

Forum Teratec

INNOVATION BY SIMULATION
SIMULER POUR INNOVER

Le rendez-vous international
The international meeting

HPCBIGDATASIMULATION

23 & 24 juin/June 2015

ECOLE POLYTECHNIQUE
PALAISEAU - FRANCE

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Teratec 2005-2015

Achievements and new steps

Gérard ROUCAIROL, TERATEC Chairman
Hervé MOUREN, TERATEC Managing Director

June 23, 2015



Teratec 2005-2015

Achievements



TERATEC: an industrial eco system

**Industrial
users**

**Technology
providers**

**Research
centres**

with two objectives:

- ➡ **to master and develop High Performance technologies**
- ➡ **to promote and enlarge their usage**

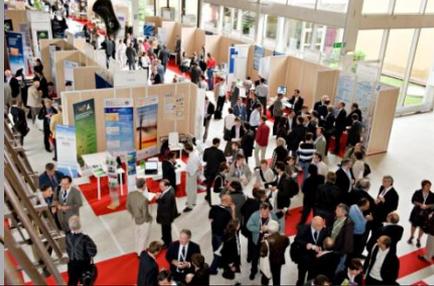


TERATEC Members



TERATEC Forum

Forum TERATEC 2006
 Ecole Centrale de Paris
 9 speakers
 12 exhibitors
 170 participants



Forum TERATEC 2015
 Ecole Polytechnique
 90 speakers
 65 exhibitors
 1 300 participants



The heart of HPC



***A technopole dedicated to
HPC, Simulation and Big Data***

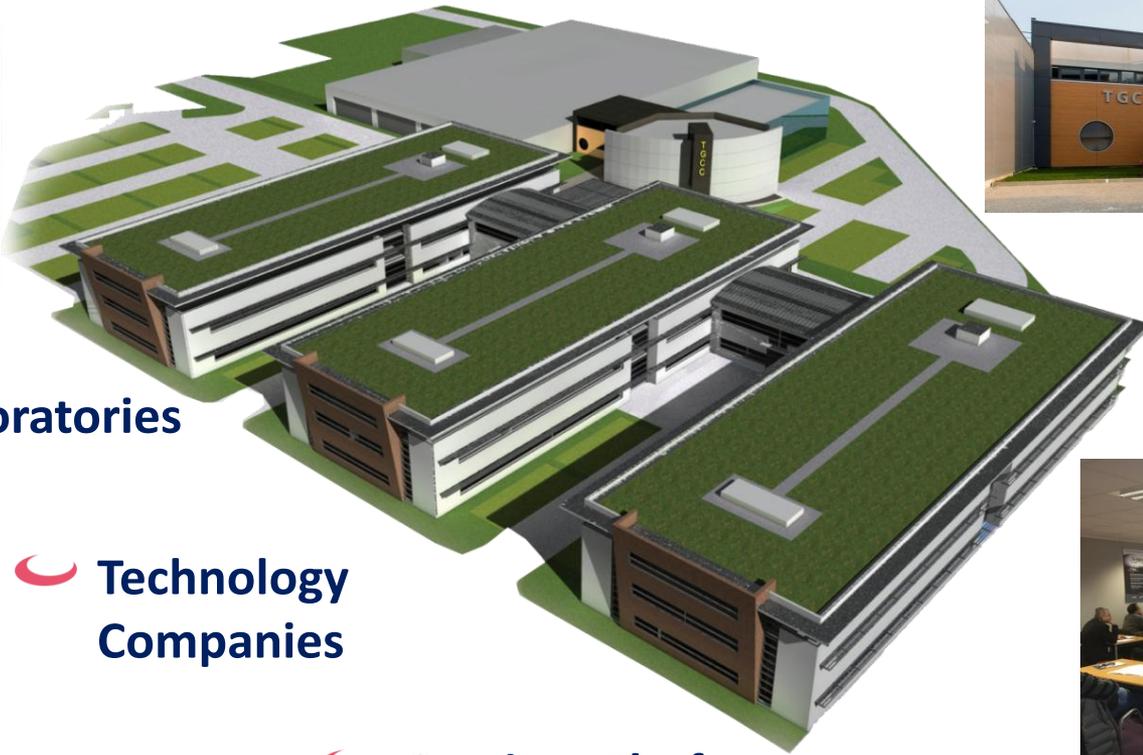


Teratec Campus

 **TERATEC Campus**

 **CEA Very Large Computing Center**

 **Incubator and Business Center**



 **Industrial Research Laboratories**



 **Technology Companies**

 **Services Platforms**

 **Training Institute**





Teratec Campus

■ Two active Industry Labs

- Extreme Computing : BULL – CEA
- Exascale Computing Research : INTEL – CEA – UVSQ

■ A new lab announced in June : Big Data by Intel

« Intel ouvre, au sein de la technopole Teratec et au profit de ses partenaires, son premier laboratoire européen dédié au développement de solutions Big Data. »

« Emmanuel MACRON salue la décision d'Intel d'établir en France, à Bruyères-le-Châtel, son premier centre européen dédié au Big data. »

■ Other labs to be announced in 2015



Teratec Campus

- **Technology Companies, Incubator and Business Center**
 - AVANTIS TECHNOLOGY - BULL – CMI DEFENCE - ESI GROUP – SILKAN
 - The ESSONNE CHAMBER OF COMMERCE AND INDUSTRY accomodates SME's and innovative companies
 - EOLEN AS+ - ATEM – CLUSTERVISION - CYBELETECH - DISTÈNE – NVIDIA - SCILAB ENTERPRISES - NUMTECH - PARATOOLS
 - Adapted solutions, custom tailored support and high quality service in a technology-rich environment

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



Collaborative Projects Industry Research

TERATEC members are key participants in major projects of ADVANCITY, ASTECH, CAP DIGITAL, MINALOGIC, SYSTEMATIC, VEGEPOLYS, ANR and ITEA

ACDC • ACTIVOPT • ADN • AGREGATION • AIRCITY • ANGEL • AQUA TEAM • CALLISTO • CAMPAS • CARAB • CARDIOXPRESS • CARRIOCAS • CHAPI • CHORUS • CITINES • COLLAVIZ • COLOC • COOL IT • CORTEX 3D • COSMOS+ • CSDL • DATASCALE • DEGIV • DESCARTES • EHPOC • ENCUPACK • E-PLU • EXPAMTIONS • FAME2 • FLACOMARE • FLEXMIM • H4H • HIPIP • ICOS • ILMAB • IOLS • IRIMI • LABS • LOCINDOOR • MACH • MANYCORELABS • MECASIF • MEDIACTIF • MIEL • MODRIO • MUSICAS • NEXPERTSANTE • O2M • OASIS • OLDP • OMD2 • OPEN GPU • OPEN HPC • OPSIM • OPTIDIS • OPUS • PARMA • PARMAT • PERFCLOUD • POINT2BDMC • POPS • POQEMON • QUAUSI • QUICK GPS • RICHELIEU • RODIN • SDM4DOE • SICODYN • SIMILAN • SMART AGRICULTURE SYSTEM • SMART-EEG • SYS-MCO • TERAOPS • TERRA X PROJETS • TERRIS@NTÉ • TIMCO • USINE NUMERIQUE • USINE NUMERIQUE 2



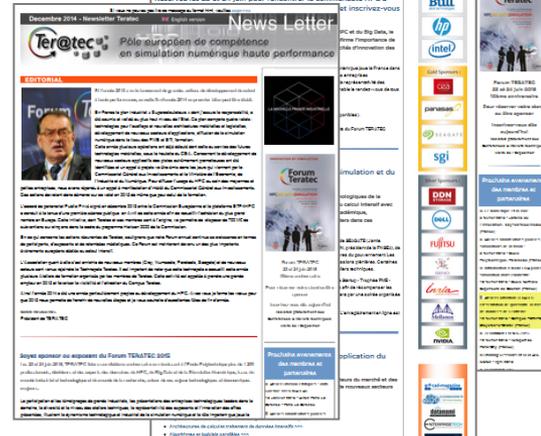
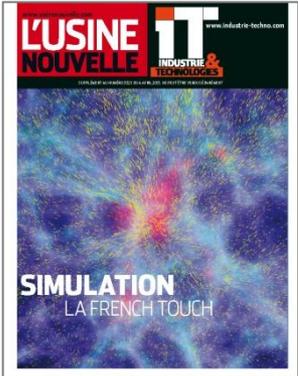
The TERATEC initiatives

Teratec is at the forefront of the creation of a nationwide and europewide environment which accelerates the development of HPC:

- **Europe** : ETP4HPC, Center of Excellence, ITEA
- **France** : Supercomputing Industrial Plan, Education (HPC Master MIHPS, and others under preparation)
- **International cooperation** outside Europe : Brasil, Mexico, etc.



Promotion & Communication





Thanks to all TERATEC friends

- The founders
 - The members
 - All our partners *from Industry, Research, Government and local authorities, International Organisations, Competitiveness clusters and Technical Centers, Press, ...*
 - And you, the Teratec Forum attendees !





Teratec 2015-2020

New steps



2015-2020 : more operational responsibilities

In a context where more and more application domains need HPC and more and more categories of actors are legitimate to use it :

- ☾ Teratec is preparing a major initiative to give SME's access to simulation.
- ☾ Teratec will participate more directly in active French and European projects : Simulation programs by industry, technical challenges, dissemination and training.



TERATEC actions for SME's

In more and more industrial domains, simulation has a major impact on competitiveness and innovation capacity.

In the French Supercomputing industrial plan, Teratec has accepted to lead, together with Genci, a national program to give SME's access to simulation.

Teratec will build a dedicated team and focus on some sectorial domains with partners :

- Manufacturing industry together with Systematic
- Building industry together with Advancity and CSTB
- Training program on Simulation realised by SystemX

Just decided and to be launched in October.



TERATEC in FR & EU projects

Being at the heart of the relation between advanced users and technology providers, Teratec is often asked to participate in development projects combining the two types of partners.

It is why we have decided to enter into operationnal projects:

- In France, in some of the initiatives launched in the frame of the industrial plan, like Materials - participation in the future Materials Simulation Lab on the Teratec Campus - and Vegetal - in close cooperation with AgreenTech, la Vallée Numérique du Végétal, recently announced.
- In Europe, in some H2020 projects covering technology and usage, like the POP Center of Excellence on applications performance.



Performance Optimization and Productivity

EU H2020 Center of Excellence (CoE)
1 October 2015 – 31 March 2018 (30
months)



- **A horizontal center of excellence**
 - Transversal across application areas, platforms, scales
 - Academic AND industrial codes
- **On Performance Optimization and Productivity**
 - Precise understanding of application and system behavior
 - Suggestion on how to refactor code in the most productive way

? Application Performance Audit

- Primary service
- Identify performance issues of customer code (at customer site)
- Small Effort (< 1 month)

! Application Performance Plan

- Follow-up on the service
- Identifies the root causes of the issues found
- Qualifies and quantifies approaches to address the issues
- Longer effort (1-3 months)

✓ Proof-of-Concept

- Experiments and mock-up tests for customer codes
- Kernel extraction, parallelization, mini-apps experiments to show effect of proposed optimizations
- 6 months effort



Partners

- BSC (coordinator), ES
- HLRS, DE
- JSC, DE
- NAG, UK
- RWTH Aachen, IT Center, DE
- TERATEC, FR



A team with

- Excellence in tools
- Excellence in programming models and practices
- Research and development background AND proven commitment in application to real academic and industrial use cases



Contacts

- If you have the feeling you are not getting the performance you expected and do not
- If you are not sure whether it is a problem of your application, the system, ...
- If you want an external view and recommendations on suggested refactoring efforts
- If you would like some help on how to best restructure your code

POP Coordination

Prof. Jesus Labarta, Judit Gimenez
Barcelona Supercomputing Center (BSC)
pop@bsc.es



An industrial world reference in High Performance Computing



Innovation



Competitiveness



Job creations



Forum Teratec

10th edition

1 300 professionals participating
90 international speakers testify
65 companies and organizations exhibit



HPC**BIGDATA****SIMULATION**

09h30 **Opening of the 10th TERATEC Forum**

G rard ROUCAIROL, Chairman, and Herv  MOUREN, Managing Director , TERATEC

10h00 **Thierry MANDON, Secretary of State in charge of Higher Education and Research**

10h30 **The fast progress of the French Supercomputing plan, part of "The New face of Industry in France"**

G rard ROUCAIROL, Herv  MOUREN and Christian SAGUEZ, TERATEC

11h00 **Data storage: the heart of any information system**

Ken CLAFFEY, VP & GM Storage Systems Group, SEAGATE

11h30 **HPC & Big Data – the time is right for a scalable framework**

Barry R. DAVIS, General Manager, High Performance Fabrics Operation, INTEL

12h00 **The Square Kilometre Array: Transformational Science Instrument and Big Data Challenge**

Paul ALEXANDER, UK Science Director SKA Organisation , Professor in Astrophysics, UNIVERSITY OF CAMBRIDGE

12h30 **Presentations of the Forum Sponsors**

Pascal BARBOLOSI, ATOS - Philippe TRAUTMANN, HP - Isabelle FLORY, INTEL - Didier JUVIN, CEA - Elisabeth JASSAUD, PANASAS - Derek BURKE, SEAGATE - Marc SIMON, SGI

13h00 **Lunch & Visit of the exhibition & Networking**

- 14h15 **HPC to meet the quality requirements of animated movies**
Farchad BIDGOLIRAD, R&D Supervisor , UBISOFT Motion Picture
- 14h45 **The challenges of simulation for a large aeronautics and space company**
Jacques BROCHET, Directeur scientifique et technologique, SAFRAN
- 15h15 **Presentations of the Forum Sponsors**
Bernard RANNOU, DATADIRECT NETWORKS - Marc MENDEZ BERMOND, DELL - Pierre LAGIER, FUJITSU - Catherine RIVIÈRE, GENCI - Eric Horlait, INRIA - Yossi ELBAZ, MELLANOX - Guillaume BARAT, NVIDIA
- 15h45 Coffee Break & Visit of the exhibition & Networking
- 16h30 **New technologies at the heart of the third agricultural revolution**
Xavier BEULIN, Chairman, AVRIL / Chairman, FNSEA
- 17h00 **Intensive computing at the heart of tomorrow's services**
Thierry BRETON, CEO, ATOS
- 17h30 **Speech of the French authorities**
- 18h00 **The 2015 Digital Simulation Awards**
Co-organized by L'Usine Nouvelle and TERATEC with partners ATOS COMSOL, HP and INRIA

19H00

TERATEC's tenth anniversary

From 19:00 at the Lake of the Ecole Polytechnique
for a festive and convivial evening organized in partnership with INTEL

Forum Teratec The 2015 Digital Simulation Awards



TROPHÉES

DE LA SIMULATION
NUMÉRIQUE
2015

The champions of the digital simulation are honored at the occasion of TERATEC's tenth anniversary

● Startup Award

CYBELETECH
OPENERGY
SAFETY LINE

● Collaboration Award

CERFACS
CORIA - CNRS
DANONE

● SME Award

DANIELSON ENGINEERING
NEXIO SIMULATION
PRINCIPIA

● Innovation Award

CS SI
ESI GROUP
HYDROCEAN

● Jury's Prize

Organised by



In partnership with



A1 - 09h00 /12h30 - NUMERICAL TECHNOLOGIES FOR PLANT INDUSTRY

Chaired by Christian SAGUEZ, CYBELETECH with the participation of Pierre CELLIER and Bruno ANDRIEUX, INRA - Jean Michel GALLIER, TRANSON - Kun-Mean HOU, ISIMA - Jean François ROUS, Groupe AVRIL - Denis WOUTERS, CYBELETECH

A4 - 09h00 /12h30 - BIG DATA, MULTISCALE AND MATERIALS

Chaired by Gilles ZERAH, CEA with the participation of Celine CHIZALLET, IFPEN - Xavier ROZANSKA, MATERIALS DESIGN - Gérard VIGNOLES, UNIVERSITE DE BORDEAUX - Benoit DEVINCRE, ONERA - Arnaud FROIDMONT, NOESIS - Eric PAROISSIEN, SOGETI

A5 - 14h00/17h30 - HPC AND SIMULATION IMPACTS ON ENGINEERING PROCESS

Chaired by Jacques DUYSENS, ANSYS and Gérard POIRIER, DASSAULT AVIATION / SYSTEMATIC with the participation of Eric LEQUINIOU, ALTAIR - Wim SLAGTER, ANSYS - Frederic FEYEL, SAFRAN - Michel GAZAIX, ONERA - Elias TANNOURY and Benoist GASTON, CS SI - Serge PRUDHOMME, UNIVERSITY OF TEXAS

A8 - 14h00/17h30 - MODELING AND DATA FOR URBAN SYSTEMS

Chaired by Robert PLANA, ALSTOM with the participation of Alain ZARLI, CSTB - Pierre BEAL, NUMTECH - Claude ARNAUD, EFFICACITY - Patrick ARMAND, CEA

A2 - 09h00 /12h30 - BIG DATA: OPTIMIZING DECISION MAKING THROUGH DATA ANALYTICS

Chaired by Ascension VIZINHO-COUTRY, MATHWORKS and Marie-Christine SAWLEY, INTEL with the participation of Clément VAL, CEESAR - Marc WOLFF, MATHWORKS - Julien DEMOUTH, DevTech, NVIDIA - Richard PILLING, INTEL - Ian BIRD, CRAY - Gerard GORMAN, IMPERIAL COLLEGE LONDON

A3 - 09h00 /12h30 - ARCHITECTURES FOR HPC/HPDA – A FEW TRENDS AND PERSPECTIVES

Chaired by Jean-Philippe NOMINE, CEA and Pascale Bernier BRUNA, ATOS with the participation of Jean-Pierre PANZIERA, ATOS - Patrick DEMICHEL, HEWLETT PACKARD - Pierre LAGIER, FUJITSU - Giri CHUKKAPALLI, BROADCOM - Geraint NORTH, ARM Ltd

A6 - 14h00/17h30 - HPC AND SIMULATION IMPACTS ON ENGINEERING PROCESS

Chaired by Jacques DUYSSENS, ANSYS and Gérard POIRIER, DASSAULT AVIATION / SYSTEMATIC with the participation of Eric LEQUINIOU, ALTAIR - Wim SLAGTER, ANSYS - Frederic FEYEL, SAFRAN - Michel GAZAIX, ONERA - Elias TANNOURY and Benoist GASTON, CS SI - Serge PRUDHOMME, UNIVERSITY OF TEXAS

A7 - 14h00/17h30 - ALGORITHMS AND PARALLEL SOFTWARE

Chaired by Guillaume COLIN DE VERDIERE, CEA with the participation of Thibault GASC, Maison de la Simulation - Marc PERACHE, CEA - Allen MALONY, PARATOOLS - Alain REFLOCH, ONERA - Frédéric NATAF, CNRS - Wim SLAGTER, ANSYS - Gino PERNA, ENGINSOFT

- ACTIVEON
- ALINEOS
- ALLINEA SOFTWARE
- ALTAIR ENGINEERING
- AMD
- ANSYS France
- AS+ GROUPE EOLEN
- BULL
- CARRI SYSTEMS
- CEA
- CLUSTERVISION
- COMSOL
- CRAY
- CS COMMUNICATION & SYSTEMES
- DATADIRECT NETWORKS
- DELL
- E4 COMPUTER ENGINEERING
- EMG2 / BITTWARE
- ENGIN SOFT
- ESI GROUP
- ESPACE PROJETS R&D
(ADVANCITY – CAP DIGITAL – COLOC
ITEA3 - MEDICEN – SYSTEMATIC)
- ETP4HPC
- EUROTECH
- EXASCALE COMPUTING
- RESEARCH
- FUJITSU
- GENCI
- HEWLETT PACKARD
- IBM
- IFPEN
- IKOULA
- INRIA
- INTEL
- KALRAY
- LENOVO
- MATHWORKS
- MELLANOX
- NAFEMS
- NICE SOFTWARE
- NUMSCALE
- NVIDIA
- OPENTEXT
- OPTIS
- PANASAS
- PARATOOLS
- PRODESIGN ELECTRONIC
- QUANTUM
- ROGUE WAVE
- SCILAB
- SEAGATE
- SGI
- SOGETI HIGH TECH
- SYSTEMATIC
- TERATEC
- TOTALINUX
- TRANSTEC
- UNIVERSITAT POLITECNICA DE
VALENCIA

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&
Welcome !



**Forum
Teratec**

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