

PROJECT

## AUTOMICS

### Pragmatic solution for parasitic-immune design of electronics ICs for automotive

**Funding:** European (7th RTD Framework Programme)

**Duration:** Jul 2012 - Aug 2015

**Status:** Complete

**Total project cost:** €5,748,892

**EU contribution:** €3,547,917



**Call for proposal:** FP7-2012-ICT-GC

[CORDIS RCN : 104594](#)

#### Background & policy context:

Smart Power ICs are extensively used in automotive embedded systems due to their unique capabilities to merge low power and high voltage devices on the same chip, at a competitive cost. In such devices, induced electrical coupling noise due to switching of the power stages, when integrating such high voltage (HV) devices with low voltage (LV) functions, is a big issue. During switching, parasitic voltages and currents, consisting of electrons and holes, lead to a local shift of the substrate potential that can reach hundreds of millivolts. This electrical coupling noise can severely disturb low voltage circuits. Such parasitic signals are known to represent the major cause of failure and costly circuit redesign in power integrated circuits. Furthermore, parasitic carrier injections are considerably increased under high temperature operation such as those encountered in automotive applications where this problem is even more severe since these dedicated IC's need to be highly reliable and stable over time. Most solutions are layout dependent and are thus difficult to optimize using available electrical simulator software.

The lack of a model strategy that would enable to simulate accurately the injection of minority carriers in the substrate as part of the HV model, as well as its propagation in the substrate, is one of the main reasons for this critical situation. This lack of a design methodology prohibits an efficient design strategy and fails at giving clear predictions of perturbations in high voltage integrated circuits.

#### Objectives:

The main objective of this project is to study the parasitic substrate coupling effects and enhance the quality of smart power ICs by diminishing risks related to reliability, safety and durability of fully electrical vehicles.

#### Parent Programmes:

[FP7-ICT - Information and Communication Technologies](#)

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

#### Lead Organisation:

**Universite Pierre Et Marie Curie**

**Address:**

Place Jussieu,4  
75252 PARIS  
France

**Organisation Website:**

<http://www.upmc.fr>

**EU Contribution:** €655,235

## Partner Organisations:

### Institut National Des Sciences Appliquées

**Address:**

135 avenue de Ranguel  
31077 TOULOUSE  
France

**Organisation Website:**

<http://www.insa-toulouse.fr>

**EU Contribution:** €85,277

### Ecole Polytechnique Fédérale De Lausanne

**Address:**

Batiment Ce 3316 Station 1  
1015 LAUSANNE  
Switzerland

**Organisation Website:**

<http://www.epfl.ch>

**EU Contribution:** €623,600

### Ams Ag

**Address:**

Tobelbaderstrasse  
8141 Unterpremstaetten  
Austria

**Organisation Website:**

<http://www.ams.com>

**EU Contribution:** €719,986

### Admos Gmbh Advanced Modeling Solutions

**Address:**

In Den Gernackern  
72636 Frickenhausen  
Germany

**Organisation Website:**

<http://www.admos.de>

**EU Contribution:** €239,269

### Continental Automotive France Sas

**Address:**

Avenue Paul Ourliac  
31036 Toulouse  
France

**Organisation Website:**

<http://www.siemensvdo.com>

**EU Contribution:** €144,815

**Université Paul Sabatier****Address:**

118, route de Narbonne  
31062 TOULOUSE  
France

**Organisation Website:**

<http://www.ups-tlse.fr>

**EU Contribution:** €20,635

**Stmicroelectronics Srl****Address:**

VIA C.OLIVETTI 2  
20864 AGRATE BRIANZA  
Italy

**Organisation Website:**

<http://www.st.com>

**EU Contribution:** €443,671

**Centre National De La Recherche Scientifique****Address:**

3 rue Michel-Ange  
75794 PARIS  
France

**Organisation Website:**

<http://www.cnrs.fr>

**EU Contribution:** €295,543

**Valeo Equipements Electriques Moteur Sas****Address:**

2 Rue Andre Boulle  
94000 Creteil  
France

**EU Contribution:** €319,886

**Technologies:**

Road vehicle operations  
Communication network for intelligent mobility

**Development phase:** Research/Invention

Transport electrification, Vehicle design and

**STRIA Roadmaps:** manufacturing

**Transport mode:** Road transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Digitalisation

**Geo-spatial type:** Other