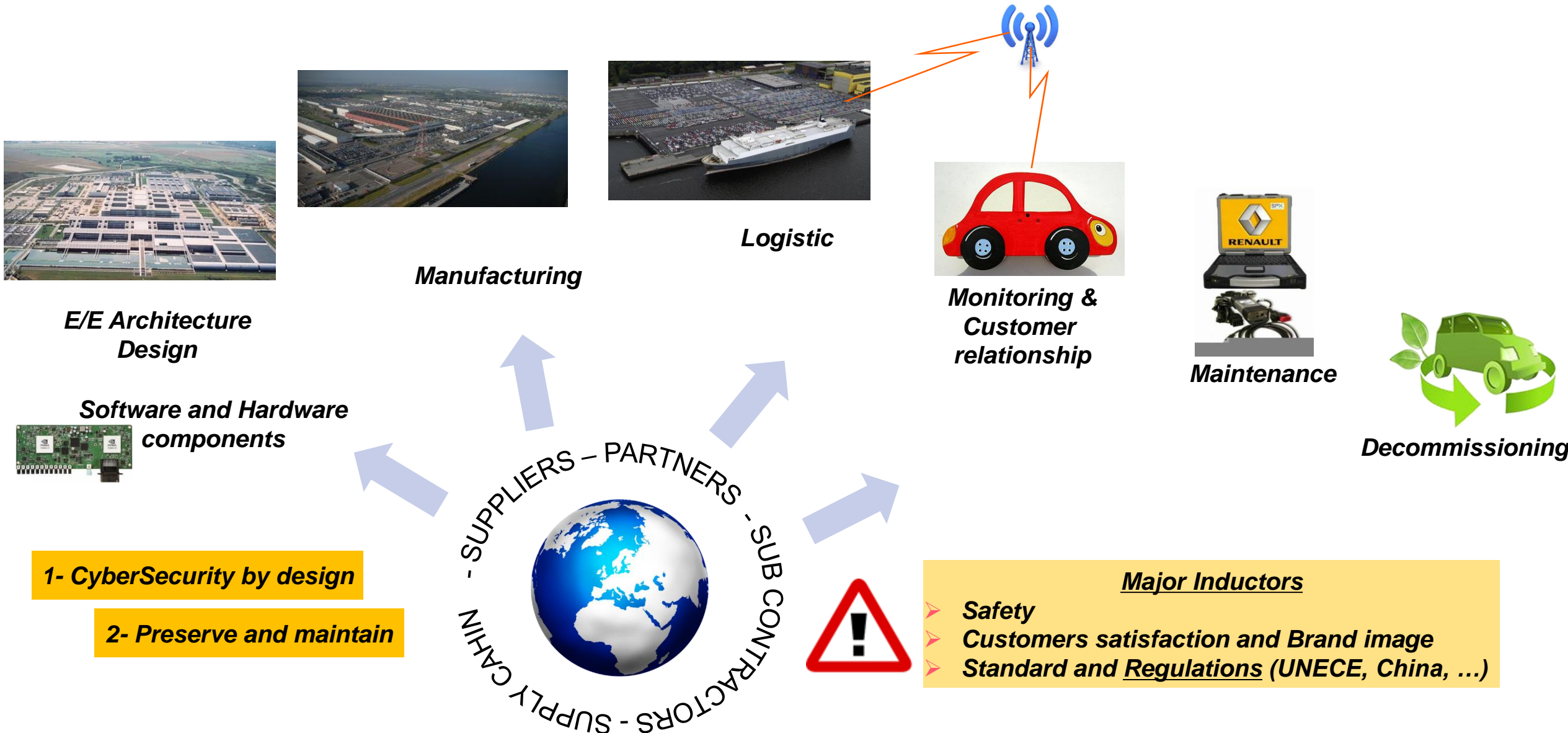- E.g. Production planning & scheduling

AI for Autonomous Systems
- E.g. Integrety of perception & localisation (joint Lab CNRS/UTC/Renault SIVALAB)
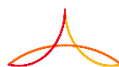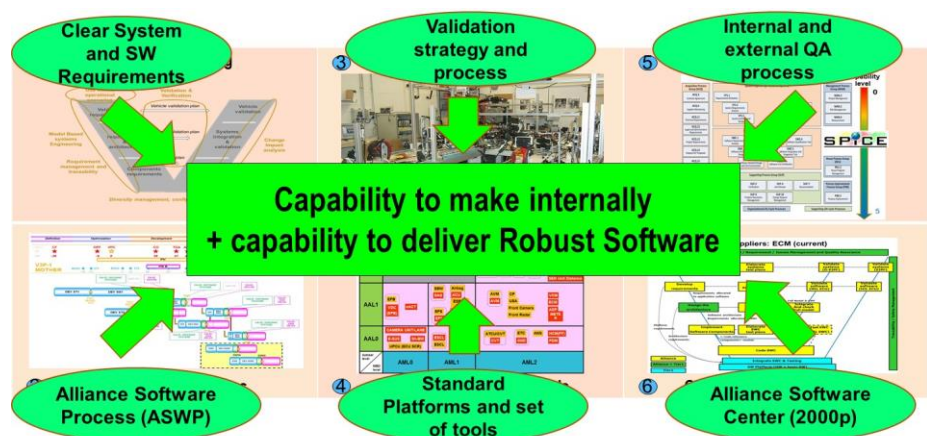
Cybersecurity: a cross company matter

E/E Architecture Design

Manufacturing

Logistic

Monitoring & Customer relationship

Maintenance

Software and Hardware components

Decommissioning

- SUPPLIERS – PARTNERS - SUB CONTRACTORS - SUPPLY CAHIN

1- CyberSecurity by design

2- Preserve and maintain

Major Inductors
- ➤ **Safety**
- ➤ **Customers satisfaction and Brand image**
- ➤ **Standard and Regulations (UNECE, China, …)**

Confidential C

Software Strategy

Capability to make internally + capability to deliver Robust Software

- Clear System and SW Requirements
- Validation strategy and process
- Internal and external QA process
- Alliance Software Process (ASWP)
- Standard Platforms and set of tools
- Alliance Software Center (2000p)

Take benefits of new Alliance Software Center organization and SW Robustness Plan deliverables:

- ☐ **Standardization**
- ☐ **Make internally some applicative SW**
- ☐ **Continuous Integration / Continuous Testing**
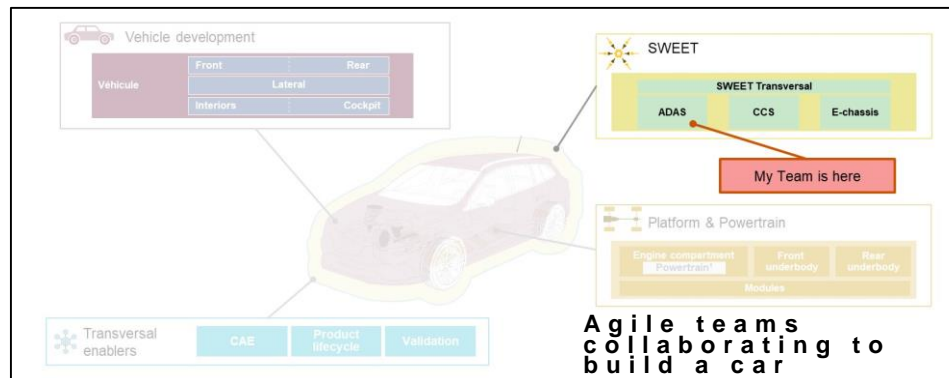- ☐ **Quality improvement (Alliance SW Process, FOTA, …)**
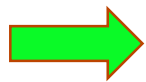
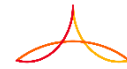## New topics to enhance Embedded Software development and increase performance:

- ☐ **SWEET (SW and EE Technology)**
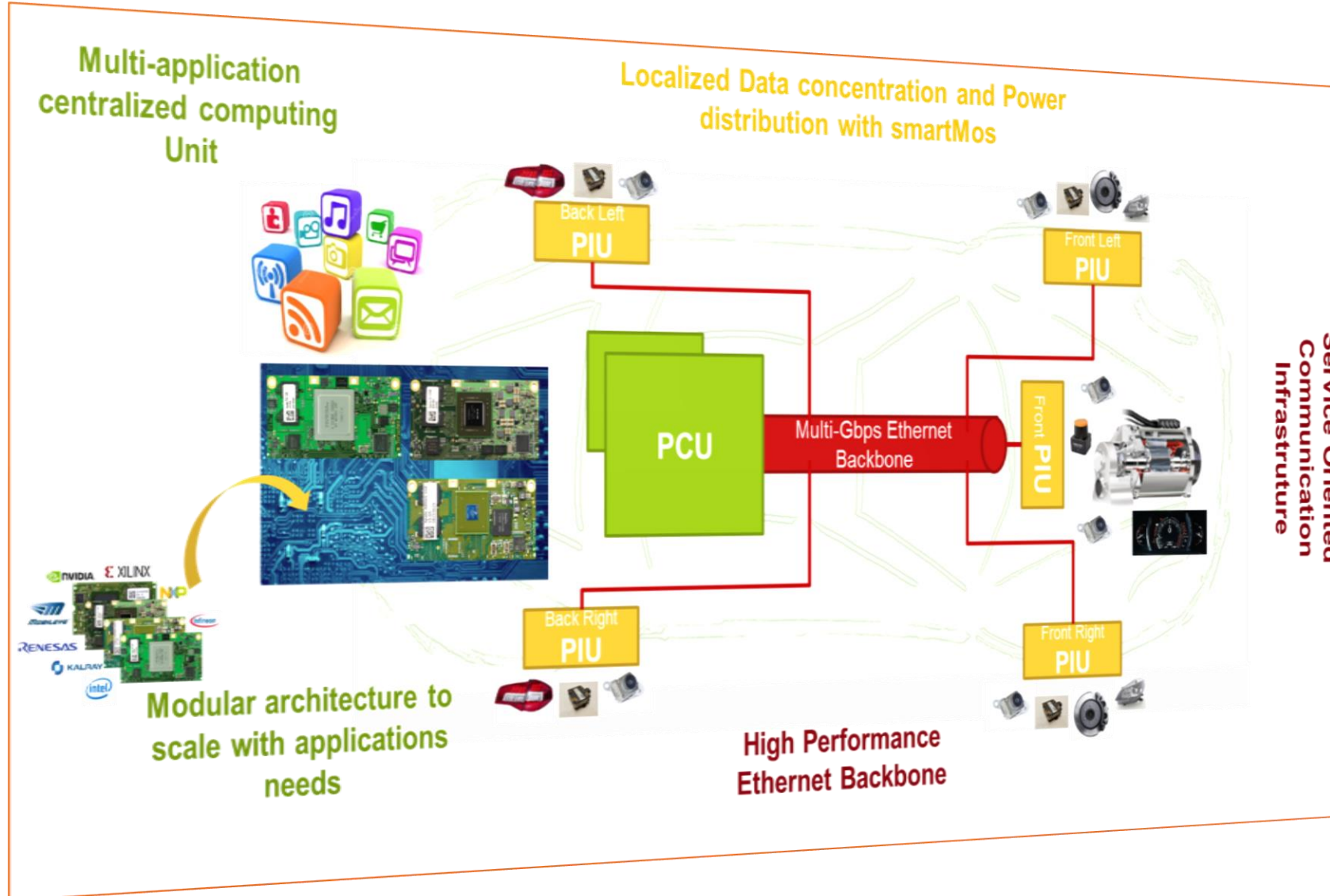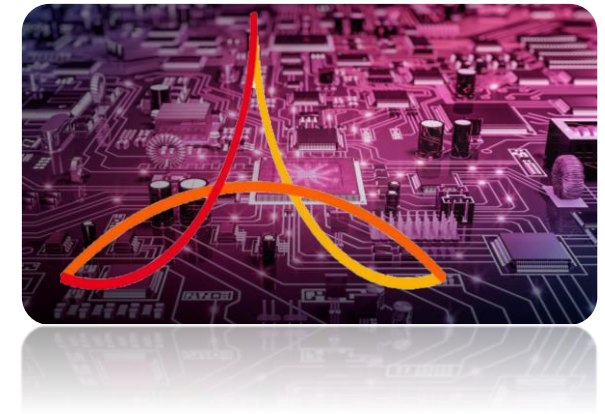- ☐ **Agile**
- ☐ **New Software Architecture**
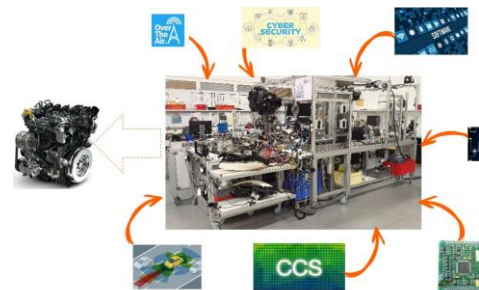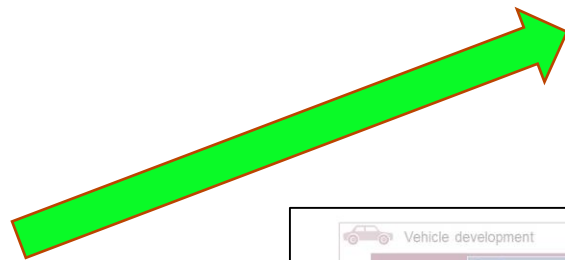
SWEET IS A COMPLETE PRODUCT

Agile teams collaborating to build a car
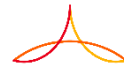
FACE Project

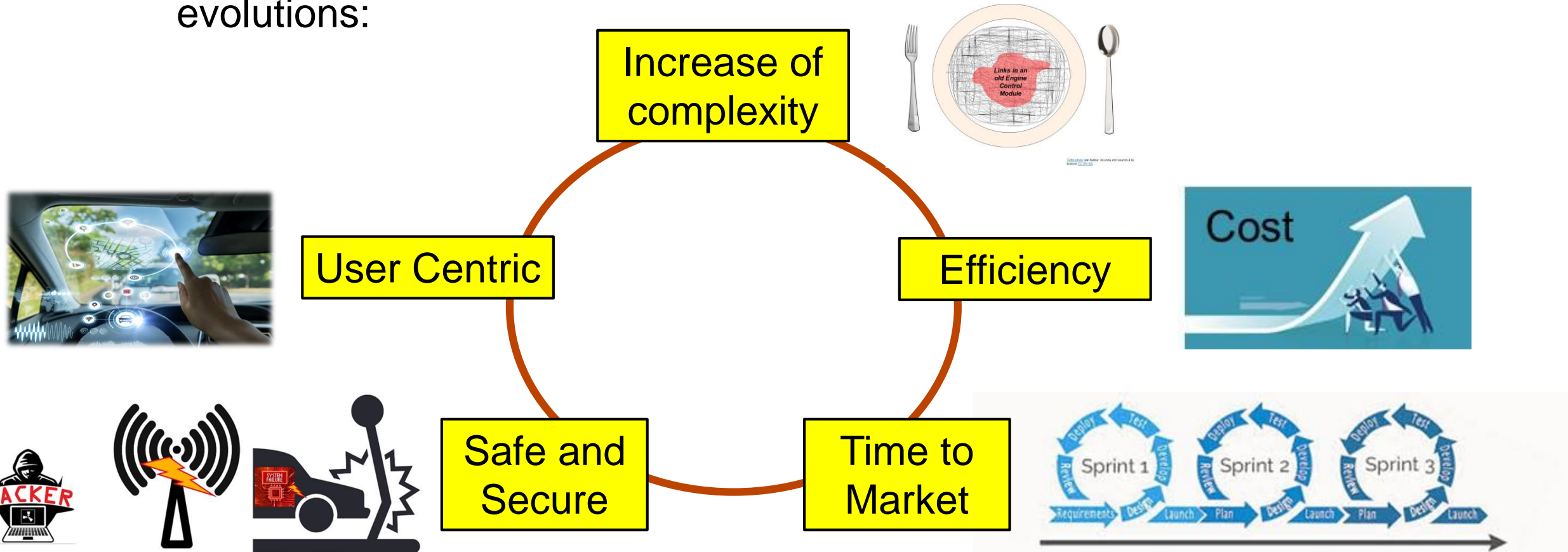**F**uture architecture for **A**utomotive **C**omputing **E**nvironment
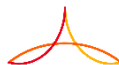

- PCU: Power Computing Unit
- PIU: Physical Interface Unit

Conclusion (1/2)

- Digitalization of the industry continues at high speed
- Both Automotive and Aeronautics industries are confronted to the same evolutions:

Increase of complexity

User Centric

Efficiency

Safe and Secure

Time to Market

Conclusion (2/2)

Have a nice congress