



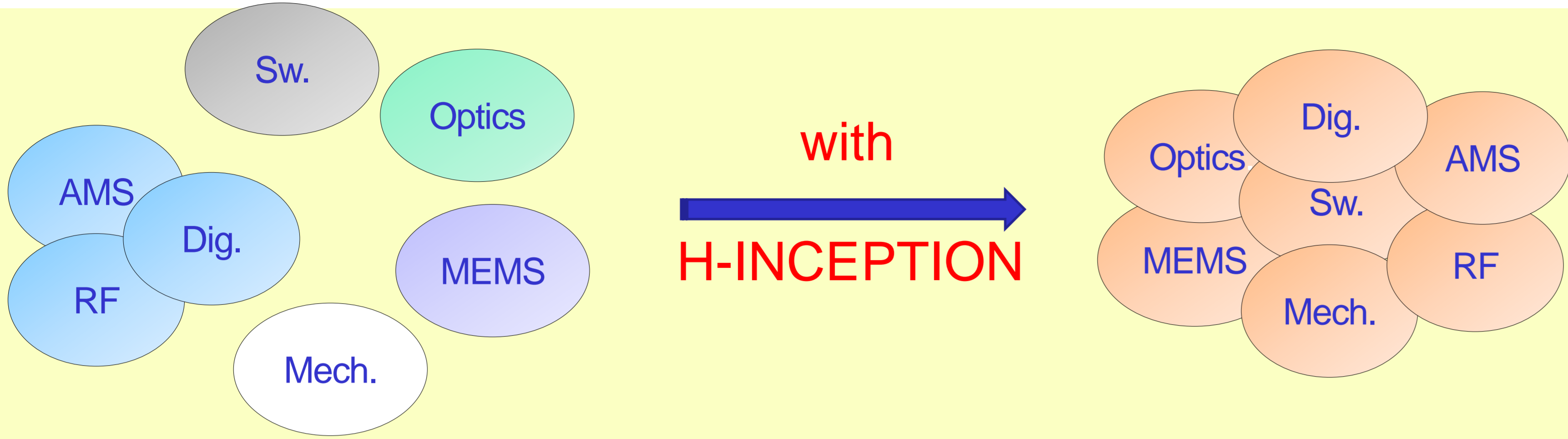
# Heterogeneous INCEPTION CA 701

EUROPEAN NANOELECTRONICS FORUM  
BARCELONA, November 27-28, 2013

## Innovative solution for Multi Domain Virtual Prototyping

**Context:** In new systems, microelectronics interact with different physical domains (optical, mechanical, biological ...)

**Challenge:** Modeling, simulating, verifying the composability and the functionality of entire systems to improve product quality and time to market



### Key Innovations for multi-domain systems:

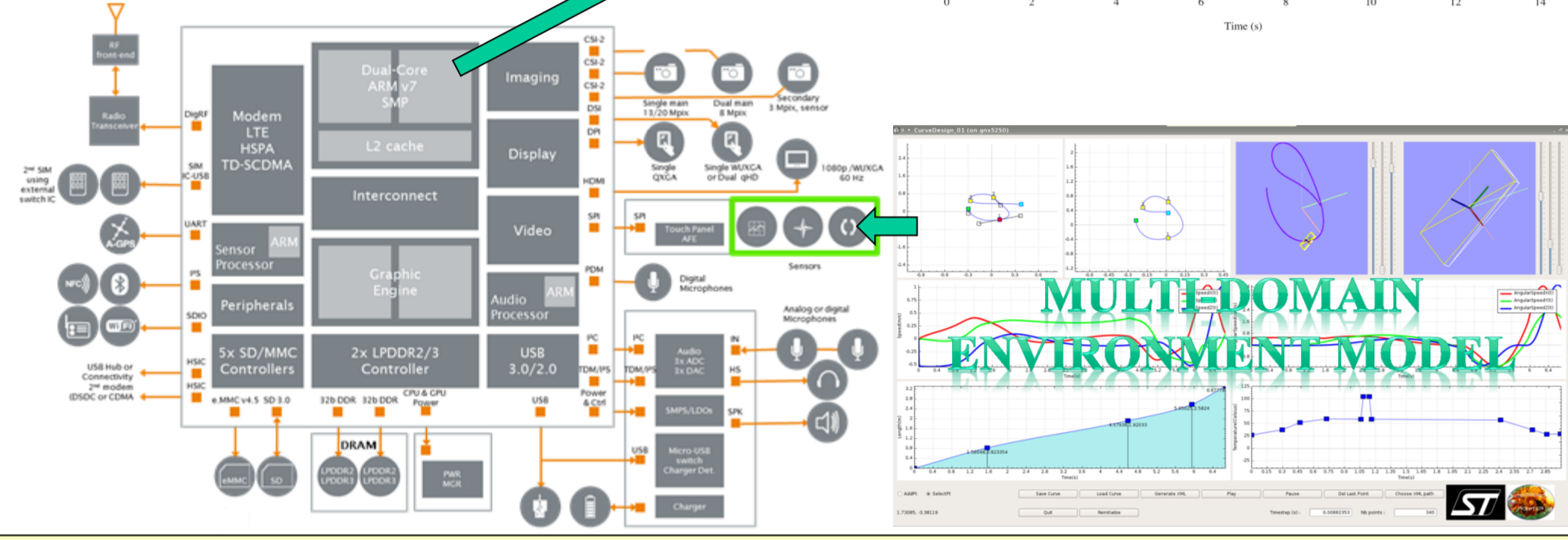
- Methodology for system design, architecture exploration, and verification
- Very fast system simulation framework
- "Correct by construction" approach for the integration

### MEMS & Electronics & Software

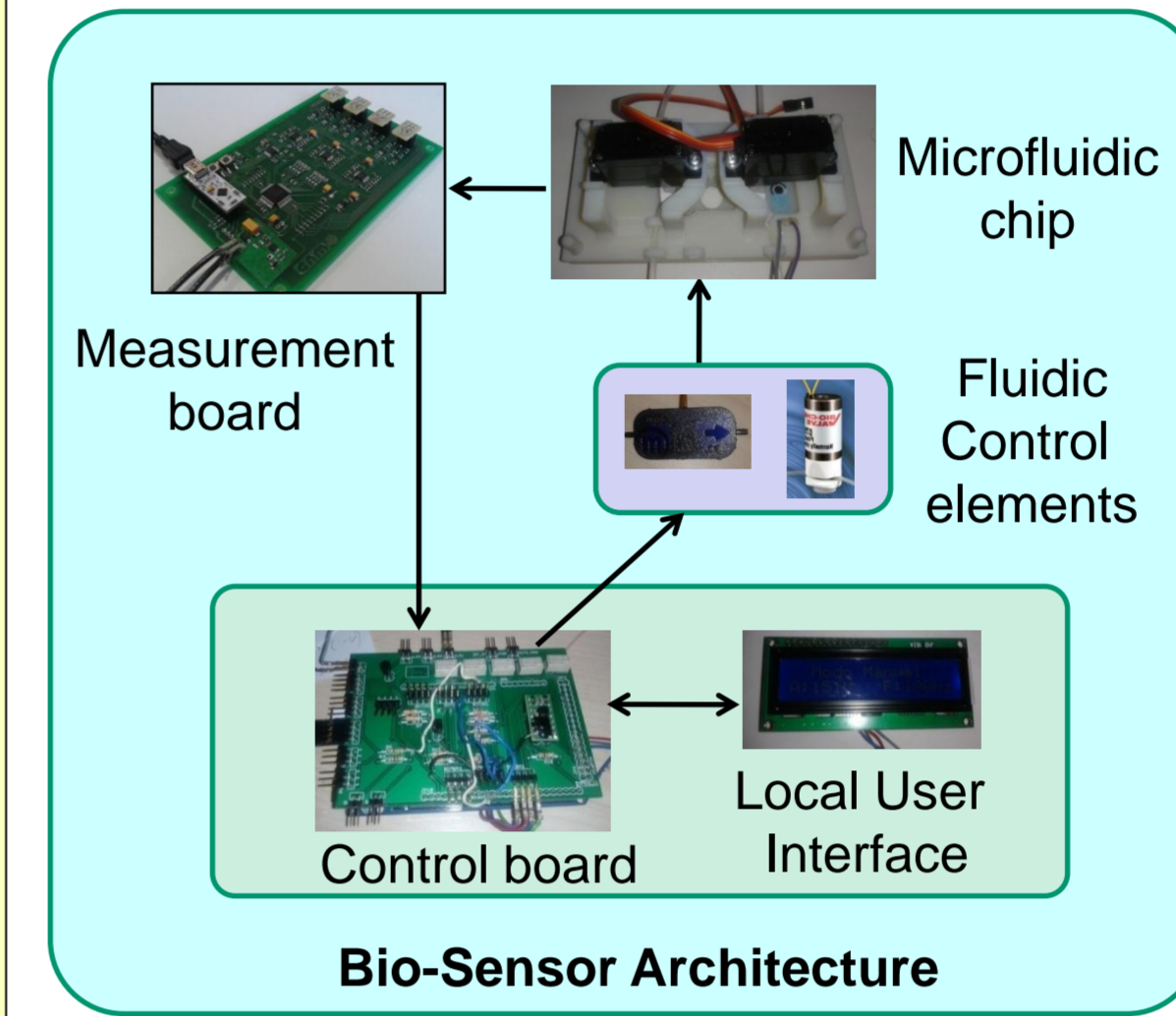
**Context:** Hand-held product Silicon-Anticipation

**Use cases:**

- Power control vs. transient mode
- Wakeup vs. free-fall
- Gyroscope drift cancellation
- Calibration
- User interface



### Bioelectronics & Software



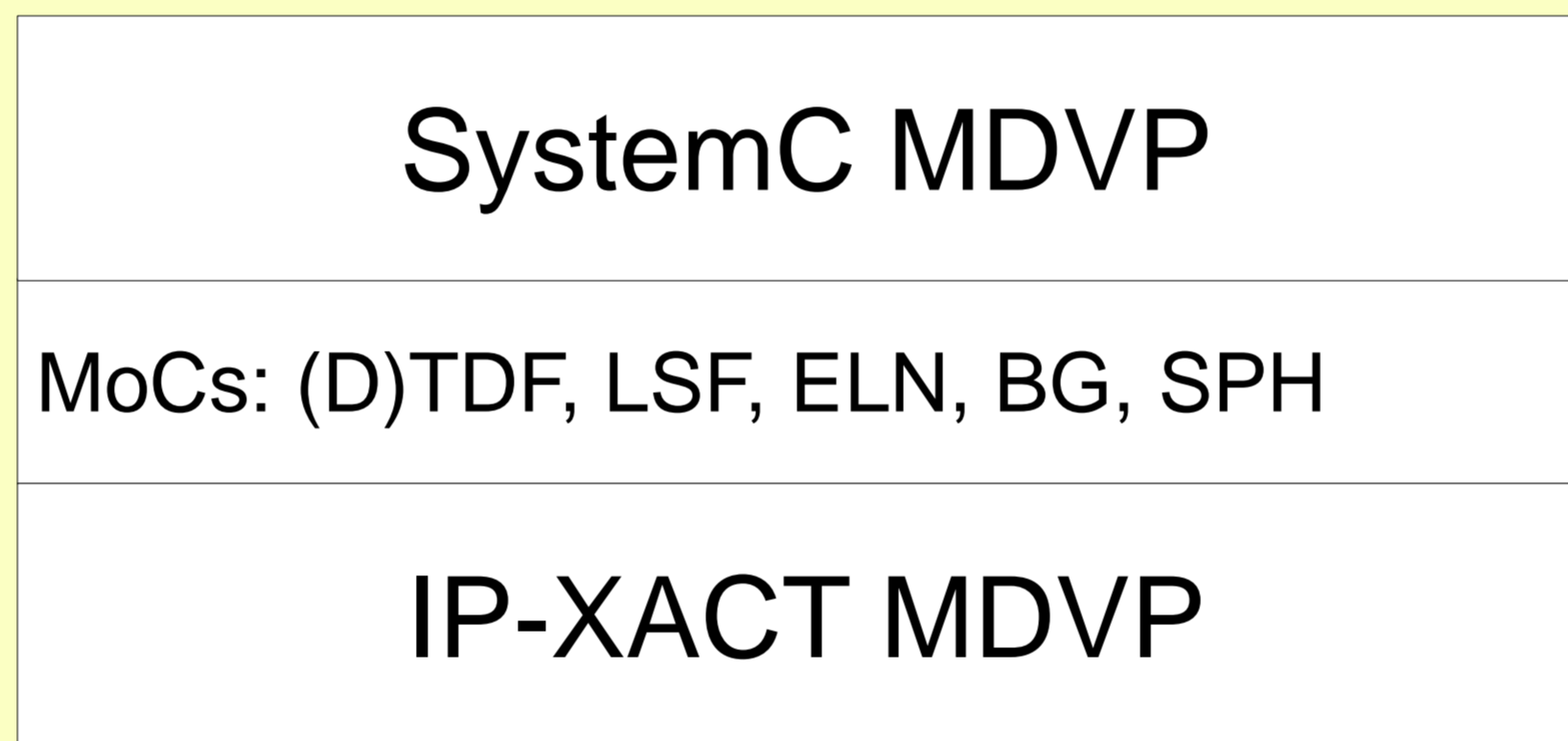
**Co-design the complete biosensor**

Simulate the interaction between:

- Embedded software
- Analog and digital electronics
- Electromechanical components (like valves, pumps and servos)
- Microfluidics (piping, channels, chambers)
- Electrochemical reactions



SystemC MDVP (ASI)  
Proof of Concept Simulator



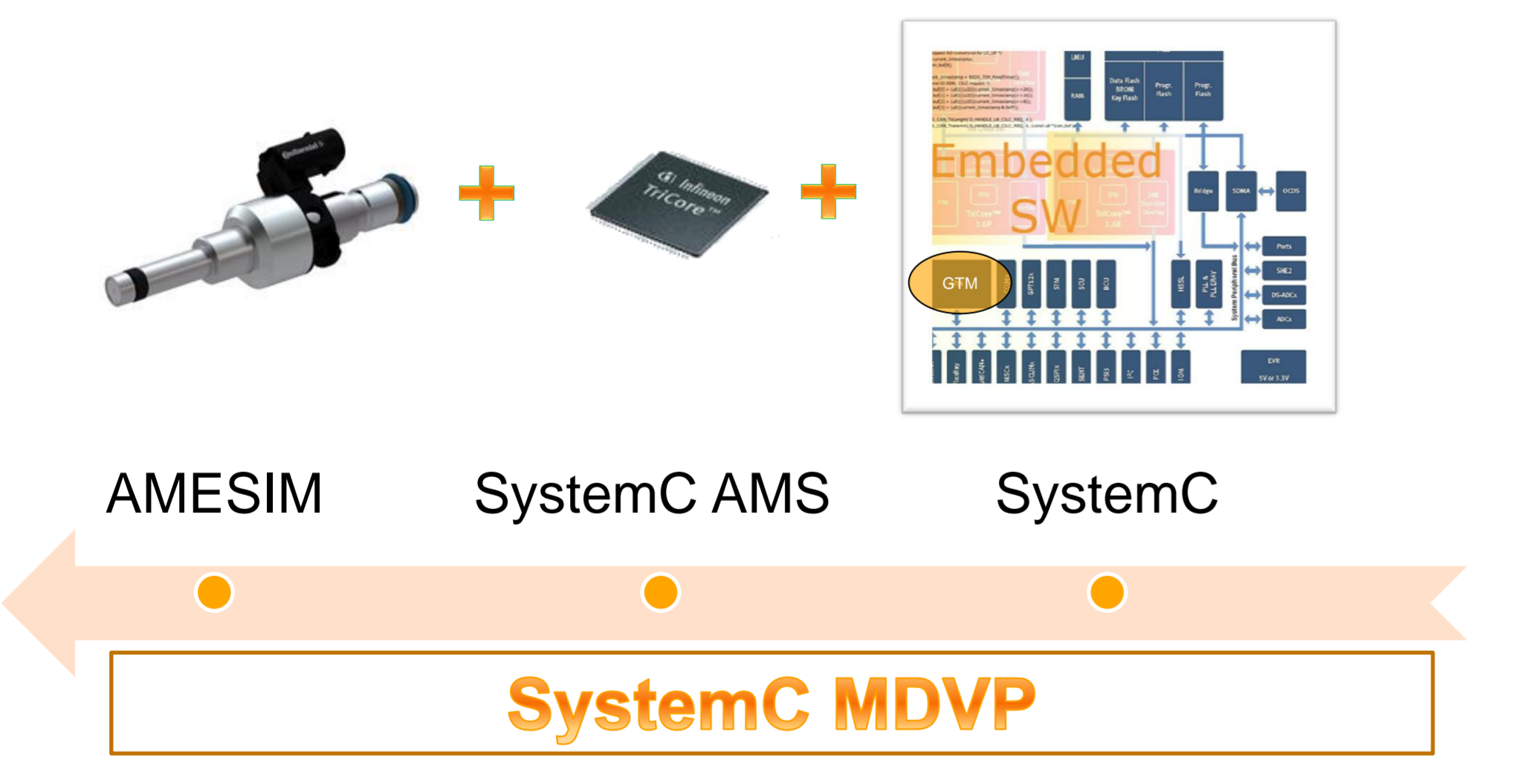
MDVP extensions for IP-XACT



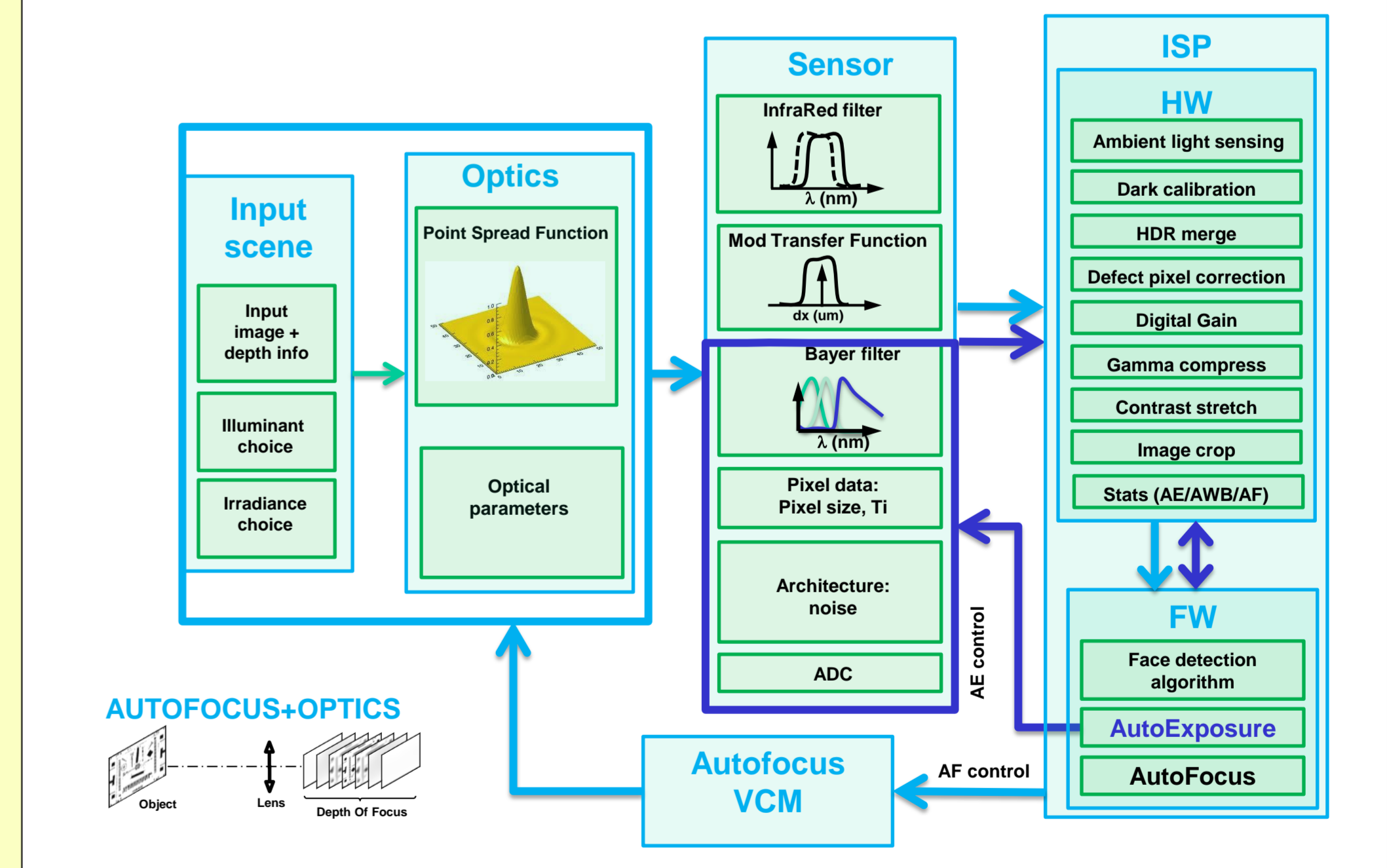
### Mechanics & Electronics & Software

**Injection Function Virtual Prototyping**

Injector + electronics (ASIC) + embedded microcontroller peripheral + embedded SW



### Optics & Mechanics & Electronics & Software

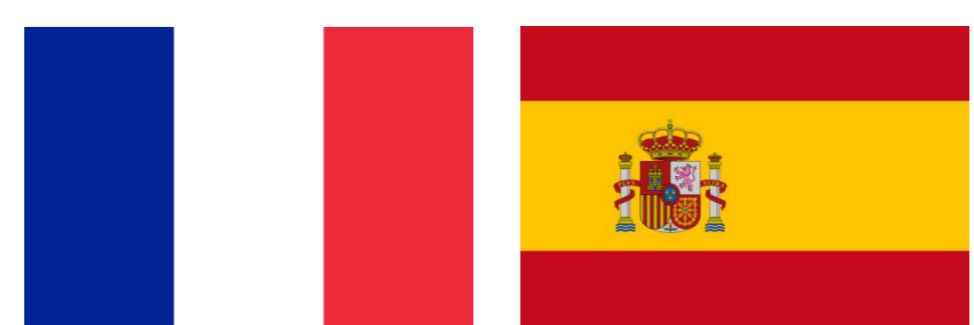


	HPC	2.3 T Flops	280 T Flops	2.6 P Flops	400 P Flops ?	E Flops ?
Levels						needs for incoming years
Multi Domains						
Application						2012-2018 HINCEPTION SystemC AMS MDVP Multi Domains
System						Multi Domains interaction
Sub Systems						Global System Power analysis
SW for IP's						Automatic Car Driver
HW IP's						Environment modeling
AMS						Robotics
RF IP's						Integration on other than Si supports
Integration	30 M Tr	1 G Tr	5 G Tr			
Time	2000	2005	2010	2015	2020	

More information on our web site: <https://www-soc.lip6.fr/trac/hinception>



Project partners:



Project leader :  
STMicroelectronics SAS Grenoble 2



Associate project partner:

