



MADES: Embedded Systems Engineering Approach in the Avionics Domain

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MADES

MADES - Project data and contact information



Project data

Project type:	Collaborative Project (STREP)
Duration:	30 months
Project start:	February 1, 2010
Project end:	July 31, 2012
Objective:	Embedded Systems Design

Project web site

<http://www.mades-project.org/>

MADES

**Model-based methods
and tools for Avionics
and surveillance
embeddeD SystEmS**

MADES Consortium



TXT e-solutions SPA (Italy)



SOFTEAM (France)



University of York (United Kingdom)



Politecnico di Milano (Italy)



The Open Group (United Kingdom)



EADS Deutschland (Germany)

MADES, scientific and Technological objectives



- Development of modelling languages, and dedicated tools, focusing on avionic and surveillance systems, based on existing generic RTES modelling languages;
- Development of advanced model-based verification and simulation methods and tools for RTES;
- Development of advanced model-based code generation methods and tools for RTES;
- Integration of developed MDE in a single framework of the seamless modelling, validation, and code generation of avionic solutions;

Main issues highlighted by the project



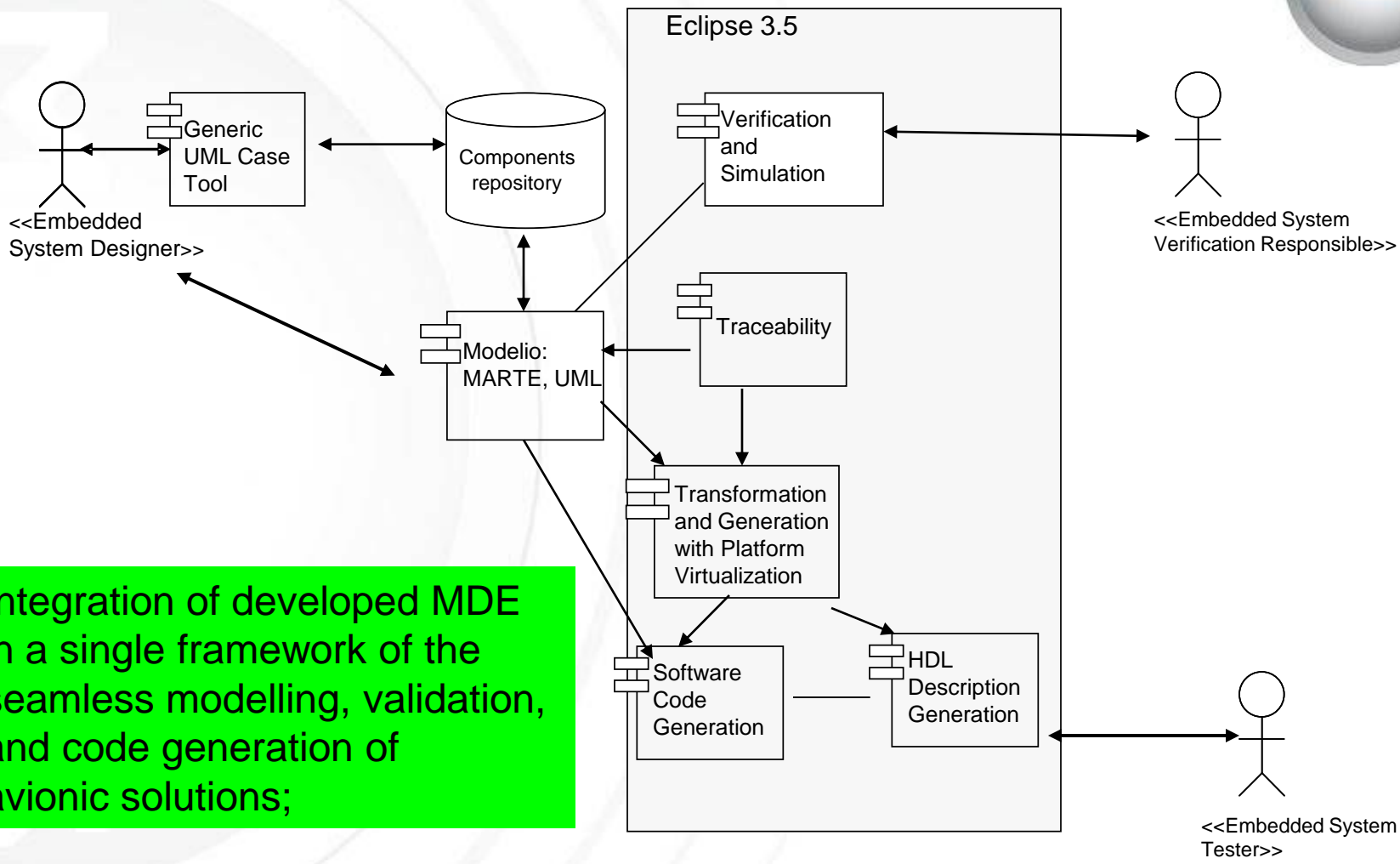
- Model-driven technologies to improve current practices in the development of embedded systems with focus on avionics and surveillance embedded systems industries (Txe e-solutions and EADS).
- Focus on customization of MARTE, the OMG UML profile dedicated to Modelling and Analysis of Real time and Embedded Systems
 - Extension with means for verification, simulation and generation
 - Dedicated implementation for methodological support

Main issues highlighted by the project



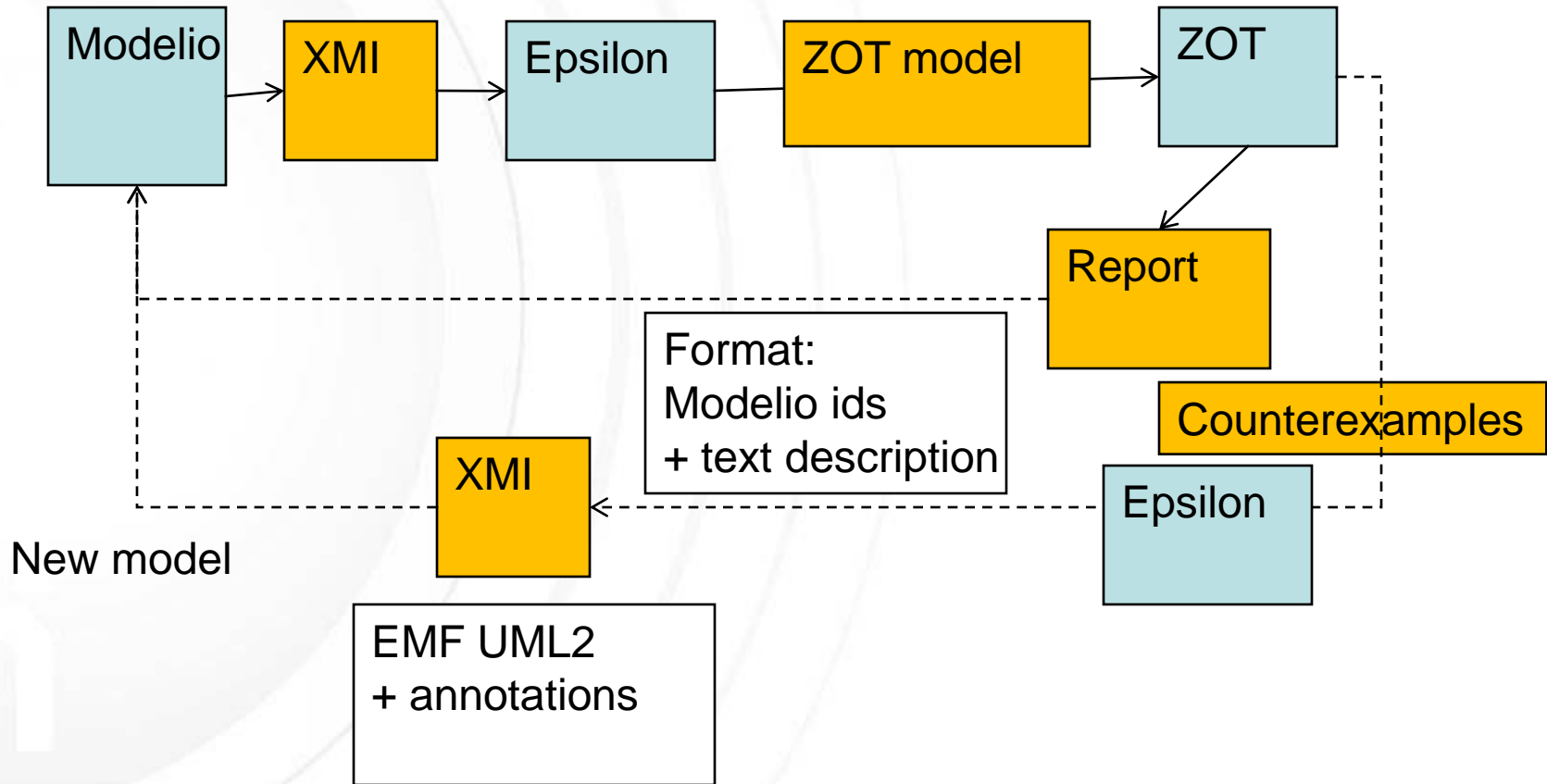
- MADES MARTE Component Repository to allow development by assembly of components
 - Need common repository for component libraries
 - Web-based repository
 - Storing component models and documentation, versioning
- Automated formal verification techniques to efficiently check system properties, including temporal ones .
- Integration of state of the art industrial simulation tools like Matlab/Simulink or Modelica/Dymola/OpenModelica in the project formal framework supporting suitable subsets of UML/MARTE.
- New transformations and code generators to enable developers to virtualise complex hardware platforms while providing rich traceability support linked to the MADES verification and simulation technologies.

Main issues highlighted by the project

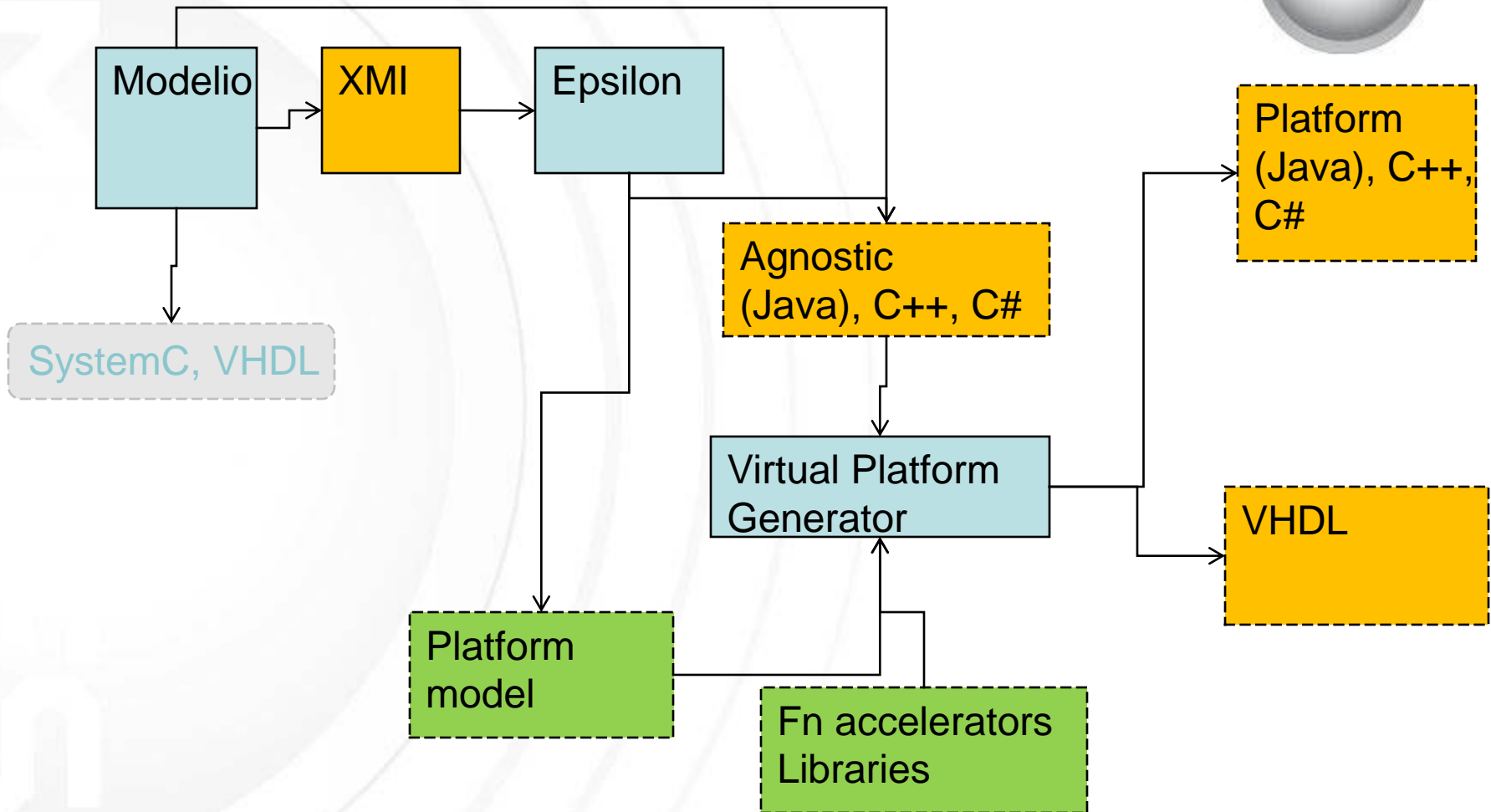


Integration of developed MDE in a single framework of the seamless modelling, validation, and code generation of avionic solutions;

Verification Integration



Code Generation



Industrial Relevance



- Retargeting effort
 - effort required to migrate an application from one processor architecture to another: this will be reduced as a consequence of the analysis being carried out on abstract but precise and formalized models;
- Reusability
 - number of software components that can be taken from one application development project to another: this will be fostered by the ability, provided by the developed tools, to state explicitly the assumptions of the various components concerning their interaction with other components and the environment;
- Verification
 - number of errors corrected earlier in the development process through new model verification methods: this will come as a benefit of the precise semantics assigned to the UML/MARTE models and of analysis carried out on such models by means of the developed model-checking tools.

Case Studies under definition..



- A **ground based radar processing unit**, where MADES tools will be used for the development of a system consisting of multiple multi-core microprocessors and FPGAs.
- An **on board radar control unit** where the MADES tools will be used to develop the C/C++-based communication processor and an user interface developed in C# for management of the radar operations modes and the visualization of geo-referenced graphical maps for the positioning of targets.



Thanks!



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