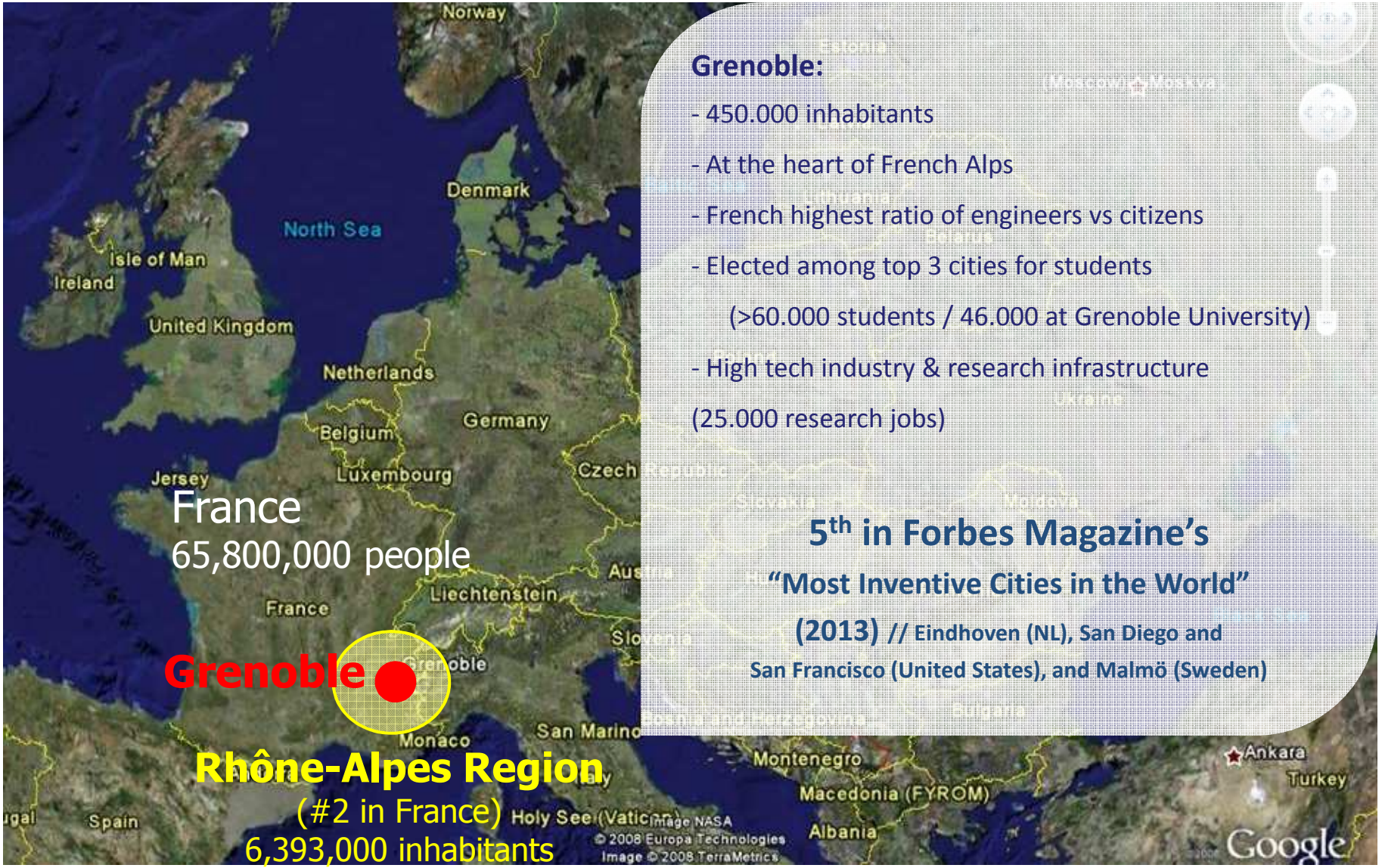

MINATEC®
MINATEC
innovation campus in
MIcro and NAno TEChnologies
Jean-Charles Guibert
Director of technology transfer of CEA
Director of MINATEC®
Education Research Industry

Where is Grenoble ?



Grenoble:

- 450.000 inhabitants
- At the heart of French Alps
- French highest ratio of engineers vs citizens
- Elected among top 3 cities for students

(>60.000 students / 46.000 at Grenoble University)

- High tech industry & research infrastructure

(25.000 research jobs)

5th in Forbes Magazine's

"Most Inventive Cities in the World"

(2013) // Eindhoven (NL), San Diego and San Francisco (United States), and Malmö (Sweden)

Two perspectives of Grenoble

Education, Research & Industry: Grenoble's history

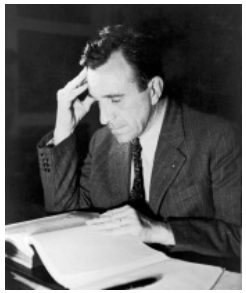
« The 3 Louis »

Louis WEIL
Dean of the
Science Faculty

1956 CEA
(CENG: nuclear research)

1962 CNRS
(upstream research)

1967 ILL
(EU High Flux reactor)



Louis NEEL
Nobel Prize (1970)
First director of
CEA Grenoble

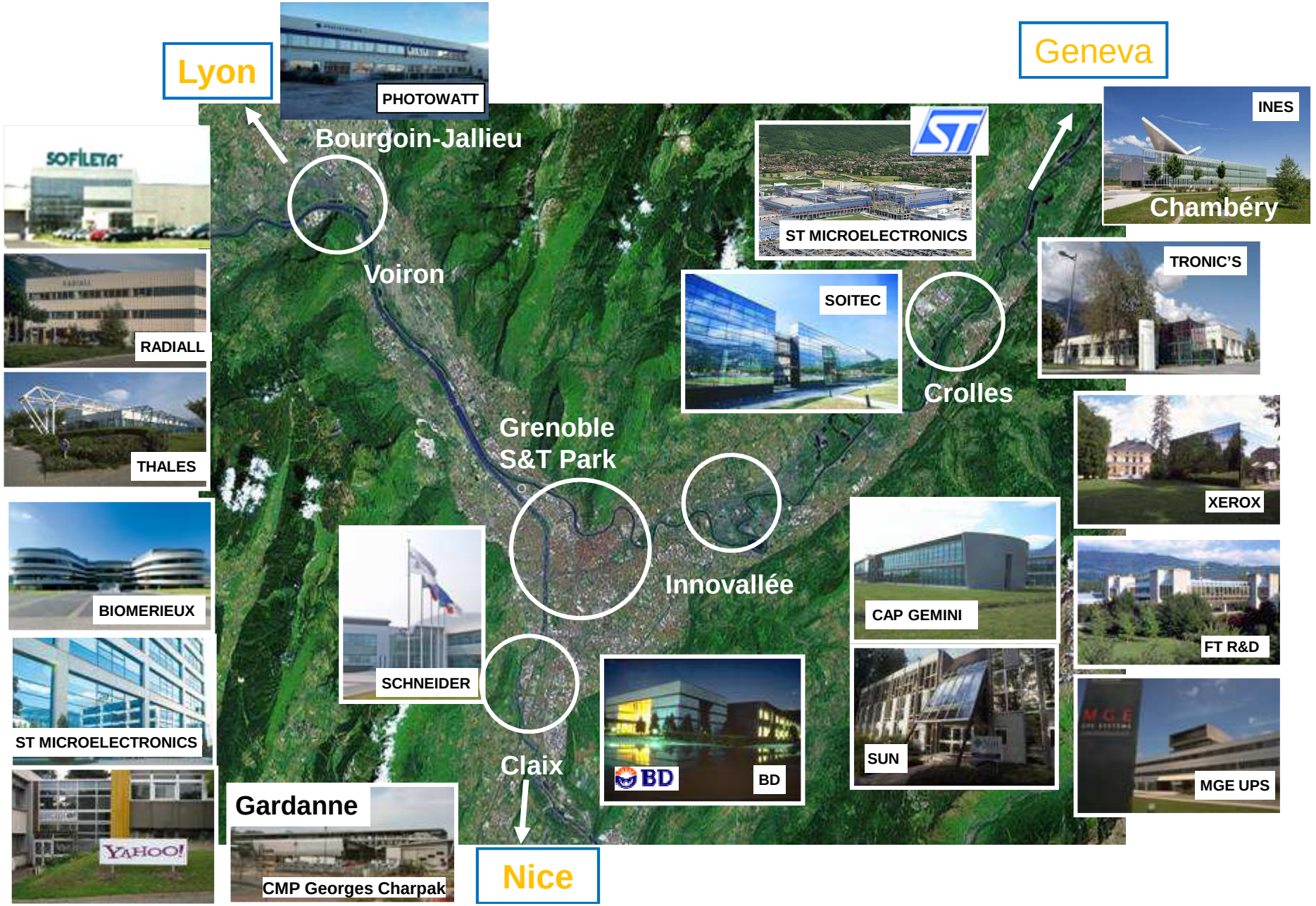
1988 ESRF
(European Synchrotron Radiation Facility)

2006 MINATEC
(micro & nanotechnology)

2010 GIANT
(innovation alliance)

Louis MERLIN
Founder of
Schneider Electric

Grenoble : a historical high tech industrial area



MINATEC key assets

Strong leadership and involvement from founders

Investments from local authorities providing support in the long-term

Unique Research infrastructures

Experience of the best French lab. for tech transfer to Industry

A major industrial partner and a whole ecosystem in Grenoble

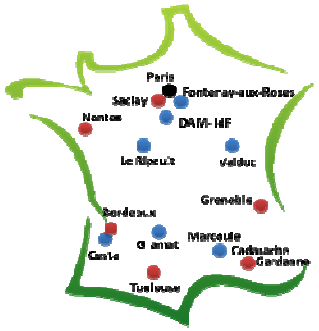
Scientific environment
➔ European facilities and upstream research

CEA: from research to industry

16 000 employees
10 research centres
4.3 Bn€ annual budget

650 patents/year
4 000 publications/year





Nuclear Energy Division

Defence and Security Division

Technological Research Division

- leti — Electronic and information technologies
- list — Software intensive systems
- liten — New Energies

cea tech — *Key Enabling Technologies*

4 500 employees
>120 research labs
>500 M€ annual budget

Fundamental Research Division (Life sciences and Physical sciences)

	leti	list	liten
Created	1967	2003	2005
Located	Grenoble	Paris	Grenoble Chambéry

CEA-Leti institute is the heart of MINATEC campus

Technology research on micro and nanotechnologies

Research & Technology Institute founded in 1967

Director : Dr Marie-Noëlle Semeria

1800 collaborators
250 PhD & 40 post-docs
37% foreign students
40 nationalities

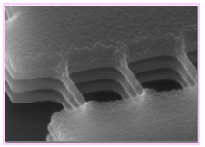
2800 patent families
40 % under licensing
311 patents in 2015

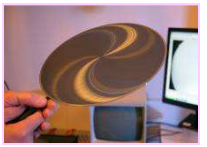
365 industry partners
50 start-ups

8 000m² clean rooms
For 200 and 300mm wafer fab, operated 24/7

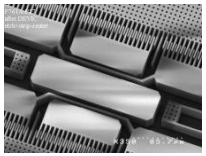
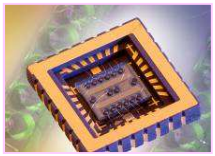
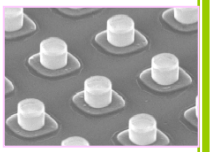
318 M€ Budget (2014)
80% under R&D contracts

Microelectronics on silicon

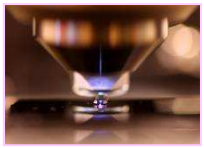
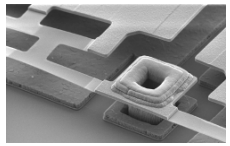
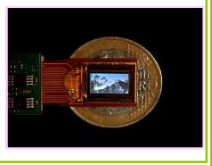




Microsystems on silicon

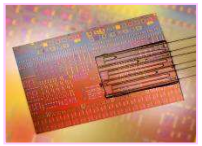
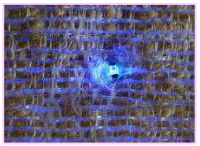
Optoelectronics components

Systems for biology & health



Smart systems, Telco, IT design

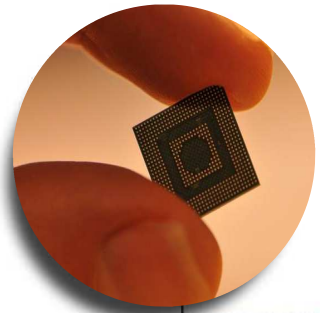




MINATEC campus is based on shared research facilities

Experimental Clinics

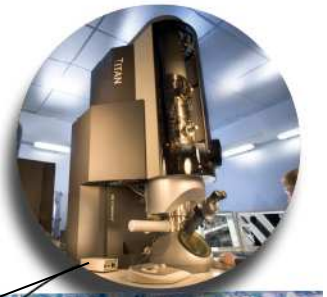
Education and trainings Platform

Integrated and embedded systems Platform



Nanoelectronic & Microsystems Platform 200-300mm

Nanocharacterisation Platform



Bio & Chemistry Platform

Photonics Platform

MINATEC campus based on the triple helix concept : Education – Research - Industry

Education

1,400 people

- *Attractivity*
- *Skills for the future*

Research

2,400 people

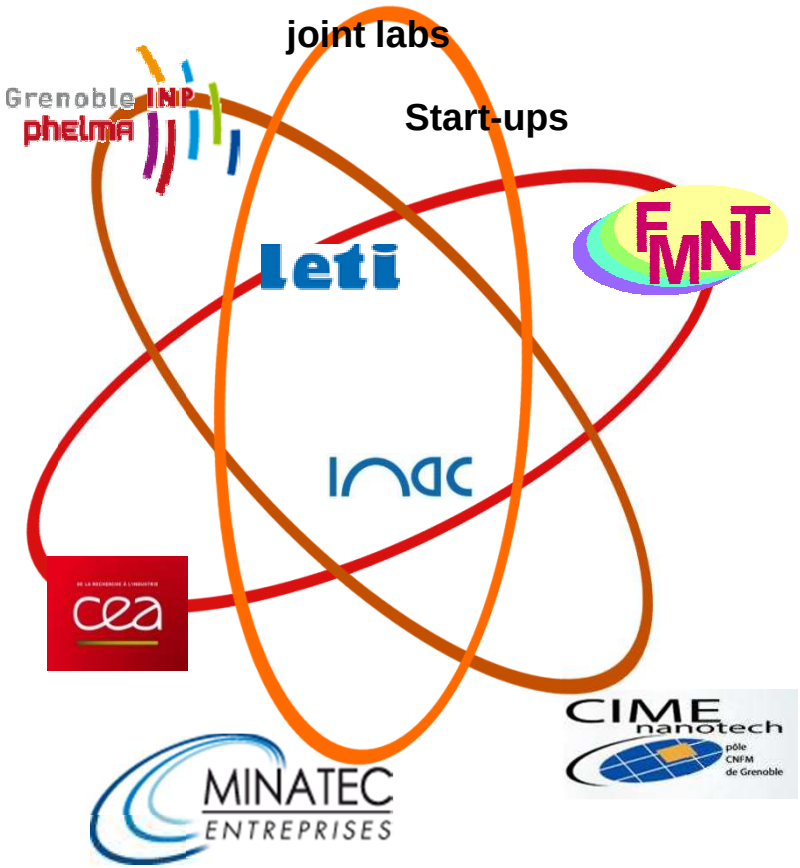
560 PhDs & post-docs

- *Interdisciplinarity*
- *Creativity*
- *Technology transfer*

Industry

600 people

- *Technology transfer*
- *Industrial partnerships*
- *Jobs creation*



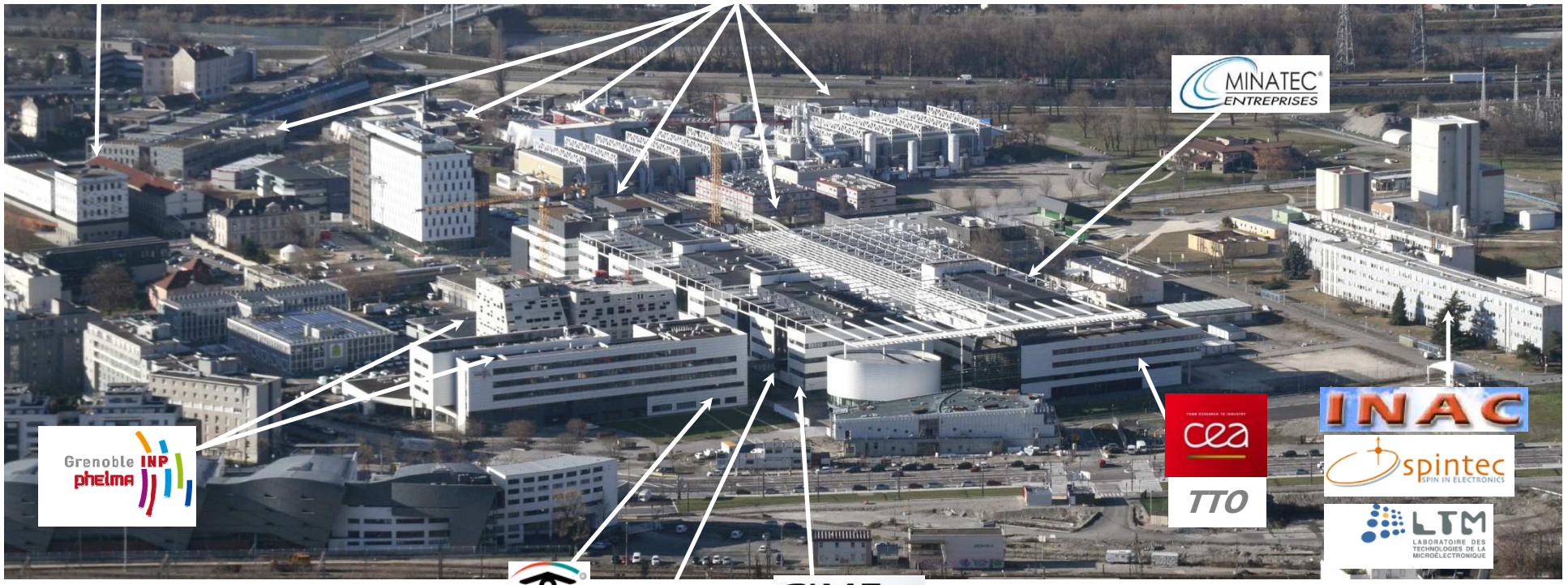
MINATEC®

- *>3000 research staff*
- *>1000 students*
- *Annual Budget 350 M€*

  Industry & contracts >60%
- *13 000m² cleanrooms*
- *400 graduates MS/PhD*
- *1600 scientific publications /year*
- *350 new patents /year*
- *20 joint laboratories*
- *10 start-up /year*
- *Operated by the* cea

MINATEC® campus – from labs to shared platforms

1.5 B€ invested in 10 years for research facilities



€150 million of building construction projects launched in 2013 in a 2nd phase

BCC

« Bâtiment Centre de Compétences »

Administration & skills
550 people → Leti' staff
10 000m²

B2i extention

800 m²

Photonics Platform

230 people
12 800 m²
900 m² of clean rooms
→ End of 2016

2014

146 000 m²

Cleanrooms : 12 000 m²

Labs : 17 700 m²

2017

180 000 m²

Cleanrooms : 13 000 m²

Labs : 20 700 m²

CCL or Design center

« Centre Conception logiciel »

Calcul & design
3 000m²
140 people
→ 2017

Phelma 2

7 000 m² - Nanoelectronics school → sept 2015

Phelma 2 - Amphi

1 400 m² - 500 sits amphitheatre /Nanoelectronics school → sept 2015

MINATEC

Education Research Industry

cea

Education – PHELMA Engineering School

- **Part of Grenoble INP group**
- **1200 students**
- **350 graduate engineers each year**
- **150 professors**
- **First European Master in micro-nanotechnologies (time share with EPFLausanne & Politecnico de Torino)**
- **Phelma 2 : two new buldings planed for Sept.2015 (8000 m2)**

- **Initial training**
- **Professional training**

PHysics **EL**ectronics **MA**terials

Training platform : CIME Nanotech - MINATEC Nanolab

MINATEC® Nanolab

CIME nanotech pôle CNFM de Grenoble

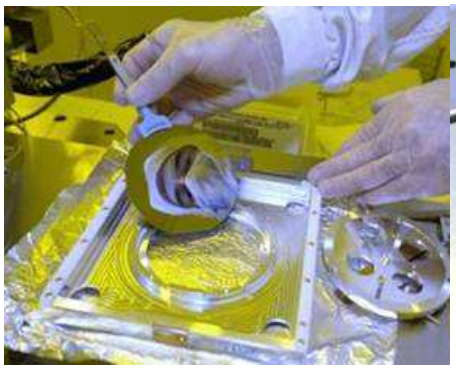
- **2500m² platform dedicated for training activities**
- **700m² cleanrooms**
- **10M€ initial investment**
- **Annual budget: 3M€ (1M€ running costs)**
- **1800 students studied on the platform in 2012**

- **Dedicated actions for high school** NANO@SCHOOL
- **Training for local and foreign companies**

Research – Upstream research Platform

- 3 partners, 4 organisms (CEA, CNRS, Grenoble INP, UJF)
- 700m² & permanent staff of 14 people
- In 2013 : 170 running projets & 300 users

- Methods and equipment facilities for lithography, deposition or etching enabling integration of nano-objects and nano-materials or patterning of thin layers in the nanometric range.
- Flexibility and ease of access : an original management and administration system run by the INAC and the FMNT
- The operating overheads of the PTA are supported by the user laboratories.




Research – Nanocharacterization platform

A unique in-line & off-line platform in Europe

- 100 people
- 1500m² cleanrooms
- 3M€/yr investments
- 40 heavy equipments
- 80 in-line equipments (from 100 to 300mm)
- Cooperation with eqt suppliers (Titan from FEI)

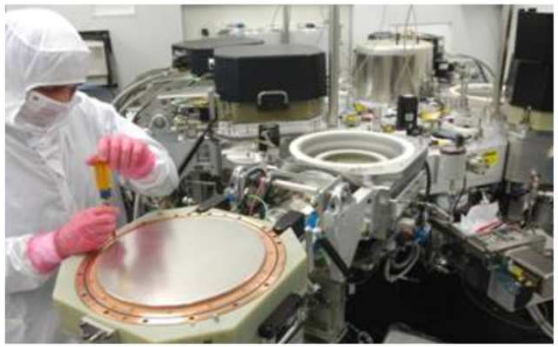
- Research team on characterization
- Close to large research infrastructures (Synchrotron, neutrons,..)
- Collaboration with both upstream and technological research teams

Technological Research: Nanotec 300 & MEMS 200 PF

“More Moore & 3D 300 platform” / “More than Moore 200 platform”

Observation and measurements of the ultimate properties of synthesized materials in devices or systems versatile nanoscale

- **Activity : proof of concept, prototyping, pre-production => from process step to packaging**
- **A platform operated by Leti**
- **>100 people**
- **Initial investissement (2006): 15M€**
- **24/7 operation**
- **Equipment sharing with start-ups**
- **Industrial partnerships & international cooperation with fundamental research labs (Cambridge, ALS) or applied research (IMEC) and industrials (STMicroelectronics, OMICRON)**



Industrial R&D labs on-site

A dedicated building for industrial partners

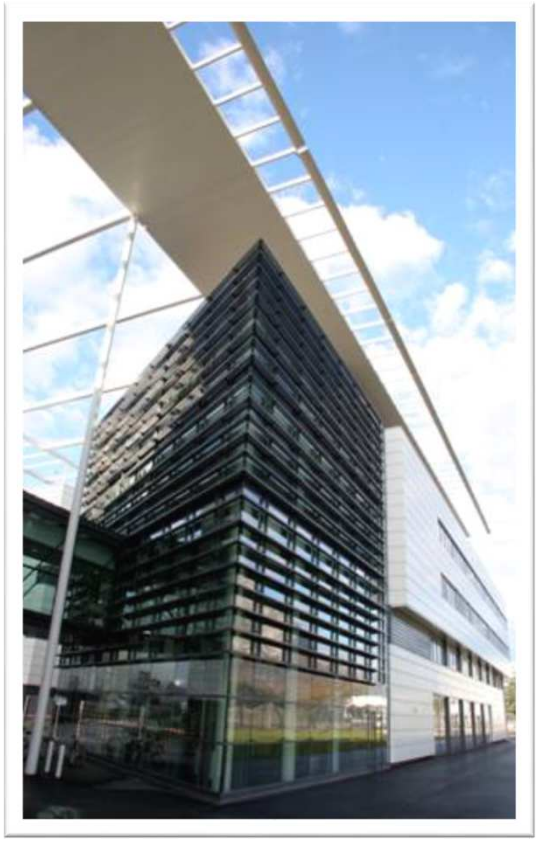
Offices, laboratories and cleanrooms to rent

- ➔ **In permanent contact with research teams**
- ➔ **Access to common MINATEC facilities**

Technology Transfer – « Maison MINATEC »

A unique gathering in Europe

150 people involved in technology transfer activities in micro&nanotechnologies



- **Research trends: Observatory for Micro-Nanotechnologies (OMNT)**
- **Strategic Marketing**
- **Competitive Intelligence / benchmark**
- **Networking and projects: Minalogic Cluster office, SEMI**
- **Patents: engineers, lawyers**
- **Technology transfers and contracts**
- **Investments – Start-ups**

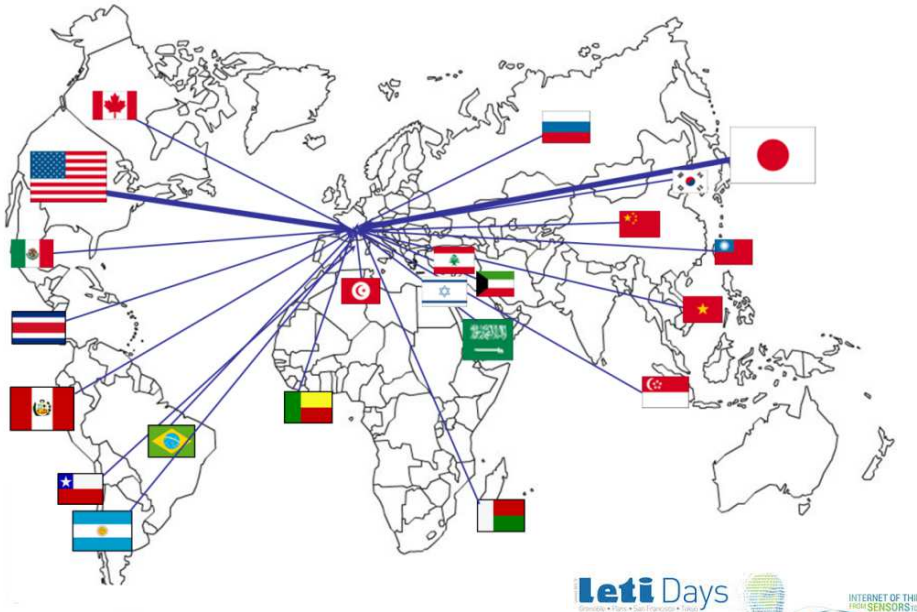
Industry: industrial partnerships within MINATEC® (examples)

Contract negotiation supported by a highly specialized team of engineers and legal experts

> 250 contracts

International official delegations

1 official delegation weekly to discover our campus



- 43 250 visitors in 2014
- 140 events
- 579 meetings
- 27 PhD & HDR presentations
- >80 nationalities

2014 Highlights

Lino Barañao,
Ministerio de Ciencia, tecnología e Innovación Productiva (MINCyT) – Argentina

Hirofumi NAKASONE,
Member of the House of Councillors of Japan

M-Monique RASOAZANANERA,
Minister of Research & Higher Eduction - Madagascar

Hiroshi AMANO,
2014 Nobel Prize in Physics


MINATEC®
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Education Research Industry