

Special session  
“ GLOBAL MODELLING OF  
HYBRID ELECTRIC VEHICLES ”

organized by  
***MEGEVH***

(French network on Hybrid Electric Vehicles)

*Session chairs*

**Alain BOUSCAYROL**

(Univ. of Lille, France)

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***MEGEVH***

*sessions*

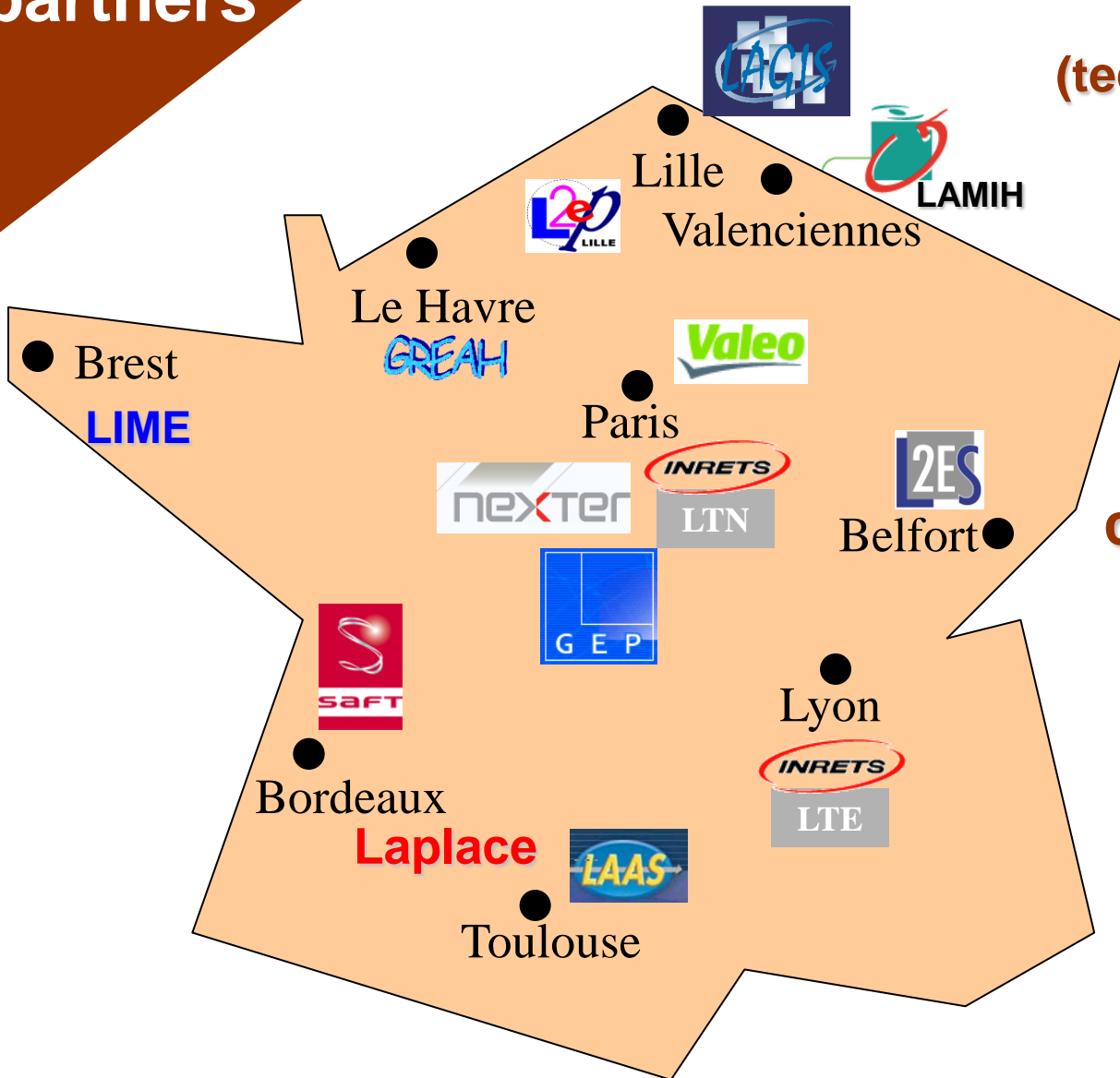
**IEEE-VPPC-2008**

# MEGEVH partners

## Project of national network



(technology for transport)



**Objective:**  
promote  
collaborative works  
on HEV in the  
French community

# IEEE-VPPC Lille 2010

(Vehicule Power Propulsion Conference)



General Chair

**Prof. Alain BOUSCAYROL**

(University of Lille, Vice-President of French VTS Chapter)



Co-Chairs

**Prof. Daniel HISSEL**

(University of Franche Comté,  
President of French VTS Chapter)



**Dr. Rochdi TRIGUI**

(INRETS, LTE,  
Member of French VTS Chapter)



## Objectives:

- component design/optimization
- component control
- system analysis (efficiency...)
- energy management of the system
- ....

## Modelling:

- static/dynamic models
- accurate/global modelling
- structural/functional approach
- backward/forward approach
- ...

different kinds of objectives



different kinds of modelling

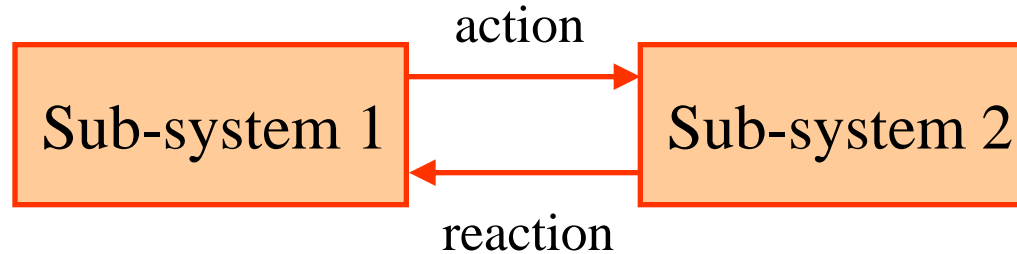
Which model?



“Studies of power propulsion needs a real system approach”

### **Cybernetics / holistic philosophy**

System = interconnected components organized for a global objective



- interconnections between components have to be evaluated
- classical separate studies could lead to mistakes
- energy management must take into account couplings

“Dynamic studies of energetic systems should respect physical causality”

### Causality principle

Outputs = integral functions of inputs

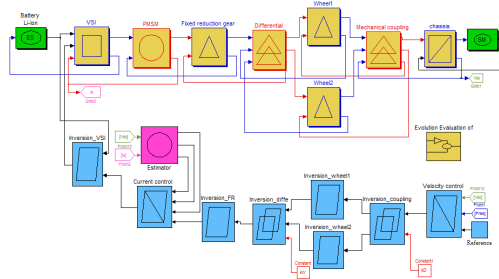
- outputs is always delayed from inputs
- energy disruption has to be avoided



Using derivative causality could lead to:

- physical misinterpretations
- increase computation time

# session outline



## 1. Multi-model of HEV with clutch

W. Lhomme & al. (AVL powertrain, UK)

## 2. Multi-physic model of HEV's energy sources

L. Boulon & al. (Univ. F Comté, France, *MEGEVH*)

## 3. Global modelling of different HEVs

K. Chen & al (Univ. Lille, France, *MEGEVH*)

## 4. Modelling and optimization of a plug-in HEV

R. Trigui & al (INRETS, France, *MEGEVH*)

## 5. Simulation and energy management of a series HEV

T. Baeumel & al (Arsenal Research, Austria)

## 6. Simulation platform of a Fuel-Cell HEV

F. Liu & al (Univ. Tsinghua, China)

## 7. Quasi-static Simulation method for rail HEV

R. Barrero & al (Univ. Brussels, Belgium)

