



Press Release
Toulouse, 12th November 2019

ERTS Congress - 10th edition from 29 to 31 January 2020 - Toulouse

"Artificial intelligence technologies will be paramount"

Having participated in the organization of ERTS International Congress for many years, Jean Arlat is chairing the Program Committee of this 10th scientific conference dedicated to embedded systems. During an interview, Jean Arlat has addressed the highlights of ERTS 2020 and unveils the main scientific topics that will be presented.

The ERTS Congress will celebrate in January 2020 its 10th Edition: what does this scientific conference represent compared to other events in the same domain?

This event builds on the know-how and history of the Occitanie Region in engineering and embedded systems. It deals with avionics, space and automotive domains that are at the core of this activity. But it goes far beyond, since today ERTS is tackling ever wider areas of application like railways, health and agriculture. This congress relies on the actors of our industrial fabric which has been growing locally for a long time. It results from strong collaborations - often built-up thanks to joint laboratories - between the researchers of CNRS & University of Toulouse and companies like Airbus, Continental, Thales. The IRT Saint Exupéry is also an important enabler of this collaboration. ERTS 2020 is therefore a unique international event at the crossroads between academic and corporate research.

This year, among the 105 submissions, the ERTS Program Committee, which I chair, has selected 56 contributions that will be presented as regular paper and talk and 11 as short paper and talk (with a poster).

What are the main trends of embedded software that will be presented during ERTS 2020?

The Congress addresses the topic of the so-called "non-functional" properties essential to the quality of the delivered services. **This deals with the dependability and the resilience of systems:** i.e., anticipating and/or detecting the consequences of possible errors and changes of the embedded system in order to minimize the risks of failure. The other challenge is to guarantee that the system will process information strictly within the given time constraints.

This year, the event will shed a special light on the **emerging services from software-intensive embedded systems** and their **increasing communication capabilities**.

Indeed, IT and digital technologies are deploying in many domains of application.

This generates of large amount of data to be managed; one refers it as "Internet of Things" or "Cyber-Physical Systems". Thus, the interconnection of these systems and the resulting exponential volume of data raise the problem of mastering communications and processing of this amount of information.

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For many application domains, the new capabilities must be more and more customized to better match the needs; they also tend to constantly need more information. **The challenge, then, is to balance the efficiency of the delivered service with the privacy requirement: i.e., to ensure access to enough information without being too intrusive. This issue is the core debate that will be held during this 10th edition of ERTS: a significant number of articles will deal with it in relationship with various facets of cybersecurity.**

What will be the place allocated to artificial intelligence?

Artificial intelligence is both a relevant solution to these new needs and a major challenge. We will pay a particular attention to it during ERTS 2020, especially through several articles on the verification and validation of embedded data in critical applications: how to ensure that the verification and validation of the processing of these data remains both effective and dependable. One of the objectives is to find generic solutions that can be deployed in different areas of application.

The place of artificial intelligence technologies will be paramount. The problem addressed is whether the achieved maturity of these technologies enables to embed them in critical systems? Several articles published during this edition of ERTS will address these points and a panel discussion will be dedicated to this subject.

Other topics linked with AI, e.g., autonomous systems, remains at the forefront: of course, one thinks of autonomous vehicles, but, the relevant applications domains also include avionics, space, agriculture, health, etc.

Since its creation in 2002, you have participated in many editions of the ERTS Congress, how do you perceive its evolution?

This conference has been created 20 years ago by Jean-Claude LAPRIE, former director of the LAAS-CNRS in Toulouse and an international leader in dependability and resilience of computing systems. The first editions have focused on embedded systems in aerospace and automotive. Since then, **there is a significant evolution towards increasingly autonomous systems linked with mobility and services in interaction with humans.** The autonomy embraces, of course, robotics, drones and human-robot interactions (dependable and privacy-aware interactions). In fact, another panel discussion will address this topic.

Artificial intelligence takes a major and increasing importance here in Toulouse. Indeed, the site is now considered as one of the main European research hubs, thanks to the ANITI project, which will receive a particular attention during this 10th ERTS.

As current scientific adviser in the French Embassy of London, how do you consider the influence of the embedded systems sector at European-level and the place of ERTS on this scene ?

ERTS is above all a scientific conference which reaches out beyond the local and national territories, as it features more than ever a **European dimension.** Indeed, during our Program Committee, there was of course a majority of representatives of the French embedded systems scientific community but also **members from Austria, Germany, Italy and Spain.**

Consistently with this international calling, the two pillars of this congress (i.e. research and innovation) are the core of ERTS 2020. As an example, one of the invited keynote will focus on

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advanced research results on the automated verification of AI-based decision systems and will be delivered by Marta KWIATKOWSKA, professor of Oxford University, whom I met in the UK. There is also an intent to better understand the benefits provided by the new European funding

* Bio data of Jean Arlat, Chairman of the ERTS 2020 Program Committee

After having directed the LAAS-CNRS of Toulouse (2011-15), Jean Arlat has been seconded in September 2016 as scientific advisor of the French Embassy in the United Kingdom.

His research interests lie in the dependability, resilience and safety of embedded computing systems for critical application sectors (aerospace, rail, automotive, etc.).

Author or co-author of more than 150 publications, he has also strongly contributed to fostering partnership with industry: from 1997 to 2000, he has lead the **Laboratory of Dependability Engineering (LIS)**, a joint laboratory between research and industry, **which brought together, in LAAS premises**, researchers and engineers from five major French companies (Airbus, Airbus Defense & Space, EDF, TechnicAtome and Thales).

He has contributed to many European projects and has developed several international collaborations (BR, TW, US, ZA). In addition to his CNRS secondment to the MEAE in the UK, he has made several long-term stays abroad, including six months in Japan (TIT - 1992) and one year in the United States (UCLA - 1979-80).

Jean Arlat graduated in electrical engineering from INSA Toulouse (1976) and received his PhD (1979) and its *Docteur ès Sciences* degree (1990), both in Computer Science, from INP Toulouse. He joined the CNRS in 1980, where he is currently "*Directeur de recherche de classe exceptionnelle*".

opportunities: this year, the *European Innovation Council* will be presented by Jean David MALO of the European Community. This initiative, launched in the spring 2019, aims at transforming successes of basic research into innovative companies and products.

About ERTS

ERTS is a high-level event, held every two years, for universities, research centres and industry. The 10th edition of this unique event in Europe for manufacturers and researchers in the sector of embedded systems and software, co-organized by 3AF (Association of Aeronautics and Astronautics of France) and the SEE (Society of Electricity, Electronics and Information and Communication Technologies) will take place from 29 to 31 January 2020 at the Pierre Baudis Convention Centre in Toulouse.

To probe further: <https://www.erts2020.org>

REGISTRATIONS ARE OPEN: www.erts2020.org

About the Aeronautics and Astronautical Association of France (3AF)

Created in 1972 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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About the Society of Electricity, Electronics and Information and Communication Technologies (SEE)

The SEE 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 organizes and co-organizes 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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