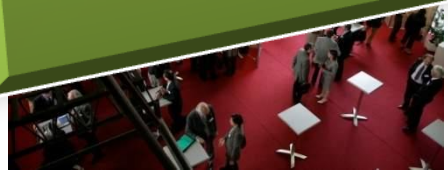
SYSTEM@TIC PARIS-REGION
Join the Digital Revolution!
Welcome to SD²T WG…!



Gérard Poirier,

Dassault Aviation,

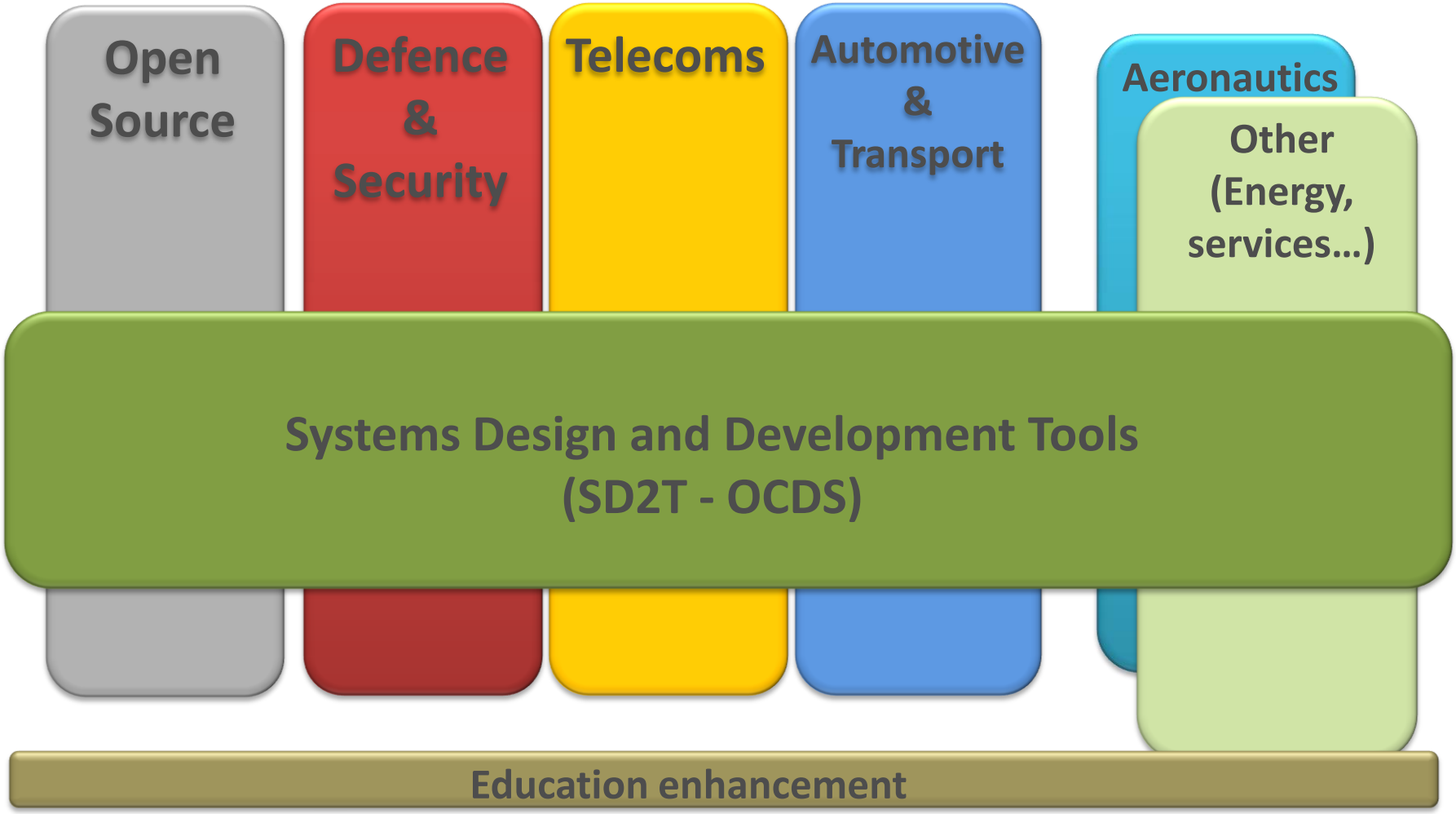
ASTech Vice President

Systematic Vice President,

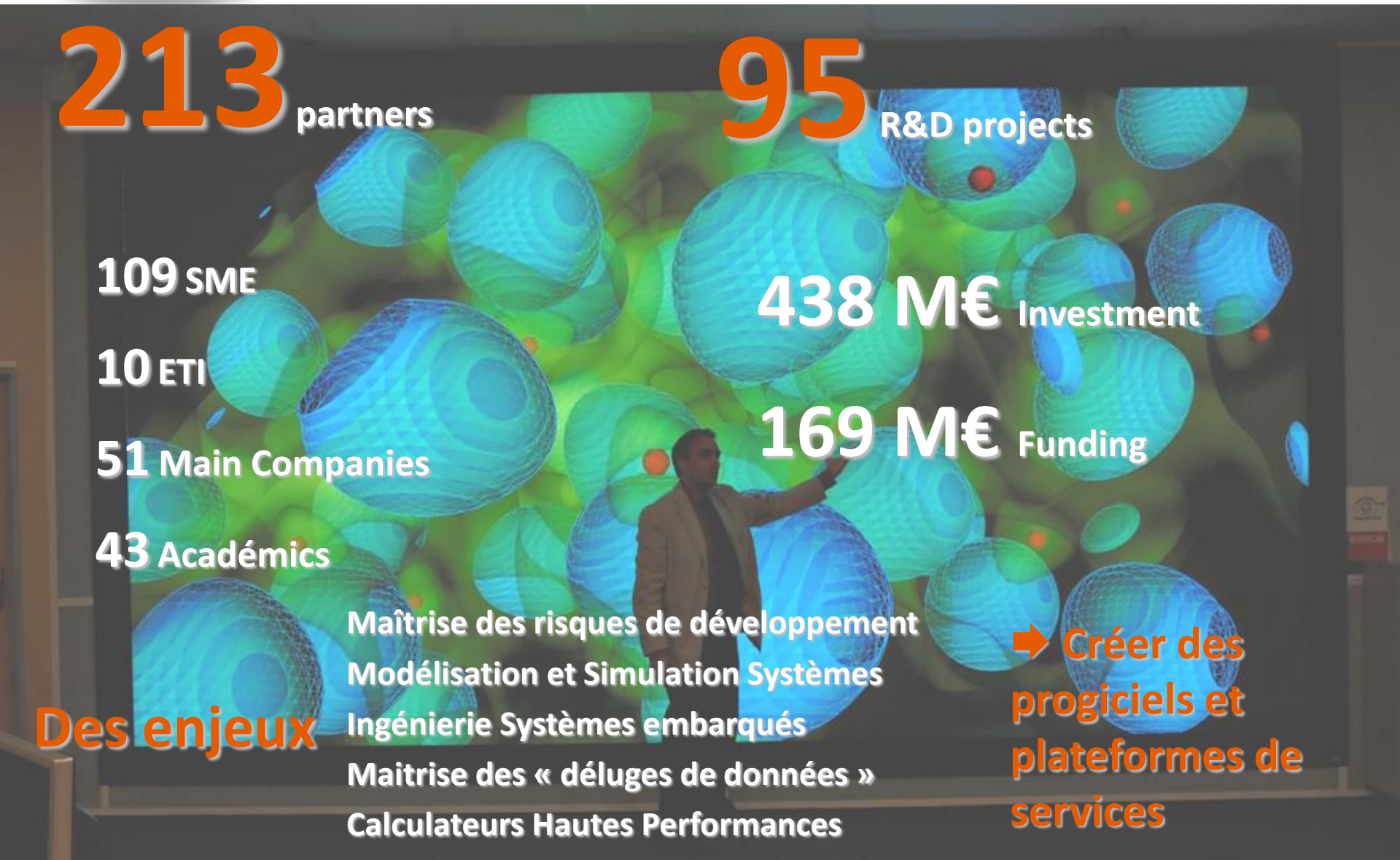
Systems Design and Development Tools WG leader

Our objective: To reach number 1 status in Europe for the Paris Region in ICT

SYSTEMATIC : the Organisation in working groups



Working Group OCDS : overview



213 partners

95 R&D projects

109 SME

10 ETI

51 Main Companies

43 Académics

438 M€ Investment

169 M€ Funding

Des enjeux

Maîtrise des risques de développement
Modélisation et Simulation Systèmes
Ingénierie Systèmes embarqués
Maitrise des « déluges de données »
Calculateurs Hautes Performances

➡ Créer des progiciels et plateformes de services

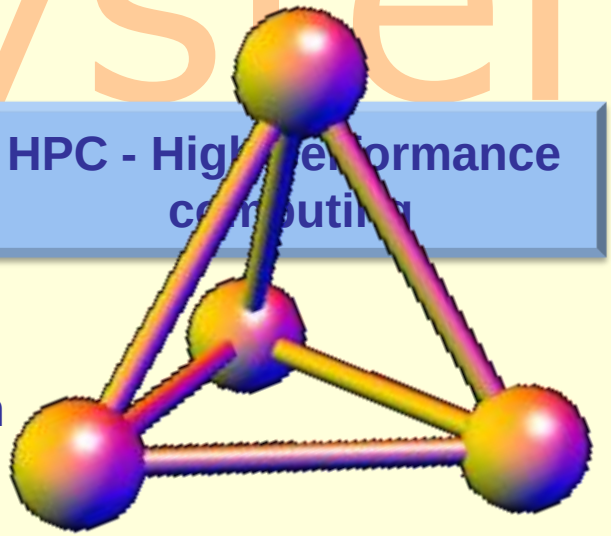
Master the development of future generations of systems

Development Axis 3

"Data analytics"

Goal:
Face up to challenges linked to « data deluge »
(processing, extractions, analysis)

HPC - High Performance computing



Development Axis 1

Modelisation / Systems simulation

Goal :
Champions simulation for multidisciplinary optimisation

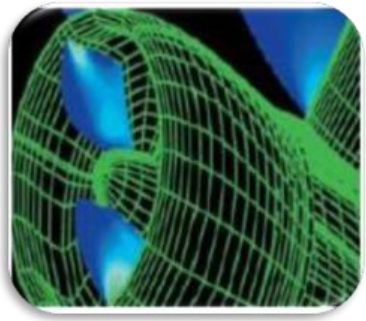
Development Axis 2

Software engineering

Goal :
Champions of Systems engineering to satisfy customer needs at lower cost

Global Approach: Advanced Technologies

Systems Design and Development Tools
Working Group statistics



AAP	Projects Nb	Costs	Public Funding
FUI	36	328 M€	123 M€
ANR	41	97 M€	36 M€
FEDER	11	13 M€	7 M€
ITEA2	1	5 M€	2 M€
OSEO	2	2 M€	1M€
S. Gaming	1	2 M€	1M€
Web 2.0	2	1 M€	0,6 M€
IDF+CG95	1	1,6 M€	0,9 M€

25 completed projects

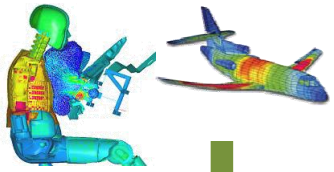
- **14 FUI Projects**
- **9 ANR projects**
- **2 OSEO projects**

Results of Systems Design and Development Tools Working Group

Modeling Systems simulation

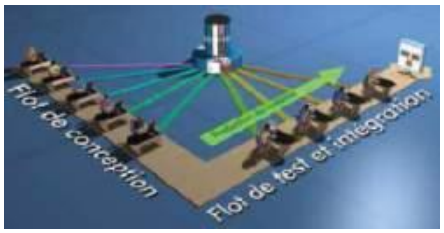
- Digital Factory

- Multi-scale and physical modelisation, multidisciplinary optimisation

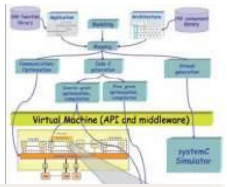


Software engineering

- Software Factory

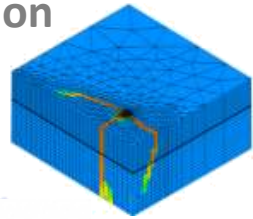


- Tools for embedded systems
- Massive Parallel Computing



Data analytics

- Data oriented architecture,
- Date « deluge » analysis and visualization



- Super-Computers

Systems Design and Development Tools
Working Group main goals

- Mastering development risks for increasing efficiency of company in development process of physical or immaterial products

- Use and promotion of results obtained through the creation and availability of software packages, service platforms, as well as the emergence of new businesses

Road-Map Axis 1 : « Simulation Champion"

- Simulation tools and multidisciplinary optimisation require a strategy over a long period and continuous effort
- Using scientific advances, the challenge is to obtain simulations as realistic as possible
- Improvement axes:
  - Basic models "more developed" using increasingly fine scales
  - Global model using MULTIPHYSIC properties
  - Multi Disciplinary Optimization
  - Taking into account notions of probability and random uncertainties
  - More efficient IT infrastructure (performance, cost, size, consumption,…)

Road-Map Axis 2:
" Software engineering Champion "

- Engineering System Tools assume a strategy based upon Model-Based Design

- Improvement axes:
  - Cover the development process of "system" models and "software" to embedded code, to implementation platforms and verification
  - Formal and reusable models, including at system level
  - Means and organization providing maintenance of developed models
  - Integration of engineering requirements and traceability
  - A dialogue with certification authorities to open up standards

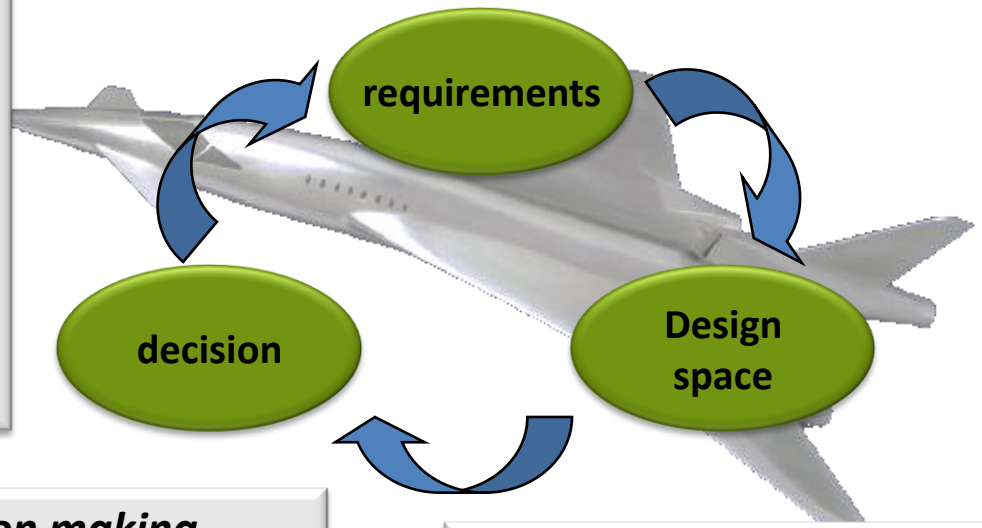
Road-Map axis 3 : « Data Mining experts »

- **"Data flow and information volumes are more and more difficult to manage." (Exaflood, next worldwide catastrophe in Les Echos, 30th Dec. 2009)**
- **Objectives :**
  - Hardware and software **architecture** , focused on data, able to capture, store and manage these information flows
  - **Analysis tools** to extract and synthesize embedded knowledge
- **Application domains: multimedia, life sciences and earth sciences, e-science, security, …**
- **Improvement axes:**
  - **Develop middleware enabling scaling up** (petabytes and more) in processing of flows, storage and random access to information
  - Improve or develop new **filtering tools or multimodal analysis** of information (images, sound, text,…) in a scaling up context
  - **Design IT architectures** (storage, processing, …) able to process those volumes in a reliable, extensible way and at reduced costs

Decision Collaborative Environment : CSDL project (27 Partners) - Decision in the design loop

Evaluate the impact of the requirements

Leader : Dassault-Aviation
Large Companies: Dassault-Aviation, EADS, MBDA, Bull, Alcatel-Lucent, EDF, Thalès, Renault, Dassault Systems
ME: CS, ANSYS, ESI Group
SME: Distène, EnginSoft, Eurodécision, Oxalya, Samtech, HPC-Project, LMS Imagine
Research labs: Digiteo/Scilab, ESIL, INRIA, ECP, ENS Cachan, ONERA, ARMINES, SupElec



Synthesis to support decision making

- Synthesis of important parameters
  - What are the limits and where they are.
  - Impact of component performances on global performances
- Propose trade offs
  - Between requirements
  - On design parameters
- Manage risks
  - Quantitative evaluation

Systematic and automatic exploration

- Understand the design space
  - What are the important parameters ?
  - How the requirements interact with each others?
  - Where are the most promising solutions ?
- Generate models dedicated to decision making
  - Trade offs
  - Evaluate risks

Un écosystème HPC d'excellence

- 101 partenaires **: 38 PME, 37 Académiques, 26 Grands Groupes**
  - **15 projets de R&D (Investissement : 120 M€, Aides :169 M€)**
- 5 création de sociétés **au travers les projets de R&D du pôle**
  - **Golaem, Inpixal, Kalray, Scilab, Xedix**
- 3 création de Laboratoires
  - **EXASCALE Computing research Lab (INTEL-CEA-UVSQ-GENCI)**
  - **Laboratoire Extreme Computing (BULL-CEA)**
  - **Programme OUTILS D'INGENIERIE ET HPC**
- Tera 100
  - **Premier supercalculateur pétaflopique, Bull-CEA**

- **Construction du** campus Teratec

More and more constraints

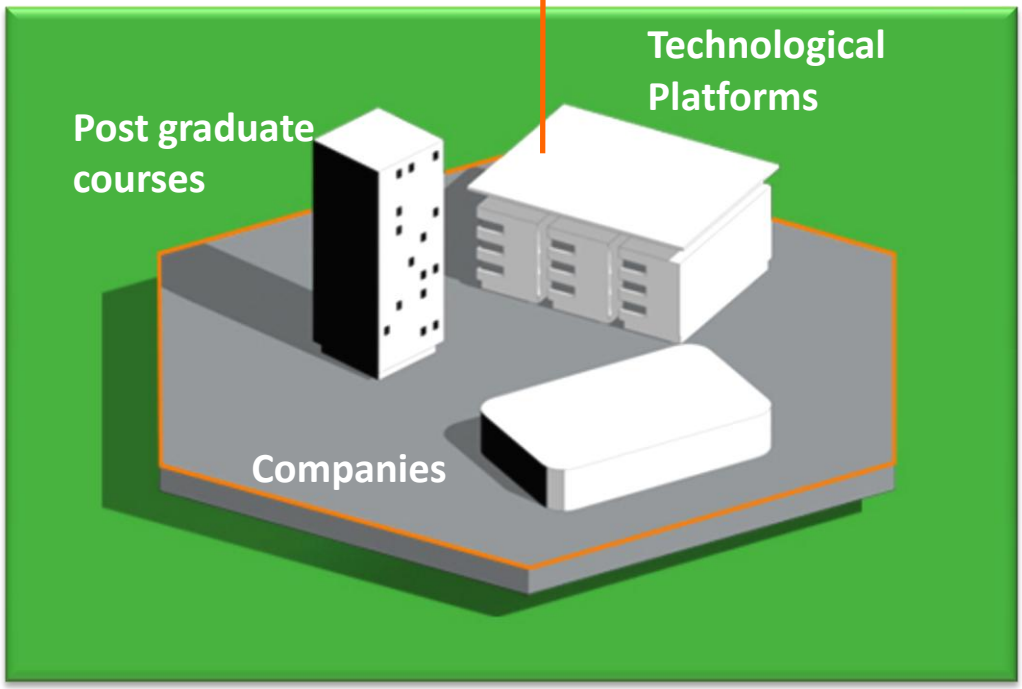
- Energy Mastering and Downsizing
- Sustainable product life cycle development (eco-design, carbon footprint) ,
- Fault tolerance ,
- Data integrity, data/information volume
- Certification

Main axes of prospective vision :

- Development of products and services will be based upon a number of technologies organized in the most standardized architecture as possible to host specific tools and services necessary to the differentiation of a given company and to enable synergies
- This development will be done through intensive use of simulation whose mastering will allow to reduce significantly and intelligently physical developments and trials in order to validate prior to effective production
- Generated « data deluge » demand processing, saving and integrity of data (« instrumentation of the world », multiplication of sensors)
- Generalization in the re-use of parts, systems, software and services, demand a configuration which is both open, rigorous and user-friendly
- Securitization will concentrate on data protection and will become increasingly differentiating

Innovation Campus

- **Around a project related to a great challenge for society and nurtured by the upstream basic research, the principle of thematic innovation campus is to work together on the site, higher education organizations, businesses and technology platforms**



Education

Research

Industry

Campus Paris Saclay

SystemX

IRT - Research & Technology Institute

In preparation

Innovation

Research & Technology Institute: Key Systems engineering LABs

- **Thank’s for your attention ….. !**