

# Grenoble Isère Report

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Laurent Malier, the Director of CEA-Leti

## CEA-Leti's big ambitions for the infinitely small

As a key partner for industry and the instigator of Minatec® (1), CEA-Leti is at the cutting edge of European research in microelectronics and micro and nano-technology, playing a key role in the international arena. We talk to its director, Laurent Malier.

### CEA-Leti has just signed a cooperation agreement on semiconductors and nanoelectronics with IBM.

#### What prompted your involvement?

This cooperation agreement consolidates the drawing power of the Grenoble cluster and makes Leti the only research institute to belong to IBM's Joint Development Alliance, which brings together the world's top players in the microelectronics industry. In this field work is now focusing on developing CMOS technologies for the production of microprocessors and integrated circuits deploying 32 and 22 nm technologies. But only a few large organizations worldwide are capable of such an undertaking. The Alliance is the currently predominant model and the one that offers the greatest direct benefit to French and European firms, because it allows them to access the key semiconductor players based in the United States and operating all over the world. Our research as part of this Alliance will explore new types of low-power transistors based on silicon-on-insulator (SOI) technology.

#### Does CEA-Leti need to extend its international reach?

The larger an organization the more open it needs to be. To make sensors demands very diverse technologies. We have to accept that we cannot master all forms of know-how and that each institute has its specialities. Our approach is therefore increasingly based on pooling knowledge

and know-how. But that also requires us to reconcile international opening and local attraction. For example Leti has been working with the California Institute of Technology (Caltech) since 2007 on very large scale integration of nanosystems (VLSI Alliance). This partnership involves physicists specializing in nanostructures, microsystems and silicon technologies, all working together up to industrial transfer. That means complementary skills reaching from basic to pre-industrial research.

#### Last year CEA-Leti celebrated its 40th anniversary. What are your development prospects?

Our research is developing in the field of healthcare and the environment, particularly in diagnostics and treatment. This line of research responds to powerful demand in society. Leti is also working on all the components in the image chain (capture, storage, transfer, visualization). Grenoble-Isère boasts the highest concentration of organizations working on image components in France. There is considerable potential in this field, boosted by software integration. Embedded microelectronics is also a top priority in our development, particularly in relation to conventional industry. Lastly new energy technologies are enjoying very strong growth and we have a leading role to play in this field, particularly in the miniaturization of components for mobile devices and embedded energy.

(1) Minatec micro and nanotechnology innovation campus

## Growth, profits and a Texas subsidiary for Tronics

Tronics Microsystems, which makes high value-added micro-electromechanical systems (MEMS), has just launched Tronics Mems Inc, its US subsidiary headquartered in Richardson, Texas. This move follows the acquisition of MedTech Development, a US firm specializing in medical systems and based in Silicon Valley. The new facility, which includes 1,850 square metres of clean room space, is dedicated to MEMS fabrication on 150 mm wafers for medical, automotive and printing applications and mobile consumer devices. Tronics reported 5% growth in sales for fiscal 2008, up to €11m, with €858,000 net profits.

## Phelma, turnkey engineers

Phelma, one of the engineering schools in the Grenoble-INP group, trains future specialists in advanced energy technologies, materials, electronics, telecommunications and embedded systems. Students from France or abroad benefit from high-grade teaching thanks to a series of technology platforms (clean room, work on nuclear physics and major European research facilities for the structural analysis of materials). Phelma graduates are immediately operational for R&D missions and wait no more than three months before finding work in Grenoble-Isère, France or abroad.

## Bouygues SA joins Minatec IDEAs Laboratory®

Minatec IDEAs Laboratory is an innovation platform backed by various partners dedicated to conceptualizing and launching future applications for micro-nanotechnology. The lab comprises some 30 people with very different backgrounds (industrialists, engineers, technologists, sociologists, anthropologists and economists). It draws its strength from the convergence of technology with human and social sciences while interacting with industry. The work of this unusual team centres on brainstorming sessions, tests and group sessions on prototypes. IDEAs Lab was started in 2003 at the instigation of CEA, France Telecom and STMicroelectronics. Since then its partners have included Essilor, Hewlett Packard, Rossignol, among others. It has just gained a valuable ally, Bouygues SA, which for the coming three years will be taking part in work on the theme "energy and mobility".

# Nano 2012 is underway!

The Nano 2012 R&D programme was officially launched in 2008, bringing together IBM's research centres at Fishkill and Albany, New York state, STMicroelectronics and CEA-Leti. It got the go-ahead in April following the signature of a framework agreement setting forth the programme's objectives and the responsibilities of the various partners. Nano 2012 is a cooperation programme which aims to boost the technological lead and competitive position of the Grenoble area in the changing conditions of the global semiconductor industry and consolidate its leadership position in the development of (32 and 22 nm) CMOS technologies and derivative technologies for system-on-chips (embedded memory, analog/RF devices, etc.). Over the next five years Nano 2012 will be allocated a €2.3bn R&D budget with a further \$1.25bn for capital investment,

## Nanobiotechnology and formal-analysis method gather in Grenoble

In June Grenoble is hosting two international conferences: NanoBioEurope'09 is devoted to nanobiotechnologies; and CAV 2009 focuses on formal-analysis methods for hard and software systems.

For the second time Grenoble is hosting the NanoBio-Europe international conference on nanobiotechnologies and nanomedicine. This event confirms Grenoble's leading role as a key centre of multidisciplinary research in nanobiotechnology. More than 250 participants from Europe, Asia and North America are scheduled to attend the two-day conference.

The scientific programme will address nanotechnology results, developments and applications in analysis – increasingly efficient, more precisely targeted yet less invasive – and treatment systems. The innovations presented at NanoBio-Europe'09 should bring high added value to the biotechnological and pharmaceutical industries. Most of these innovations are based on multidisciplinary collaboration involving experts from life science, micro and nanotechnologies, materials science, physics and medicine.



ST Microelectronics, Crolles facility

making it one of France's biggest industrial projects. National and local government are providing substantial support for the project, contributing some €457m. Realization of this project will make Grenoble-Isère a global centre for tomorrow's nanoelectronics, with potential for creating about 650 jobs in the Grenoble area. In just 10 years more than €6bn will have been invested in micro and nano-electronics in Grenoble-Isère.

Also for the second time, Grenoble's Verimag laboratory – established by Joseph Sifakis, winner of the Turing award in 2007 – is organizing the Computer Aided Verification (CAV) conference. CAV 2009 is the 21st edition of this event which seeks to advance the theory and practice of computer-aided formal analysis methods for hardware and software systems. CAV believes it is essential to maintain its leadership position in hardware verification, sustain recent momentum in software verification, and consider new domains such as biological systems. The conference covers the full spectrum from theoretical results to concrete applications, with the emphasis on practical verification tools, and the algorithms and techniques required for their implementation. Four hundred scientists from laboratories and companies all over the world are expected.

# Grenoble-Isère puts its firms on the innovation highway

**Small and medium-sized enterprises (SMEs) need input from research to design and manufacture competitive products. Several years ago scientific organizations and local authorities in Grenoble-Isère resolved to support local firms in their innovation efforts by giving them access to powerful R&D facilities, in particular a series of technology platforms at the Minatec® centre.**



Clean room operators, CEA-Leti

"It is in the interest of firms, particularly SMEs, to take advantage of the region's technological potential to integrate miniaturized components in their products," says Laurent Malier, the director of CEA-Leti. This is one of the objectives of the Minatec campus: to bring industry closer to the world of research and thus boost innovation. This can be achieved by making available ways and means for research and fabrication of smart, miniaturized components, opening the door to a huge network of skills and technology once beyond the reach of most SMEs.

## Sharing know-how and creating value: the principle of technology platforms

Technology platforms are a way of making available to industry, particularly SMEs, R&D skills and resources to help them develop. "On the one hand these companies stand to gain by integrating miniaturized components in their technologies. On the other we have the necessary skills and infrastructure to inte-

grate such systems and produce pre-production runs," says Malier.

For example the nano-characterization platform on the Minatec campus offers some of the most powerful characterization resources in the world (mass spectrometry, X-ray diffraction, atomic force microscopy, Auger microscopy, etc.). It is open to upstream and industrial research projects thanks to a system of SME partnerships. Just a step away from this platform stands the Advanced Technology Building (BHT), devoted to industrial transfer. It currently hosts about 15 firms, including various start-ups and SMEs, and features a MEMS 200 mm fabrication line (open 24/7). This provides mixed teams from research and industry with a unique environment – probably the only one of its kind in the world – for developing microsystem technologies (pre-industrial research, prototyping, production of limited runs).

## Innovating across the board with "integrative industries"

Conventional industry (transport, textile, construction, etc.) must cope with an increasingly difficult economic situation and only the most competitive will survive. One way of getting round this obstacle is to boost innovation, making greater use of smart, communicating miniaturized devices. Several projects are taking shape at Minatec to enable firms to integrate the full potential of micro and nanotechnology and nanomaterials in their products and services.

Over the next year the Integrative Industries Building (B2I) will bring together some 250 people (students, researchers, firms) in premises occupying 9,000 square metres. This building will include two showrooms, an anechoic chamber (shielded to attenuate sound or electromagnetic energy), special areas for producing mock-ups and prototypes, and an integration platform for testing new microsystems developed by researchers

and industrialists. The aim here is to enable firms, regardless of their business or size, to take advantage of the resources at the Grenoble innovation centre. Within the B2I, the CimAlpes platform, the fruit of a partnership between Minalogic (2) and Minatec, will give companies the full benefit of a complete range of shared R&D services and resources, reaching from design to test, through characterization and system development. These platforms are a major asset for the swift development and production of products drawing on emerging technology bricks, the key to keeping French industry attractive and dynamic.



Printed circuits

## A technology alliance unique in Europe

In 2006, CEA (France), CSEM (Switzerland) and Fraunhofer AG (Germany) founded the Heterogeneous Technology Alliance (HTA). Its aim is to facilitate the acquisition of joint research projects to design innovative products for the microelectronics industry. When VTT (Finland) joined the alliance in 2008 it changed its name to 4-Labs.

Managed as a single corporate entity 4-Labs guarantees its industrial customers simple, centralized access to the technologies developed by the four research centres, which represent almost 5,000 researchers and a portfolio of 3,000 patents. 4-Labs is based in Geneva and is now considering collaboration with the United Kingdom, Italy, Spain and Poland.

## Bike racing season in the French Alps

This summer the French Alps will be hosting four stages of the Tour de France cycling classic. Grenoble-Isère will be particularly in the limelight, with the 19th stage starting from Bourgoin-Jallieu (between Grenoble and Lyon). The race will also feature two mountain stages in the Alps: from Martigny to Bourg-Saint-Maurice; and Bourg-Saint-Maurice to Grand-Bornand. Lastly one of three time-trial races will be held at Annecy, in this case an individual event.

A hundred and five years after its start the Tour de France remains a major classic in international cycling, each year attracting 10 to 12 million spectators to road-sides all over the country. The 96th edition of the "big loop" will run from 4 to 26 July 2009, taking competitors on a 3,445 kilometre race across six countries and 32 French departments, in just 21 stages.

## Welcome to Grenoble, Isère



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As a multicultural, cosmopolitan city Grenoble has a valuable resource in the form of its Maison de l'International. Regardless of whether you are a researcher or a student, an artist or an entrepreneur, you will find all the resources you need



to feel at home in the capital of the French Alps. Its staff will guide you through administrative formalities (housing, finding schools for your

children, registering for leisure activities), point you towards the numerous international organizations available in and around Grenoble (associations, consulates, training bodies, etc.) and highlight conferences and exhibitions of international interest.

And should you nevertheless feel a little home-sick, Maison de l'International offers a large selection of the international press (The Economist, The New Yorker, US News and World, Die Zeit, Tiempo, Panorama, Espresso, etc.). The setting itself is worth a visit, the centre being located in a superb 17th century mansion overlooking a pleasant garden in the city centre. You can be sure of a warm welcome at Maison de l'International.



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