
Meeting of The GEMOC Initiative

<http://www.gemoc.org/meeting-ec2013>

Research-Project Symposium
ECOOP, ECMFA and ECSA 2013
July 1st, 2013

Context

- Open forum for sharing experiences, problems and solutions on the conjoint use of multiple software languages
- Bring together programming and modeling communities
- Informal and working meeting => Your meeting!
- Organized by the GEMOC initiative (see <http://gemoc.org>)

Objectives

- Exchange of concrete artifacts, ideas and opinion
- Provide constructive feedback
- Leverage on experiences to start a classification of the possible relations between modeling/programming languages
- Encourage collaborations (and start building a community) on solving the problems arising from the globalization of modeling languages

Program – Morning (public)

- 09:30 - 10:00: Welcome, and GEMOC initiative (B. Combemale)
- 10:30 - 11:00: Language workbenches for model and language heterogeneity #1 (**GEMOC Studio**, J. DeAntoni)
- *10:30 - 11:00: coffee break*
- 11:00-11:30: Language workbenches for model and language heterogeneity #2 (**ModHel'X**, F. Boulanger)
- 11:30-12:00: Language workbenches for model and language heterogeneity #3 (**Neverlang**, W. Cazzola)
- 12:00-12:15: Conclusion, and agenda of the afternoon session
- *12:15 - 14:00: lunch*

Program – Afternoon (for the GEMOC members)

- 02:00-02:15: Round table and news about the GEMOC initiative
- 02:15-03:30: BoF session "model and language composability"
(relations, differences)
- *03:30-04:00: coffee break*
- 04:00-05:00: BoF session "scope and roadmap of the GEMOC initiative"
- 05:00-05:15: Conclusion (actions, collaborations...)

The GEMOC Initiative

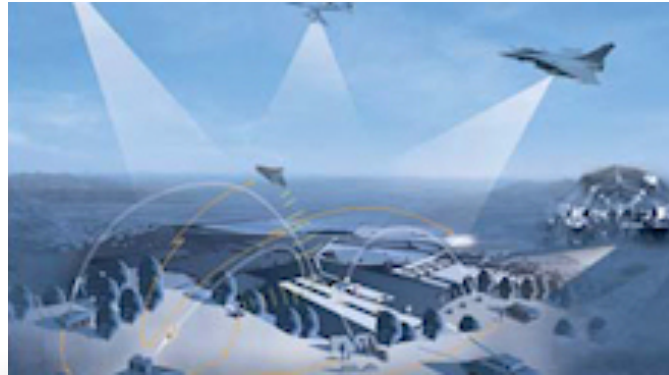
On the Globalization of Modeling Languages

<http://www.gemoc.org>

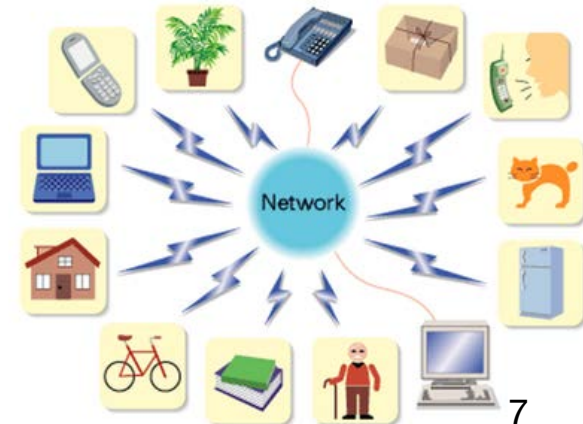
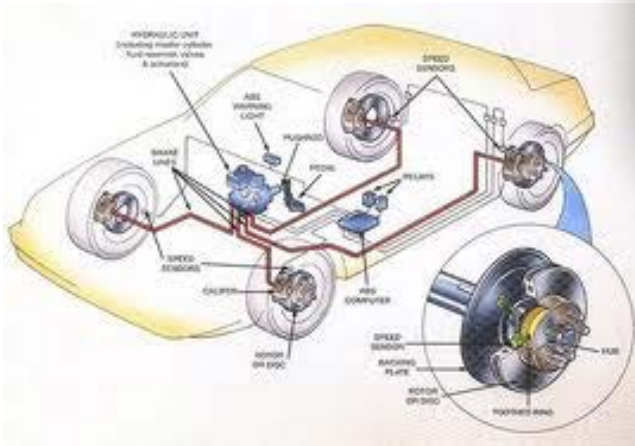
Contact: Benoit Combemale
benoit.combemale@irisa.fr

Version: June, 2013

Context

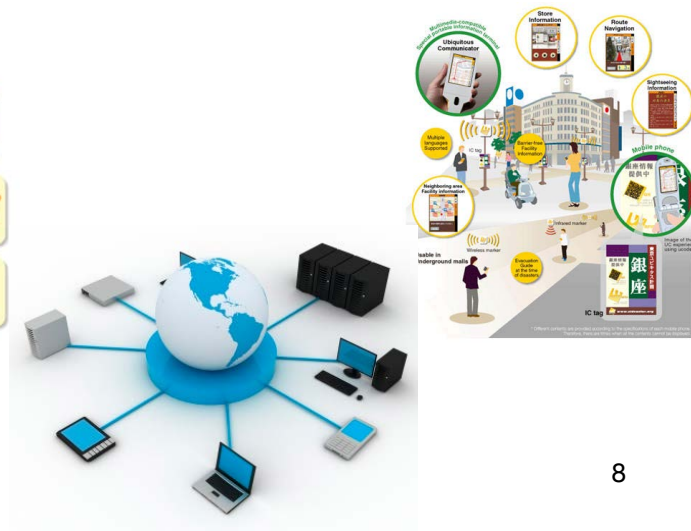
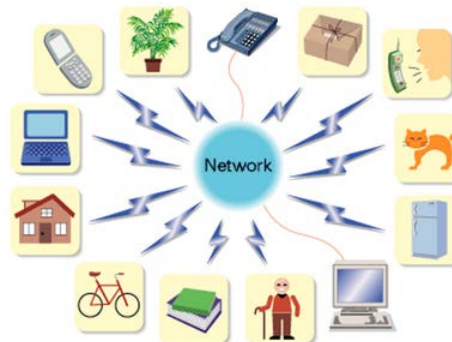
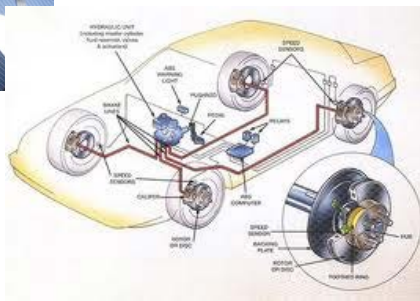


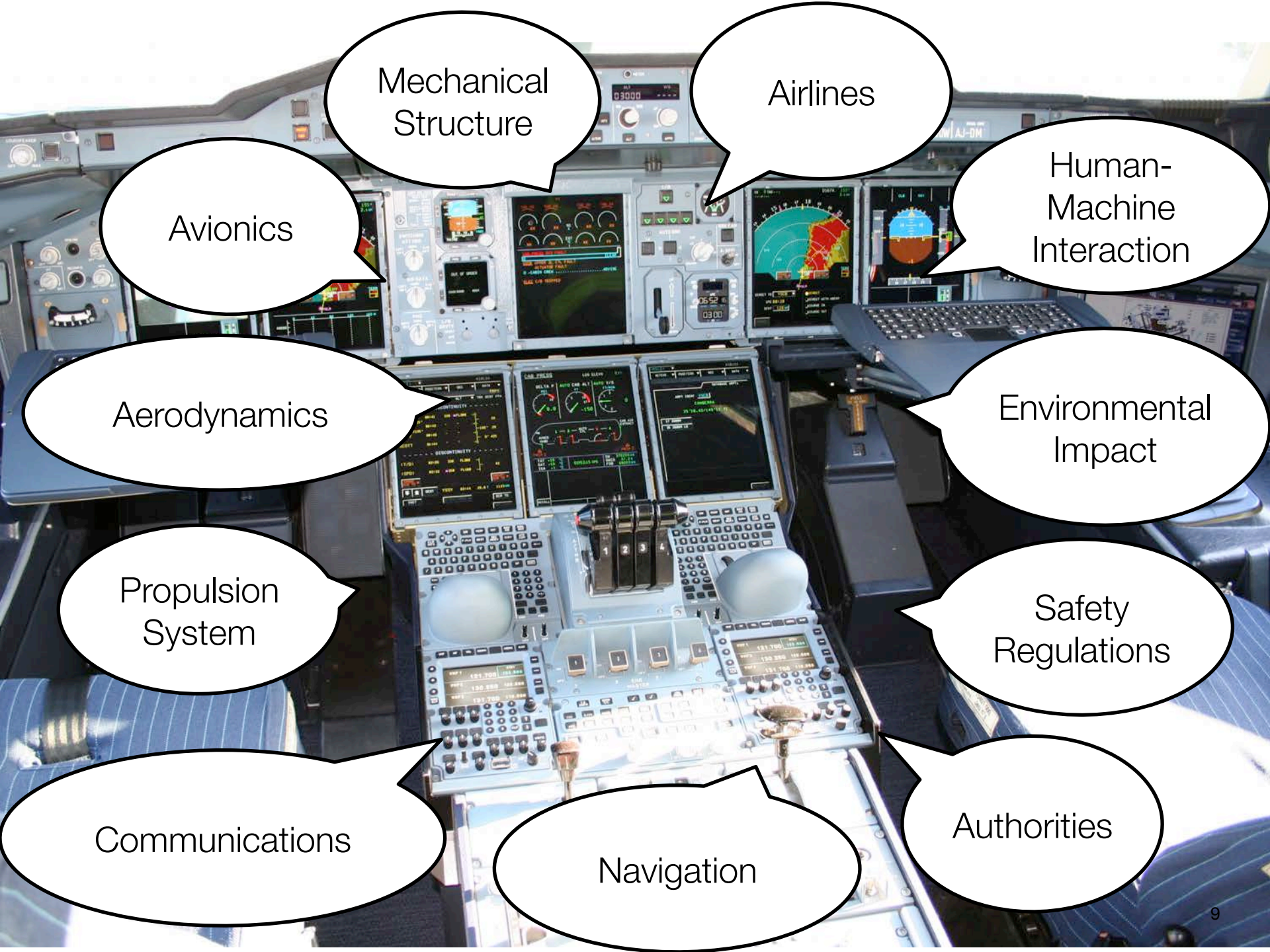
Software intensive systems



Complex Software-Intensive Systems

- deal with multiple concerns
⇒ require *global analysis and execution*
- integrate heterogeneous parts
⇒ require *global service*
- manage evolution of concerns and the emergence of new concerns
⇒ require evolution and creation of tools and methods for software development





Mechanical
Structure

Airlines

Avionics

Human-
Machine
Interaction

Aerodynamics

Environmental
Impact

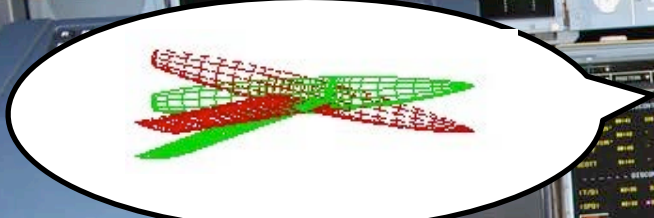
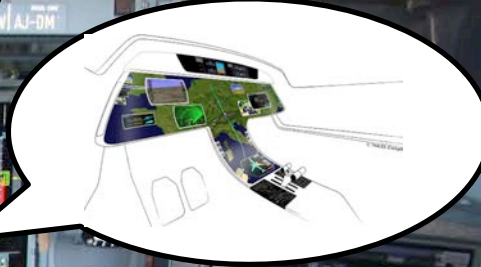
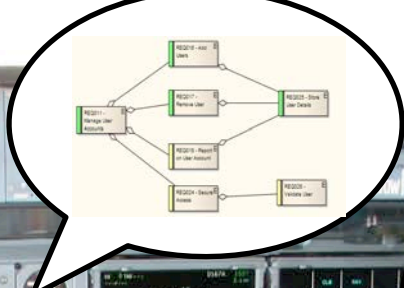
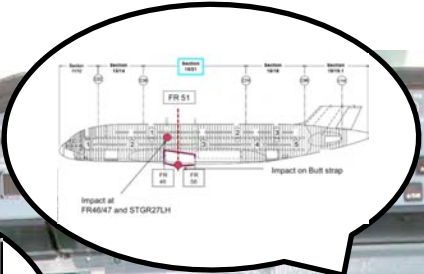
Propulsion
System

Safety
Regulations

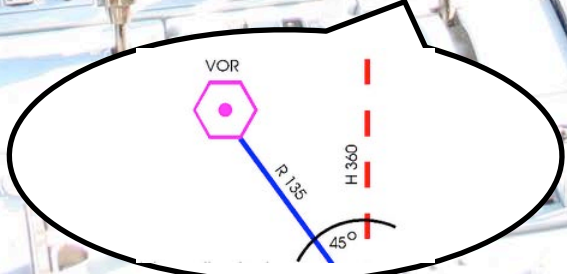
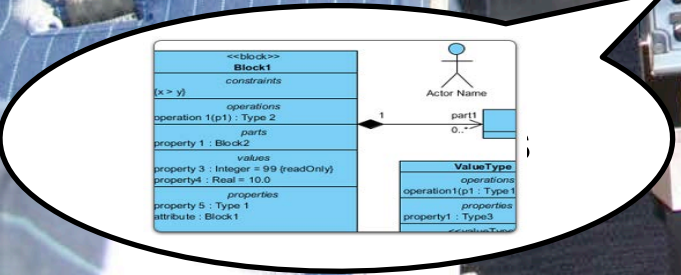
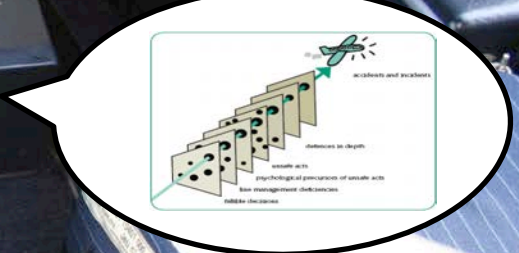
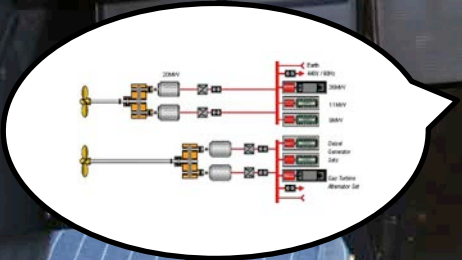
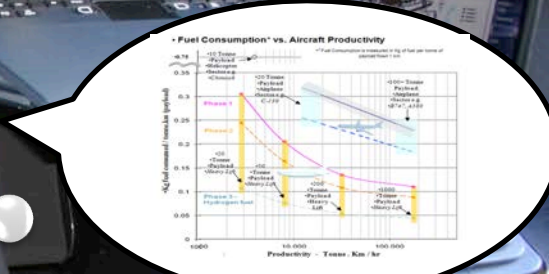
Communications

Navigation

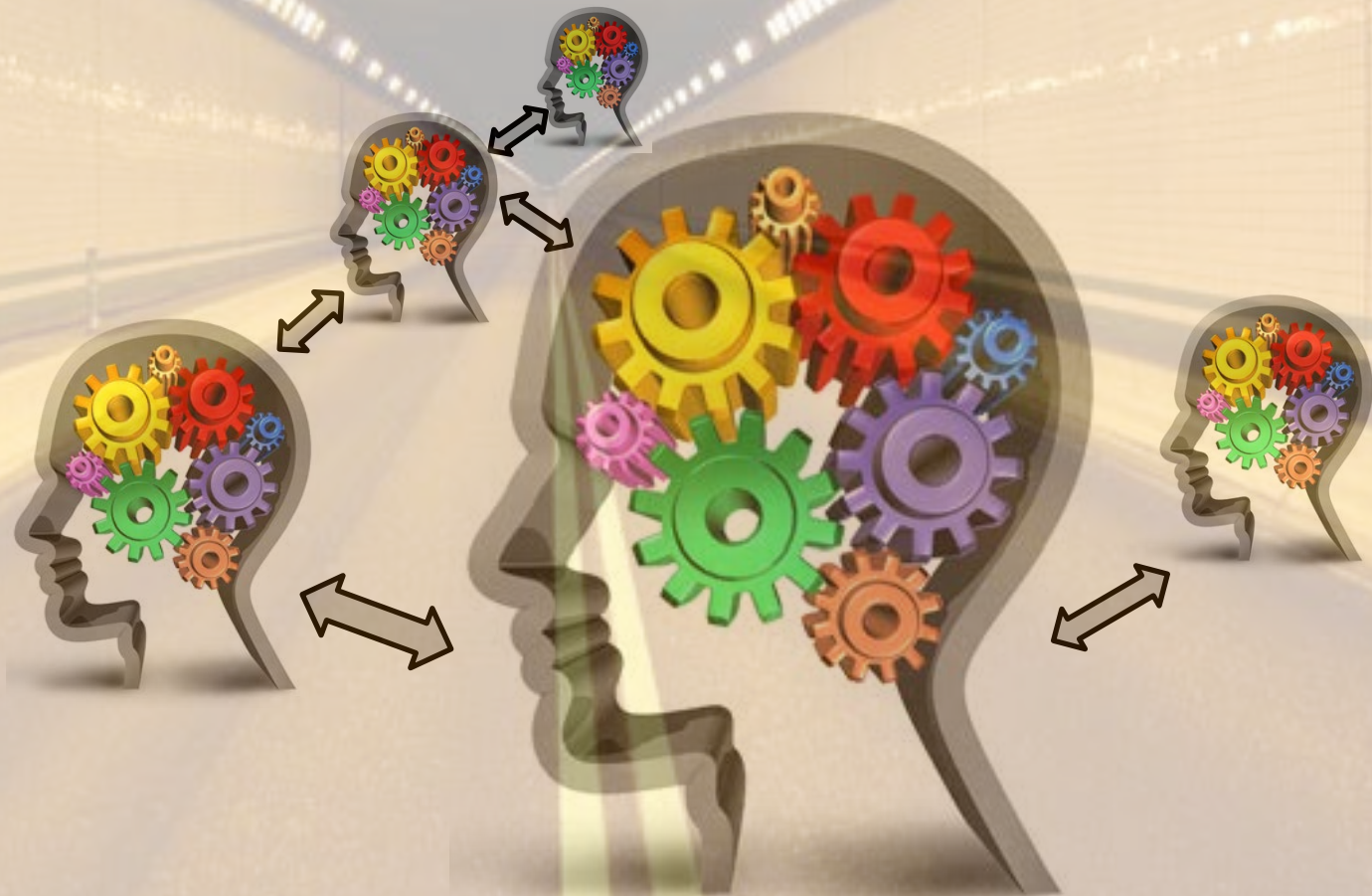
Authorities



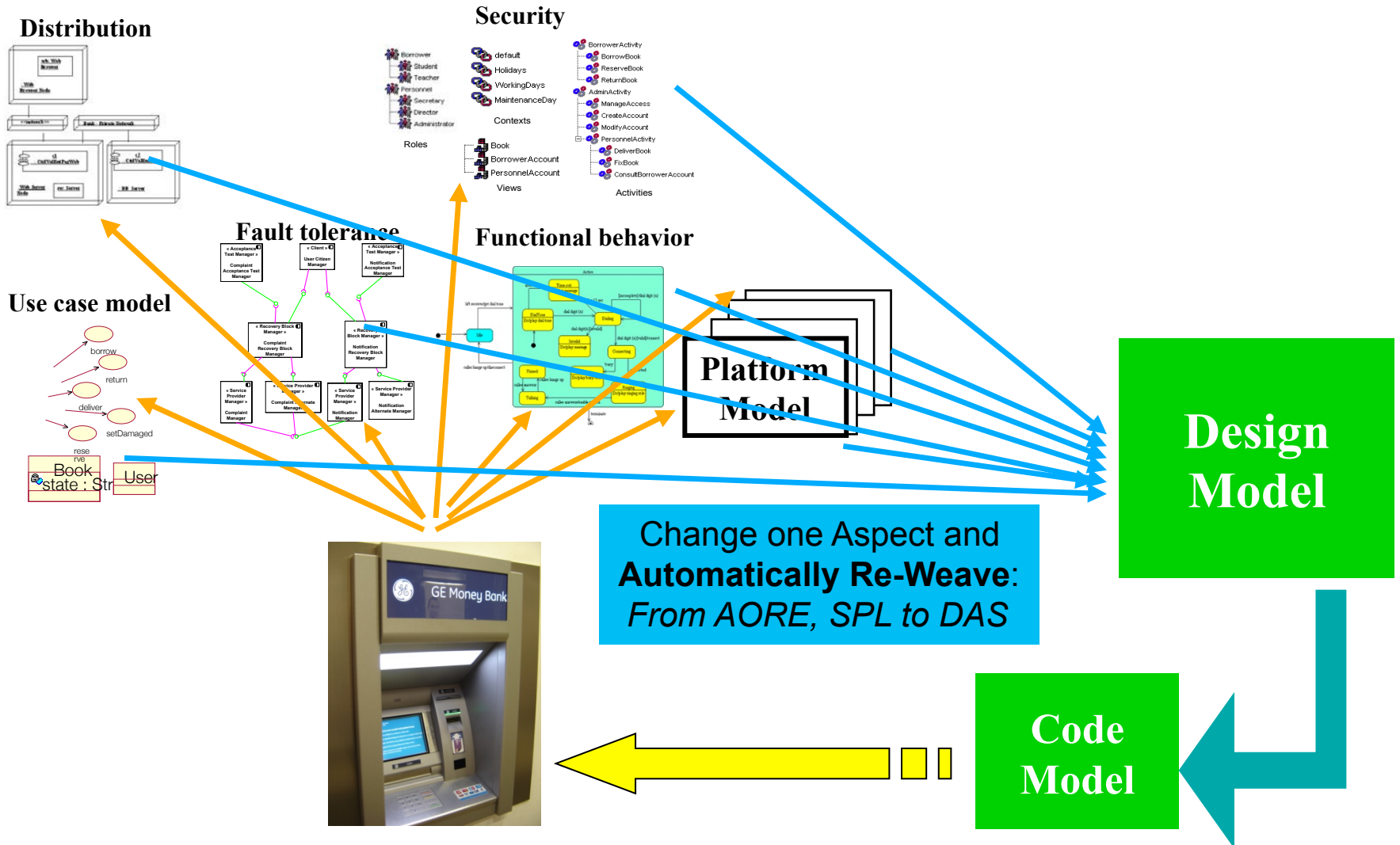
Heterogeneous Modeling Languages



Heterogeneous Modeling in Global Software Engineering



Model Driven Engineering...



=> *Software Language Engineering*

- The separation of concerns...

Modularization [Parnas72] to allow the structure of the product to resemble the structure of the organization that designed it [Conway68]

- ... at the language level

Domain-Specific (Modeling) Language (DSML) should serve to implement a solution in terms of a problem (socio-technical coordination [Herbsleb07]).

- requires to manage the relations between languages

to avoid social isolation and non sharing information (as observed for example in the use of APIs [Souza04])

Challenges

- *Model Driven* Engineering
 - ➔ *Software Language* Engineering
- Language relationships should be capitalized
 - ⇒ from transformation to composition
- Global model coordination and analysis
 - ⇒ from design to runtime

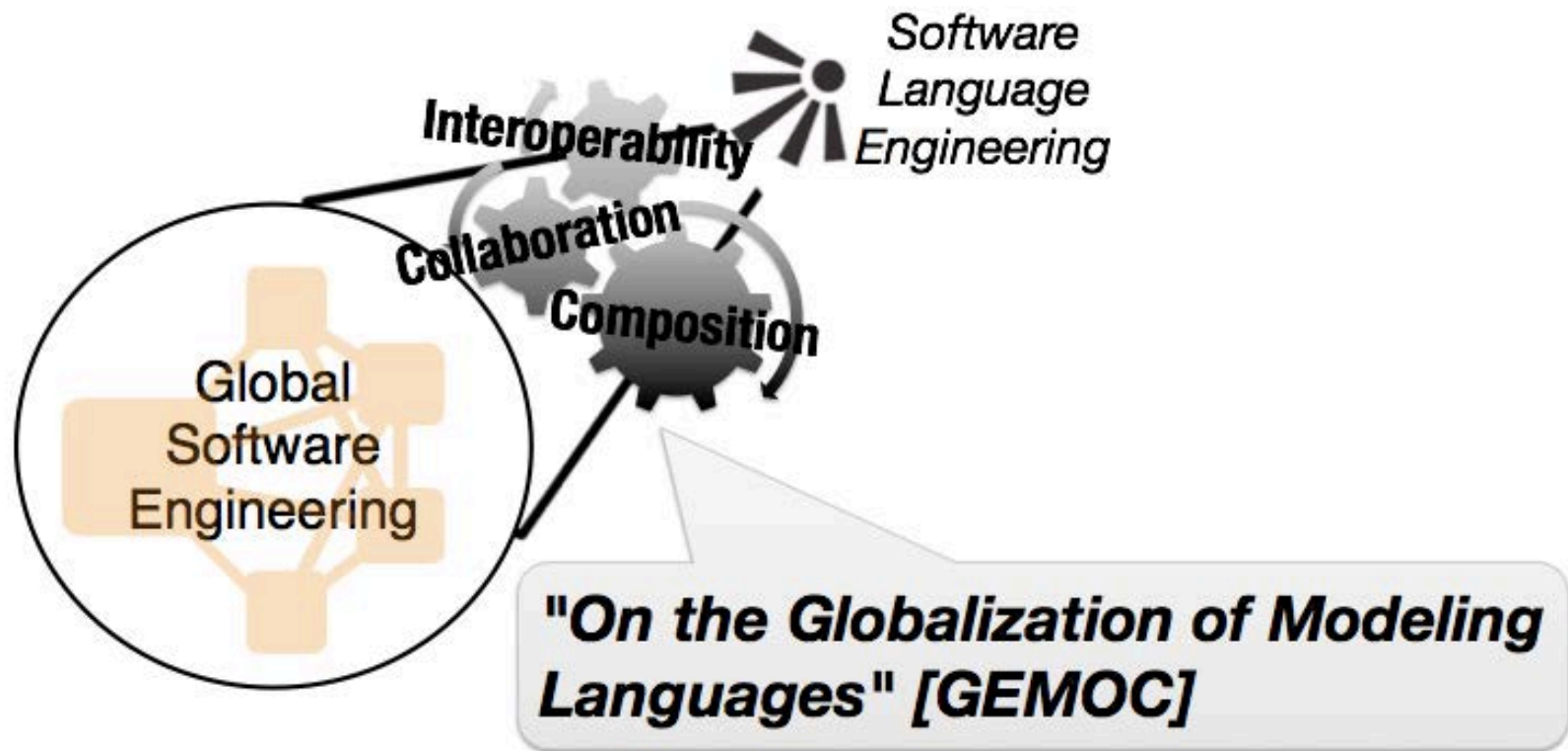


Gemot

***On the Globalization
of Modeling Languages!***

An Initiative...

Focuses on SLE tools and methods for interoperable, collaborative, and composable modeling languages



... Constantly Growing



The GEMOC Initiative *is born!*

An open initiative to

- coordinate (between members)
- disseminate (on behalf the members)

worldwide R&D efforts on the globalization of modeling languages

<http://gemoc.org>

- Advisory Board: Benoit Combemale (Fr.), Robert B. France (USA), Jeff Gray (USA), Jean-Marc Jézéquel (Fr.)
- Funded by complementary and successive projects
- IP left to PCA of each projects

Current Projects

completed, ongoing

CNRS GDR GPL
Specific Action
2011

- Survey of the techniques and tools to compose DSMLs and their respective MoCs
- *Partners: IRISA (Triskell), I3S (Aoste)*
- Cf. <http://gemoc.org/as2011>

ANR INS
GEMOC
2012-2016

- A Language Workbench for Heterogeneous Modeling and Analysis of Complex Software-Intensive Systems
- *Partners: Inria (Triskell), I3S (Aoste), IRIT, ENSTA-Bretagne, Thales, Obeo*
- Cf. <http://gemoc.org/ins>

CNRS PICS
MBSAR
2013-2015

- Travel funds for permanent staff and PhD students
- *Partners: IRISA (Triskell), CSU*
- Cf. <http://gemoc.org/mbsar>

ANR INS GEMOC (2012-2016)

"A Language Workbench for Heterogeneous Modeling and Analysis of Complex Software-Intensive Systems »

Tools and methods for the definition and coordination of *heterogeneous executable modeling languages over heterogeneous models of computation*



<http://gemoc.org/ins>

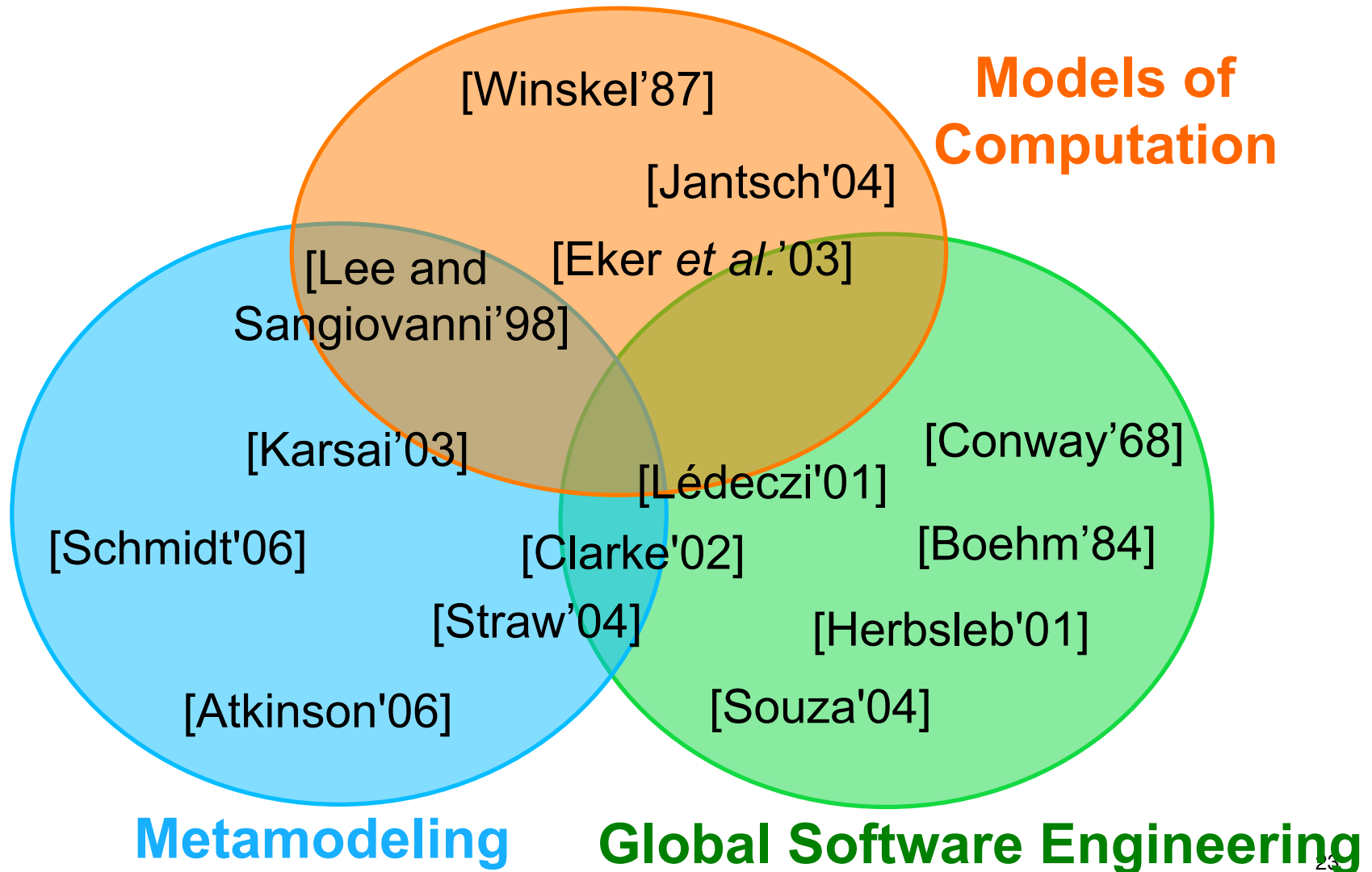
Executable Metamodeling

- Effective environments for the design and implementation of executable domain specific languages (*e.g.*, Kermeta at Inria)
- BUT these environments do not allow the integration of heterogeneous models of computation (concurrency, communication...)

Models of Computation

- Effective environments to deal with the execution and analysis of models based on heterogeneous models of computation (*e.g.*, Ptolemy at UC Berkeley, ModHel'X at Supélec)
- BUT these environments do not allow adaptation to specific business/application domains

Heterogeneity and SE



ANR INS GEMOC: Issues

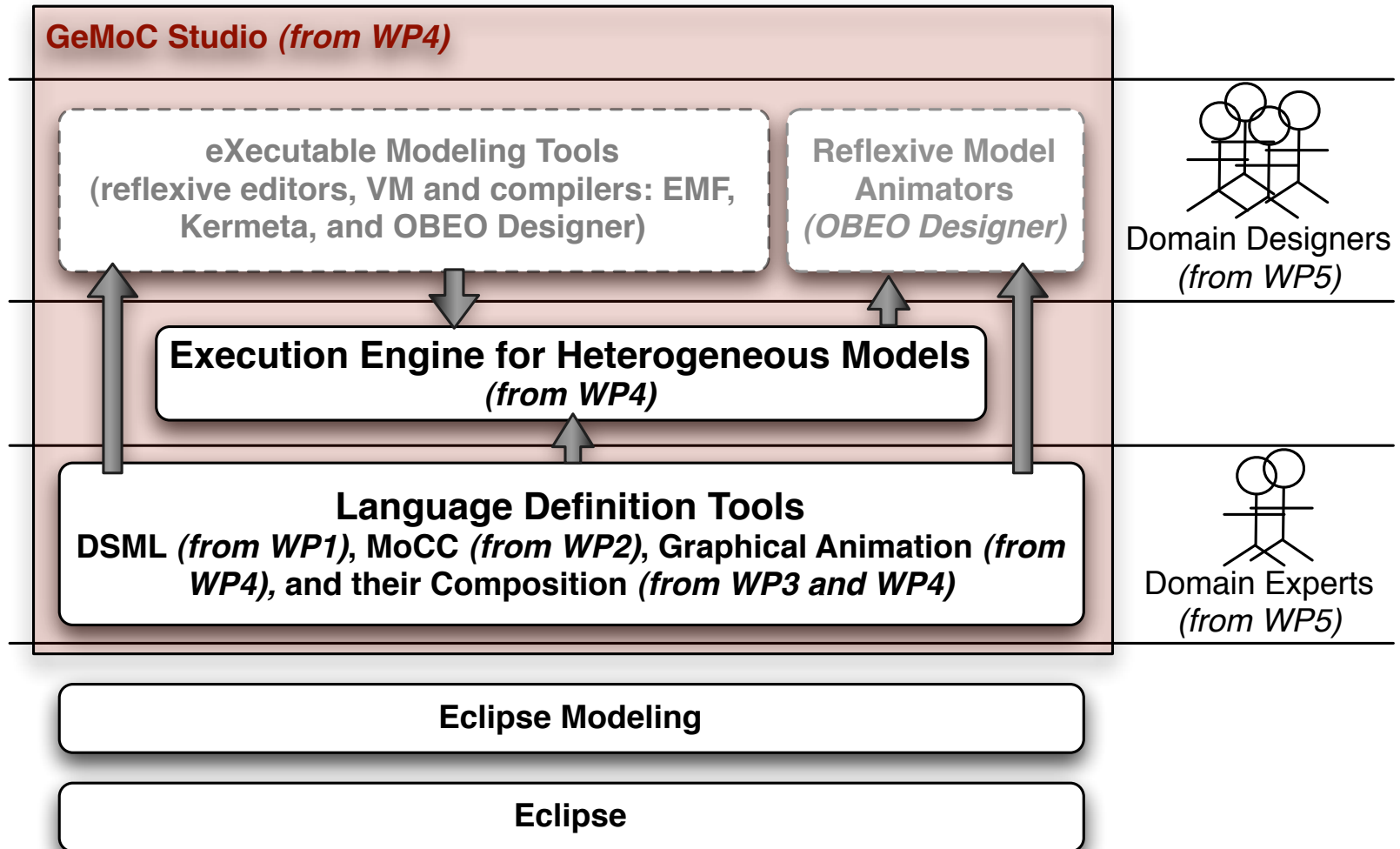
- **Scientific Issues:**

- Formal foundations for composable software language design and implementation
- Formal foundations for semantic coordination of software languages
- Associated tool-supported methodology leveraging on executable metamodeling and models of computation

- **Technical Issues:** an Eclipse-based GEMOC studio integrating

- A language workbench
- A language coordination and execution engine
- A workbench for viewpoint definition and animation over heterogeneous models

ANR INS GEMOC: Expected Studio



Cross Road Traffic Light

<http://youtu.be/gT1QUImFkLM>

Debug - fr.inria.aoste.gemoc.example.semaphore/TrafficControl/trace/Simulation2013_0617_224845/TrafficControl_MoCC2013_0617_224845.vcd - Eclipse SDK

File Edit Navigate Search Project Run Vcd Editor Window Help

TFSM.ecl TFSMMoC.ccsLib TrafficControl.emfEx *TFSM_System TrafficControl_MoCC.

TrafficControl

Control

after 6 on minutes / dosomething / switch; Night

when isDay / doDay

when isNight / doNight

after 1 on minutes / dosomething Day

after 4 on minutes / dosomething / switch; / switch;

Semaphore0

Green0

after 2 on minutes / doGreen

when switch / doRed

after 1 on minutes / dosomething

Red0

Simulation

mainBlock:Red0_entering

mainBlock:Red0_leaving

mainBlock:Red0_to_Green0_fire

mainBlock:Green0_entering

mainBlock:Green0_leaving

mainBlock:Green0_to_Red0_fire

mainBlock:switch_occurs

mainBlock:Day_to_Day_fire

mainBlock:minutes_ticks

Console

priority specification : 2013_0617_224845

Timing Output (VCD Generation) : 3 ms

Timing Output (EMF Code Execution) : 85 ms

Timing Output (Obeo ViewPoint Animator) : 471 ms

Simulation (Step 29)

Timing Output (VCD Generation) : 3 ms

Timing Output (EMF Code Execution) : 89 ms

Timing Output (Obeo ViewPoint Animator) : 500 ms

Simulation (Step 30)

Timing Output (VCD Generation) : 4 ms

fire: Green0 to Red0 -> doRed

Timing Output (EMF Code Execution) : 142 ms

Timing Output (Obeo ViewPoint Animator) : 1112 ms

Console

GroovyWrapper [java Application] /usr/lib/jvm/jdk1.7.0_17/bin/java (Jun 17, 2013 10:49:13 PM)

ticked: 59

---- request finished ----

---- new request ----

received: tick

ticked: 60

---- request finished ----

---- new request ----

received: tick

ticked: 61

---- request finished ----

---- new request ----

received: setred

Light in red

---- request finished ----

Day Night 61 minute

273M of 423M

ANR INS GEMOC: Identification

- Project Coordinator: Benoit Combemale (benoit@gemoc.org)
- Consortium: Inria, CNRS I3S, INPT IRIT, ENSTA Bretagne, Thales, Obeo
- External Partner: Supélec
- Date: 01.12.12 – 30.03.16 (40 months)
- Budget: 2 700 000 €
- Supported by the *French Agency for Research (ANR)*
 - ▶ Program *Ingénierie Numérique et Sécurité (INS 2012)*
 - ▶ Grant n°ANR-12-INSE-0011
 - ▶ ANR Funding: 982 720€
- Competitiveness clusters: Image & Réseaux, Aerospace Valley, Systematic



➡ Visit <http://gemoc.org/ins>

GEMOC MEETING

July 1st, 2013, Montpellier, France
co-located with ECMFA, ECOOP and ECOSA 2013
Research-Project Symposium

- Official launch of the GEMOC Initiative
- Working group on the classification of the relations between modeling languages
- Coordination EU-US, and intra EU

<http://gemoc.org/meeting-ec2013/>

GlobalDSL 2013

International Workshop on *The Globalization of Domain Specific Languages*

July 2nd, 2013, Montpellier, France

co-located with ECMFA, ECOOP and ECSA 2013

- Topics of interest include *composability, interoperability, modularity, reuse, and variability* of programming/modeling languages
- Keynote by Prof. Dr. Bernhard Rumpe on "*Compositional Model-Based Software Development*"

<http://gemoc.org/globaldsl2013>

GEMOC 2013

International Workshop on *The Globalization of Modeling Languages*

September 29th, 2013, Miami, Florida, USA
co-located with MODELS 2013

- Topics of interest include *composability and interoperability of heterogeneous modeling languages, model and metamodel composition, multi-paradigm modeling and simulation*
- An open forum for sharing experiences, problems and solutions on the conjoint use of multiple modeling languages.

<http://gemoc.org/gemoc2013>