



Key Technologies for the Automobile of the Future

Dr.-Ing. Jochen Langheim

25 years of EUREKA

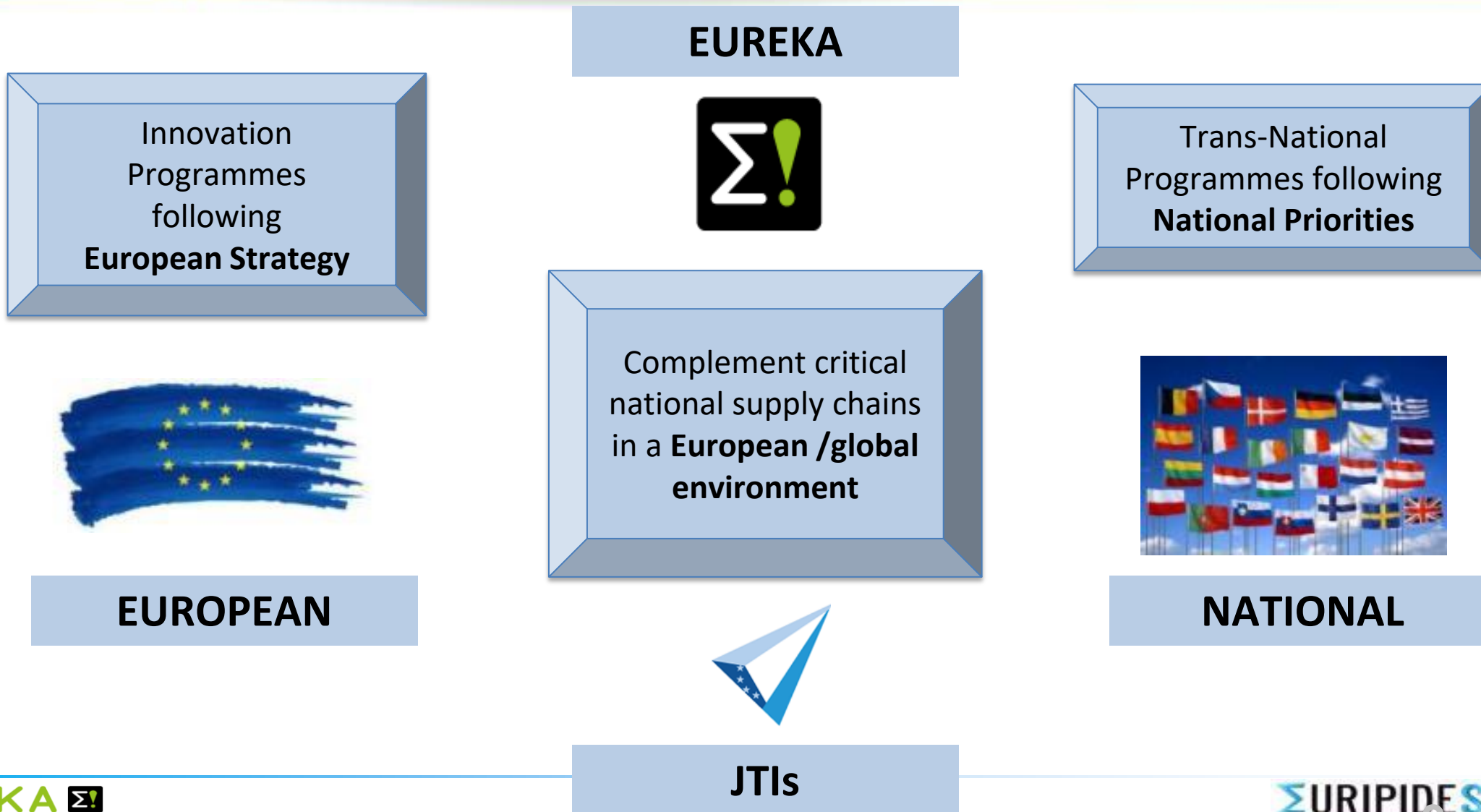


« We have done projects since 25 years in EUREKA and it is the best environment for funded projects. »

Airbus, Thales, Gemalto, ST, ++



European Innovation Landscape



EUREKA members commitment



19 Members supporting:

Belgium, Canada, Czech Republic, Estonia, Finland, France, Germany, Ireland, Israel, Hungary, Norway, Monaco, Poland, Romania, South Korea, Spain, Sweden, Switzerland and Turkey



2 Members interested:

Austria and Malta



Grand Challenges

- Software Updates Over-the-Air
- Communication inside and outside vehicles
- Data Security
- Interaction with logistics
- Energy efficient system architectures
- Energy and power management
- High power charging
- Grid integration & Billing
- Testing and dependability
- Functional safety
- Artificial intelligence
- Smart sensors & actuators
- Environment recognition
- Localization, maps and positioning
- Interaction between humans and vehicles
- Driver activity monitoring, Predictive health management
- Online personalization of vehicles
- Smart mobility for elderly people, digital (non-)natives or handicapped
- Game changer is Asia

Development opportunities in Automotive

Engine Management:
new microcontrollers; 28 nm
EV & HEV motor control

ADAS: Neural networks
Processing Power
Solid state Lidar
Sensor Fusion

V2X: Proliferation

EV: SiC and GaN
technologies for high power
applications

Car radio:
integrate «internet radio»

Smart Antenna:
Data security and
throughput

VIpower:
next generation technologies
and packaging

Power Transistors
New technologies and
packaging

Braking: electric braking
including EV motor
braking energy
recuperation

MCUs:
Security, More MIPs
«Consumer electronics»

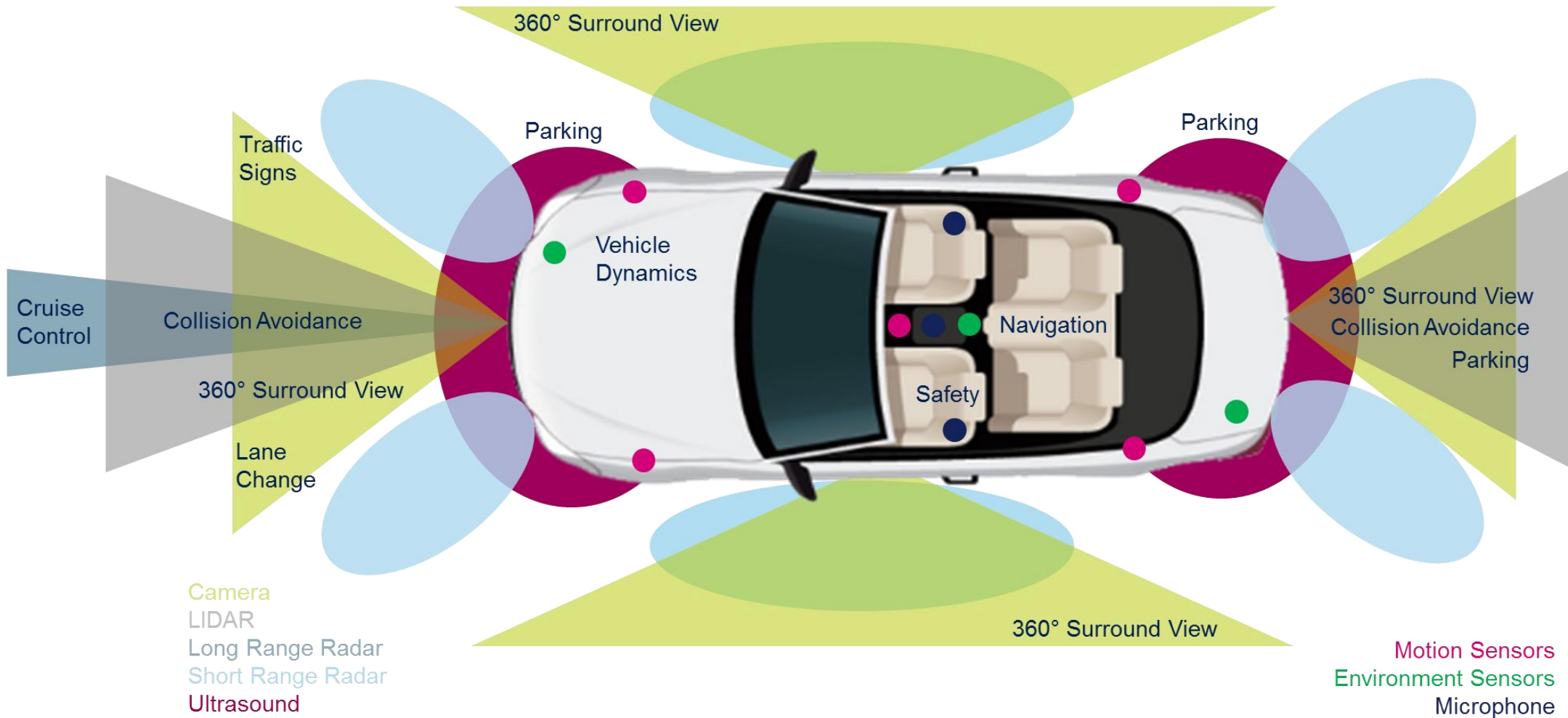
MEMS: further miniaturisation
new sensors for pressure,
humidity, air analysis, alcohol...

Front lighting:
New BCD technologies for
LED/Motor drivers
3D integration

Driver info and sound system:
Robust systems for shared cars
Full Digital Audio



ADAS Sensor Opportunities



Electrification Opportunities

DC-DC HV

- Converts DC from the high voltage batteries (150V-700V) to a DC voltage required by the traction inverter

Battery management Systems (BMS)

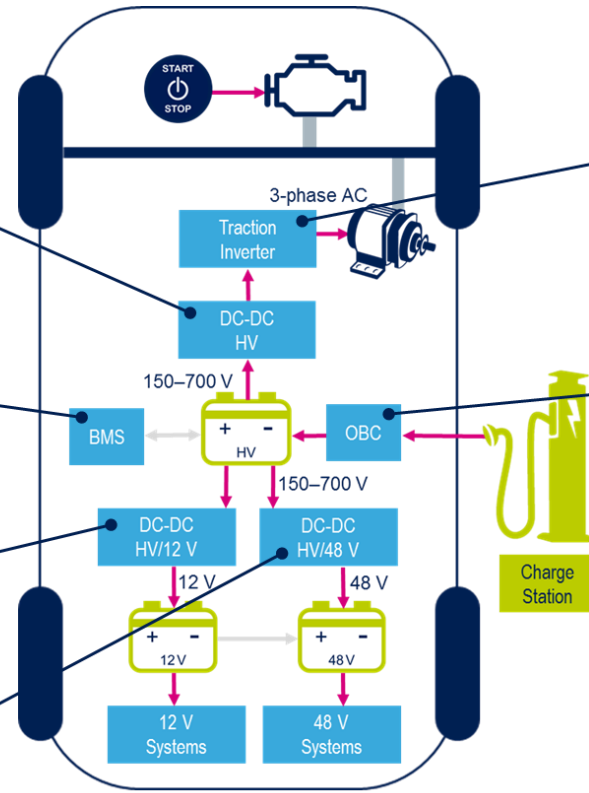
- Manages the batteries for longevity and performance

DC-DC 12 V

- Converts HV DC from the HV batteries to 12 V for use in legacy vehicle subsystems

DC-DC 48 V

- Converts HV DC from the HV batteries to 48 V for use in vehicle subsystems



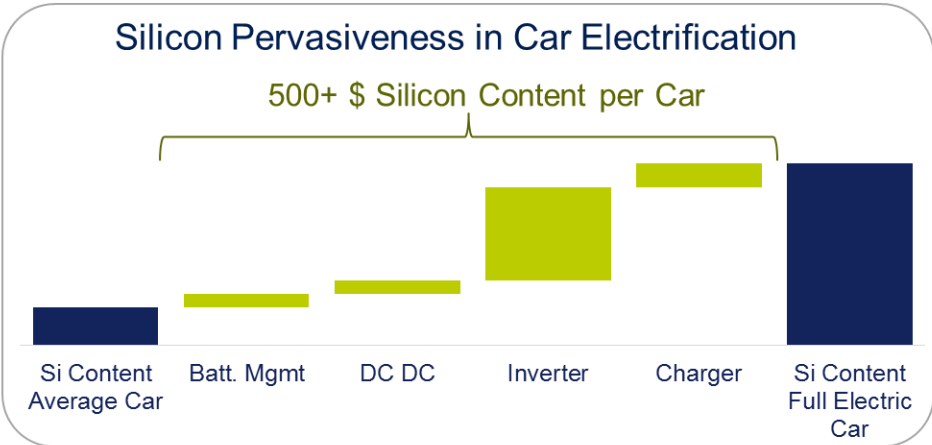
Plug-in Hybrid Electric Vehicle

Traction Inverter

- Converts DC Voltage into 3-phase AC at up to 200kW for the electric motor

On-Board Charger (OBC)

- Converts AC from the Grid 95-265 V_{ac} and converts to a DC voltage required for battery charging 150-700 V



Software Updates Over-the-Air

Software and Firmware Updates

1st Wave

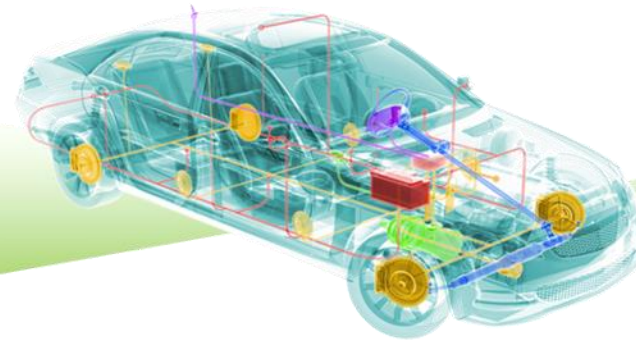
Single-ECU

- Infotainment
- Navigation
- TCUs

2nd Wave

Multi-ECU

- Powertrain
- Drivetrain
- Etc.



Data Collection and Aggregation

Vehicle Diagnostics

Driving Behavior

3rd Party Data

Improving Automaker Profit, Accountability, and Customer Satisfaction

Recalls & Cybersecurity

- ⦿ Reduced Recall Expenses
- ⦿ Faster Recall Compliance Times
- ⦿ Improved Cybersecurity Response

Performance & Operations

- ⦿ New Driving Centric Services
- ⦿ Post-Purchase Enhancements
- ⦿ Increased Operational Efficiencies

Ford Fiesta - 1976

Voir aussi sur ce blog, la pub pour la Ford Fiesta de 1981.



LA CONCURRENTE!
FORD FIESTA 5CV.

Toute la robustesse et la sécurité de Ford dans une petite voiture : 17.900 F*^{clés en mains}.

5,6 litres aux 100 km

Weight: 750 kg

Ford Fiesta 1976 Price including Inflation today: 13 000 EUR

LA CONCURRENTE ! FORD FIESTA 5CV.

Toute la robustesse et la sécurité de Ford dans une petite voiture : 17.900 F*^{clés en mains}.

5 CV, traction avant, moteur transversal, 3,56 m, c'est la nouvelle Ford Fiesta. La petite dernière (elle sera vite en tête) a rassemblé tout ce qui se fait de mieux dans chacune des autres 5 CV. Et, c'est une Ford... Voilà pourquoi la Ford Fiesta 5 CV s'annonce comme une sérieuse concurrente.

5,6 litres aux 100 km

Weight: 750 kg

Car Evolution



2007

13 000 Eur

Weight: 1500 kg

Consumption around 4 - 6 l / 100 km

2017

13 000 Eur

Weight 1100 kg

Consumption around 4.7 l /100km

FORD Fiesta 2040

13 000 EUR

1000 kg

< 2 l / 100 km

FORD Fiesta 2040

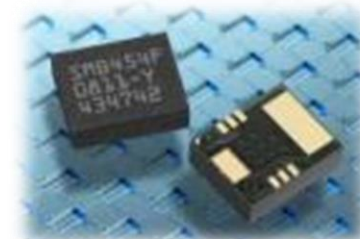
13 000 EUR

900 kg

Electric / H2

Concept - TRACE Project (in CATRENE)

Consumer vs. Automotive Grade



Consumer

Automotive



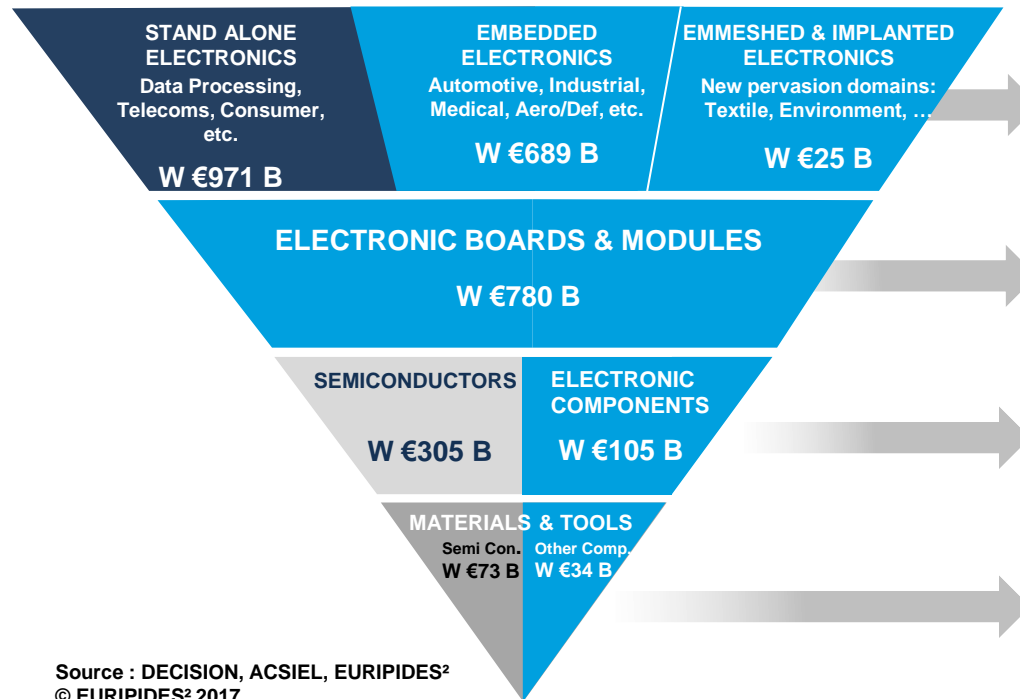
Time to market	< 1 year	> 1 year
Lifetime	1 - 3 years	10 - 15 years
Vibration	negligible	0-2000 Hz
Acceptable field failures	up to 10 %	Goal: zero failure
ESD safety	up to 3 kV	up to 15 kV
Acceptable field failures	< 10 %	Goal: zero failure
Failure documentation (effect / cause)	no	yes
Long-term supply	no	up to 30 years

› Consumer technologies are quite frequently not designed and qualified for automotive use
 › They typically do not meet stringent requirements for safety, reliability and ruggedness
 › Result: CE-AE gaps

TRACE Project Consortium = Value Chain



Electronics and Semiconductor Industry Value Chain in 2016



Source : DECISION, ACSIEL, EURIPIDES²
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	Prod in Europe (€ B)	% Europe / World
Level 4	253	15%
Of which Embedded Electronics	189	27%
Level 3	75	10%
Level 2	43	10%
Level 1	28	26%
Of which SC	21	29%

Call 2017



**EURIPIDES² is your partner
2 calls per year (Spring and Autumn)**

Autumn call

- ▶ **Project Outline (PO): 20 September 2017**
- ▶ **Full Project Proposal (FPP) : 29 November 2017**



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Linked 
Groups


European Smart Electronic Systems