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Software, integrated circuits and microelectronics: the Grenoble-Isere multiplier effect



© CEA-Leti

Daniel Vellou, CEA-Leti, Head of the Design and System Integration Department

Grenoble-Isere's advanced software expertise has created an environment that fosters the emergence of innovative solutions in the semiconductor industry. We talked to Daniel Vellou, the head of the Design and Systems Integration Department at CEA-Leti, who is convinced that the added value here has a lot to do with the ability to pool the energies of various players all capable of anticipating industrial demand.

How does CEA-Leti work with its industrial partners?

It is CEA-Leti's job to build innovation that can be transferred to industry. This concerns all branches of industry, in both conventional sectors and advanced technology. Leti adapts the framework of its partnerships to suit demand, with services ranging from targeted intervention over a limited period of time to the setting up of a joint laboratory as part of a long-term commitment. CEA-Leti has carried out research in the past that is now proving extremely relevant for deploying green production techniques, such as designing chips with lower power consumption. This has long been a key concern of ours, which gives us a valuable lead in a field that is now of key importance.

In what respect does CEA-Leti contribute to Grenoble-Isere's drawing power?

The Grenoble ecosystem brings together in one place about 30 companies specializing in the development of software for the design of microelectronics components, commonly known as electronic design automation (EDA). This fabric draws on an extremely diverse range of players: world leaders such as Mentor Graphics or Synopsys; top semiconductor firms, notably STMicroelectronics, E2V Semiconductors and Soitec; but also highly specialized local companies, including Dolphin Integration, Design & Reuse, CWS, Iroc Technologies and

EdXact; and lastly internationally renowned research laboratories, CEA-Leti, Verimag and TIMA, among others. At the core of this system CEA-Leti anticipates the demands of industry and plays an essential part in technology transfer. Such a range of complementary skills encourages the development of innovative software solutions, in circuit design, simulation and verification, all of which helps Grenoble-Isere keep its competitive edge in a very challenging environment.

What about the future promise of the Grenoble-Isere ecosystem?

Grenoble-Isere has been working on soft and hard-ware research for more than 40 years, achieving world-class performance in massively parallel multi-processing, 3D circuit development, EDA and technology development. Add to that the favourable context, with the presence here of Soitec, one of the leading companies in the race to produce next-generation materials, which gives us the certainty of working on top-notch media. Furthermore the support of the French government, through its research tax-credit (CIR) scheme, boosts the R&D efforts of local companies in a very tangible way. Lastly the Nano 2012 programme, which is one of the largest projects currently engaging French industry, brings together the world's top players in this particular field thanks to the agreement signed by IBM, CEA-Leti and STMicroelectronics.

R3-Logic in Grenoble-Isere

It was at a symposium at Grenoble's Minatec centre that Lisa MacIrrath, R3 Logic's CEO, convinced microsystem entrepreneurs of the merits of her company's innovative design tools which open the way for a wide range of multimedia and mobile phone applications. Various tools are used concurrently to treat different aspects of the problem: system-on-chip design, substrate design, signal integrity, thermal management, environmental constraints, RF and so on. The launch of R3-Logic's R&D centre here, assisted by AEPI, fits into the larger framework of establishing the 3Dim3 research partnership. Scope for R&D tax credits (under the French CIR scheme) convinced this up-and-coming American firm to join the European project and settle in France, as part of the Grenoble-Isere corporate incubator, Pétale.

Prize-winning Advantech

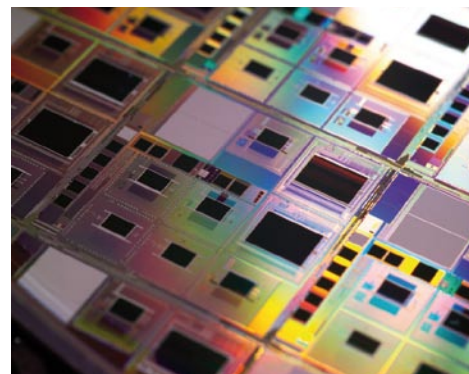
The Taiwanese firm Advantech, which is represented in Grenoble-Isere, has been in the news lately. The manufacturer of industrial-grade PCs has won two prizes. In its annual appraisal the China Automation website awarded the new Ark-600 series of compact chassis this year's prize for innovative products. At the same time visitors to the China Industrial Control site praised Advantech's powerful integrated platform. The Ark-600's modular design, small footprint, thermal performance and good value were also acclaimed by system integrators as a benchmark for excellence.

BioMerieux strengthening its position in Grenoble-Isere

Until now the Centre Christophe Merieux in Grenoble has focused on research in molecular biology, but it will soon be manufacturing *in vitro* diagnostics systems too. This follows the construction of a 2,500 square metre building, boosting the facility's total floor space to 8,000 square metres. The new extension, which will be online in 2010, coincides with the modernization of existing premises. The company is investing a total of €18m in the undertaking, which consolidates Grenoble's position as bioMerieux's global molecular biology power base. At the end of 2008 the facility had a workforce of almost 135 people. The new departure involves the creation of about 100 new jobs in the course of 2009, evenly spread between R&D and production. The manufacturing department will be dedicated to the development and fabrication of bioMerieux molecular biology systems which include tests for HIV, and the A and B influenza viruses (this test is currently being adapted to include the H1N1 strain).

TSMC and CEA-Leti join forces

In the race to achieve further miniaturization TSMC, the world's leading semiconductor manufacturer, has made a strategic choice. The Taiwan-based firm wants to start production of integrated circuits using the multiple-electron-beam direct write (MEBDW) system. To design the maskless lithography system, enabling the fabrication of circuits with 22 nanometre details, TSMC has joined Imagine, an R&D programme led by CEA-Leti. The Grenoble-based electronics and information technology laboratory currently owns more than 1,400 patent families. Over a three-year period it will give TSMC the benefit of its



Integrated circuit

micro and nano-electronics expertise and research facilities in the furtherance of its industrial ambitions, namely to bring MEBDW up to operational speed, while adapting production tools and processes. Ultimately this technology should achieve resolutions of as tiny as one nanometre.

In preparation for developments that are bound to alter fabrication processes TSMC is counting on France and Grenoble-Isère to set in motion the technological changes on which tomorrow's circuits will be founded, while consolidating its leadership position.

Second €5m investment round for Tiempo

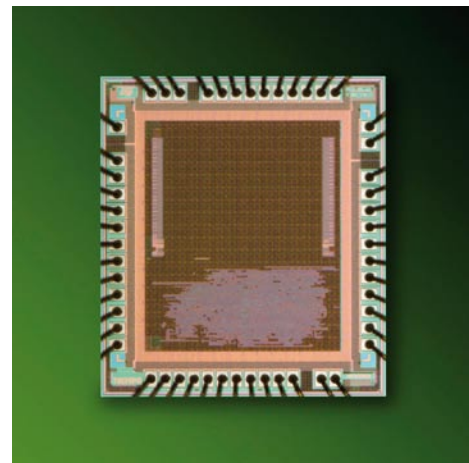


Tiempo, which deploys an innovative technology for designing asynchronous, ultra-low consumption integrated

circuits, has just completed a €5m series B financing round with two new investors, Viveris Management and Oddo Private Equity. Previous series A investors also took part in the round.

The company develops and markets a complete solution, centring on core IPs and design software, for high-performance, delay-insensitive integrated circuits. This technology makes Tiempo one of the leading players in asynchronous cores for microcontrollers, microprocessors and cryptoprocessors. Target applications including circuits with very low power consumption for embedded and/or secure electronics: power management circuits, RFID chips, standard or contactless smart cards, as used in key sectors such as automotive electron-

ics, healthcare and mobile phones. The energy-saving performance of Tiempo microcontrollers is so impressive they are already well placed in the fast growing green electronics market.



Clockless integrated circuit

Grenoble-Isere, welcome to high-technology country!

Few sites boast as many technological, industrial and scientific assets as Grenoble-Isere to rise to the challenges of miniaturization, nanotechnology, and hard and software convergence. A centre for innovation in micro and nanotechnology, Grenoble-Isere also fields powerful skills in computer science and software, all valuable levers in developing next-generation technologies.



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This is France's top research centre, after Paris, with one of the country's largest number of scientists and high training capacity, reflected in its 62,800-strong student population. With 500 companies and more than 38,500 jobs, information and communications technology has enjoyed spectacular growth in Grenoble-Isere in the past 15 years. So what makes the region tick? High-quality university training, top-grade basic and applied research, the invaluable proximity of international research facilities – the European Synchrotron Radiation Facility (ESRF), the Institut Laue Langevin (ILL) specializing in neutron science and technology, and the European Molecular Biology Laboratory (EMBL) – and last but not least a solid industrial base.

Synergy and exchange between disciplines key to success

Grenoble-Isere has based its success and notoriety on a single model: interdisciplinary working and synergy between training, research and industry. The strength of this model resides in its ability to innovate, hatch new projects, encourage exchanges and the sharing of innovation. By offering a complete added-value chain from training to industrial output of new technologies, Grenoble-Isere bridges the gap between

researchers and leading companies such as Schneider Electric, STMicroelectronics or Hewlett Packard, while drawing on smaller innovative firms and start-ups. In recent years the region has demonstrated its ability to rise to the technology challenges of tomorrow thanks to a range of projects that pool energies. Testimony to this achievement is the launch of the Minatec campus in 2006, mobilizing the full gamut of players in the Grenoble area (universities, research organizations, companies and local authorities). Now with a €2.3bn R&D budget and a further \$1.25bn in capital investment spread over the next five years, the Nano 2012 programme, officially launched last April and involving STMicroelectronics with several partners (including IBM and CEA-Leti), makes Grenoble-Isere a global centre for tomorrow's nanoelectronics developments.

Pivotal role for technology in key social issues

Grenoble-Isere stands out for the high level of expertise it has developed in and around silicon technology and integrated circuits. But the area is also consolidating its position in emerging markets such as biotechnology and new energy technologies. This should come as no surprise. The semiconductor industry, well represented in the Grenoble area, serves as a foundation for much technological innovation, deploying solutions to major challenges for tomorrow's world in fields as diverse as renewable energy, transport, telecommunications and medicine.

Thanks to advanced circuits the necessary processing power can be embedded in advanced products. Even in conventional industry it has become vital to offer smart, miniaturized systems, enabling firms to retain their competitive edge in an ever-changing global market. Thanks to the diversity of its skills and a long tradition of working together Grenoble-Isere is one of the leading centres in the

race to surmount future challenges, with as an additional asset an enviable situation in the midst of the French Alps, superb natural resources, a buoyant economy and a lively arts scene.



© Phototec

ESRF (European Synchrotron Radiation Facility)

Solar panels are flourishing in Grenoble-Isere

With 30% annual market growth Europe's photovoltaic dynamic is very much a reality, blessed with a promising future. What is more Grenoble-Isere is actively involved. With direct contacts with microelectronics equipment manufacturers, the National Solar Energy Institute (Ines) just up the road in Chambéry, and support from Tenerrdis, the renewable energies competitive cluster, Grenoble-Isere is a major power base for PV technology in France. The year 2007 brought a big step forward with the launch of PV Alliance, a partnership involving Photowatt Technologies (France's only manufacturer of PV cells), EDF Energies Nouvelles and CEA. PV Alliance aims to develop and produce high-efficiency PV cells, thanks in particular to the Solar Nano Crystal R&D programme. This programme, which enjoys European Union support, aims to manufacture solar-quality silicon directly and boost the efficiency of PV cells by integrating micro and nanotechnology.

> TIME OFF <

Rhone-Alpes, where the living is easy



Pignol's restaurant in Saint Cecile Convent (Grenoble)

© Alain and Dominique Vayro

Paul Bocuse, Michel Troigros, Marc Veyrat, Anne-Sophie Pic and Georges Blanc : all these representatives of French gourmet food have two points in common. They have all been awarded three rosettes by the Michelin guide, the supreme distinction in *haute cuisine* ... and they ply their trade in Rhone-Alpes, a region that boasts some 60 star-spangled chefs. But over

and above such celebrity chefs, hundreds of more humble cooks serve good meals to food lovers in an area endowed with an incredible number of brasseries, bistros and other restaurants.

But what is behind this remarkable situation? First and foremost the diversity of landscape and climate, which encourages a huge

variety of farming produce. The region is located in the midst of a whole series of sectors accredited with one of the now famous *Appellation d'Origine Contrôlée*. Secondly access to local produce, the fruit of the *terroir*, with highly prized items such as Bresse poultry, Lyon *charcuterie* or indeed Drome truffles. Superb wines – from Beaujolais, Cotes du Rhone and Savoie – are also grown here, delighting wine lovers and securing Rhone-Alpes' international repute as a centre of production. Last, but not least, people here simply enjoy good food, which coupled with excellent quality of life, make this a genuinely special place. Gourmet food is a major asset for the Rhone-Alpes travel trade, helping to attract visitors from all four corners of the globe with the prospect of delicious meals. And top chefs are increasingly opening their kitchens to share their skills and passion, and lift the veil on some their secrets. So Rhone-Alpes has every reason to lay claim to the title of world capital of gourmet food, while wishing you: "*Bon Appétit!*".

Embedded system specialists gather in Grenoble

This coming October Grenoble will be hosting two major embedded software events: ESWeek (Embedded Systems Week) will bring together, from 11 to 16 October, physicists, mathematicians and computer scientists to take stock of the latest R&D achievements in this field, both hard and soft.

ELC-E (Embedded Linux Conference-Europe), on 15 and 16 October, is a top conference in the world of embedded Linux. It is held twice a year, in spring in California and in Europe, in the autumn. This is the first time that both events have been staged simultaneously in time and space. In 2008 ESWeek and Embedded Linux Conference Europe, held respectively in Atlanta (USA) and at Ede (Netherlands), attracted more than 900 participants.



Coinciding with this event, the nanotechnology and embedded software competitive cluster Minalogic is organizing the first edition of its Embedded Systems Exhibition on 14 and 15 October. The show aims to highlight the region's most innovative



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firms and show off the most exciting examples of embedded software. Some 600 to 1,000 visitors from industry and academe are expected to attend this series of events.

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