9th European Congress
EMBEDDED REAL TIME SOFTWARE AND SYSTEMS
ERTS² 2018
FROM JANUARY 31st TO FEBRUARY 2nd / TOULOUSE, FRANCE
PIERRE BAUDIS CONGRESS CENTER

PROGRAMME
The Internet of Things (IoT) is the ultimate vision for ICT. We now have the ability to measure, sense and see the exact condition of practically everything. People, systems and objects can communicate and interact with each other in entirely new ways. We are moving slowly but inevitably toward a unification of networking infrastructures, including telecommunication networks, the internet, industrial and home networks. Finally, we should be able to respond to changes quickly and accurately, by predicting events and optimizing resources.

To what extent this ambitious IoT vision of “universal global neural network” is reachable today? There exist two important roadblocks to this evolution. One is the lack of security guarantees. The internet infrastructure and systems in general, are vulnerable. They have been built in an ad hoc manner and it is impossible to provably enhance their security.

The other roadblock is the lack of guarantees for response time and latency in the internet. This is a major impediment to the development of automated services.

Additionally, the IoT vision advocates the extensive deployment of autonomous systems and services which are often critical. These challenge our ability to guarantee their trustworthiness: 1) they rely on learning techniques that cannot be formally validated; 2) they are open and their software needs to be frequently updated; 3) they should tightly integrate critical and non-critical features.

Embedded systems play a central role in the IoT vision. They are essential components of the Internet of Things and as such, their evolution should adequately address the changing needs in the area.

ERTS 2018 as the unique European cross-sector event on Embedded Software and Systems gathering together researchers, engineers and professionals, is an excellent forum for addressing all these issues and exchanging on future challenges and opportunities.
Embedded systems are becoming more and more important in our day to day life, most of the devices that we are using contain « Electronics » and « Software » and are pushing us towards Industry 4.0 and digitalization. All major industry changes have been fueled by major technology steps and this one can be considered as the one of the software.

Expressed as such, we are focusing on technology only but there is also a major transformation from User perspective. User Experience is the new most important point in the development of new products and this focus is at the origin or the consequence of a services-oriented industry.

In the Automotive domain, we are facing these exact same new challenges with our developments for Electrical, Autonomous and Connected Vehicles, with increasing risks on Safety and Security. Software is becoming the first value of our vehicles and also the main asset we need to create and maintain. This will support introducing different User interactions with our products and work on the loyalty to our brands. Continuous relationship and evolutions are key to achieve our goals.

All these new features require interactions between on-board and off-board resources and their development will need to rely on robust System Engineering methods.

ERTS is now a very well-known convention, with people coming from almost all parts of the world with representatives from Academia to Industry teams. It is a real opportunity to exchange across domains, to share best practices, to discover roadblocks and items in research phase, to present difficulties and solutions.

The more the attendance, the better the exchanges!
Registration conference access
All attendees must register upon arrival and receive a conference badge which will be requested to access all ERTS² 2018 events. The registration desk opening hours are as follows:
Tuesday 30 January  16:00 - 18:00
Wednesday 31 January  08:00 - 18:00
Thursday 1 February  08:30 - 18:30
Friday 2 February  08:30 - 14:00

Conference proceedings
All conference attendees will receive a conference Folder including the Programme, proceedings on usb key and Book of Abstracts. Proceedings will be also available to download on the website after the conference.

Exhibition
A major exhibition is run in parallel to ERTS² 2018, covering a wide range of products and services in the field of embedded software. The exhibition is located in the room Concorde, level -1.
Wednesday 31 January  09:00 - 20:00
Thursday 1 February  09:00 - 19:00
Friday 2 February  09:00 - 14:00

Coffee Breaks
Coffee breaks will take place in the Exhibition Hall, Room Concorde, level -1.
Wednesday 31 January  from 11:15 to 11:45 and from 16:30 to 17:00
Thursday 1 January  from 10:30 to 11:00 and from 16:00 to 16:30
Friday 2 January  from 10:30 to 11:00

Conference Meals
Lunches are included in the Registration fees and will be served from Wednesday to Friday in room Caravelle, level 0, Wednesday from 12:30 to 14:00, Thursday from 12:45 to 14:00 & Friday from 12:45 to 14:00

Transportation
A complimentary transportation pass will be distributed to the attendees at the badge withdrawal. This pass gives access to the Toulouse official transportation: tramway, metro, buses and shuttle to airport.

Internet Access
A WiFi system will be provided, giving free internet access to all ERTS² 2018 Conference delegates.
Network: ERTS2018
Password: ERTS2018

Luggage room
A cloakroom is at the delegates’ disposal at the Conference centre, in front of the Registration desk, level 0

Social Events
• Cocktail party on Wednesday 31 January - from 18:30 to 19:30 Exhibition Hall, Room Concorde, level -1
• Gala Evening on Thursday 1 February - from 19:30 to 22:30, Room Caravelle 1+2, level 0 of the Congress Center. The invitation will be requested at the main entrance (given at the badge withdrawal for those who benefit from a full registration including the gala dinner).
  Additional gala dinner can be purchased onsite (until Wednesday 31 January, upon availabilities) at the price of 90€
ERTS² 2018 will be held at the Pierre Baudis Convention Center, located in the centre of Toulouse.

**Address:**
Centre de Congrès Pierre Baudis
11, esplanade Compans Caffarelli
31000 Toulouse

**Access:**
**By Metro**
Compans Caffarelli (Line B) Station

**By bus**
The congress centre is served by bus lines:
N°1, N°70 & N°71 (Bus stop Compans Caffarelli), N°16 (Bus stop Jeanne d’Arc)

**From/To Airport**
A shuttle bus every 20 minutes with a station in front of the Pierre Baudis Congress Centre (Compans Caffarelli)

**Taxi**
A station is available just in front of the entrance of the Hotel Mercure Atria, Boulevard Lascrosse
To call a taxi: + 33 (0)5 61 20 90 00
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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room Guillaumet 1+2</th>
<th>Room Ariane 1</th>
<th>Room Ariane 2</th>
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<td>09:00</td>
<td>Opening Allocutions</td>
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<tr>
<td>09:15</td>
<td>Opening Session by <strong>Joseph Sifakis</strong>, Verimag - France</td>
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<td>09:45</td>
<td>Plenary Session : Industrial Co chair: <strong>Alexandre Corjon</strong>, Alliance Renault-Nissan Global Vice President - France &amp; Keynote Address 1: Airbus representative, France</td>
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<tr>
<td>11:15</td>
<td>Exhibition visit &amp; Refreshment break (Room Concorde, level -1)</td>
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<td>11:45</td>
<td>Keynote Address 2 - Raja Chatila, Director of Institute of Intelligence Systems and Robotics, ISIR - UPMC, France</td>
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<td>12:30</td>
<td>Lunch (Room Caravelle, level 0)</td>
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<td>14:00</td>
<td>We.1.A Model Based System Engineering 1</td>
<td>We.1.B Agility for Certification</td>
<td>We.1.C Lightweight Platforms</td>
<td>We.1.D Smart Vehicles Simulation</td>
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<tr>
<td>15:00</td>
<td>We.2.A Model Based System Engineering 2</td>
<td>We.2.B Challenges of Certification</td>
<td>We.2.C Distributed Real Time Platforms</td>
<td>We.2.D Smart Vehicles</td>
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<td>16:30</td>
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<td>17:00</td>
<td>Panel 1 - Trends and challenges for autonomous vehicles</td>
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<td>18:30</td>
<td><strong>Welcome Reception - Exhibition Hall, Room Concorde level -1</strong></td>
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### THURSDAY 1 FEBRUARY

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<td>Model Based System Engineering 3</td>
<td>Safety and Security</td>
<td>Execution Platforms</td>
<td>Intelligent Systems</td>
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<td>10:30</td>
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<td>11:00</td>
<td>Keynote Address 3 - Max Lemke, DG Connect EU</td>
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<td>11:45</td>
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<td>14:00</td>
<td>Panel 2 - How Machine learning could be used (or not) for safety - critical applications?</td>
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<td>Software Verification</td>
<td>Safety and Dependability Assessment</td>
<td>Manycore</td>
<td>Virtual Engineering</td>
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<td>16:30</td>
<td>Th.3.A</td>
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<td>Model Based System Engineering 4</td>
<td>Formal Requirements</td>
<td>Design for Multicore</td>
<td>Cyber Physical System Simulation</td>
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<tr>
<td>19:30</td>
<td>Gala Evening (Pierre Baudis Congress Center, Room Caravelle, level 0)</td>
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### FRIDAY 2 FEBRUARY

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<td>Fr.1.C</td>
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<td>Software Development</td>
<td>Formal Methods</td>
<td>Networks</td>
<td>Digitalization</td>
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<tr>
<td>11:00</td>
<td>Keynote Address 4 - Xavier Leroy, Senior Research Scientist, INRIA</td>
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<td>11:45</td>
<td>Fr.2.A</td>
<td>Fr.2.B</td>
<td>Fr.2.C</td>
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<td>Software Tools</td>
<td>Resilience</td>
<td>Field Bus</td>
<td>Multicore Implementation</td>
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<tr>
<td>12:45</td>
<td>Lunch (Room Caravelle, level 0) and Closing Session</td>
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<td>14:00</td>
<td>Conference End</td>
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### Room Auditorium St Exupéry

- **09:00-09:15** Opening Allocutions - Louis Claude Vrignaud, Continental, France
  Opening by high level representatives of organizing societies and local authorities

- **09:15-09:45** Opening Session
  Joseph Sifakis, Verimag - France

- **09:45-11:15** Plenary Session:
  - **09:45-10:15** Industrial Co chair: Alexandre Corjon, Alliance Renault-Nissan Global
    Vice President - France
  - **10:15-10:45** Keynote Address 1: Airbus representative, France
  - **10:45-11:15** Moderated discussion

- **11:15-11:45** Exhibition visit & Refreshment break (Room Concorde, level -1)

- **11:45-12:30** Keynote Address 2: Raja Chatila, Director of Institute of Intelligence Systems and Robotics, ISIR- UPMC, France

- **12:30-14:00** Lunch (Room Caravelle, level 0)

### Room GuillaumeT

- **Session We.1.A - Model Based System Engineering 1**
  - **Chair:** Philippe Baufreton, Safran Electronics & Defense - France
  - **We.1.A.1 - SCADE AADL**
    - Thierry Le Sergent; Adnan Bouakaz - ANSYS, France
  - **Guilherme Goretkin** - ANSYS, United States
  - **We.1.A.2 - Capella to SysML Bridge: a Tooled-up Methodology for MBSE Interoperability**
    - Nesrine Badache - Artal Technologies, France
  - **Pascal Roques** - PRFC, France

- **Session We.1.B - Agility for Certification**
  - **Chair:** Mohamed Kaaniche, LAAS- CNRS-France
  - **We.1.B.1 - Making Agile Development Processes fit for V-style Certification Procedures**
    - Charlotte Pichot; Sergio Bezzecchi - Alstom Transportation Systems, France
  - **Burkhart Wolff** - Université Paris-Sud / LRI, France
  - **Paolo Crisafulli** - IRT SystemX, France
  - **We.1.B.2 - ED-12C/DO-178C vs. Agile Manifesto - A Solution to Agile Development of Certifiable Avionics Systems**
    - John Marsden; André Windisch - Airbus Defence and Space, Germany
  - **Julien Villermín; Claire Aventini** - Airbus, France
  - **Robert Mayo; Jürgen Grossi** - Airbus Helicopters, Germany
  - **Louis Fabre** - Airbus Helicopters, France

### Room Ariane 1

- **Session We.1.C - Lightweight Platforms**
  - **Chair:** Stefan Vogel, Continental Automotive, Germany
  - **We.1.C.1 - The SEMAPHORO Haptic Interface: a real-time low-cost open-source implementation for dyadic teleoperation**
    - Lucas Roche; Florian Richer; Ludovic Saint-Bauzel - ISIR - UPMC, France
  - **We.1.C.2 - A Generic Virtual Machine Approach for Programming Microcontrollers: the OMicroB Project**
    - Steven Varoumas - LIP6, France
  - **Benoit Vaugon** - ENSTA-ParisTech, France
  - **Emmanuel Chailloux** - LIP6 - University Pierre and Marie Curie - Paris 6, France

### Room Ariane 2

- **Session We.1.D - Smart Vehicles Simulation**
  - **Chair:** Olivier Guetta, Renault - France
  - **We.1.D.1 - Development Framework for the Longitudinal Automated Driving Functions with Off-board Information Integration**
    - Eric Armengaud; Sebastian Frager; Stephen Jones; Alexander Massoner; Alejandro Ferreira Parrilla; Niklas Wikstroem; Georg Macher - AVL List GmbH, Austria
  - **We.1.D.2 - Towards Simulation-Based Verification for Continuous Integration and Delivery**
    - Henrik Lönn; Henrik Kaijser; Peter Thorgren - Volvo Group, Sweden
    - Johan Ekberg - Arccore AB, Sweden
    - Maria Henningsson - Modelon AB, Sweden
    - Mats Larsson - Systemite AB, Sweden
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<td>WEDNESDAY 31 JANUARY</td>
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<td>15:00-16:30</td>
<td>AUDITORIUM ST EXUPÉRY</td>
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<td></td>
<td><strong>Session We.2.A - Model Based System Engineering 2</strong></td>
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<td>Chair: Emmanuel Ledinot, Dassault Aviation - France</td>
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<td></td>
<td>We.2.A.1 - Unifying safe hardware system design and implementation</td>
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<td>through UML-based architecture description languages</td>
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<td></td>
<td>Shuai Li; Yupanqui Munoz Julho; Natasha Yakymets; Asma Charfi;</td>
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<td>Sébastien Gérard; Morayo Adedjouma; Chokri Mraidha; Ansgar</td>
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<td>Radermacher - CEA LIST, France</td>
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<td>We.2.A.2 - Calur: an Action Language for UML-RT</td>
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<td>Nicolas Hili; Juergen Dingel - Queen’s University, Canada</td>
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<td>Ernesto Posse - Zeligsoft, Canada</td>
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<td>We.2.A.3 - PhiSystem: a tool methodolgy for design and validation</td>
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<td>Matteo Morelli; Arnaud Cuccuru; Sebastien Gerard - CEA LIST, Laboratory of Model driven engineering for embedded systems, France</td>
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<td>Philippe Fiani - Sherpa Engineering, La Garenne Colombes, France</td>
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<td>15:00-16:30</td>
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<td><strong>Session We.2B. - Challenges of Certification</strong></td>
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<td>Chair: Gérard Ladier, Aerospace Valley - France</td>
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<td>We.2.B.1 - Software safety - A journey across domains and safety</td>
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<td>Jean-Paul Blanquart - Airbus Defence and Space, France; Emmanuel</td>
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<td>Ledinot - Dassault Aviation, France; Jean Gassino - IRSN, France;</td>
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<td>Philippe Baufreton; Bertrand Rique; Safran, France; Jean-Louis</td>
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<td>Boulanger - CERTIFER, France; Stéphane Brouste - Groupe PSA, France;</td>
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<td>Jean Louis Camus - ANSYS-Esterel Technologies, France; Cyrille</td>
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<td>Comar - AdaCore, France; Philippe Quéré - Renault, France</td>
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<td>We.2.B.2 - A consistent safety case argumentation for artificial</td>
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<td>intelligence in safety related automotive systems</td>
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<td>Stefan Dr. Vogt; Alexander Dr. Rudolph - Continental Automotive</td>
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<td>GmbH, Germany; Juergen Prof. Dr. Mottok - LaS³, OTH Regensburg,</td>
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<td>We.2.B.3 - Avionics Certification: Back to Fundamentals with</td>
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<td>James Chelini - Verocel, Inc, United States; Jean Louis Camus -</td>
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<td>ANSYS-Esterel Technologies, France; Cyrille Comar - AdaCore, France;</td>
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<td>Duncan Brown - Rolls-Royce, United Kingdom; Anne-Perrine Porte -</td>
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<td>ZODIAC Aerospace, France; Miguel De Almeida - APSYS, France;</td>
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<td>Hervé Delseny - Airbus, France</td>
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<td>15:00-16:30</td>
<td>ROOM ARIANE 1</td>
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<td><strong>Session We.2.C - Distributed Real Time Platforms</strong></td>
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<td>Chair: Frédéric Pinot, Ansaldo STS - France</td>
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<td>We.2.C.1 - A Multi-Core Basic Software as Key Enabler of Application</td>
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<td>André Goebel - Continental Automotive GmbH, Germany; Denis</td>
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<td>Claraz - Continental Automotive SAS, France</td>
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<td>We.2.C.2 - Radiation-Tolerant System-On-Chip (SOC) With Deterministic</td>
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<td>Ethernet Switching For Scalable Modular Launcher Avionics</td>
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<td>Christian Fidi; Ivan Masar; Jean-Francois Dufour; Mirko Jakovljevic</td>
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<td>- TTTech, Austria</td>
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<td>We.2.C.3 - METriCS: a Measurement Environment for Multi-Core Time</td>
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<td>Sylvain Girbal; Jimmy Le Rhun; Hadi Saoud - Thales TRT, France</td>
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<td>15:00-16:30</td>
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<td><strong>Session We.2.D - Smart Vehicles</strong></td>
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<td>Chair: Gilles Le Calvez, Valeo - France</td>
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<td>We.2.D.1 - Enabling Tomorrow’s Road Vehicles by Service-Oriented</td>
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<td>Rolf Johansson - Zenuity, Sweden; Rikard Andersson - SMSC, Sweden;</td>
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<td>Markus Dernevsk - Volvo Cars, Sweden</td>
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<td>We.2.D.2 - An SDN hybrid architecture for vehicular networks:</td>
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<td>Application to Intelligent Transport System</td>
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<td>Soufian Toufga; Philippe Owezarski; Slim Abdellatif; Thierry</td>
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<td>Villemur - LAAS-CNRS, France</td>
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<td>We.2.D.3 - How to Find a Minimum Viable Product in IoTA</td>
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<td>Thirunavuukarasu Ramalingam; Christophe Benaroya; Samuel Fosso-</td>
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<td>Wamba - Toulouse Business School, France</td>
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<td>16:30-17:00</td>
<td>Exhibition visit &amp; Refreshment break (Room Concorde, level -1)</td>
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<td>17:00-18:00</td>
<td>Panel 1 (Auditorium St Exupéry) Trends and challenges for</td>
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09:00-10:30
**AUDITORIUM ST EXUPÉRY**

**Session Th.1.A - Model Based System Engineering 3**
Chair: Uwe Kühne, Airbus Defence and Space, Germany

- **Th.1.A.1 - System Optimization: A Use Case in the Space Domain**
  Mihal Brumbulli; Emmanuel Gaudin - PragmaDev, France
  Alexandre Cortier; Alain Rossignon - Airbus Defence & Space, France

- **Th.1.A.2 - Launcher Sequential Analysis**
  David Lesens; Mathilde Ducamp; Julien Grand; Daniel Mercier - Ariane Group, France

- **Th.1.A.3 - A Lightweight Meta-Model to Support Automotive Systems and Software Engineering**
  Georg Macher; Eric Armengaud - AVL List GmbH, Austria
  Eugen Brenner; Christian Kreiner - Graz University of Technology, Austria

10:30-11:00
**Exhibition & Poster visit & Refreshment break** (Room Concorde, level -1)

11:00-11:45
**Keynote Address 3:** Max Lemke, DG Connect EU (Auditorium St Exupéry)

ROOM GUILLAUMET

**Session Th.1.B - Safety and Security**
Chair: Jürgen Mottok, LaS3 OTH Regensburg - Germany

- **Th.1.B.1 - Safe and Secure Autopilot Software for Drones**
  Amin El Mrabti; Denis Gautherot - Sogilis, France
  Yannick Muy - AdaCore, France
  Frédéric Pothon - ACG Solutions, France

- **Th.1.B.2 - Autonomous and connected vehicles: Collaboration of Aeronautic and Automotive industries to face the huge challenges for safe and secure embedded systems**
  Yves Dordet; Gérard Ladier - Aerospace Valley, France
  Pascal Traverse; Hervé Delseny - Airbus, France
  Christian Assier; David Lopez - NXP, France
  Jean François Sencerin - Renault, France

- **Th.1.B.3 - Securing the Connected Car: Application Code Matters**
  Mark Pitchford - LDRA Ltd., United Kingdom

ROOM ARIANE 1

**Session Th.1.C - Execution Platforms**
Chair: Christoph Ainhauer, BMW CarIt - Germany

- **Th.1.C.1 - Evaluation of DREAMS resource management solutions on a mixed-critical demonstrator**
  Gerhard Fohler; Gautam Gala - Technische Universität Kaiserslautern, Germany
  Daniel Gracia Perez - Thales, France
  Claire Pagetti - ONERA, France

  Sylvain Girbal; Jimmy Le Rhun - Thales TRT, France

- **Th.1.C.3 - ESPRIT: Overview of the Vehicles Road-Train Real-Time Architecture**
  Nicolas Gobillot; Eric Lucet - CEA, France

ROOM ARIANE 2

**Session Th.1D - Intelligent Systems**
Chair: Jean-Luc Dormoy, EDF Group - France

- **Th.1.D.1 - Application of a Hybrid Navigation System for an Autonomous Space Air-Launched Vehicle**
  David Vallverdu; Carles Pou; Mariona Badenas; Eduard Diez - GTD, Spain

- **Th.1.D.2 - Autonomous Detect & Avoid**
  Jean-François Lamaudiere; Nicolas Capdeville; Boubekeur Begue; Nicolas Senequier - AKKA Technologies group, France

- **Th.1.D.3 - 3D scanner positioning for aircraft surface inspection**
  Marie-Anne Bauda; Stanislas Larnier; Alex Grenwelge - AKKA Research, France
11:45-12:45  
**Poster Overview** (+ Poster exhibition in Foyer Concorde all the day)  
**AUDITORIUM ST EXUPÉRY**: Chair: Philippe Cuenot, Continental Automotive - France

**Th.PO.1** - Situation Awareness for Collaborative Robotics in Manufacturing Applications, Feasibility Study  
Katleen Blanchet; Olivier Lebec; Christophe Leroux - CEA, France  
Amel Bouzeghoub - Télécom SudParis, France

**Th.PO.2** - Overview of the HEAA method defined by Airbus for Alarm design (Human Errors Analysis which concentrates on Alarm titles and their procedures)  
Florence Beaujard - Airbus, France

**Th.PO.3** - The Certification Challenges of Connected and Autonomous Vehicles  
Hugues Bonnin - Continental, France

12:45-14:00  
**Lunch** (Room Caravelle, level 0)

14:00-15:00  
**Panel 2 - How Machine Learning could be used (or not) for safety-critical applications?** (Auditorium St Exupéry)

**Summary**

Artificial Intelligence based on technics like machine learning invades all and every domains including transport systems like aircraft, cars, rail, and all critical embedded systems. In this field of safety critical systems it is more than necessary to demonstrate how to be confident in the results of such complex algorithms used for artificial intelligence. Therefore we should be able to explain how machine learning works and why it gives results in which we can trust. Then it would be possible to adapt the current rules and industrial standards used to give confidence to the public and/or to the authorities in charge of approval, e.g. EASA in the avionics context.

**Moderator**  
Hervé Delseny, Airbus - software aspects of certification, France

**Panelists**  
Adrien Gauffriau, Airbus, Critical Software engineer and Data Analyst, France  
Alexander Rudolph, Continental - safety manager «Chassis & Safety», Germany  
Virginie Wiels, ONERA - head of the Information Processing and Systems Department, France  
Xiaowei Huang, Lecturer at University of Liverpool - correctness (e.g., safety, trustworth, etc) of autonomous systems, UK  
Guillaume Soudain, EASA - Software Senior Expert, Germany

**12:45-14:00**  
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**THURSDAY 1 FEBRUARY**

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<td>Th.2.A - Software Verification, Patrick Cormery, ArianeGroup, France</td>
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<td>Th.2.A.1 - Lightweight Checkers in a New Light, Romain Béguet; Clément Fumex; Yannick Moy, AdaCore, France</td>
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<td>Th.2.A.2 - Why Bother to Unit Test?, Pierre-Henri Stanek, QA Systems GmbH, France</td>
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<td>Guillaumet Room</td>
<td>Th.2.B - Safety and Dependability Assessment, Agnes Lanusse, CEA LIST - France</td>
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<td>Th.2.B.1 - Timed Formal Model and Verification of Satellite FDIR in Early Design Phase, Alexandre Albore, IRT Saint-Exupéry, France</td>
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<td>Th.2.B.2 - Model-Based Safety Analysis for co-assessment of operation and system safety: application to specific operations of unmanned aircraft, Louis-Marie Séjeau, LURPA, ENS Cachan, France</td>
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<td>Christel Seguin; Pierre Bieber; Jean-Loup Farges; Xavier Pucel, ONERA, France</td>
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<td>Ariane 1 Room</td>
<td>Th.2.C - Manycore, Olivier Nadal, AKKA, Aeroconseil, France</td>
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<td>Th.2.C.1 - Computing Routes and Delay Bounds for the Network-on-Chip of the Kalray MPPA2 Processor, Marc Boyer - ONERA, France</td>
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<td>Benoît Dupont de Dinechin - Kalray, France</td>
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<td>Hamza Rihani - Vérimag - University of Grenoble - Alpes, France</td>
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<td>Claire Maïza - University of Grenoble - Alpes, France</td>
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<td>16:00-16:30</td>
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**Room Guillaumet**

- **Th.2.A.1** - Lightweight Checkers in a New Light
  - Romain Béguet; Clément Fumex; Yannick Moy - AdaCore, France

- **Th.2.A.2** - Why Bother to Unit Test?
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**Room Ariane 1**

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  - Alexandre Albore - IRT Saint-Exupéry, France
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- **Th.2.B.2** - Model-Based Safety Analysis for co-assessment of operation and system safety: application to specific operations of unmanned aircraft
  - Louis-Marie Séjeau - LURPA, ENS Cachan, France
  - Christel Seguin; Pierre Bieber; Jean-Loup Farges; Xavier Pucel - ONERA, France

**Room Ariane 2**

- **Th.2.C.1** - Computing Routes and Delay Bounds for the Network-on-Chip of the Kalray MPPA2 Processor
  - Marc Boyer - ONERA, France
  - Benoît Dupont de Dinechin - Kalray, France
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- **Th.2.C.2** - Using execution graphs to model a prefetch and write buffers and its application to the Bostan MPPA
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  - Hamza Rihani - Vérimag - University of Grenoble - Alpes, France
  - Claire Maïza - University of Grenoble - Alpes, France

- **Th.2.D.1** - Full Virtualization of Renault’s Engine Management Software and Application to System Development
  - Dirk von Wissel; Yohan Jordan - Renault SA, France
  - Jakob Mauss - QTronic GmbH, Germany
  - Adrian Dolha - QTronic-Software SRL, Romania

- **Th.2.D.2** - Model Quality Objectives for embedded software development with MATLAB and Simulink
  - François Guérin; Patrick Munier - MathWorks, France
  - Jérôme Bouquet; Florian Levy - Renault, France
  - Florent Féve - Valeo, Germany
  - Stéphane Faure - Valeo, France
  - Matthieu Foucault; Thierry Hubert - PSA, France
  - Ursula Garcia; Stéphane Louvet - Bosch, France
  - Pierre-Nicolas Paton; Alain Spiewek - Delphi, France
THURSDAY 1 FEBRUARY

16:30-18:00

AUDITORIUM ST EXUPÉRY
Session Th.3.A - Model Based System Engineering 4
Chair: Thierry Seynaeve, E2-CAD - France

Th.3.A.1 - Interoperable Toolchain for Requirements-Driven Model-Based Development
Jan Steffen Becker; Thomas Peikenkamp - OFFIS e.V., Germany
Vincent Bertram - Daimler AG Group Research & MBC Development, Germany
Tom Bienmüller; Udo Brockmeyer; Tino Teige - BTC Embedded Systems AG, Germany
Heiko Dörr - Model Engineering Solutions GmbH, Germany

Th.3.A.2 - Development and Verification of UML Architectures by Refinement and Extension Techniques
Thomas Lambolais; Anne-Lise Courbis - IMT mines Alès, LGI2P, France

Th.3.A.3 - Temporal Properties in Component-Based Cyber-Physical Systems
Tobias Sehnke; Matthias Schultalbers - IAV GmbH, Germany
Rolf Ernst - Technische Universität Braunschweig, Germany

ROOM GUILLAUMET
Session Th.3.B - Formal Requirements
Chair: Cyrille Comar, Adacore - France

Th.3.B.1 - Using Traffic Sequence Charts at the Development of HAVs
Werner Damm; Astrid Rakow - University of Oldenburg, Germany
Stephanie Kemper; Eike Möhlmann; Thomas Peikenkamp - OFFIS - Institute for Information Technology, Germany

Th.3.B.2 - Pattern-based requirements development
Jean-Paul Bodeveix; Mamoun Filali-Amine - IRIT, France
Arnaud Dieumegard - IRT Saint-Exupéry, France

Th.3.B.3 - Formal architecture modeling for documenting and assessing Aeronautics Maintenance: A case study
Olivier Poitou; Pierre Bieber - ONERA, France
Ludovic Simon - Thales Avionics, France
Joël Ferreira - TAP, Portugal

ROOM ARIANE 1
Session Th.3.C - Design for Multicore
Chair: Eric Armengaud, AVL List - Austria

Th.3.C.1 - Model-Based Design, Analysis and Synthesis for TSP Multi-Core Space systems
Christophe Honvault - ESA, Netherlands
Jérôme Hugues - ISAE, France
Claire Pagetti - ONERA / IRIT-ENSEEIHT, France

Th.3.C.2 - A Model Based Safety Critical Flow for the AURIX Multi-core Platform
Gunther Siegel; Cédric Pasteur - ANSYS SBU, France
Roman Knížek - HighTec EDV-Systeme GmbH, Czech Republic

Th.3.C.3 - A model based certification approach for multi/many-core embedded systems
Pierre Bieber; Frédéric Boniol; Youcef Bouchebaba; Julien Brunel; Olivier Poitou; Thomas Polacsek; Luca Santinelli; Nathanaël Sensfelder - ONERA, France
Claire Pagetti - ONERA / IRIT-ENSEEIHT, France

ROOM ARIANE 2
Session Th.3.D - Cyber Physical System Simulation
Chair: Eric Conquet, ESA - The Netherlands

Th.3.D.1 - Real time and interactive co-execution platform for the validation of embedded systems
Sara Sadvandi; Franck Corbier; Eric Mevel - DASSAULT SYSTEMES, France

Th.3.D.2 - Coincidence Problem in CPS Simulations: the R-ROSACE Case Study
Henrick Deschamps - ISAE Supaéro / Airbus Operation SAS, France
Gerlando Cappello - Airbus Operation SAS, France
Janette Cardoso; Pierre Siron - ISAE Supaéro, France

Th.3.D.3 - Integrating AADL and FMI to Extend Virtual Integration Capability
Jean-Marie Gauthier; Raphaël Faudou - Samares-Engineering, France
Jérôme Hugues - ISAE-Supäéro DISC, France

19:30-22:30 Gala Evening (Pierre Baudis Congress Center, Room Caravelle, Level 0) with Best Paper Award Ceremony
**FRIDAY 2 FEBRUARY**

**AUDITORIUM ST EXUPÉRY**

**Session Fr.1.A - Software Development**
**Chair: Eric Jenn, Thales Avionics/IRT**
Saint Exupéry - France

**Fr.1.A.1 - Breaking down silos with contract based design for industrial software development: illustrated through an aerospace case study**
Vijay Bahadur Singh - Siemens PLM, India
Tuur Benoit - Siemens Industry Software, Belgium
Vincent Braibant - Siemens Industry Software, France

**Fr.1.A.2 - Statecharts for Unified Model-Based Design - As simple as possible, as rich as needed**
Jean-Louis Dufour - SAFRAN Electronics & Defense, France

**Fr.1.A.3 - Renault Nissan new Software Strategy**
Olivier Guetto; Emmanuel Coutenceau - Renault, France
Kazuhiro Ishigami - Nissan, Japan

**ROOM GUILLAUMET**

**Session Fr.1.B - Formal Methods**
**Chair: Laurent Mangane, Airbus - France**

**Fr.1.B.1 - CompCert: Practical Experience on Integrating and Qualifying a Formally Verified Optimizing Compiler**
Daniel Kästner; Michael Schmidt; Christian Ferdinand - AbsInt GmbH, Germany
Ulrich Wünsche; Jörg Barrho; Marc Schlickling - MTU Friedrichshafen GmbH, Germany
Bernhard Schommer - Saarland University, Germany
Xavier Leroy - INRIA, France
Sandrine Blazy - IRISA, France

**Fr.1.B.2 - Formalise to automate: deployment of a safe and cost-efficient process for avionics software**
Abdellatif Atki - Ausy, France
Abderrahmane Brahmi; David Delmas; Mohamed Habib Essoussi - Airbus Operations SAS, France
Thomas Marie - Ausy, France
Famantantantsoa Randimbivololona - CEPRESY Informatics, France

**Fr.1.B.3 - Proving Properties of Reactive Programs -- From C to Lustre**
Loïc Correnson; Benjamin Blanc; Zaynah Dargaye; Bruno Marre - CEA LIST, France
Jean Gassino - IRSN, France

**ROOM ARIANE 1**

**Session Fr.1.C - Networks**
**Chair: Marc Boyer, Onera - France**

**Fr.1.C.1 - Mixed-Criticality on the AFDX Network: Challenges and Potential Solutions**
Anaïs Finzi; Ahlem Miftaoui; Fabrice Frances; Emmanuel Lochin - ISAE-SUPAERO, France

**Fr.1.C.2 - Towards Embedded Packet Processing Devices for Rapid Prototyping of Avionic Applications**
Fabien Geyer; Max Winkel - Airbus Group Innovations, Germany

**Fr.1.C.3 - Next-Gen Train Control / Management (TCMS) Architectures: “Drive-By-Data” System Integration Approach**
Mirko Jakovljevic; Arjan Geven; Derya Mete Saatci; Natasa Simanic-John - TTEtech, Austria
Bernd Loehr - Newtec, Germany

**ROOM ARIANE 2**

**Session Fr.1.D - Digitalization**
**Chair: Louis-Claude Vrignaud, Continental Automotive - France**

**Fr.1.D.1 - Simulation-Based Fault Injection as a Verification Oracle for the Engineering of Time-Triggered Ethernet networks**
Loïc Fejoz - RealTime-at-Work, France
Bruno Regnier; Philippe Miramont - Centre National d’Etudes Spatiales, France
Nicolas Navet - DesignCPS/University of Luxembourg, Luxembourg

**Fr.1.D.2 - A Deterministic Approach for Embedded Human-Machine Interfaces (HMI) Testing Automation**
Francois-Xavier Dormoy; Vincent Rossignol - ANSYS, France

**Fr.1.D.3 - Co-Engineering in aeronautics? The A320 forward section case study**
François Bouissiere; Claude Cuiller; Pierre-Eric Dereux; Stéphane Kersuzan - Airbus, France
Thomas Polacek; Cédric Pralet; Stéphanie Roussel - ONERA, France
FRIDAY 2 FEBRUARY

10:30-11:00  Exhibition visit & Refreshment break (Room Concorde, level -1)
11:00-11:45  Keynote Address 4 (Auditorium St Exupéry)
             Xavier Leroy, Senior research scientist, INRIA

11:45-12:45

AUDITORIUM ST EXUPÉRY

Session Fr.2.A - Software Tools
Chair: Denis Claraz, Continental Automotive - France

Fr.2.A.1 - Increase avionics software development productivity using Micro-
python and Jupyter notebooks
Nicolas Valot; Pierre Vidal; Louis Fabre
- Airbus Helicopters, France

Fr.2.A.2 - Interactive Parallelization of Embedded Real-Time Applications
Starting from Open-Source Scilab & Xcos
Oliver Oey; Michael Rückauer; Timo Strisp; Juergen Becker - emmtrix Technolo-
gies GmbH, Germany
Clément David; Yann Debray - ESI Group, France
David Müller; Umut Durak - German Aerospace Center (DLR), Germany
Emin Koray Kasnakli; Marcus Bednara; Michael Schöberl - Fraunhofer, Germany

ROOM GUILLAUMET

Session Fr.2.B - Resilience
Chair: Jean-Paul Blanquart, Airbus - France

Fr.2.B.1 - How Resilient is your computer system?
William Excoffon; Jean-Charles Fabre
- LAAS-CNRS France
Michaël Lauer - Université de Toulouse/ LAAS-CNRS, France

Fr.2.B.2 - Challenges and Opportunities with Multi-Core Embedded Platform - A Spotlight on Real-Time and Dependability Concepts
Lukas Osinski; Tobias Langer; Jürgen Mottok - Laboratory for Safe and Secure Systems - OTH Regensburg, Germany
Ralph Mader - Continental AG, Germany

ROOM ARIANE 1

Session Fr.2.C - Field Bus
Chair: Thierry Monteil, LAAS - France

Fr.2.C.1 - Insights on the Performance and Configuration of AVB and TSN in Automotive Ethernet Networks
Jörn Migge - RTaW, France
Marc Boyer - ONERA, France
Nicolas Navet - University of Luxembourg, Luxembourg
Josetxo Villanueva - Renault SAS, France

Fr.2.C.2 - Embedded Hybrid Anomaly Detection for Automotive CAN Communication
Marc Weber; Simon Klug; Eric Sax - Karlsruhe Institute of Technology, Germany
Bastian Zimmer - Vector Informatik GmbH, Germany

ROOM ARIANE 2

Session Fr.2.D - Multicore Implementation
Chair: Christophe Moreno, Thales Alenia Space - France

Fr.2.D.1 - Real-time on-Board Manycore Implementation of a Health Monitoring System: Lessons Learnt
Moustapha Lo; Nicolas Valot - Airbus Helicopters, France
Florence Maraninchi; Pascal Raymond - Verimag, France

Fr.2.D.2 - Quality of Service for Integrated Modular Avionics (IMA) on Multicore Processors using a Safety Net Architecture
Johannes Freitag; Sascha Uhrig - Airbus, Germany

12:45-14:00  Lunch (Room Caravelle, level 0) and Closing Session
CONGRESS GENERAL CHAIRS
Alexandre CORJON - Alliance Renault-Nissan Global Vice President, Electrics, Electronics and Systems - France
Joseph SIFAKIS - Turing Award 2007, Verimag Laboratory, France

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Florent CHRISTOPHE - SEE Midi Pyrénées/Onera, France
Francis GUIMERA - 3AF Midi-Pyrénées, France
Louis-Claude VRIGNAUD - SIA/Continental Automotive, France

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Philippe CUENOT - Continental Automotive, France
Hervé DELSENY - Airbus, France
Christophe GRAND - Onera, France
Claire PAGETTI - Onera, France

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BOCIONEK Siegfried - Bombardier Transportation, Germany
BOUDGUIGA Aymen - IRT SystemX, France
BOULANGER Jean-Louis - Certifer, France
BOYER Marc - ONERA, France
BRABAND Jens - Siemens AG, Germany
BROWN Duncan - Rolls-Royce, UK
CLARAZ Denis - Continental Automotive SAS, France

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DÉLÉRIS Yannick - Airbus, France
DELSENY Herve - Airbus, France
DORMOY Jean-Luc - EDF Group, France
DUPONT De Dinechin Benoit - Kalray, France
FLAMMINI Francesco - Linnaeus University, Sweden
GIL-VICENTE Pedro - Polytechnical University of Valencia, Spain
GLASER Sébastien - Institut VeDeCoM, France
GRAND Christophe - ONERA, France
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Created in 1972, the 3AF is a French aerospace society. Its mission is to advance the aerospace profession, stimulate progress in the state of the art or aerospace science and technology and represent the profession in public policy discussions.

Unite, share, enlighten and advance: 3AF is a forum for knowledge exchange.

Unite a network of more than 1500 members, 60 companies from the scientific aerospace community.

Share 10 international conferences and symposiums per year, experts publications.

Enlighten A scientific society, an expert pool of knowledge consulted by decision makers and media.

Advance 20 technical commissions which contribute to advancing the aerospace industry.

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The SEE (the French Electrical, Electronics, and Information & Communication Technologies Society) is a non-profit-making scientific association, directed to the public benefit. The SEE groups its members into 22 Technical Committees and 12 Regional Groups, creating links between them through its Newsletter and website. SEE mission’s is to promote French science and technology, as well as create within these two fields meeting opportunities for industrialists, research scientists, teachers, students and trainee engineers both from France and abroad. The SEE thereby organises and co-organises events in its particular fields of competence. These professional national colloquia deal with particular topics and prospects, as well as major international Conferences. Other events include technical visits, evening lectures and training courses.

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The Société des Ingénieurs de l’Automobile (the French Society of Automotive Engineers) is a society officially considered as serving the public interest. Its purpose is to represent technical excellence in the automobile industry through its expert and knowledge sharing networks. The SIA draws its members from the ranks of automobile engineers and technicians and all those active in promoting automotive engineering. SIA has 2 000 members and a network of over 18 000 engineers, technicians and research workers behind it.

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The **Aerospace Valley** World Competitiveness Cluster extends over the Occitanie & Aquitaine regions to constitute the Europe’s leading pool of jobs in the aeronautics, space and embedded systems fields. The purpose of the Aerospace Valley cluster is to develop the global research and industrial ecosystem for competitiveness improvement in these fields and to grow jobs in its regions. With regard to embedded systems, the cluster’s development priorities focus on:

- safety, dependability, reliability and certification at all levels (from systems to software and hardware);
- performance, integration, modularity and quality of electronic, electrical, electro-mechanical systems and equipment;
- IT parts and energy development;
- systems diagnosis and prognosis;
- new modes of human-system interaction, and intra and inter-systems communication;
- smaller, less expensive and more powerful devices in conjunction with Nanolinnov, a major program for Embedded systems; Aerospace Valley offers also, in the embedded systems field, numerous opportunities for diversification, particularly in the areas of health, agriculture, energy, connected and autonomous vehicles and home automation.

Founded in 1994, AdaCore supplies software development and verification tools for mission-critical, safety-critical, and security-critical systems. Four flagship products highlight the company’s offerings: - The GNAT Pro development environment for Ada, a complete toolset for designing, implementing, and managing applications that demand high reliability and maintainability, - The CodePeer advanced static analysis tool, an automatic Ada code reviewer and validator that can detect and eliminate errors both during development and retrospectively on existing software, - The SPARK Pro verification environment, a toolset based on formal methods and oriented towards high-assurance systems, and - The QGen model-based development tool, a qualifiable and customizable code generator and verifier for Simulink® and Stateflow® models, intended for safety-critical control systems. Over the years customers have used AdaCore products to field and maintain a wide range of critical applications in domains such as space systems, commercial avionics, military systems, air traffic management/control, rail systems, medical devices, and financial services. AdaCore has an extensive and growing worldwide customer base; see www.adacore.com/customers/ for further information. AdaCore products are open source and come with expert on-line support provided by the developers themselves. The company has North American headquarters in New York and European headquarters in Paris.

Airbus is a global leader in aeronautics, space and related services. In 2016 it generated revenues of €67 billion and employed a workforce of around 134,000. Airbus offers the most comprehensive range of passenger airliners from 100 to more than 600 seats and business aviation products. Airbus is also a European leader providing tanker, combat, transport and mission aircraft, as well as one of the world’s leading space companies. In helicopters, Airbus provides the most efficient civil and military rotorcraft solutions worldwide.
Embedded Systems and Software Development

Embedded software is increasingly being used in smart devices, but imperfect code can be the cause of many product failures. Industry leaders estimate that every 1,000 lines of embedded software contain eight bugs. To manage this quality risk, as well as to meet higher standards for software certification, you need to leverage embedded software development tools and certified code generators.

**ANSYS** provides a model-based embedded software development and simulation environment with a built-in automatic code generator to accelerate embedded software development projects. System and software engineers use ANSYS SCADE solutions to graphically design, verify and automatically generate critical systems and software applications with high dependability requirements. SCADE solutions are highly interoperable and can be easily integrated, allowing for development optimization and increased communication among team members.

Certified code generation across industries

SCADE code generators have been qualified/certified at the highest level of safety across six market segments by more than ten safety authorities worldwide, including:
- DO-178C up to Level A – Aerospace and Defense Applications by FAA, EASA, Transport Canada and ANAC
- IEC 61508 up to SIL 3 – Transportation and Industrial Applications by TÜV SÜD
- EN 50128 up to SIL 3/4 – Rail Transportation Applications by TÜV SÜD, EBA and Certifer
- IEC 60880 demonstrated compliance – Nuclear Applications by nuclear safety authorities
- ISO 26262 up to ASIL D – Automotive Applications by TÜV SÜD

SCADE speeds the embedded software development process

SCADE users report the following development and verification cost improvements:
- alignment of the design process according to safety standard objectives
- reduction of development costs by 50 percent, on average
- acceleration of certification by a factor of two


**Continental** develops pioneering technologies and services for the sustainable and connected mobility of people and their goods. Founded in 1871, the technology company offers safe, efficient, intelligent and affordable solutions for vehicles, machines, traffic and transport. In 2016, Continental generated sales of €40.5 billion and currently employs more than 233,000 people in 56 countries.
The IRT Saint Exupéry has been launched by the French government within Investments for the Future Program to boost the maturation and transfer of state-of-the-art technologies in the field of Aeronautics, Space and Embedded Systems. Based in Bordeaux, Sophia Antipolis and Toulouse, this Institute of Technology combines resources from public and private partners to lead R&T activities in three strategic domains: High Performance Multifunctional Materials, More Electrical Aircraft & Embedded Systems.

The Embedded Systems domain is divided in 4 Competence Centres: Systems Engineering – Multidisciplinary Design Optimisation – Digital Signal Processing – Intelligent Systems & Data, with technology road maps focused on safety critical real time systems and intelligent & secure systems. Current research activities are related to safety analyses & certification, use of high performance COTS platforms, model-based collaborative methodologies and platform, dependable Artificial Intelligence.

**SIEMENS - MENTOR GRAPHICS**

Enable and Accelerate Innovation with Siemens

Industrial IoT is transforming industry for greener, smarter and safer world.

Digital Transformation fosters innovation that improves products and enables monetization related to Big Data processing. Today, 80% of this innovation is related to the Electronics and Software components.

With recent acquisitions of LMS, Polarion and Mentor Graphics, Siemens PLM Software is the de-facto “innovation enabler” and “acceleration player” for Industrial IoT (IIoT).

Mentor Embedded Solutions

The best-in-class Industrial IoT Systems run Mentor Embedded Solutions

- Scalable
- Secure
- Multicore

Simcenter Embedded Software Designer

The best-in-class Industrial IoT Systems are developed with Simcenter Embedded Software Designer

- Model & Architect Software
- Test Software

Polarion

The best-in-class Industrial IoT Systems are managed with Polarion ALM

- Collaboration
- Traceability
- Reuse
QA Systems Company QA Systems’ fundamental goals are to accelerate and improve software development. Operating on a global scale, QA Systems has over 350 blue-chip customers, spanning a range of industries, including aerospace & defence, automotive, healthcare and railways. The company supplies and supports its own dynamic testing tools, in addition to carefully selected products from strategic business partners, for static testing, requirements engineering, architectural analysis and software metrics. Cantata Tool Cantata dynamically proves code with intelligent unit and integration testing, in the most cost effective manner. It provides a complete test development environment, built on Eclipse, and it integrates easily with developer desktop compilers and embedded target platforms. Cantata has been successfully used by customers worldwide since the 1990s to meet the main international safety-related standards, including: ISO 26262, EN 50128, IEC 60880, DO 178B/C and IEC 62304.