

PROMETEO

Plataforma Tecnológica Española de
Sistemas con Inteligencia Integrada



ARTEMIS JTI – Primera convocatoria

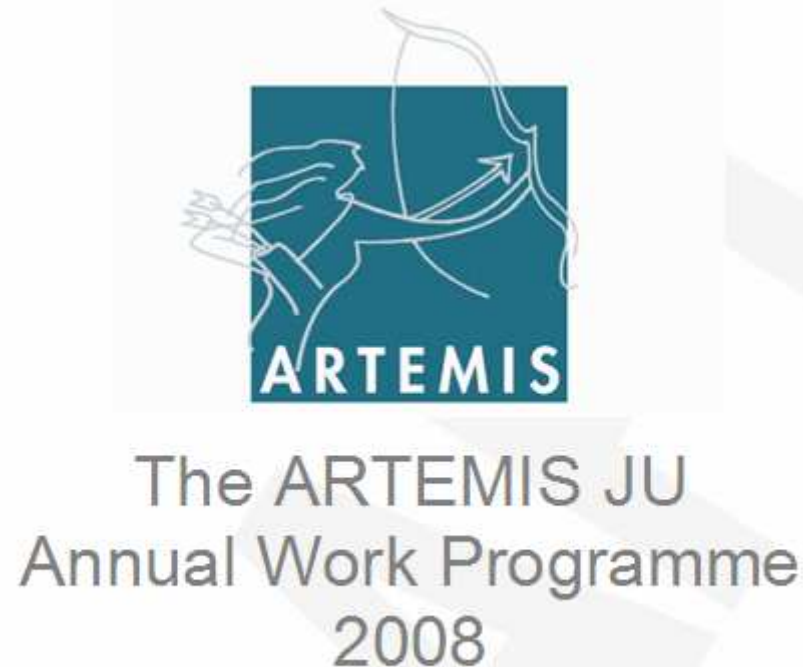
Programa de Trabajo para Convocatoria 2008

(prioridades y subprogramas)

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Convocatoria 2008 : Programa de Trabajo

- **ARTEMIS Joint Undertaking AWP:** Programa de trabajo para la convocatoria 2008, indicando las prioridades, mecanismos, recomendaciones y subprogramas para la primera convocatoria. Publicación a lo largo de esta semana.



- Esta presentación contiene información adelantada sobre último draft.

Convocatoria 2008 : Contexto

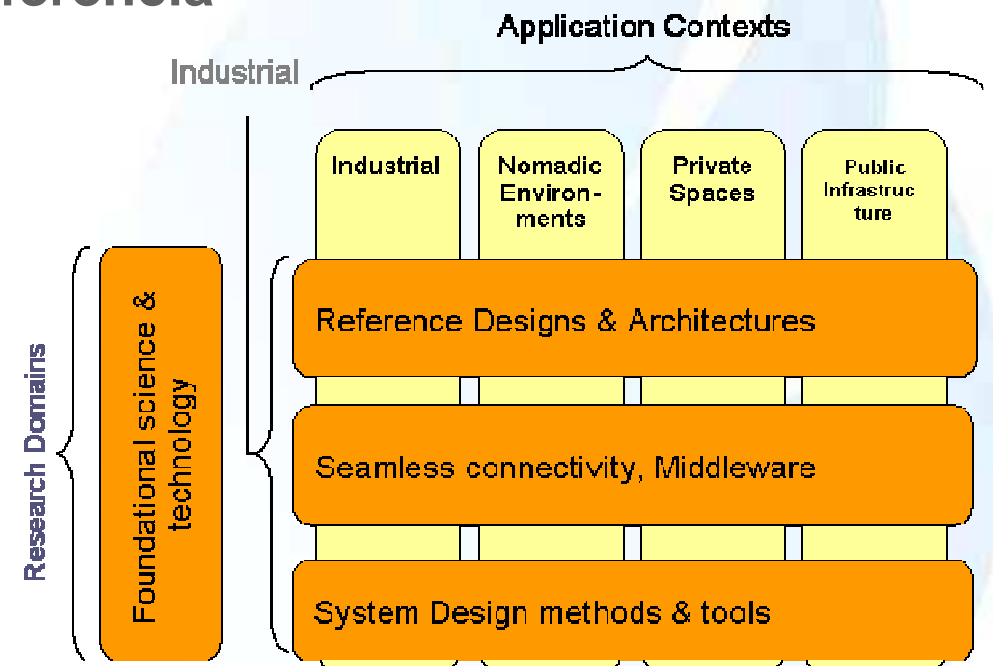


Convocatoria 2008 : SRA/RA/MASP/AWP

- **Contexto del AWP:** Los precedentes del AWP son:
 - La Strategic Research Agenda (SRA) de la plataforma tecnológica ARTEMIS (2006)
 - La Research Agenda (RA) elaborada por la Joint Undertaking ARTEMIS (2008)
 - El documento estratégico de planificación plurianual (MASP) de la Joint Undertaking ARTEMIS (2008)
- **RA vs SRA:** La RA de ARTEMIS es un subconjunto de la SRA de ARTEMIS, puesto que por un lado otros programas diferentes de la JTI contribuyen a la implantación de las metas de la SRA ARTEMIS, y por otro la RA tiene unas metas de implantación de tecnologías más allá de lo abarcado por la SRA (prototipos, impacto social de las soluciones, etc).
- **MASP:** Describe cómo la JU va a implantar la RA, y cómo se va a gestionar, financiar y operar dicha implantación.

Convocatoria 2008 : Contextos y Dominios

- **Contextos de aplicación:** Los ya conocidos dentro de Prometeo.
 - Sistemas industriales
 - Entornos nomádicos
 - Espacios privados
 - Infraestructura pública
- **Dominios de Investigación:** Los ya conocidos dentro de Prometeo.
 - Arquitecturas y diseños de referencia
 - Conectividad y Middleware
 - Métodos y herramientas



Convocatoria 2008 : Tecnologías & Subprogramas

- **Subprogramas:** Nacen para focalizar las actividades de investigación de forma que se facilite el impacto social de los prototipos, soluciones y demostraciones empíricas de los proyectos realizados.
- **Tecnología vs. aplicación:** Es importante distinguir el aspecto social de la aplicación buscada de las nuevas tecnologías de sistemas empotrados a desarrollar en los proyectos. El foco de los proyectos debe ser la tecnología de sistemas empotrados, puesto que es ahí donde radica el peso específico de ARTEMIS.
- **Tecnologías transversales:** Uno de los principios básicos es que los desarrollos tecnológicos deben de ser aplicables en más de un contexto de aplicación, de forma que las soluciones tengan una reutilización industrial.

SP1.Methods and Processes for Safety-relevant Embedded Systems

SP2.Person-centric Health Management

SP3.Smart Environments and Scalable Digital Services

SP4.Efficient Manufacturing and Logistics

SP5.Computing Environments for Embedded Systems

SP6.Security, Privacy and Dependability in Embedded Systems for Appliances/Networks/Services

SP7.Embedded Technology for Sustainable Urban Life

SP8.Human-centric Design of Embedded Systems

Arquitecturas de referencia:

- **Reference designs and architectures that offer common architectural approaches for given ranges of applications. It includes topics such as:**
 - **Composability:** the ability to derive instantiations of architecture from a generic platform that support the constructive composition of large systems out of components and sub-systems without uncontrolled emergent behaviour or side effects.
 - **Architectural dependability**, to ensure secure, reliable and timely system services despite accidental failure of system components and/or the activity of malicious intruders.
 - **Design for safety** by means of architectures instantiated from a generic platform that enable the implementation of safety critical systems and the concurrent construction of dependability models. In addition to the required dependability and functionality of the provided services, emphasis is put on architectural support for certification, and the establishment of a safety case.

Convocatoria 2008 : Prioridades industriales

Conectividad y Middleware:

- **Middleware that allows seamless connectivity and interoperability. It includes topics such as:**
 - **Cross domain connectivity and communication capabilities**, necessary to realise the seamless interoperability between the 'Ambient Intelligent Environments' envisaged for the European citizen (at home, travelling, at work, in public spaces,...)
 - **Resource management** to insure seamless connectivity between ES in a physical and logical environment more and more subject to changes, and to dynamically adapt to such changes. Resource management should ensure high utilization of the system resources such as CPU, memory, network, and energy, and guarantee operation within resource reserves or budgets.

Convocatoria 2008 : Prioridades industriales

Métodos y Herramientas:

- **Integrated system design methods and tools for rapid development and prototyping. It includes topics such as:**
 - Establishment of an integrated chain of **European-sourced tools**, based on ARTEMIS JU results, to support a complete process flow of development of Embedded Systems from user requirements, through system design, to system-on-chip production.
 - **System-level model-based tools and design processes** that contribute, in an integrated fashion, to elevating the abstraction level for architecture exploration and product design.
 - **Test, validation and verification tools to support compositional design** that can be integrated into the complete process flow to support concurrent verification and validation at the product level as an integral part of the design process.

Convocatoria 2008 : Descripción de los subprogramas

- **Objetivos y desarrollos a realizar.**
- **Relevancia e impacto social de la aplicación** de los desarrollos sobre tecnologías: Cómo contribuyen los proyectos a mejorar la vida de los ciudadanos, el tejido empresarial Europeo, etc.
- **Aportaciones concretas de los proyectos:** Qué se espera de los proyectos, qué es prioritario desde un punto de vista técnico.
- **Aspectos transversales de los proyectos:** Cómo se espera que los proyectos se coordinen y engarcen con otros subprogramas.

SP1 Methods and processes for safety-relevant embedded systems

- The overall aim of this sub-programme is to enhance the quality of services and products in strategic European industrial sectors and to decrease fatalities and injuries by building cost-efficient processes and methods supporting the development and operation of **safety enabling embedded systems**.
- The aim is to achieve technological breakthroughs in four research areas:
 - Requirement Management
 - Architecture Modelling and Exploration
 - Analysis Methods
 - Component Based Design
- These breakthroughs will contribute to progress in several transverse processes, e.g. Design for Safety, Design for Maintainability, Design for Reuse, Considerations for Certification aspects...

SP2. Person-centric health management

- This sub-programme will establish an overall system approach for person centric health management based on an integrated system concept of **seamless integration of interoperable components** (devices as well as services). This will offer personalized prevention and treatment strategies by taking advantage of the opportunities offered by new technology, such as:
 - Gathering data by a large variety of sensors
 - RT decentralised data management
 - Ubiquitous access to a citizens health data
 - Adequate communication between partners in inter-disciplinary care teams
- An essential part in this eHealth approach relates to **embedded systems technology**: communicating sensors and actuators, improvements in genetic, molecular and imaging equipment for diagnostics, advanced treatment technology in surgery, chemical and radiation therapy and guidance based on tele-monitoring in post event care; facilities for diagnostic and epidemiological analysis, remote management of implanted drug delivery, tele-surgery.

SP3. Smart environments and scalable digital services

- The overall goal of SP3 is to provide **methods, tools, technology and models** with which developers will be able to **build “smart environments”**, i.e. ecosystems of smart and heterogeneous devices interacting with each other and with the environment, and cooperating together to provide a foundation for rapid local applications and service innovations.
- Application scenarios for smart environments that have been identified already include:
 - Smart locations (smart city, smart home, smart public space, ...)
 - Smart physical objects (objects equipped with identification mechanisms such as RFID tags, smart multi-media content storage, smart communications objects such as wireless grids and co-operative networks)
 - Smart virtual spaces (Mixed mode Physical and 3D-Virtual spaces, community spaces)
 - Private mobile social networks ('PMSNs')
- The vertical and horizontal approaches are strictly related. Systems for vertical scenarios must be designed taking into account interoperability and extensibility: common service platforms must be able to cope with the needs of the most relevant applications. In order to narrow down the possible choices, a **dual approach** will be taken:
 - identify a common architecture and build a horizontal interoperable infrastructure for service innovation
 - identify a set of domain specific services, “vertical cases”, with relevant business models

SP4. Efficient manufacturing and logistics

- The main ambitions of this sub-programme are to **improve time-to-market, productivity, and efficiency in manufacturing and logistics with new embedded technology**, recognising that the boundaries between manufacturing and logistics will become blurred as manufacturing operations are carried out closer to the customer and in-transit manufacture blurs the boundaries between production and distribution.
- Embedded systems' architecture, together with supporting methodologies and tools that enables **advanced lifecycle management** for manufacturing, distribution, recycling and disposal of goods.
- The architecture should enable the **interoperation and reconfiguration of embedded devices and systems** in both products and processing equipment so as to build complete plant solutions
- The architecture should be supported by all the necessary **systems and tools** to support development and implementation of systems conforming with the architecture.

SP5. Computing environments for embedded systems

- A main goal of this sub-programme is to enable transition from separate sectoral, vertically structured technologies and markets to a **horizontally structured technologies and markets**.
- A second goal is to **enable massive real-time data-processing in multiple domains** (image processing, signal processing, computational fluid flow, etc).
- A third goal is to enable **composition of platform independent software over highly concurrent, fault-tolerant systems** with a variety of communication schemes, types of core, etc. Run-time adaptability is required so as to optimise performance and resource usage - particularly extremely low power consumption.
- This need for multi-domain and cross-domain application is central to this sub-programme.

SP6. Security, privacy and dependability in Embedded Systems

- The main goal of this sub-programme is to ensure that **security, privacy and dependability (SPD) can be ensured in the context of integrated and interoperating heterogeneous services, applications, systems and devices.** Systems and services must be robust in the sense that an acceptable level of service is available despite the occurrence of transient and permanent perturbations such as hardware faults, design faults, imprecise specifications, and accidental operational faults.
- The approach is to establish a common conceptual framework - and thereafter conformant methods and tools for design and implementation - to assure security, privacy and dependability in three classes of systems:
 - interconnected embedded systems employing heterogeneous devices and standard communication technologies working in **managed and trusted environments.**
 - interconnected embedded systems, employing heterogeneous devices and advanced communication technologies (including securing on demand 'instant' networks) working in **unmanaged and non-trusted environments.** This will require definition of security schemes spanning different dynamic domains, assurance of end-to-end security, and adaptive, context and information dependent security.
 - interconnected embedded systems in a framework characterized by an efficient **combination of managed and unmanaged systems,** where each embedded system builds its own trust and security model, whichever communication technologies or media channels will be adopted. This will also include adaptive trust based on the provenance of the information used by each embedded system.

SP7. Embedded technology for sustainable urban life

- The main goal of this sub-programme is to enable **sustainable urban life** through rationalisation in the use of resources while increasing comfort and security in urban environments by means of **embedded intelligence and integration technology**.
- The approach is to achieve greater **efficiency** in use of resources, more **flexibility** in the **provision of resources** and better **situation awareness for the citizen and for service and infrastructure owners**. This should be achieved through the deployment and inter-operation of **embedded systems throughout the environment**.
- Therefore, the main outcome of application should be improved **energy efficiency** in residential and non-residential buildings as a **first priority**, while efficiency in the management of **other resources** in more extensive urban and sub-urban areas are to be addressed **in subsequent years**.

SP8. Human-centric design of embedded systems

- This sub-programme aims to **automate tasks which are today fully under human control** (e.g., driver assistance in the automotive domain) and to extend automation in tasks which are today highly assisted (e.g., pilot assistance systems in the avionics domain). The **HMI** determines how these systems are perceived by the users. It is the mediator between new functionalities or services and the user, mediating human intervention (like configuration, adjusting or overriding) and machine intervention (like preventing hazardous manoeuvres).
- The approach is to establish a methodology for design and development of **human-in-the-loop adaptive control systems** suitable for application in multiple safety critical domains and sectors, taking into account not just explicit interactions between human and machine, but also the **cognitive state of the human**.

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