An Ecosystem for Competitiveness and Innovation

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High Performance Computing

High Performance Computing is essential for Science, but also for Industry in all domains and all size of enterprises.

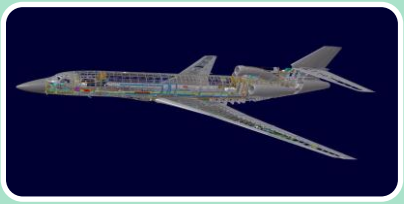
It has become a strategic factor of competitiveness and innovation in most sectors of the economy, with a major impact on employment and national wealth.

- **Industry** needs large computing power to design complex systems and to accelerate the introduction of innovative products.
- **Research** relies more and more on simulations to produce new knowledge.

HPC is a key element
of our competitiveness and our innovation capacity

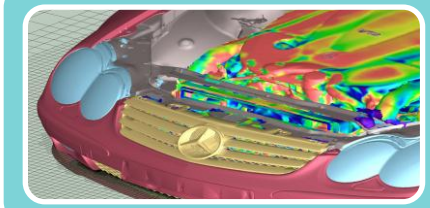
In Industry

Examples of industrial challenges where HPC (High Performance Computing) is a key technology :



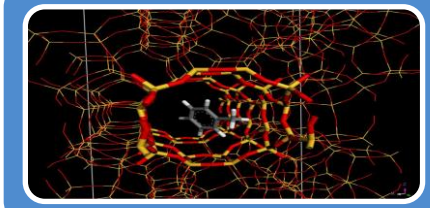
Aeronautics

where the design of airplanes more energy efficient and less noisy cannot be done without simulations involving very large models of the entire aircraft and analysis of physical phenomena at different scales,



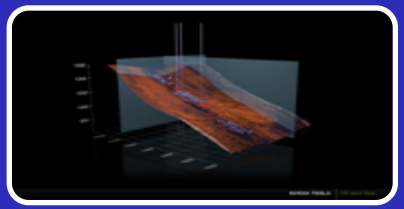
Automotive industry

which wishes to reduce consumption and CO2 emissions while increasing the level of comfort and security,



Pharmaceutical industry

where the discovery of new active molecules and new drugs is accelerated by numerical simulations,

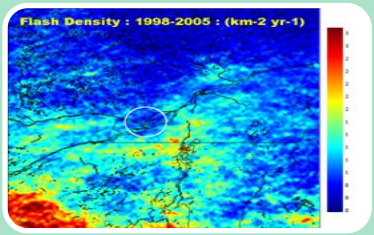


Oil industry

which needs supercomputers to discover new oil fields and to optimize production of existing reservoirs.

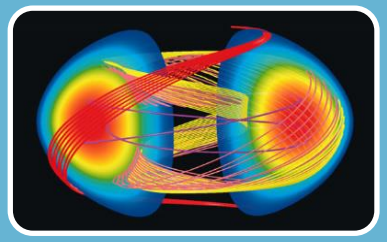
In Science

In science, simulation and HPC have become the third pillar - alongside theory and experimentation – for the creation of knowledge. Many key scientific issues for tomorrow's society depend in part on supercomputing :



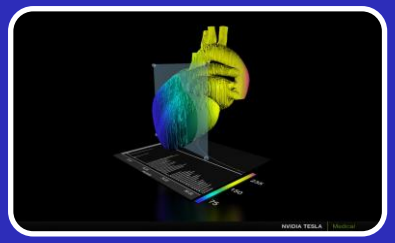
Climatology

requires computing power to make a precise diagnosis of the situation, and evaluate the impact on climate change of measures which could be put in place,



Fusion energy

where the existence of a tool such as ITER reactor can not be conceived without large computing power,



Biology and **medicine**

are using simulation to better understand the mechanisms involved in the cells and organs and also to model pathologies.

HPC is essential in many domains

- In a domain like **Energy**, HPC is mandatory to progress on more efficient transport systems (car, aircraft), better exploitation of resources (oil industry) and development of new resources.
- In **Health**, development of new drugs, of new and personalized treatments, as well as brain biology or bespoke prosthesis, need supercomputing power.
- The **Services** industries will need more and more computing power to develop new and optimized services (in Finance, risk assessment and new financial services).
- The **Media industry** (movie and video creation and distribution) is redefining itself around HPC, like many other sectors, including national and regional security.

HPC is becoming an engine of the economy,
with potential major impact on our daily life.

This is why we have created TERATEC an eco-system regrouping

on one subject :

How to master HPC technologies and enlarge their usage

Ter@tec

I.T. Companies

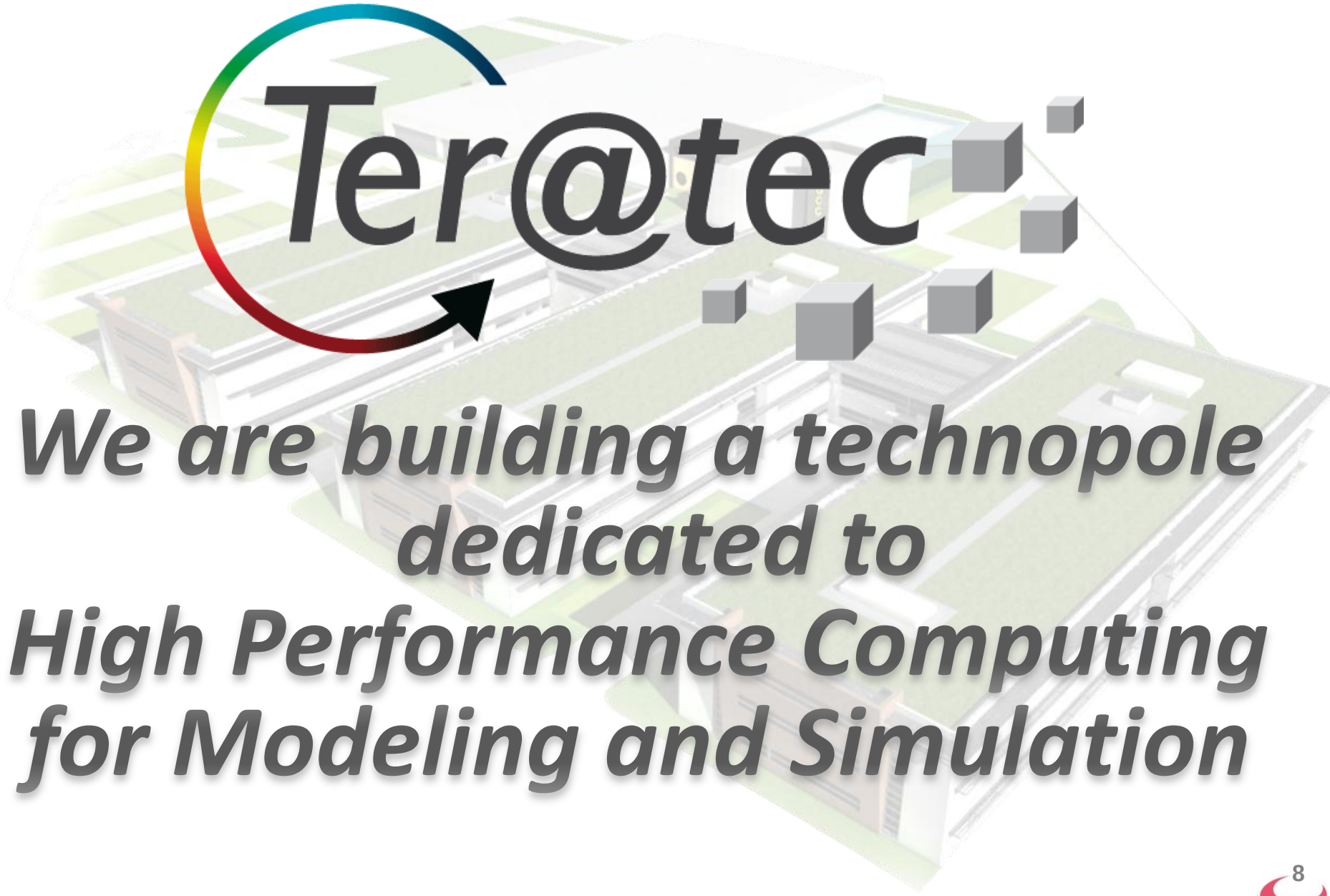
⇨ Create, develop and optimize

Research

⇨ Knowledge progress

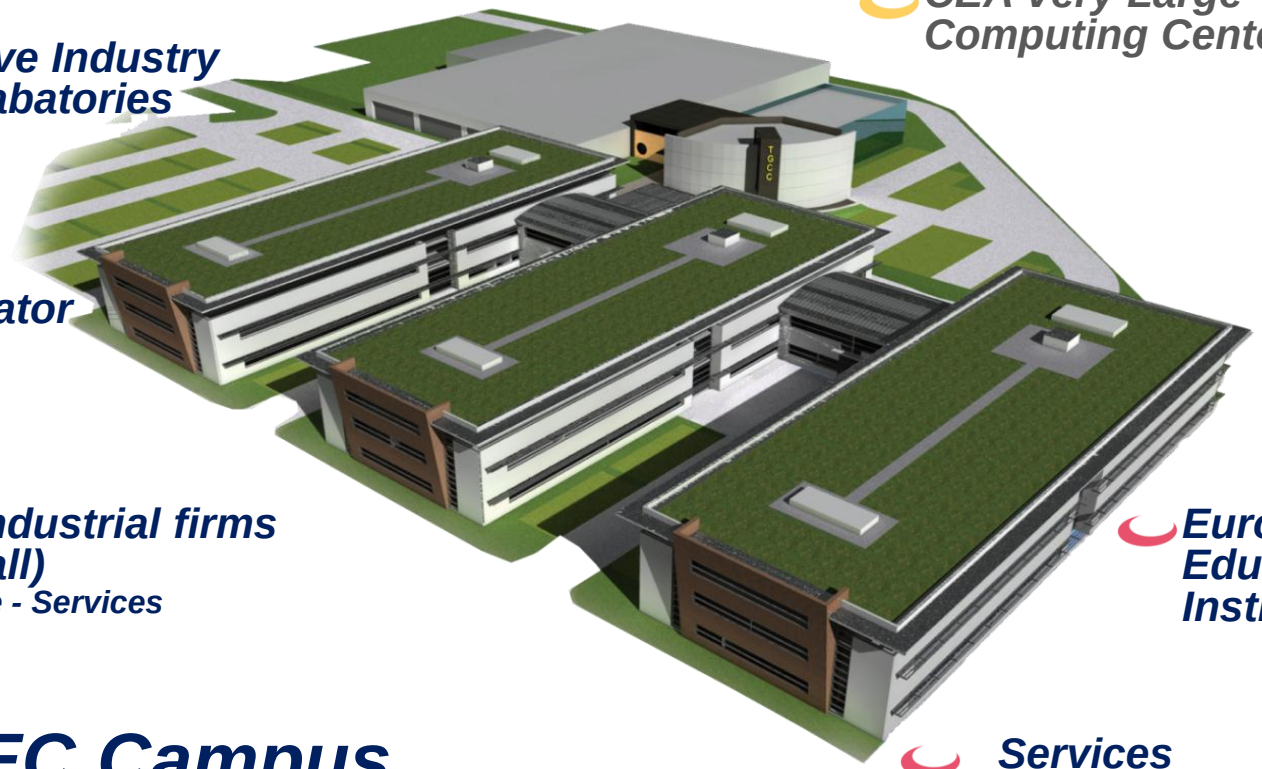
Industrial Users

⇨ Increase competitiveness



We are building a technopole dedicated to High Performance Computing for Modeling and Simulation

A unique place, with active participation of key players of every step of the value chain



- CEA Very Large Computing Center
- Collaborative Industry Research labatories
- Business Incubator
- HPC leading industrial firms (large and small)
  Harware – Software - Services
- European HPC Education Institute
- Services Platform

TERATEC Campus

TERATEC CAMPUS
Open June 2012

CAMPUS TERATEC
The basis for a new step forward

Incubator and Business center

Domiciliation

Headquarters domiciliation - Postal domiciliation - Management of mail - Availability of the large meeting room,

All-inclusive Private Space

Good quality of equipment furniture
Telephone - Internet – Secure access –
Personalized reception and telephone service - Support and Secretarial

Facilites Management

Reprography Services - Management and maintenance offices - Coaching innovative projects - Management of Business Development

Common space

CCI ESSONNE

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Collaborative Projects Industry - Research

TERATEC members are key participants in major projects of Systematic, ANR and ITEA2:

- **AIRCITY** - 3D simulation of air quality in the city with 3m resolution
- **CHAPI** - Calcul embarqué Hautes performances pour les Applications Industrielles
- **COLLAVIZ** - Collaborative platform for the simulation-based design applications
- **COOL-IT** - Energy optimization of Data Centers
- **CSDL** - Complex System Design Lab
- **H4H** - Optimise HPC Applications on Heterogeneous Architectures
- **ILMAB** - First simulation chain in the construction field.
- **MANYCORELABS** - Software tools for Manycore embedded platforms
- **MIEL** - MIxed ELement - 3D Mesher
- **MUSICAS** - Méthodologie Unifiée pour la Simulation de l'Intégrité et la Contrôlabilité des Assemblages Soudés
- **OASIS** - Optimization of Addendum Surfaces In Stamping
- **OMD2** - Distributed Multi-disciplinary Optimization
- **OPEN GPU** - Open Source platform to take advantage of the GPU assets in industrial applications
- **RICHELIEU** – Accelerate science-oriented programming languages
- **SIMILAN** - SIMulation & Implementation high performance fitted to digitaL signAl processing

Industrial Research Laboratories

The Teratec Campus is home to several research laboratories on topics such as future architectures and exaflop systems, developing and parallelizing simulation software, and designing complex systems.

- **Extreme Computing** (CEA/Bull)
- **Exascale Computing Research Lab** (INTEL/CEA/GENCI/UVSQ)
- **The SystemX Technological Research Institute** also establishes the permanent laboratories for its HPC program on the campus.

Education and Training

Teratec has joined forces with universities and major engineering schools to design programs in initial and continuing education that cover the entire spectrum of high performance simulation and modeling.

These initiatives will be expanded and reinforced to form a European training institute.

- **Master Degree in High-Performance Computing** (MIHPS)

  Supported by Université de Versailles Saint-Quentin-en-Yvelines, Ecole Centrale de Paris, l'Ecole Normale Supérieure de Cachan and PRES UniverSud.

- **Specialized Master in High-Performance Simulation and Modeling** (MSHP)

  Supported by Ecole Centrale de Paris and Supélec

- **Continuing education**

  Animated by technology companies, systems suppliers, software providers and services companies

2012-2013 : a turning point

- **A larger scope confirmed**
  - From Classical Supercomputing to Systems Design, Big Data, Multimedia Creation, Life science applications….
- **Program extensions**
  - R&D projects : from French collaborative projects to European and international cooperations
  - Education : new initiatives

2013 : The new initiatives

- **R&D**
  - Creation of the SystemX IRT
  - Launch of the HPC European Technology Platform
- **New services**
  - Launch of the HPC Cloud initiative, NumInnov
  - Preparation of dedicated Services platforms for Engineering, for Multimedia, for Health, etc.
- **Training**
  - Master's Degree in High-Performance Computing & Simulation
  - Specialized Mastere in high-performance simulation and modeling for Engineers
  - Continuous training programs and ad-hoc seminars

TERATEC 2012 Forum
Plenary sessions

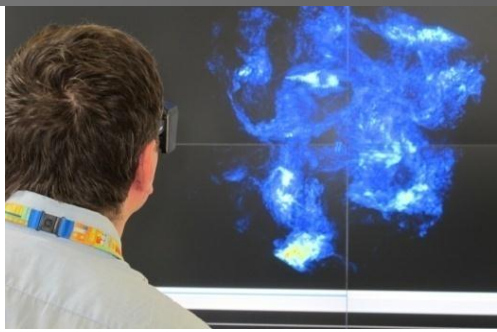
The plenary sessions illustrate the increasing impact of HPC in many industrial and research fields and its role in major scientific and technological challenges. With the participation of leading international industrial users, technologies providers and key responsibles from the political, economic and academic worlds :

- David ROS, Conseil Général de l'Essonne
- Philippe GILLET, Vice-président, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE
- Anthony LICHNEWSKY, Software Architect- HPC Specialist, SCHLUMBERGER
- Steve BARBER, Chief Executive Officer , XYRATEX
- Ananth KRISHNAN, CTO, TATA CONSULTANCY SERVICES
- David SILAGY, Directeur de centre de recherche, ARKEMA
- Joel MONNIER, Président, KALRAY
- Bernard QUERLEUX, PhD, HdR , L'OREAL Recherche & Innovation
- Nelson MACULAN, ancien ministre de l'Education du Brésil et professeur à l'Université fédérale de Rio-de-Janeiro
- Robert MADELIN, Directeur général Société de l'information et médias de la Commission Européenne

TERATEC 2012 Forum Exhibition

A large exhibition presents products and innovations from the major HPC players : manufacturers and editors, systems integrators and services providers, universities and research centres, competitiveness clusters and public organisations, etc.

- ACTIVEON
- ALINEOS
- ALLIANCE SERVICES PLUS
- ALLINEA SOFTWARE
- ALTAIR ENGINEERING
- ALTRAN
- ALYOTECH
- AMD
- ANSYS FRance
- BARCO
- BULL
- CAPS ENTREPRISE
- CARRI SYSTEMS
- CD ADAPCO
- CEA
- CENAERO
- CCI DE L'ESSONNE
- CLUSTERVISION
- CC DE L'ARPAJONNAIS
- COMMUNICATION & SYSTEMES
- CG DE L'ESSONNE
- DATADIRECT NETWORKS
- DELL
- ENGIN SOFT
- ESI GROUP
- EUROTECH
- EXASCALE COMPUTING RESEARCH LAB
- FRAUNHOFER ITWM
- FUJITSU
- GENCI
- HEWLETT PACKARD
- HPC PROJECT
- IBM
- IFPEN
- INRIA
- INTEL
- KALRAY
- MICROSOFT
- NAFEMS
- NICE SOFTWARE
- NOESIS
- NVIDIA
- OPEN GPU PROJECT
- OPENSIDES
- OXALYA
- PANASAS
- ROGUE WAVE
- SCILAB
- SGI
- SYSFERA
- SYSTEMATIC
- TERATEC
- TOTALINUX
- TRANSTEC
- VCODYNE



TERATEC 2012 Forum
Technical workshops

The technical workshops address major technical HPC topics.
It gives the possibility to review the most important collaborative projects involving industry and research.

- HPC and complex systems design
- Systems architecture
- Scientific Visualization
- Big data
- Exascale Challenges
- Images production
- Parallel applications on manycore architectures
- HPC in Life sciences
- HPC and substainable development
- GPU, State of art and future evolutions
- Green Computing Centers

Join us !
TERATEC 2013 Forum
25 & 26 june – Ecole Polytechnique, Paris

European Reference in Modeling & Simulation High Performance Computing

With permanent industrial objectives

Innovation

Competitiveness

Job creations

Thank you for your attention

www.teratec.eu