

PROJECT PROFILE

CAT311

Crucial to the 'intelligent city' of the future and to European automotive leadership

[TRACE]

TRACE will enable intelligent mobility and ensure intelligent infrastructure is in place by developing and demonstrating methods, processes and tools to facilitate usage of consumer-electronics components that will be deployable more rapidly in the life-critical automotive domain.

Today's automotive customers demand the latest technologies, not only in electronic consumer products, such as mobile phones or tablets, but also in their vehicles. Satisfying this growing demand will generate new market opportunities and attract customers to vehicles with new technologies.

However, there are six good reasons why there is an urgent need for an innovative methodology to enable the use of consumer electronics (CE) semiconductor components in new automotive applications (thus ensuring European automotive leadership and competitiveness, as well as securing current jobs and creating new ones):

1. Innovative automotive systems require complex semiconductor devices;
2. Required complexity can only be realised by advanced semiconductor processes developed for high-volume markets;
3. Availability of qualified complex automotive devices is getting scarcer;
4. Functionalities shown in 'demonstrator' cars cannot usually be directly replicated in series-production ones;
5. Required functionality is only available through the deployment of CE;
6. CE devices are not qualified for use in life-critical systems and harsh environments.

Delivering needed methodology and tools

TRACE aims at developing a methodology, including processes and tools, required to upgrade and transfer standard CE semiconductor components and technologies to the automotive domain. It will be generally applied to identify required modifications and adaptations, as well as, final conditions for qualification of CE components, technologies and resulting integrated systems for functionally safe and reliable automotive applications.

Simply put, this methodology will be based on an iterative requirement-engineering process with integrated risk-management as a core element of

product development. Findings are returned into the requirement-engineering process in order to finally find the optimal solution for measures and changes needed to modify components and/or adapt the system, as well as, adjust application requirements.

Key project tasks will be to:

1. Define and set up a new automotive-development process involving the whole value chain;
2. Define and set up a new system-development and integration process that balances the shortcomings arising from the use of former CE components along the value chain;
3. Define and set up a process for enabling automotive capability of CE semiconductor components;
4. Set up a new customer-relation process to account for formal and logistic automotive total quality management (TQM) deviations;
5. Develop a proof of concept with dedicated demonstrators.

TRACE combines leading European OEMs, worldwide Tier 1 market leaders and leading European semiconductor companies, with specialised and experienced SME and best-in-class research institutions. This will work effectively and efficiently in solving problems encountered in producing deployable CE components for automotive electronics (AE) applications based on competence and innovation.

A promising automotive market

The importance of the automotive and automation electronic sectors for the European economy is supported by recent studies. Real growth in Europe's electronic production is predicted only for automotive (CAGR 7%) and automation systems (CAGR 6.5%), while other segments stagnate or even decline. While the share of European Union (EU) electronics production remains relatively small (€197 billion in 2012) compared to the worldwide production (€1,412 billion), the effect of the electronic sector as a driver for Europe's production in total

PROJECT CONTRIBUTES TO

- ✓ Communication
- ✓ Automotive and transport
- ✓ Health and aging society
- ✓ Safety and security
- ✓ Energy efficiency
- ✓ Digital lifestyle
- ✓ Design technology
- ✓ Sensors and actuators
- ✓ Process development
- ✓ More than Moore

PARTNERS

Robert Bosch GmbH (CO) / Berliner Nanotest and Design GmbH / BMW AG / Chemnitzer Werkstoffmechanik GmbH / Daimler AG FRT GmbH / Goepel electronic GmbH / iMAR Navigation GmbH / Nexperia Germany GmbH / NXP Semiconductors Germany GmbH / Siemens AG / TWT GmbH Science & Innovation / Volkswagen AG / Ams AG / AKKA Technologies / Continental / Coventor / VEDECOM / Smile / STMicroelectronics Grenoble / STMicroelectronics Grand Ouest / STMicroelectronics SA / Tronics Microsystems / Catena / Heliox / NXP Semiconductors Netherlands BV / Imsys AB / QRTech / Volvo Car Corporation / Fraunhofer-Gesellschaft / FH Johanneum / University Bremen / University Siegen / CEA / Université Bordeaux / Delft University of Technology / KTH Royal Institute of Technology / Swerea IVF AB

COUNTRIES INVOLVED

-  Germany
-  Austria
-  France
-  Netherlands
-  Sweden

PROJECT LEADER

Jochen Beintner
Robert Bosch GmbH

KEY PROJECT DATES

11 April 2016 to 10 April 2019

has extremely high significance and is still growing (18% for automotive and 23% for automation in 2017). Therefore, Europe has to be capable of using all its resources to ensure the availability of electronics components and modules with all functionalities needed for the creation of world-leading applications in the automotive and automation sectors.

Expected benefits: European economy

Currently, two major trends in the development of future vehicles are automated driving and connectivity. Both technologies strongly rely on advanced, high-performance semiconductor components available for cell phones and computers, for instance, but not for vehicles due to limited functional safety and environmental robustness. TRACE will allow European OEMs, and Tier 1 and Tier 2 suppliers to early adapt latest technology trends in vehicles. This will give them competitive advantage, not only over Silicon Valley tech companies, but also Asian or other American competitors. This means that TRACE will extend the European automotive leadership from its traditional strength into the digital age. Of course, this project will not only positively impact the automotive industry, thanks to results that will be applicable to other industries, especially automation.

TRACE will support European OEMs, SMEs and Tier 1 and 2 companies in increasing revenue through increased market share: by combining fast time-to-market with CE experience and technology leadership, the market share of European automotive OEMs and electronics companies (and firms in other domains like automation) will be strongly increased within their particular relevant product segments. TRACE partners estimate a market-share increase of 5%-30%.

Expected benefits: employment

In general, it is observed in automotive that one employee generates around €200.000 in turnover. Based on this assumption, up to 7,500 new jobs will be created. If we estimate that the TRACE contribution to this development effort is around 5% (with additional synergies

through collaboration), then there should be a corresponding expected impact on employment of the same order of magnitude: around 370 new jobs.

In case of European OEMs, projections show that integration of advanced driver-assistance systems (ADAS) and connectivity, as well as, other new functionalities enabled or accelerated by TRACE results will lead to several hundred additional new jobs in development and production. In addition, based on the feedback of some TRACE partners, the generation of new jobs within SMEs is estimated around 1-20 new employees, depending on the size of the company. With TRACE results applicable to other domains, like industrial and medical, the potential for new jobs will increase even further.

Addressing societal and environmental concerns

TRACE will also accelerate the development of new ways of reducing traffic congestion through sensor and communication systems. Notably, co-operative driving and predictive traffic management will result in better traffic-flow. By connecting cars to intelligent traffic systems, traffic congestion will be reduced. This will not only help optimise the use of available road capacity; but it will also improve the quality of life and the environment.

In addition, energy efficiency, air cleanliness and noise reduction are gaining increasing attention, thanks to growing populations, urbanisation and climate change. Here too intelligent traffic systems will offer integral system solutions towards road-use and energy efficiency, as well as road safety. Furthermore, with the introduction of electronic systems for safe and autonomous driving, passive safety measures will be replaced by active ones, resulting in reduced weights of cars and therefore lower fuel consumption and CO2 emission. And sensors, such as radar cameras and the like will create a safety bubble around the car and reduce traffic incidents.

TRACE is clearly about advancing technology and the economy, while protecting society and the environment.

