



## Introduction

### ECPE Workshop

#### Built-in Reliability into Power Electronic Systems

25 – 26 June 2008  
Toulouse, France

19 years ago Intel introduced the concept of building-in reliability. It basically means to control design, processes and materials which are used for producing chips rather than testing the chip itself.

This concept is also very well suited to secure the reliability of power electronics systems. Today “zero defect” throughout the supply chain is a requirement. Everything has to be done right from the beginning, starting with the requirements concerning reliability and mission profile.

After having worked out a first design the next step in the design process is “Virtual performance assessment” which includes electrical, thermal and EMI simulations. The results are compared with data sheets and standards. The fourth step is “Reliability assessment” based on the “physics of failure”, and physical models for Life-time prediction. The fifth step is “Robustness validation”, a brand new validation philosophy for components and modules/ ECUs, which has been worked out by many automotive industries under the umbrella of ZVEI, SAE, JSAE. The handbook J 1879 is available since 04/2007, and J1211 will be published 04/2008.

Prof. Eckhard Wolfgang (ECPE) will chair the workshop together with Michel Mermet-Guyennet, (PEARL) and Thomas Harder (ECPE). All presentations and discussions will be in English.

## Programme

Wednesday, 25 June 2008

10:00 Start of Registration

10:30 Welcome and Introduction  
ECPE, PEARL

### Performance and Reliability Requirements:

10:55 Railway  
M. Mermet-Guyennet, PEARL (F)

### Mission Profiles:

11:15 Aircraft  
M. Iturriz, Airbus France (F)

11:40 Automotive  
R. Greul, Continental Automotive Systems  
Division (D)

12:05 Translation of Mission Profile to PE  
E. Wolfgang, ECPE (D)

12:30 Lunch

### Virtual performance assessment:

13:45 Multi-Physics Tools for 3D Integration  
H. Feral, EPSILON (F)

14:15 Safety Management and Fault Tolerant  
Topologies  
F. Richardeau, University of Toulouse/  
LAPLACE (F)

14:45 Thermal Design  
M. Ciappa, ETH Zurich (CH)

15:15 Vibrational Design  
C. Barthes; Continental Automotive (F)

15:45 Coffee break

16:15 EMI  
J.-M. Dienot, E. Batista, PEARL, Alstom (F)

### Reliability assessment (Part I):

16:45 Physics of Failure  
P. McCluskey, CALCE (USA)

17:30 Panel discussion (speakers of day 1)

18:15 End of 1<sup>st</sup> day's programme

20:00 Dinner at Hotel Mercure St. Georges  
Dinner speech: Electrical Needs in  
Future Aircraft  
L. Prisse, Airbus France

## Programme

Thursday, 26 June 2008

### Reliability assessment (Part II):

09:00 High-Temperature Electronics  
P. McCluskey, CALCE (USA)

09:50 Failure Analysis  
M. Medina, D. Trias, S. Drouet, SERMA (F)

10:20 Life Time Prognosis  
M. Ciappa, ETH Zurich (CH)

10:50 Coffee Break

### Cases studies for Built-in Reliability:

11:20 Industry  
U. Scheuermann, Semikron (D)

11:40 Automotive  
J.-M. Morelle, Valeo (F)

12:00 Railway  
M. Piton, Alstom Transport (F)

12:20 Aircraft  
R. Meuret, Sébastien Vieillard,  
T. Lhommeau, Hispano Suiza (F)

12:40 Lunch

### Robustness Validation:

14:00 Introduction to RV handbooks  
E. Wolfgang, ECPE (D)

14:15 Testing of Robustness Margins  
M. Piton, Alstom Transport (F)

14:45 Reliability Testing  
G. Coquery, INRETS (F)

15:15 Panel Discussion (speakers of day 2)

16:00 End of Workshop