

- **Action for the Dissemination and Adoption of the MARTE and related Standards for component based middleware**



THALES



VOLVO

## ADAMS in a nutshell

### ● Project Coordinator

- ▶ Commissariat à l'Énergie Atomique (France),  
Dr. Sébastien Gérard, CEA LIST

### ● Partners

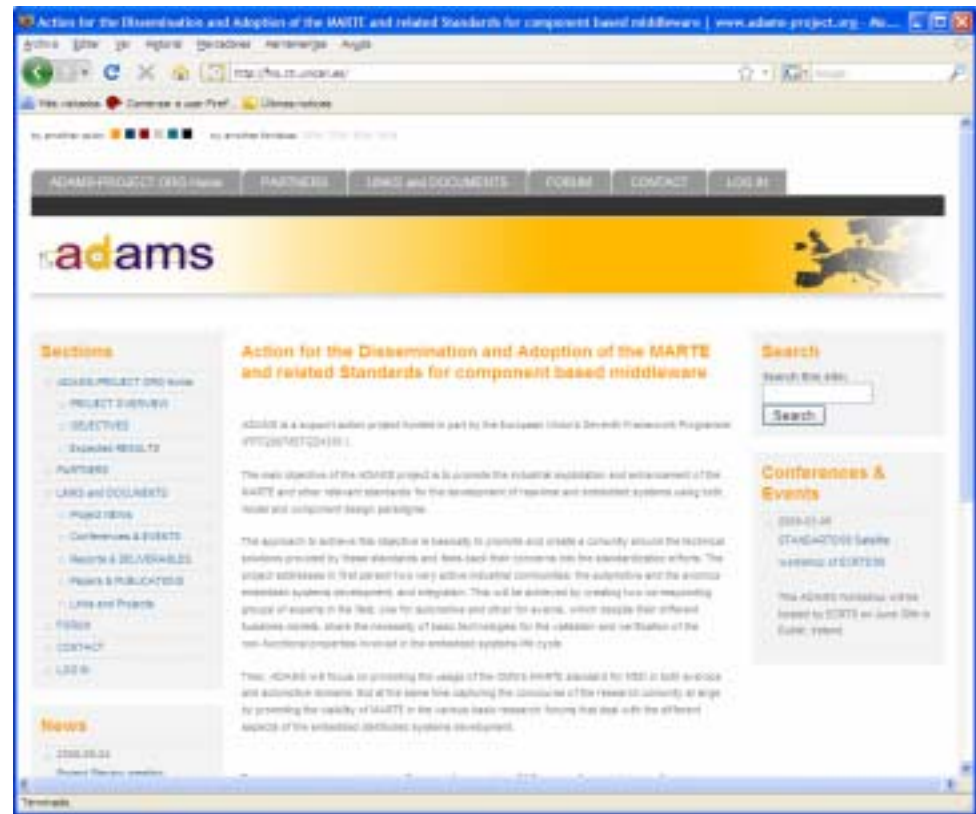
- ▶ THALES Group (France),  
Universidad de Cantabria  
(Spain)
- ▶ Volvo Technology  
Corporation (Sweden)

### ● Timing

- ▶ 24 months,  
started in 2008-05-01.

### ● Project public website

- ▶ [www.adams-project.org](http://www.adams-project.org)



## ADAMS: initial motivations and aims

- **Action for the Dissemination and Adoption of the MARTE and related Standards for component based middleware**
- **Why a support action for MARTE?**
  - ▶ **Context**
    - ▶ Several projects (European or national) started on this subject
      - ATEEST, ASSERT, CHESS, SATURNE...
    - ▶ Current growing interest on MBE involves a lot of activities related to standardization
    - ▶ Growing interest in UML2
  - ▶ **Rationale**
    - ▶ MARTE is the OMG's standard for MBE of RTES
    - ▶ MARTE may be a modeling integrator framework of other standardization attempts.
- **ADAMS' goals**
  - ▶ **Promoting the usage of the MARTE**
    - ▶ In the context of:
      - Model-based Engineering
      - Component-based paradigm
    - ▶ Focused on two specific domains:
      - Automotive: EAST-ADL, OSEK and AUTOSAR
      - Avionics: AADL and ARINC

## A goal achieved through 3 main objectives

### ● Objective 1

- ▶ Disseminate widely the knowledge about MARTE.

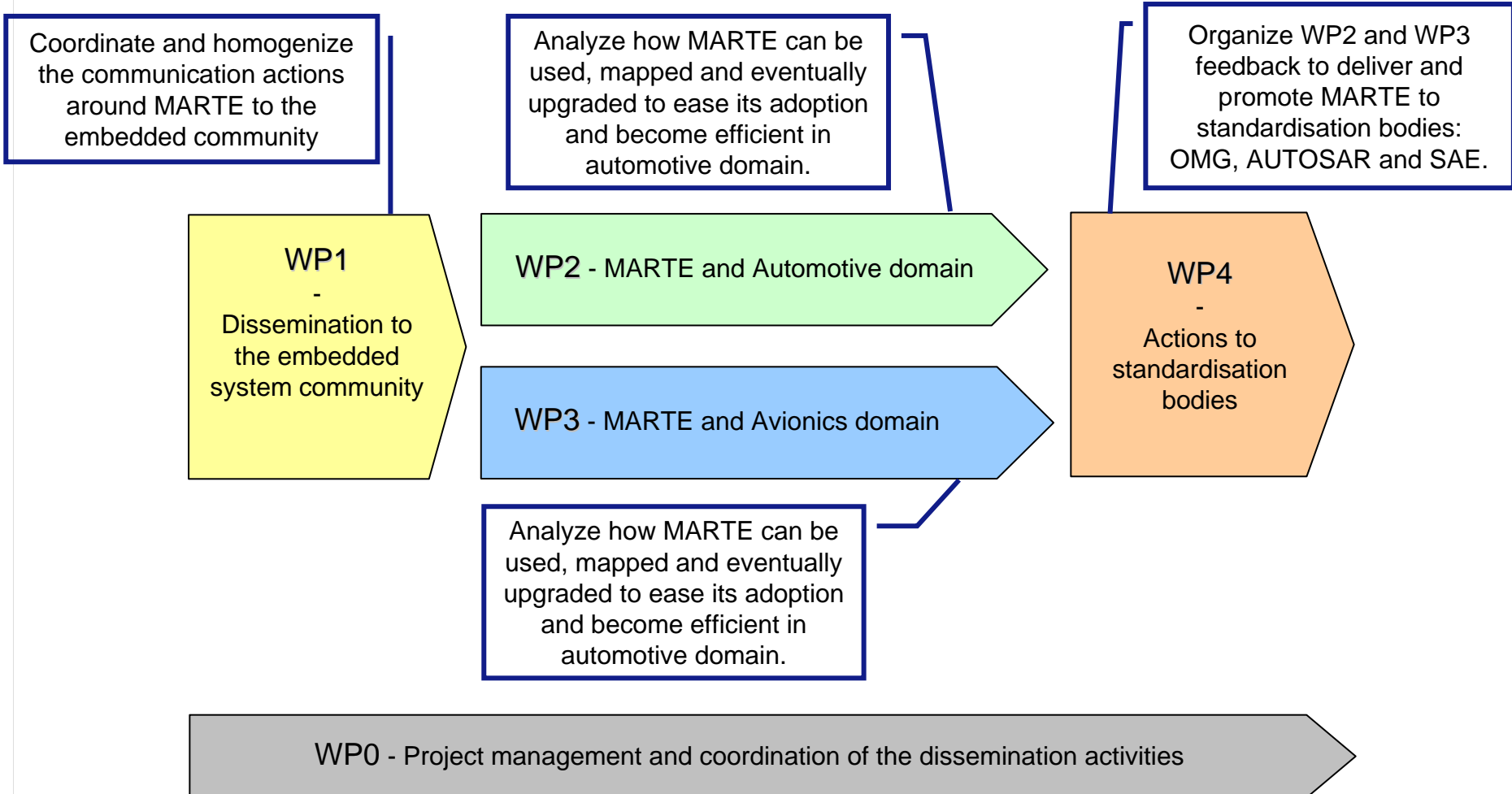
### ● Objective 2

- ▶ Trigger and coordinate analysis of the capabilities of MARTE:
  - ▶ Establishing links with domain specific initiatives.
  - ▶ Establish and coordinate “working groups”.

### ● Objective 3

- ▶ Promote and coordinate convergence actions on the concerned standardization bodies.

## Outlines of the Project Architecture



## Creation of a dedicated working group for automotive domain

- **The working group was established, members are:**
  - ▶ **Francois Ougier, Renault**
    - ▶ EDONA project leader
  - ▶ **Yann Tanguy, CEA**
    - ▶ EDONA
  - ▶ **DeJiu Chen, KTH**
    - ▶ ATESSST, ATESSST2
  - ▶ **Kai Richter, Syntavision**
    - ▶ Tool vendor (schedulability analysis), TIMMO
  - ▶ **Shin'ichi Shiraishi, Toyota**
    - ▶ AUTOSAR
  - ▶ **Marco DiNatale, Scuola Superiore S. Anna**
    - ▶ Connection to GM, timing expert
  - ▶ **Matthias Weber, Carmeq**
    - ▶ ATESSST, ATESSST2, AUTOSAR
  - ▶ **Philippe Cuenot, Continental Automotive France**
    - ▶ ATESSST, EDONA
  - ▶ **Rolf Johansson, Mentor Graphics**
    - ▶ Tool vendor (timing and AUTOSAR), ATESSST, ATESSST2, TIMMO
  - ▶ **Mark-Oliver Reiser, TU Berlin**
    - ▶ ATESSST, ATESSST2
  - ▶ **Stefan Kuntz, Continental Automotive GmbH**
    - ▶ TIMMO, AUTOSAR

## Issues for aligning MARTE with AUTOSAR and EAST-ADL2 (I)

### ● Syntactical issues

- ▶ Purpose: Align the terminology of MARTE concepts as close as possible to the one of automotive standards.
- ▶ <http://www.omg.org/issues/marte-fff.open.html#Issue12579>
- ▶ <http://www.omg.org/issues/marte-fff.open.html#Issue11820>
- ▶ Resolution = MARTE Beta2 GCM concepts renamed

### ● Semantic issues

- ▶ Purpose: Fit the MARTE semantics with automotive needs
- ▶ <http://www.omg.org/issues/marte-fff.open.html#Issue11820>
  - ▶ This issue has been raised in order to improve ports of MARTE and to make its usage simpler and better aligned with user needs.
- ▶ <http://www.omg.org/issues/marte-fff.open.html#Issue11839>
  - ▶ This issue has been raised to define in MARTE a causality model for the communication schema involving data-based communication between components. The resolution has been written in order to fit with both EAST-ADL2 and AUTOSAR semantics.
- ▶ <http://www.omg.org/issues/marte-fff.html#Issue11777>
  - ▶ This issue has been raised in order to make easier the annotation of end-to-end flow model with real-time features.

## Influence other research projects (I)

- **The projects are influenced by the involvement of the project members in these projects**
  - ▶ Mutual exchange of ideas
  - ▶ Preparations for the use of MARTE in the respective project context
- **TIMMO:**
  - ▶ Identification of automotive timing needs in MARTE context
  - ▶ Timing concepts for EAST-ADL2 and AUTOSAR defined
  - ▶ Concrete constructs are inspired by AUTOSAR
  - ▶ MARTE concepts are assessed and no major conflicts are identified
- **ATESST2:**
  - ▶ ATESST2 has integrated timing modelling concepts from TIMMO
  - ▶ EAST-ADL2 profile defined in ATESST2 enables use of MARTE profile with EAST-ADL2
  - ▶ EAST-ADL2 UML2 profile part of the MARTE standard
  - ▶ AUTOSAR profile defined in ATESST2 enables use of MARTE profile with AUTOSAR
- **EDONA:**
  - ▶ Use of EAST-ADL2/AUTOSAR and MARTE
  - ▶ Timing extension of EAST-ADL2 based on MARTE (compatible with TIMMO TADL)
  - ▶ Schedulability analysis (with MAST tool) on EAST-ADL2 using MARTE for denoting schedulability analysis models
  - ▶ Gateway between EAST-ADL2 (aligned on MARTE) towards AUTOSAR (Artop, [www.artop.org](http://www.artop.org))

## Influence other research projects (II)

- **MeMVaTex:**

- ▶ Use of EAST-ADL2 and MARTE

- **CESAR:**

- ▶ Expected use of EAST-ADL2/AUTOSAR and MARTE

- **INTERESTED:**

- ▶ Work on the use of MARTE with EAST-ADL2 for performing schedulability analysis (with RtDruid) based on a use case provided by Magnetti Marelli.

- **IMOFIS:**

- ▶ Definition of a profile for safety analysis defined as an extension of the MARTE profile, Generic Quantitative Analysis Modelling (use cases provided by Alstom and Renault)

- **MemVaTex:**

- ▶ Requirement engineering => support for modelling non-functional requirement based on MARTE related features.

- **RT-Simex:**

- ▶ Model simulation and debugging => based on the Generic Component Model of MARTE and its semantics profile, HLAM (High Level Modelling Language).

## Creation of a dedicated working group for Avionics domain

- **The working group was established, members are:**

- ▶ **Madeleine Faugère (THALES)**

- ▶ is the THALES expert of SAE-AADL and the THALES representative at the SAE.

- ▶ **Bruce Lewis (US Army)**

- ▶ is the chairman of the SAE AS-2C Architecture Analysis & Design Language (AADL) standard.

- ▶ **Peter Feiler (SEI, Carnegie Mellon)**

- ▶ is the technical lead and author of the SAE AS-2C Architecture Analysis & Design Language (AADL) standard.

- ▶ **Gilles Poussin (THALES)**

- ▶ is presently Technical Manager of the SCARLETT project,

- ▶ **Patrice Toillon (THALES)**

- ▶ is an ARINC standard expert especially for the ARINC 653.

- ▶ **Patrick Farail (AIRBUS-France)**

- ▶ is Airbus Methods Development Engineer for Airborne Computer Software since 1989.

- ▶ **Ben Watson (Lockheed Martin)**

- ▶ is the Technology Lead for the Lockheed Martin Systems and Software Initiative (SSI).

- ▶ **Prof. H.A. Thompson (ROLLS-ROYCE)**

- ▶ is Programme Manager of the Rolls-Royce Control and Systems University Technology Centre in the Department of Automatic Control and Systems Engineering.

- ▶ **Pierre Dissaux (ELLIDISS)**

- ▶ is an active member of the AADL standardization committee and is currently leading the development of modelling and verification tool-chains for critical systems based on AADL.