




# Artemis for researchers?

**Werner Damm**
**Chairman Artemis Center of Innovation Excellence for Transportation**
**Chairman SafeTRANS**

# 2 Structure of Presentation

- About OFFIS
- About Artemis
- Chances and Benefits for Research Organizations: Artemis Centers of Innovation Excellence
- Lessons learned

# 3 About OFFIS

OFFIS Institute for Information Techology

- **Members:**
  - State of Lower Saxony and University Oldenburg
  - Professors of University of Oldenburg
- **Budget:**
  - Turnover 2010 13 million €
  - Basic funding from the state of Lower Saxony approx. 26%
  - Third party funding from international, national and regional projects approx. 74%
- **Performance:**
  - More than 400 regional/national/international cooperation partners
  - More than 300 completed R&D projects since 2001
  - Europe-wide network in science/industry/politics
  - Various spin-offs, participation in development of international standards


# 4 Competencies

## Application orientation + Technology Leadership = Sustainability

### Application Know-How

organizationally structured into three R&D-Divisions

- Energie / Energy
- Gesundheit / Health
- Verkehr / Transportation

### ICT Know-How

technologically focused in interdisciplinary Technology Clusters

- Automated Nanohandling
- Dependable System Design
- HW-/SW System Design Methodology
- Enterprise Application Integration
- Human Machine Interaction
- Intelligent Data Management

# R&D Division Transportation - Mission 1/2

- We identify the key industrial needs in IT technologies as an enabler for mobility and safety in transportation to guide our R&D activities.

- Our solutions to such needs are based on internationally leading, interdisciplinary research on methods, tools and technologies for the development and construction of dependable, cooperative and assistive transportation systems.

Verkehr
Transportation

# R&D Division Transportation - Mission 2/2

- We partner with key industrial stakeholders to turn such solutions into sustainable innovations with strong industrial impact.
- We support the commercialization of our solutions through vendors and spin-off companies.
- We capitalize on the combination of deep industrial networking and internationally renowned research in providing an excellent working environment. We actively stimulate both industry directed and research directed career paths.

Verkehr
Transportation

OFFIS
INSTITUTE FOR
INFORMATION TECHNOLOGY

# About Artemis

# What is ARTEMIS

**ARTEMIS** is:

**A**dvanced **R**esearch & **T**echnology in

**EM**bedded **I**nnovation **S**ystems

# What is the ARTEMIS vision

**Embedded systems will realise the dream of Ambient Intelligence in everyday objects. This will increase the Quality of life. The result makes life healthier and more secure.**

# The ARTEMIS JU

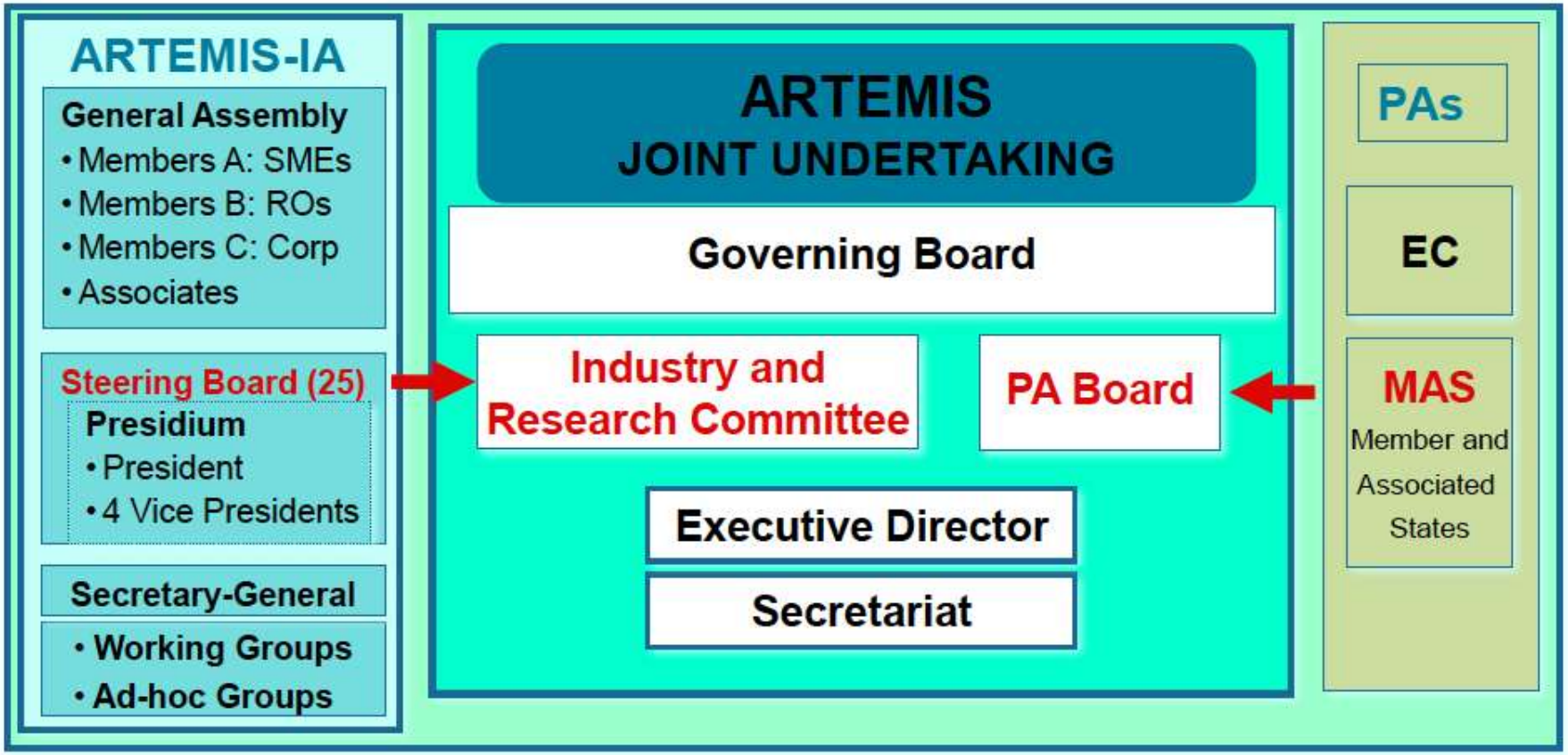
**ARTEMIS Joint Undertaking is a public private partenrship between the EC, participating Member States, and**

**ARTEMIS Industry Association in ARTEMIS.**

- A 2.7 b€ Research Programme
  - Running until 2017
- Focus on down-stream innovation:
  - Important for Europe's industries
  - Important for Europe's citizens

# Structure ARTEMIS Joint Undertaking

- "Industry" is represented by the ARTEMIS-IA
- "Public Authorities" (PAs) are represented by the PA Board



# ARTEMIS Member States

Austria, Belgium, Denmark, Estonia, Finland,

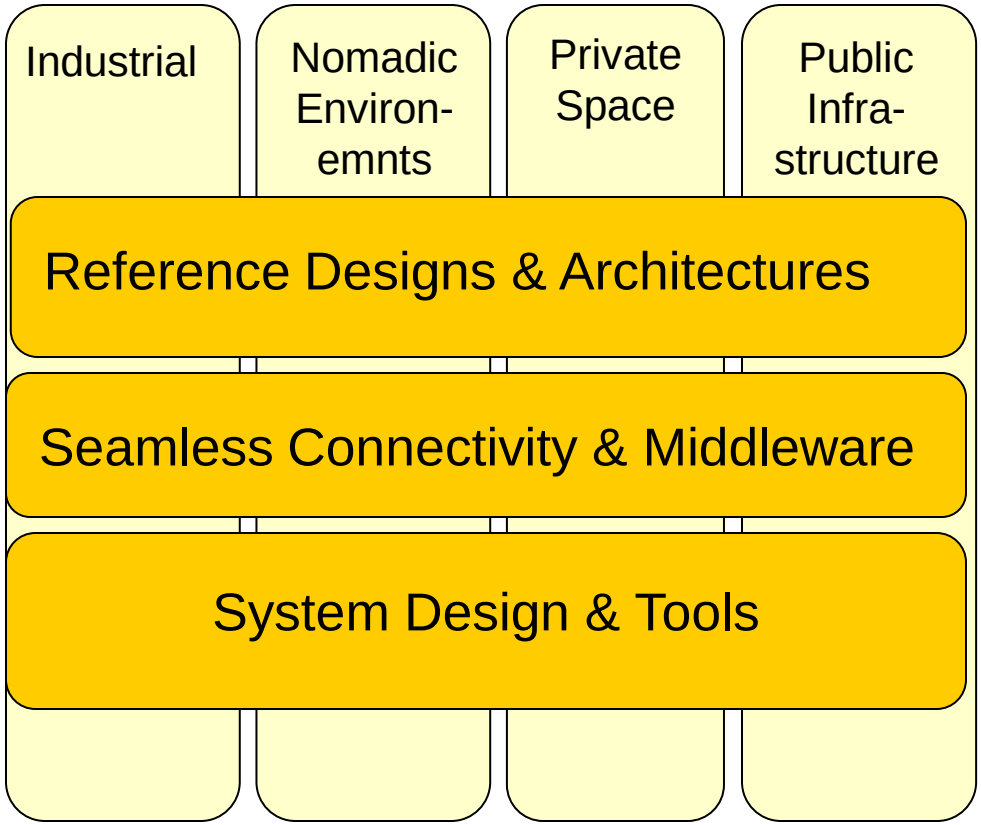
France, Germany, Greece, Hungary, Ireland,

Italy, the Netherlands, Portugal, Romania,

Slovenia, Spain, Sweden, UK, Latvia,

Czech Republic, Norway, Cyprus,

# ARTEMIS – Research Areas




Common objectives:

- Design Efficiency
- Ease of Use
- High added value
- Time to market
- Modularity
- Safety / Security
- Robustness
- Competitiveness
- Innovation
- Cost reductions
- Interoperability

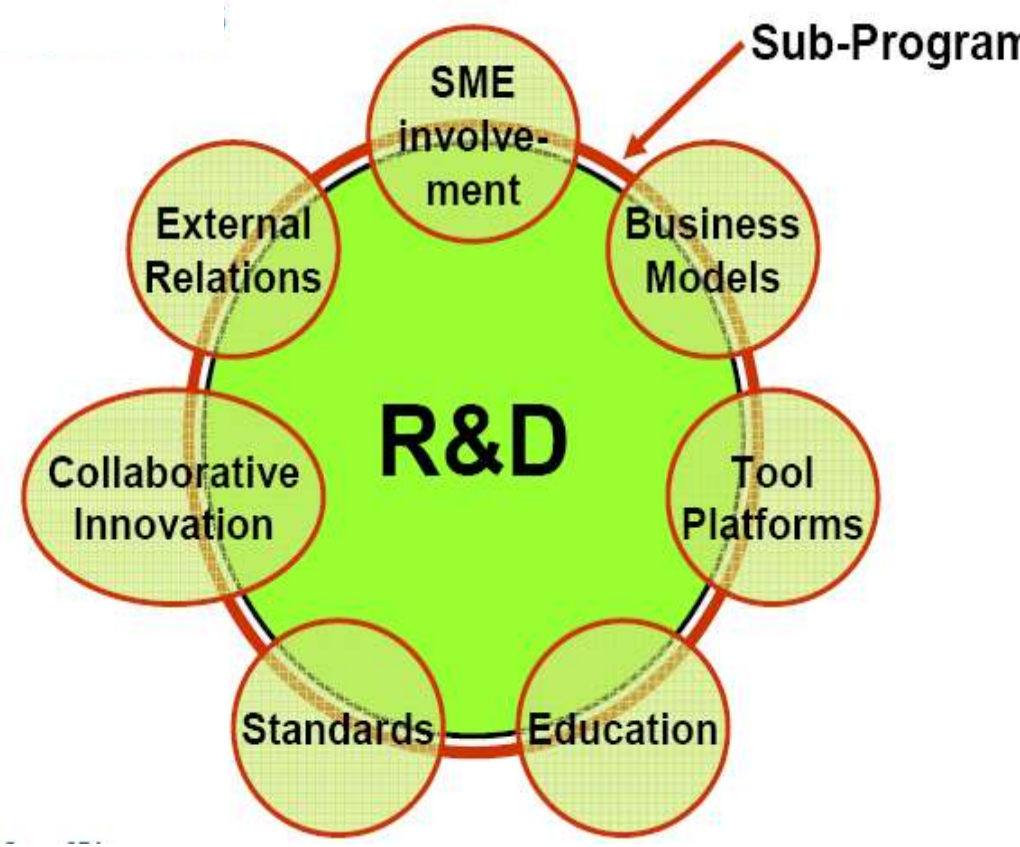
# ARTEMIS Sub-Programmes (version 2010)

**ARTEMIS Sub-Programmes (ASPs):**

- ASP1: Methods and Processes for Safety-relevant Embedded Systems
- ASP2: Healthcare Systems
- ASP3: Smart Environments
- ASP4: Efficient Manufacturing and Logistics
- ASP5: Computing Environments for Embedded Systems
- ASP6: Inter-networked ES for the Security and Critical Infrastructures Protection
- ASP7: Embedded Technology for Sustainable Urban Life
- ASP8: Human Centred Design of Embedded Systems

# Artemis Projects

- strongest evaluation factor: industrial impact
- cross-sectorial
- must contribute to Artemis high-level objectives and Artemis Subprogrammes
- industry driven
- national eligibility criteria apply
- Germany:
  - 2/3 effort industry
  - strategic dimension



# ARTEMIS Calls

**Call 1 (2008):**

- ARTEMIS Joint Undertaking : 35.1 M €
- Total ARTEMIS Member States' contribution: 63.78 M €
  = **98,88 M €**

**Call 2 (2009)**

- ARTEMIS Joint Undertaking : 37,086,500 €
- Total ARTEMIS Member States' contribution: 67.42 M €
  = **104,506,500 €**

**Call 3 (2010)**

- ARTEMIS Joint Undertaking : 33.12 M €
- Total ARTEMIS Member States' contribution: 60.22 M €
  = **93,34 M €**

# Chances and Benefits

## Artemis Centers for Innovation Excellence

# Artemis CoIE

- form an innovation Eco-System with tight cooperation structures between Large Industries, SMEs, tool vendors. and research organizations
- with well defined scope in the Artemis research matrix
- contribute to Artemis SRA, Multi-Annual Strategic Plans
- harmonize strategy for implementation of Artemis SRA with CoIE members
- boost synergies between projects launched from the CoIE
- contribute to future emerging standards within their scope
- can boost sharing of project results through creation of reference technology platform

- form an excellent environment for participating research organizations
  - direct access to industrial priorities
  - joint development and evaluation of potential needs
  - clear exploitation strategies such as with participating SMEs and/or vendors

OFFIS

ARTEMIS

7 FP | JTI | EUREKA | National Programs

# ARTEMIS

## European Technology Platform on Embedded Systems

Advanced Research and Technology for Embedded Intelligence & Systems


**ARTEMISIA - ARTEMIS Industrial Association**

**Strategic Research Agenda**

**EICOSE :** European Institute for Complex and Safety Critical Systems Engineering

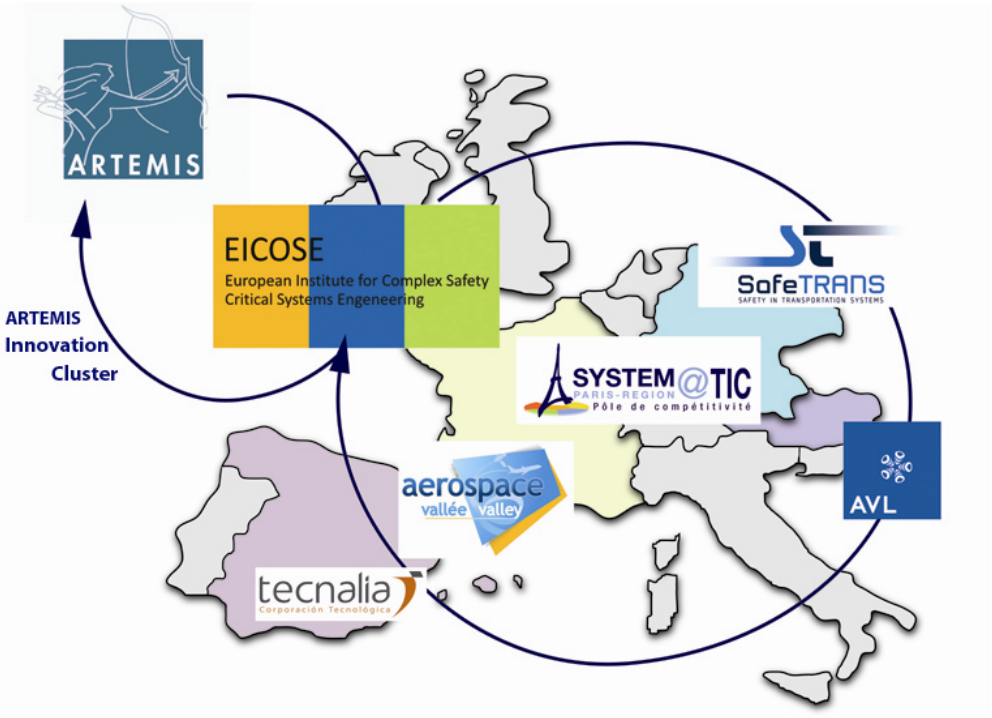
**Innovation Cluster on Transportation (aéronautics-automotive-railways)**

# EICOSE

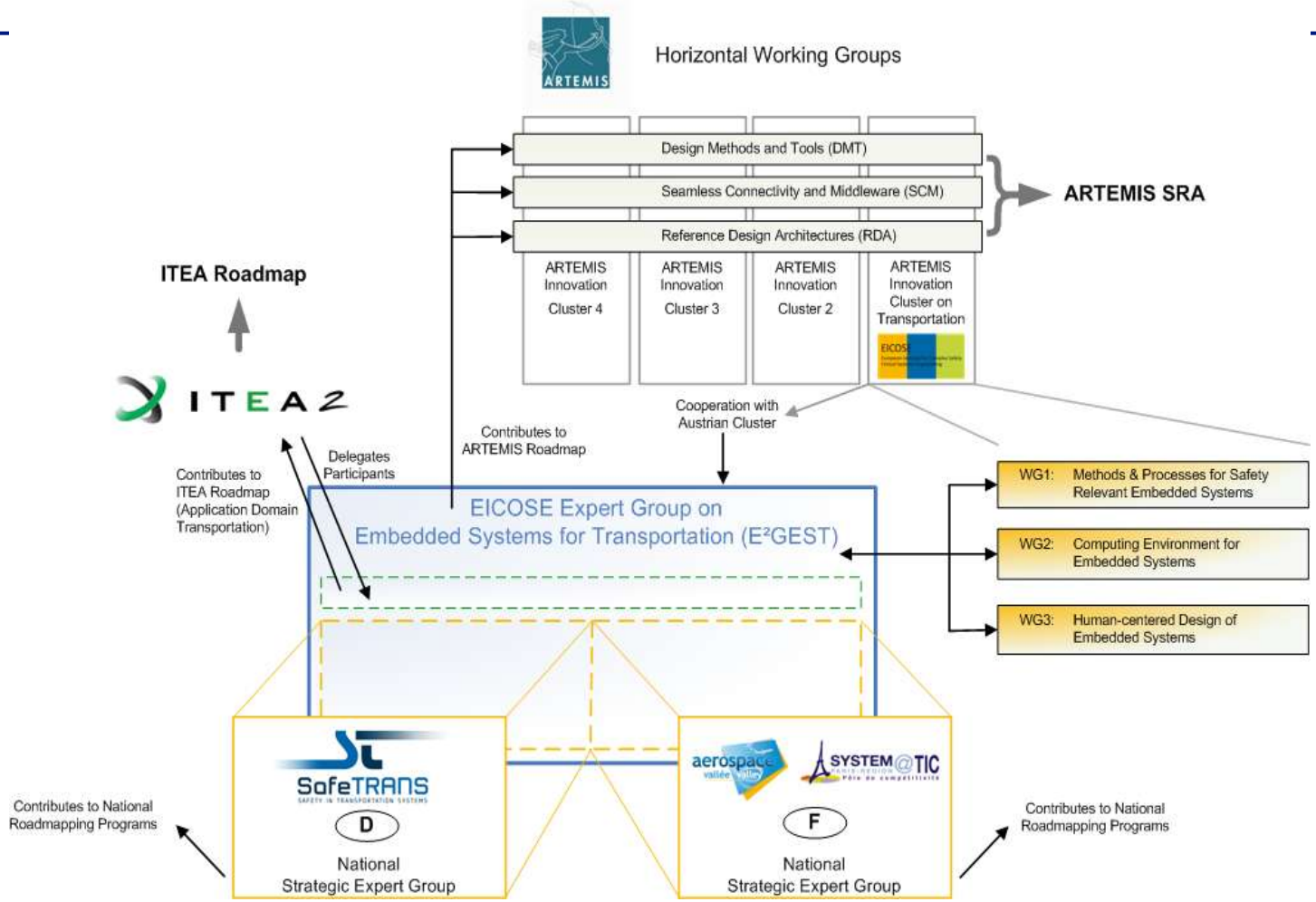
Strategic partnership
with Aerospace Valley
and SYSTEM@TIC

Creation of EICOSE (European Institute for Complex Safety Critical Systems Engineering)

EICOSE is the first ARTEMIS Center of Innovation Excellence



# EICOSE – Integration in European R&D



EICOSE
European Institute for Complex Safety Critical Systems Engineering

E²GEST Expert Group
Theme oriented Working Groups
Project Incubation Workshops

Co-ordination with
- ITEA, European Technology Platforms
- EUCAR, CLEPA, ERA, ERRAC, ACARE

SafeTRANS Members

Market Requirements

Innovation Potentials

Sustainable Deployment Capabilities

Research Priorities

Harmonized Research Strategy

Numerous projects (European FP, ARTEMIS JU, national), e.g. CESAR, MBAT, D3COS, SPES 2020,...

Cross sectorial standard Reference Technology Platform, providing meta-models, methods & tools

unding

Process & Methods Innovations

-Driving/Contributing to 3 ARTEMIS Subprogrammes

-Contributing to ITEA2 Roadmap 3

-Contributing to German national Innovation Alliance

- Contributing to German national Roadmap for Embedded Systems

# MOTIVATION AND RATIONALE OF CESAR

- The three transportation domains automotive, aerospace, and rail, as well as the automation domain share the need to develop ultra-reliable embedded systems to meet societal demands for increased mobility and ensuring safety in a highly competitive global market.
- To maintain the European leading edge position in the transportation as well as automation market, CESAR aims to boost cost efficiency of embedded systems development and safety processes by an order of magnitude.
- Creating the European cross-sectoral standard reference technology platform (RTP) providing meta-models, methods, and tools for safety-critical hard-real-time system development.
- Compliant to evolving industry standards such as AUTOSAR and safety related standards e.g. ISO CD 26262 (automotive) or e.g. IEC 61508 (automation).

# CESAR EFFORT AND BUDGET

| N° | | SN | Legal Name |
|---|---|---|---|
| 1 | | AVL | AVL List GmbH |
| 2 | | A-D | AIRBUS Deutschland |
| 3 | | A-F | AIRBUS France SAS |
| 4 | | ABB NO | ABB AS |
| 5 | | ABB SE | ABB AB |
| 6 | | AbsInt | AbsInt Angewandte |
| 7 | | ACCIONA | ACCIONA Infraestructu |
| 8 | | ASF | Ansaldo Segnalament |
| 9 | | ASTRIUM Satellites | ASTRIUM SAS |
| 10 | | AUK | AIRBUS UK Limited |
| 11 | | AUTH | Aristotle University of |
| 12 | | CEA | Commissaria t à l'Énergie |
| 13 | | CNRS | Centre National de |
| 14 | | CRF | Centro Ricerche Fiat |
| 15 | | CSW | Critical Software S.A. |
| 16 | | DA | Danieli Automation |
| 17 | | Delphi | Delphi |
| 18 | | DLR | Deutsches Zentrum für |
| 19 | | DS | Dassault Systemes |
| 20 | | EADS-DE | EADS Deutschland |
| 21 | | EADS-IW | EADS Deutschland |
| 22 | | ED | ELSAG DATAMAT |
| 23 | | ESI-Tecnalia | Fundación European |
| 24 | | EST | ESTEREL Technologie |
| 25 | | Fraunhofer | Fraunhofer Gesellschaft |
| 26 | | FSC | Formal Software |
| 27 | | Geensys | Geensys |
| 28 | | HAI | Hellenic Aerospace |

| N° | | SN | Legal Name |
|---|---|---|---|
| 29 | | IFAT | Infineon Technologie |
| 30 | | IFX | Infineon Technologie |
| 31 | | INRIA | Institut National de |
| 32 | | ISI | ATHENA - Industrial |
| 33 | | KTH | Kungliga Tekniska |
| 34 | | NTNU | Norwegian University of |
| 35 | | NTUA | National Technical |
| 36 | | OFFIS | OFFIS e. V. |
| 37 | | ONERA | Office National |
| 38 | | OSC-ES | OSC - Embedded |
| 39 | | Oxford | Oxford University |
| 40 | left project | | |
| 41 | | SAGEM | SAGEM |
| 42 | | SIA | AleniaSIA Spa |
| 43 | | Siemens | Siemens AG |
| 44 | | SINTEF | Stiftelsen SINTEF |
| 45 | | TC&E | Quintec Associates |
| 46 | | TCF | Thales Communicati |
| 47 | | THAV | Thales Avionics S.A. |
| 48 | | TRT | Thales S.A. |
| 49 | | UNIBO | Alma Mater Studiorum - |
| 50 | | UNIMAN | The University of |
| 51 | | UniTS | Universita' degli Studi di |
| 52 | | ViF | The Virtual Vehicle |
| 53 | | VOLVO | Volvo Technology |
| 54 | | HS | Hispano-Suiza |
| 55 | | MB | Messier-Bugatti |
| 56 | | TM | Turbomeca |

## Consortium

- with 55 Partners
- Further Assisting Parties

## Project Performing:

- Duration: 3 years
- Start: 01.03.2009

## Manpower:

- Effort: 5124 MM ~ 142 MY/Y*

## Project Figures:

- Total Budget: 58.535.000 €
- Total Funding: 28.317.000 €

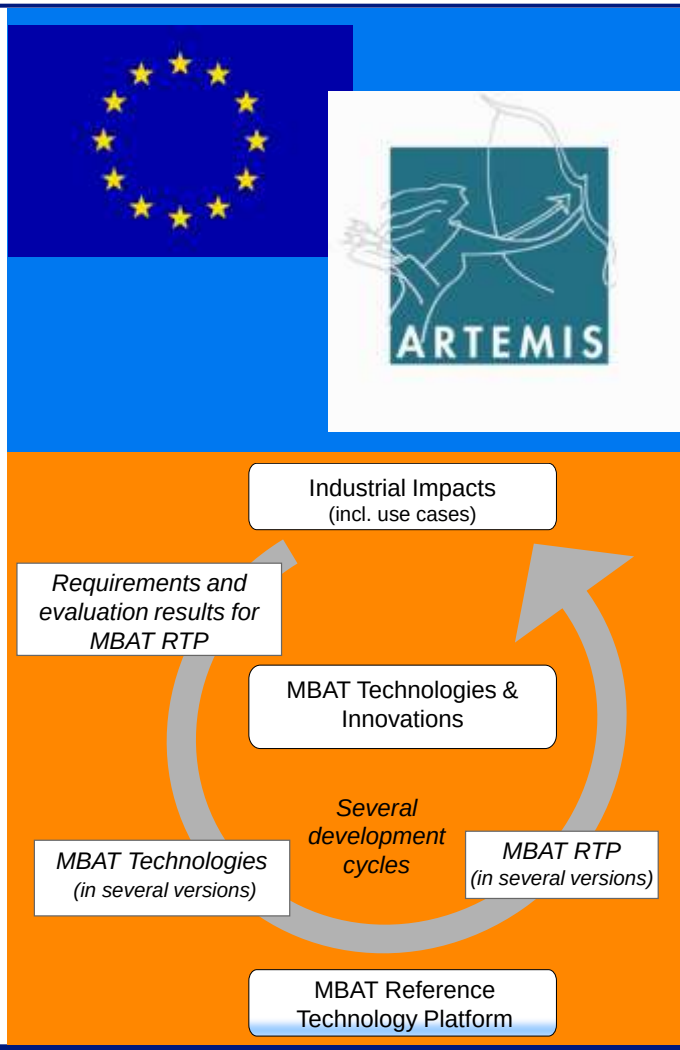
# MBAT – Combined Model-based Analysis and Testing of Embedded Systems

## Objectives

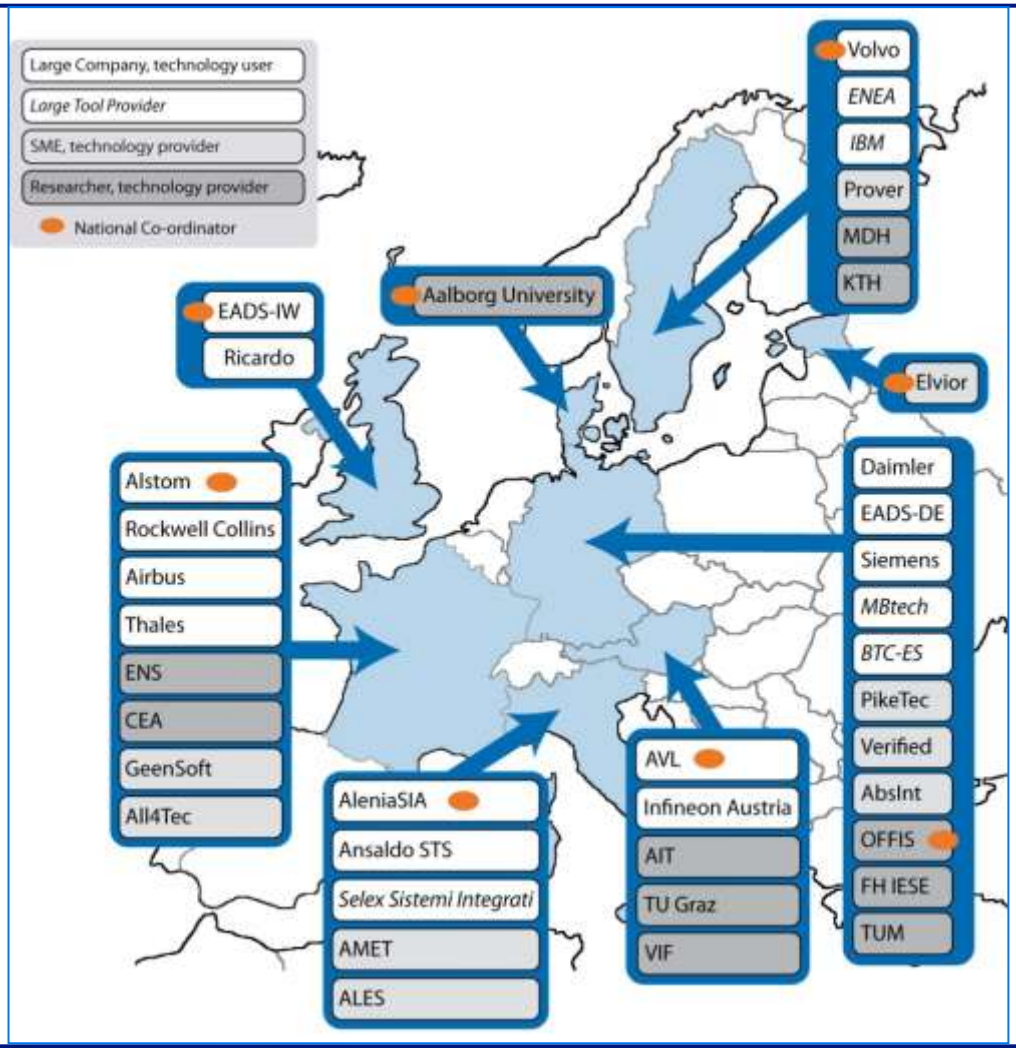
- Provide Europe with a new leading-edge Reference Technology Platform for effective and cost-reducing Validation and Verification of Embedded Systems

## Approach

- Based on meta models and compatible components to enable construction of customized System Analysis & Test Environments
- Combined Model-based Analysis & Test Methodology including innovative analysis and test case generation techniques on different development levels
- Tool support based on an interoparability standard (RTP)
  - Compliant to CESAR RTP
- Industry driven (cross domains)
  - Business needs
  - Use case and derived requirements



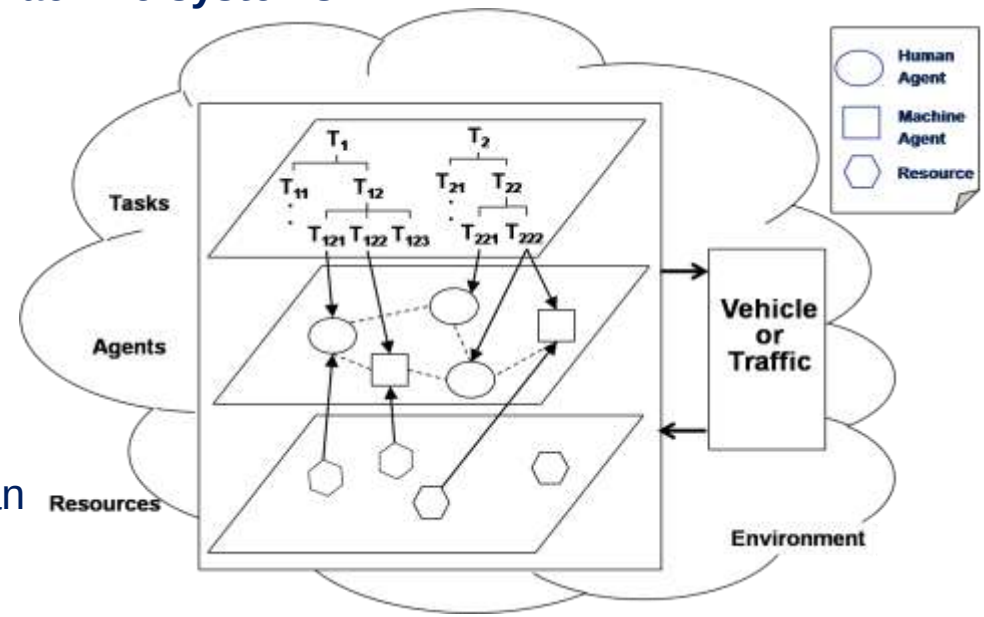
# MBAT Partners




# D3CoS – Designing Dynamic Distributed Cooperative Human-Machine Systems

**Goal:** to develop techniques and tools for system engineers and to embed them in industrial system development processes to support affordable **design**, **development** and **evaluation** of highly innovative **cooperative human-machine systems**.

**Approach:** Reusable cross-domain and domain specific methods, techniques, notations and tools to support development of DCoS composition, interaction and interfaces




**Expected Results:**

1. Common methodology to integrate the D3CoS techniques and tools into an easy to use, reliable, valid tool chain for Embedded Systems design
2. Open experimental simulation platforms (including reference scenarios) interfacing models of cooperative human and machine agents, usable by system engineers for testing purposes
3. Common architectures for cooperative systems with Embedded Systems
4. A data base with reference designs and design patterns

# D3CoS Partners

| | |
|---|---|
| OFFIS e.V. | DE |
| AVMap | IT |
| British Maritime Technologies Group Ltd | UK |
| Centro Ricerche Fiat S.C.P.A. | IT |
| Czech Technical University in Prague | CZ |
| Deutsches Zentrum für Luft- und Raumfahrt e.V. | DE |
| EADS Deutschland GmbH | DE |
| ENAC | FR |
| Honeywell International s.r.o. | CZ |
| Kongsberg Norcontrol IT | NO |
| Marimatech | DK |
| Alemea Technology Srl | IT |
| Rheinmetall Defence Electronics GmbH | DE |
| Supaero | FR |
| TrueStream | DE |
| Technical University of Munich | DE |
| Trans World Services TWS SRL | it |
| University of Modena and Reggio Emilia | IT |
| Visteon Deutschland GmbH | DE |
| Voith Engineering Services GmbH | DE |
| Visteon Software Technologies | FR |
| Ostfriesische Lufttransport GmbH | DE |

# Lessons learned

# Hurdles

- Complicated financing scheme due to combination of budget from member states and commission
- Significant level of over-booking in Germany entails, that only top-rated proposals can succeed
- This entails extremely high effort in project preparation phase, yet with high risk
- High effort for closing consortium agreements

# Access Rights to Foreground – Artemis model CA

### 4.2.4 Access Rights for Use

Any Access Rights for Use which are deemed granted, on a royalty-free basis shall be deemed granted for the lifetime of the relevant Foreground.

Access Rights to Foreground for Use are hereby requested and shall be deemed granted, as of the Effective Date, on a royalty-free basis to and by all Parties.

# Access Rights to Foreground – Artemis model CA

Save as expressly otherwise provided in this Section 4.2.7, no Party shall be obliged to grant Access Rights to Source Code.

**OPTION 1**

All Access Rights to Software that is Foreground, whether for execution of the Project or for Use, shall be in the form of Source Code Access.

**END OF OPTION 1**

**OPTION 2**

All Access Rights to Software that is Foreground, whether for execution of the Project or for Use, shall be in the form of Limited Source Code Access.

**END OF OPTION 2**

# Conclusion

- Artemis offers a phantastic environment for applied research

- But it requires
  - strong industrial networking
  - a strategic investment
  - sustained commitment

# Annex

## Criteria for
## Artemis Centers for Innovation Excellence

# ARTEMIS CoIE Criteria - Partners

Partners

- Minimum number 3 from at least 2 different countries
- Minimum number from industry 2
- Membership of ARTEMIS-IA of 1 of the members at the time of application → as soon as the label is granted, at least 50% have to become a member of ARTEMIS-IA within one year (same if a candidate is a cluster of associations)
- Partners must be active in the market

# ARTEMIS CoIE Criteria

Partners

- Institutions or initiatives based on a group of individuals or teams, or local CoIE, working closely together, with proven highly recognised experience and capabilities in the their domain
- Public or private bodies, large companies, SMEs
- Cover all levels in the supply chain
- Academic institutions at all levels
- Bridging institutions that help to close gaps between actors and other public and private organisations (venture capital firms, shared resources, training companies)

# ARTEMIS CoIE Criteria

Innovation and R&D

- Innovative ecosystem: Actors in a CoIE will share common interests – potentially from key technology research through to a market – that provide a focus for both the participants and the outside world
- Culture of openness, trust, fairness and willingness to cooperate
- Base of world-class knowledge and experience
- Stimulating environment that facilitates interaction (situations arise in which solution ideas meet problems)

# ARTEMIS CoIE Criteria

Innovation and R&D

- Scope: to support the development of academic excellence regarding both technology and cooperation
- Main R&D domain should fit the ARTEMIS SRA
- Through relations with other networks and public authorities → provide enough mass to sustain the visibility and viability of this interaction, and to attract interest from and retain considerable impact on the market

# ARTEMIS CoIE Criteria

Networking

- Build and maintain relationships with other networks (it has an inter-cluster cooperation strategy) and the public authorities, and contribute to enhance EU competitiveness
- Demonstrate its activities on a regular basis, for example, publishing an annual activity and progress report that describes, amongst other things, the progress made on ARTEMIS label criteria
- Provide networking and matchmaking facilities to encourage frequent interaction and the initiation of cooperative R&D projects

# ARTEMIS CoIE Criteria

Other label criteria

- Mission document and some basic rules of interaction must be established
- Chairperson or Speaker will be nominated to act as the point of contact
- CoIE mission must be translated into a plan of action that describes the main activities driving the innovation system forward: common meetings, workshops, pre-studies/pre-projects, R&D projects, different interest groups (technology, sector, etc), events involving representatives from all stakeholders (researchers, developers, producers, users, financers, marketing, etc).
- This plan of action must be updated at least once a year
- Evaluation: Re-assessment of the CoIE-ARTEMIS label by ARTEMIS-IA once every 3 years

# ARTEMIS CoIE Criteria

Optional extras

- Contribute to ecological principles, recognising real concerns about safety, energy usage and sustainability as well as actively stimulate SME participation in the ARTEMIS innovation ecosystem(s)
- Explore new business models for trading in the envisaged dynamic innovation environment, including the incorporation of open source concepts and encouraging the establishment of open European Tool Platforms that could evolve and interoperate with other tool solutions
- Extending standardisation to related domains and recommending adaptations to European educational systems, assisting them to supply, sustainably, suitably skilled engineers and researchers
- Encouraging the opening of supply chains, where beneficial, a more open innovation environment might be created