CISTER Quicknews

CISTER - Research Centre in **Real-Time & Embedded** Computing Systems

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CELEBRATING 2 DECADES OF CYBER PHYSICAL SYSTEMS IN PORTUGAL

On September 27th, CISTER hosted "XX.CPS – Duas Décadas de Cyber-Physical Systems" to celebrate two decades of Portuguese research on Cyber-Physical Systems (CPS).

The event looked at the landmark moment when the Portuguese research community on real-time embedded computing and related fields started to collaborate and develop innovative computing systems, now widely known as Cyber-Physical Systems.

The event was attended by several well-known members of the Portuguese academia who are pivotal in their engagement in CPS, and with whom CISTER researchers have a longstanding and solid record of successful collaboration.

Each researcher presented a short overview of their flagship results, achieved over the last two decades, and challenges to the development of current and future generation of CPSs. CISTER is very proud of having maintained these strong and successful collaborations.

Our sincere thanks goes to Henrique Madeira (Universidade de Coimbra), Henrique Cardoso (Universidade do Porto), Jorge Sousa Pinto (Universidade do Minho), José Rufino (Universidade de Lisboa), Luís Almeida (Universidade do Porto), Nuno Roma (Universidade de Lisboa), Paulo Pedreiras (Universidade de Aveiro) and Mário Sousa (Universidade do Porto) for making this into such a joyful and fruitful event.

This event is part of a series associated with the celebrations of the 20th anniversary of CISTER.

So, stay tuned for more!!!

CISTER Quicknews

progress in projects

KEY EUROPEAN PLAYERS WILL DISCUSS SECURE AND TRUSTABLE INDUSTRIAL IOT IN CISTER

CISTER is proud to announce it will be the host of the first general meeting of the ECSEL project SCOTT (Secured COnnected Trustable Things) in October.

SCOTT is one of the largest European research projects focusing on important aspects of trustability, dependability, security, privacy, and safety of the Industrial Internet of Things (IIoT).
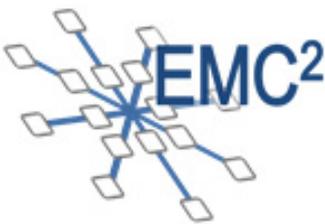
SCOTT has a consortium of large European industrial partners such as Volvo, INDRA, Ericsson, AVL, NXP, Nokia, and Phillips that together with a team of leading academic partners aim to leverage the IIoT and related technologies across European industries. Such technologies include: wireless sensor networks, RFID, machine to machine communications, cloud computing, Big data, software-defined networks, and 5G. The general meeting will also host the technical board and strategic board meeting, as well as the official general assembly and workshops of the different technology lines and building blocks of the project.

CISTER has a relevant role in the project as chair of the technical board, member of the core team and strategic board. CISTER is also the leading partner of the reference architecture design, one of the main partners in the aeronautical industrial domain, and a contributing partner in standardisation, certification and regulation.

EMC2 – THE SUCCESSFUL STORY OF ONE OF THE LARGEST EUROPEAN ICT PROJECTS ON EMBEDDED REAL-TIME COMPUTING SYSTEMS

EMC2 (Embedded multi-core systems for mixed criticality applications in dynamic and changeable real-time environments), an Artemis Innovation Pilot, has received its final review, noting the Excellent outcome of the project.

After three years of intensive work, EMC2 provided a breakthrough for system (and application) integration through an innovative and sustainable service-oriented architecture approach for mixed criticality applications in dynamic and changeable real-time environments such as automotive or avionics.

The field of embedded systems is undergoing a disruptive evolution, where different types of systems and components are interconnected, thus reducing the boundaries between application domains, and placing the focus on interoperability.

In addition, the increasing use of multi- and many-core processors brings additional challenges to the development of critical and real-time applications, and the process of developing new systems is inefficient and expensive. EMC2 directly tackled these challenges, helping the European Embedded Systems industry to maintain its leading edge position. The project was one of the largest ICT projects in Europe with around 100 partners and a total budget of 94 Million Euros.
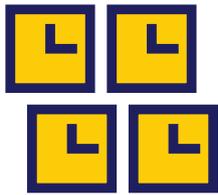
Among others, the project included renowned companies such as Ericsson, BMW, Airbus, Volvo, Philips Healthcare, Siemens, Thales and Infineon Technologies, and reputed academic and research institutions such as KTH, Tue, CEA, LERO, DTU, LTU, TNO and Fraunhofer.

CISTER was highly involved in several of the project activities, with more than 10 researchers involved (with a total effort of 120 person month). CISTER's focus was in the research-oriented work packages, mainly in two of the "Living Labs", leading a use case in the area of automotive (together with Critical Software), and involved in another use case in the area of avionics (led by the Airbus Group).

RESULTS OF SUCCESSFUL FP7 PROJECT LEAD BY CISTER PRESENTED TO KEY ACADEMIC AND INDUSTRIAL EUROPEAN INSTITUTIONS AT EMC2'S SAFETY CRITICAL SYSTEMS WORKSHOP
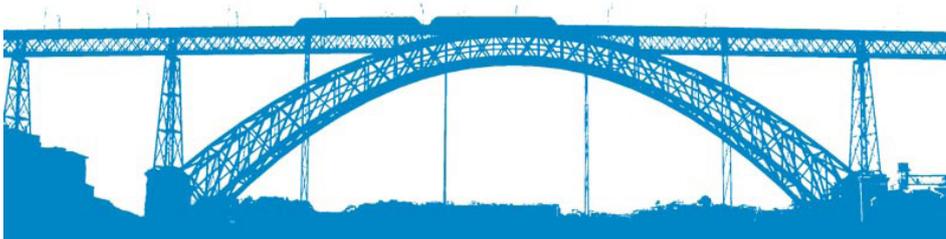
CISTER researcher Luis Miguel Pinho gave an invited talk in the Safety Critical Systems Workshop that took place in June in Granada, Spain.

He presented the results of research done at CISTER on the challenge of timing analysis for high-performance parallel systems. The talk included an overview of the current and future challenges posed to critical applications due to the unpredictable interactions in parallel platforms, as well as the work performed by CISTER to address these challenges, done in the scope of the P-SOCRATES FP7 project. The talk was organized by the EMC2 European Project, with representatives from around 100 European institutions, both academic and industry in audience. The workshop included a set of invited talks and more than 40 demonstrators of technological developments in safety-critical domains from institutions in Europe.

activities in the centre

CPS WEEK 2018 PREPARATIONS IN FULL SWING

Preparations for the Cyber-Physical Systems Week 2018, one of the leading events in the area, has begun. CPS Week 2018 will be held in Porto and the organisation put in place has started its roles.

The General Chairs of the 2018 edition (its 11th edition) are Eduardo Tovar (CISTER's Director) and Luis Almeida (Institute of Telecommunications (IT)/ Faculty of Engineering of the University of Porto (FEUP)).

As a premier event, CPS Week brings together four top conferences - HSCC, ICCPS, IPSN, and RTAS - and multiple workshops, tutorials, summits, and various exhibitions from both industry and academia.

Altogether the CPS Week program covers a multitude of complementary aspects of CPS, and reunites the leading researchers in this dynamic field.

The colocation of all these focused events in one single time-period makes CPS Week one of the most important venues for networking and research interchange when it comes to all Cyber-Physical Systems related topics.

achievements in academia

PATENT ON VEHICLE PLATOONING ACCEPTED

CISTER researcher Anis Koubaa and Eduardo Tovar, along with collaborators from other universities, have been granted an IP Australia patent.

The patent is for their invention titled, "System and method for operating a follower vehicle in a vehicle platoon."

The patent deals with an innovative solution for vehicular platoon to control their motion in normal and degraded operational modes.

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activities in the centre

DISCUSSING THE IMPROVEMENT OF THE DIGITIZATION OF EUROPEAN INDUSTRY - CISTER HOLDS MEETING OF THE LARGEST EUROPEAN PROJECT TO DATE

Productive 4.0 aims to achieve significant improvement in digitizing the European industry by means of electronics and Information and Communication Technology (ICT) – it is the largest European project to date, with 104 partners from 19 countries, with an overall budget of 114M euros.

Important research centers and universities (VTT, LTU, BME, etc), and representatives of large European companies such as Philips, Volvo, NXP Semiconductors, CEA (French Alternative Energies and Atomic Energy Commission), and SEB (a Swedish bank) attended a Productive 4.0 meeting, held at CISTER last September.

CISTER was represented by its researchers Michele Albano, Cláudio Maia and David Pereira.

The goal of the meeting was to further develop the results of the successfully completed Arrowhead project and in the creation of a service oriented framework to support communications for the Industrial Internet of Things (IIoT). It appears that both systems developed by CISTER (QoS Manager and Event Handler) are required in a number of use cases, and CISTER has established collaborations to further research on inter-cloud QoS, and on heterogeneous support (like, combination of different messaging buses such as MQTT and AMQP) for event handling.

FIRST CISTER SUMMER INTERNSHIP IN PROGRESS

Real-time embedded computing system is one of the cornerstones of modern and future generation of applications in a variety of domains, such as avionics, automotive, among others.

It is therefore imperative that CISTER, as an international leading research unit in the field, contributes to the growth of this area among interested students who consider this knowledge a valuable asset for their future careers. With this in mind, the first edition of the CISTER Summer Internship was started in September with six interns, selected from a total of 16 undergraduate applicants. The three month program follows a traditional summer school format and consists of students being exposed to foundational topics such as real-time scheduling and communications (both theoretical and implementation perspectives), as well as more advanced topics such as formal verification, parallel computing, and middlewares for IoT.

Next, the interns will build small yet challenging projects that integrate variety of concepts they have learnt, with a clear application towards CPS/IoT.

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