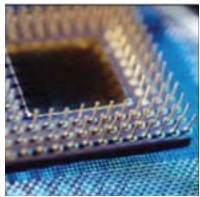
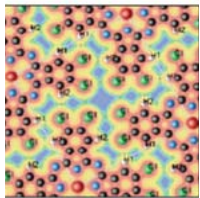
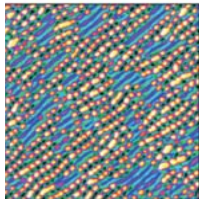
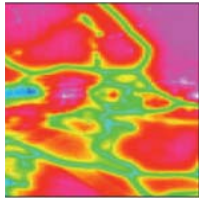


Forum OCOVA 2008, Gap, 9-10 Septembre 2008



Im2np

**Institut Matériaux
Microélectronique Nanosciences
de Provence**

Université Paul Cézanne
Université de Provence
Université Sud Toulon Var
CNRS
ISEN
Polytech'Marseille
Ecole Centrale Marseille



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1. IM2NP

2. RFID @ IM2NP

3. Institut Carnot STAR



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IM2NP UMR 6242

Resulting from the merging of 2 laboratories (CNRS)

- L2MP, TECSSEN

Manpower

- 276 scientists, 180 permanents et 96 PhD & post-docs

Industrial Partnership

- Materials
- Microelectronics
- 5 to 6 M€ / year

Continuité recherches fondamentale et appliquée



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Principales Missions

- ✓ Volonté de créer un ensemble de recherche publique ayant une visibilité, une cohérence et une réelle crédibilité aux plans national et international
- ✓ En lui donnant une taille critique et un champ d'application allant de la recherche fondamentale aux innovations technologiques

Major goals :

- Develop in a coherent way basic research together with industrial applications at national and international levels
- Provide advanced information and communication science and technology education
- Increase the size of Provence academic research in micro-electronics and nanotechnology to fit the level of local industry



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Localization

Marseille



**Université Paul Cézanne
Campus de Saint Jérôme**
Réactivité et diffusion aux interfaces
Microstructures auto-organisées
Nanostructures semiconductrices épitaxiées
Magnétisme
Nanostructuration
Microcapteurs
Théorie, modélisation et simulation



**Université de Provence
Campus de Château Gombert**
Conception de circuits intégrés
Mémoires



**Université de Provence
Campus de Château Gombert**
Dispositifs ultimes sur silicium
Théorie, modélisation et simulation

Toulon



Université Sud Toulon Var
Mémoires
Micro-capteurs
Nanostructuration



ISEN
Conception de circuits intégrés
Dispositifs ultimes sur silicium
Nanostructuration

Presentation

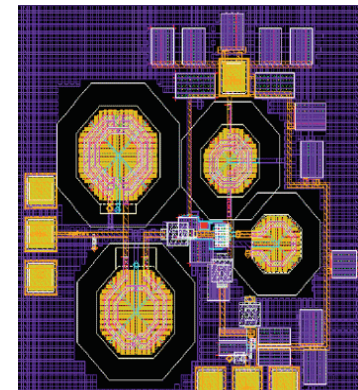
IM2NP

Director : Rachid Bouchakour

Research is performed inside two departments and fourteen teams:

**MATERIALS &
NANOSCIENCES
DEPARTEMENT**

(directors L. Porte, C. Bergman)

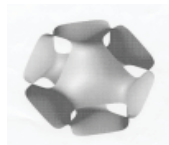
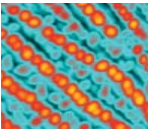
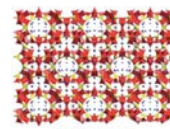
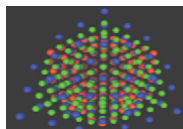
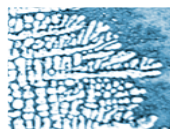
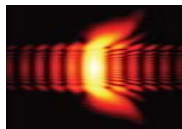
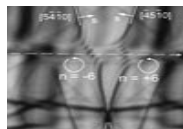


Materials & Nanosciences Department

■ Key Figures

- 8 teams
- 77 Permanents, 29 PhD, 10 post-docs
- 32 PhD et 3 HDR supported (2002-06)

■ Spectrum of activities



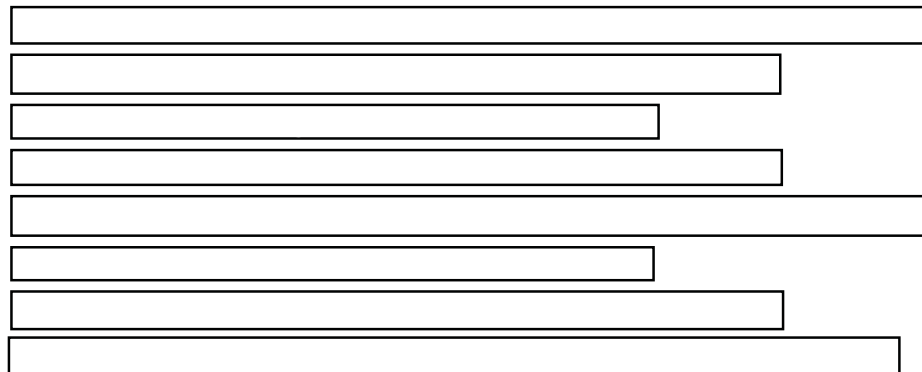
FUNDEMTALS
(physique, chimie)

MATERIALS

DEVICES

DESIGNS

SYSTEMS

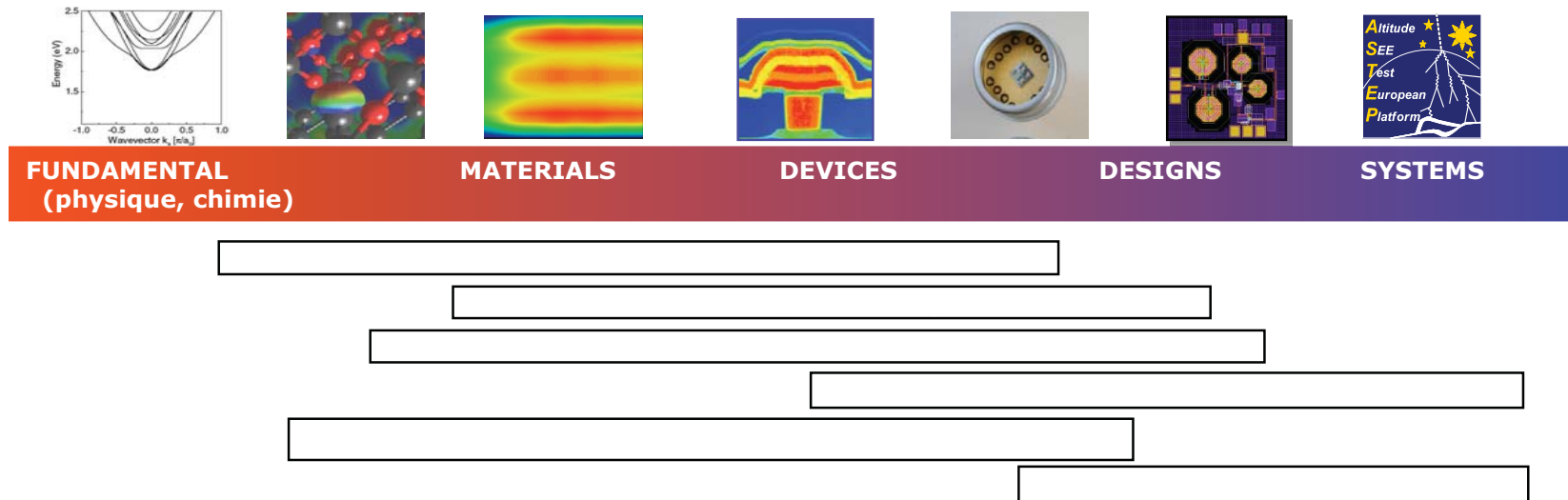


Micro and Nanoelectronics Department

■ Key Figures

- 6 teams
- 69 permanents, 65 PhD, 20 post-docs
- 44 PhD et 12 HDR supported (2002-06)

■ Spectrum of activities



Presentation

- ❑ **Platform CIMPACA :**
Characterization, Design, Micropacks
- ❑ **Platform ASTEP – Plateau de Bure (2552m)**



→ *Caractérisation des composants et circuits dans l'environnement radiatif terrestre naturel (neutrons atmosphériques)*

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2. RFID @ IM2NP

3. Institut Carnot STAR



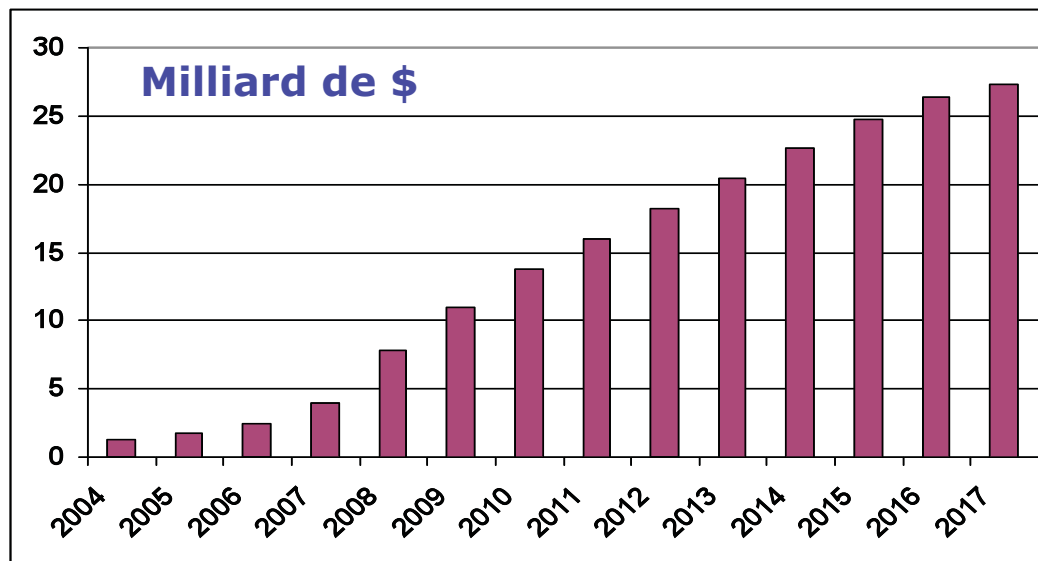
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La RFID : les enjeux

Domaines d'application

- La maîtrise de la chaîne logistique ;
- La lutte contre la contrefaçon ;
- La sécurisation du suivi de produits
- Le suivi du respect des aspects réglementaires liés aux produits.



Technologies

- Tag passifs
- Tag actifs
 - (Wifi, ZigBee, RTLS, ULB)

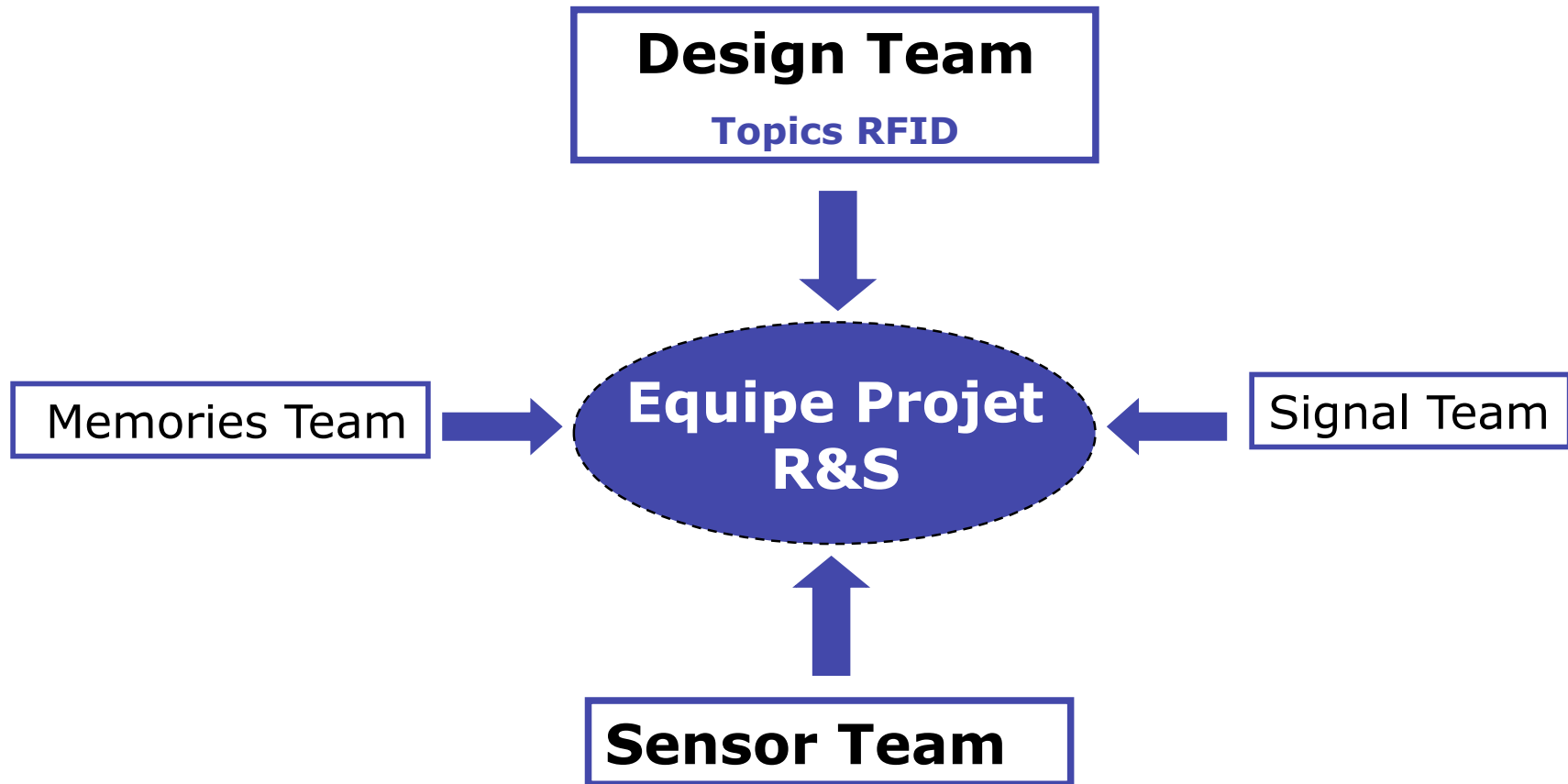
Marché mondial RFID (tag+lecteur) : source IDtechEx

La RFID : les enjeux

✓ Les principaux verrous technologiques

- Les performances et l'adaptation de la technologie utilisée en fonction de l'application ;
- L'interopérabilité, en particulier pour des applications en boucle ouverte ;
- Le coût : actuellement de l'ordre de 15 cents (souhait 5 centimes) ;
- L'industrialisation du « process » d'interconnexion antenne-puce et de packaging adapté ;
- L'amélioration de la sensibilité des « front-end » RF ;
- Le design d'antennes universelles ;
- La gestion de l'énergie dans les puces ;
- La capacité de lecture de tags multiples (en vrac) et le traitement anticollision.

RadioFrequency **ID**entification



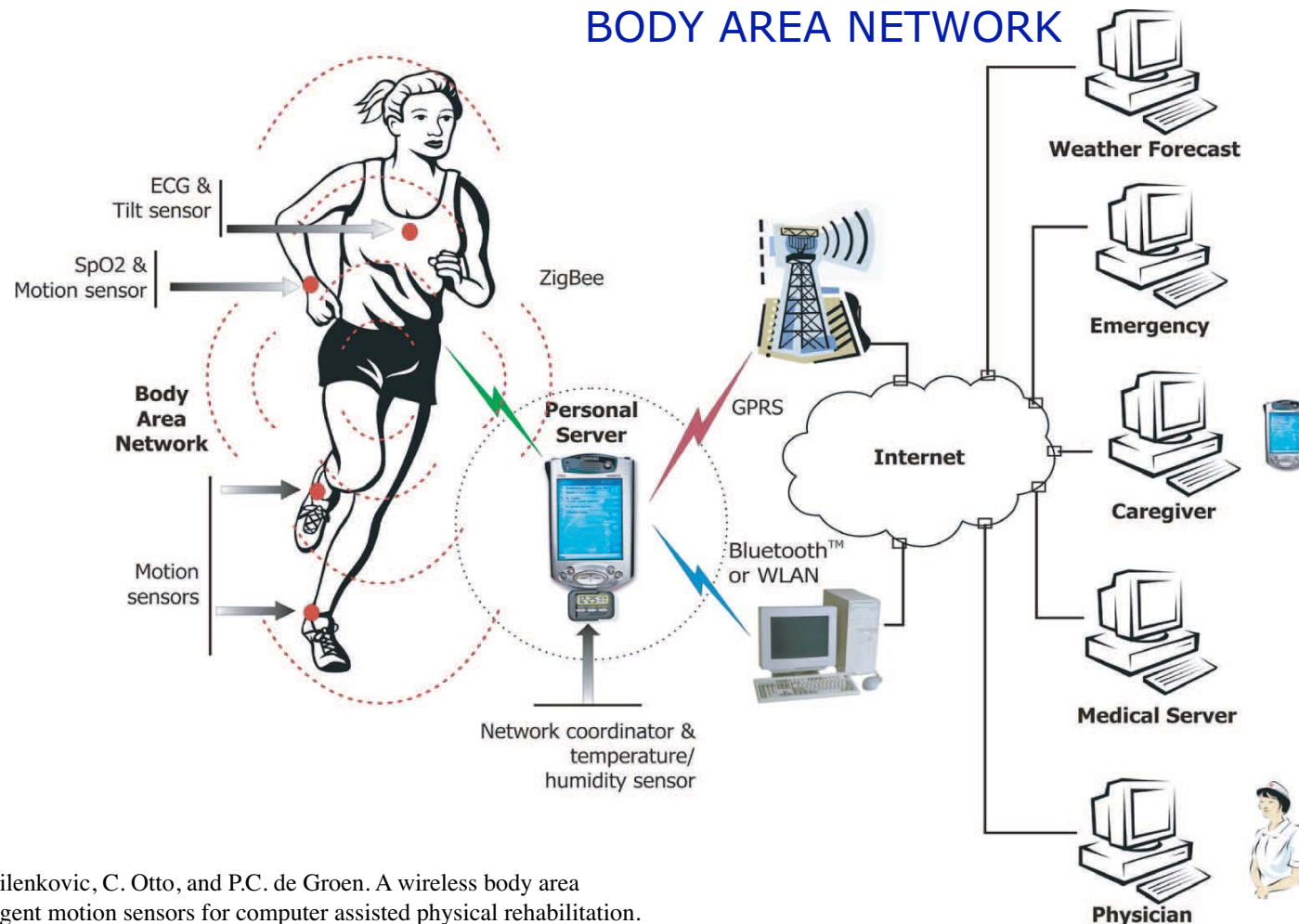
➤ **Lever les verrous technologiques**

- Antennes multistandards ;
- Antennes reconfigurables : (MEMS, composants, circuits RF et BF) ;
- Intégration d'antennes : AOC, AIP ;
- Architectures reconfigurables : SOC, SIP, microsystemes ;
- Méthodologie de co-simulation et de co-design : SIP, SOC
 - antenne/puce/boîtier/PCB support
- Méthodologie de conception « globale »
 - prise en compte de l'environnement, de l'application
 - modélisation (VHDL AMS, SystemC, ..)
- Diminution de la consommation, de la tension de fonctionnement

➤ **Utiliser les nouvelles technologies**

- Polymer : antennes, sensors, transistors
 - Tag design RFID
- Metamatériaux, BIE

Project Research



E. Jovanov, A. Milenkovic, C. Otto, and P.C. de Groen. A wireless body area network of intelligent motion sensors for computer assisted physical rehabilitation. *Journal of NeuroEngineering and Rehabilitation*, 2005

Tag UHF design



Probes measurements

- Chip,
- S11, Power, Vdc
- LabVIEW



Design antennas

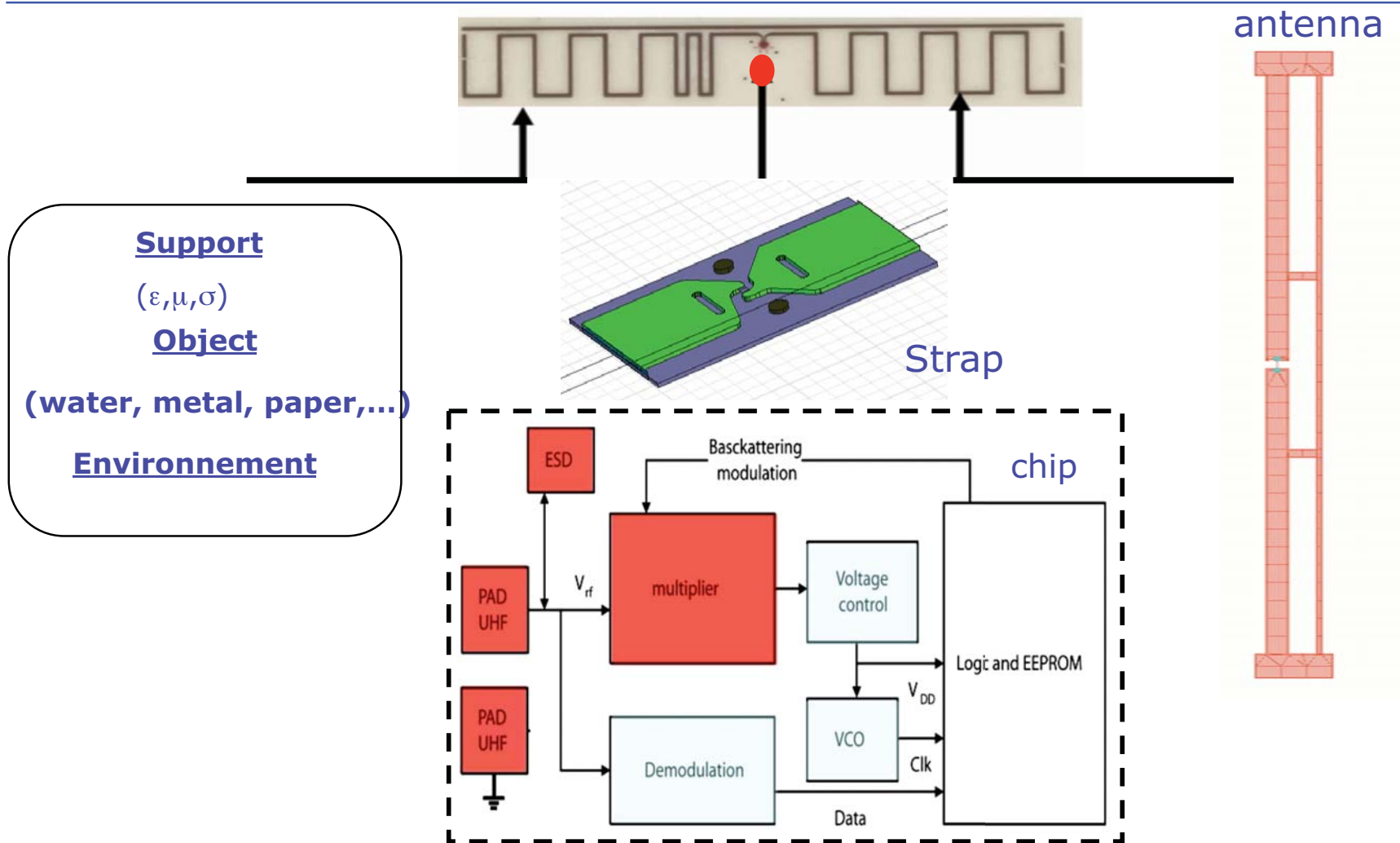
- miniaturization
- ADS, HFSS



Anechoic measurements

- Vdc @ 860-960MHz
- Variation of Vdc
- LabVIEW

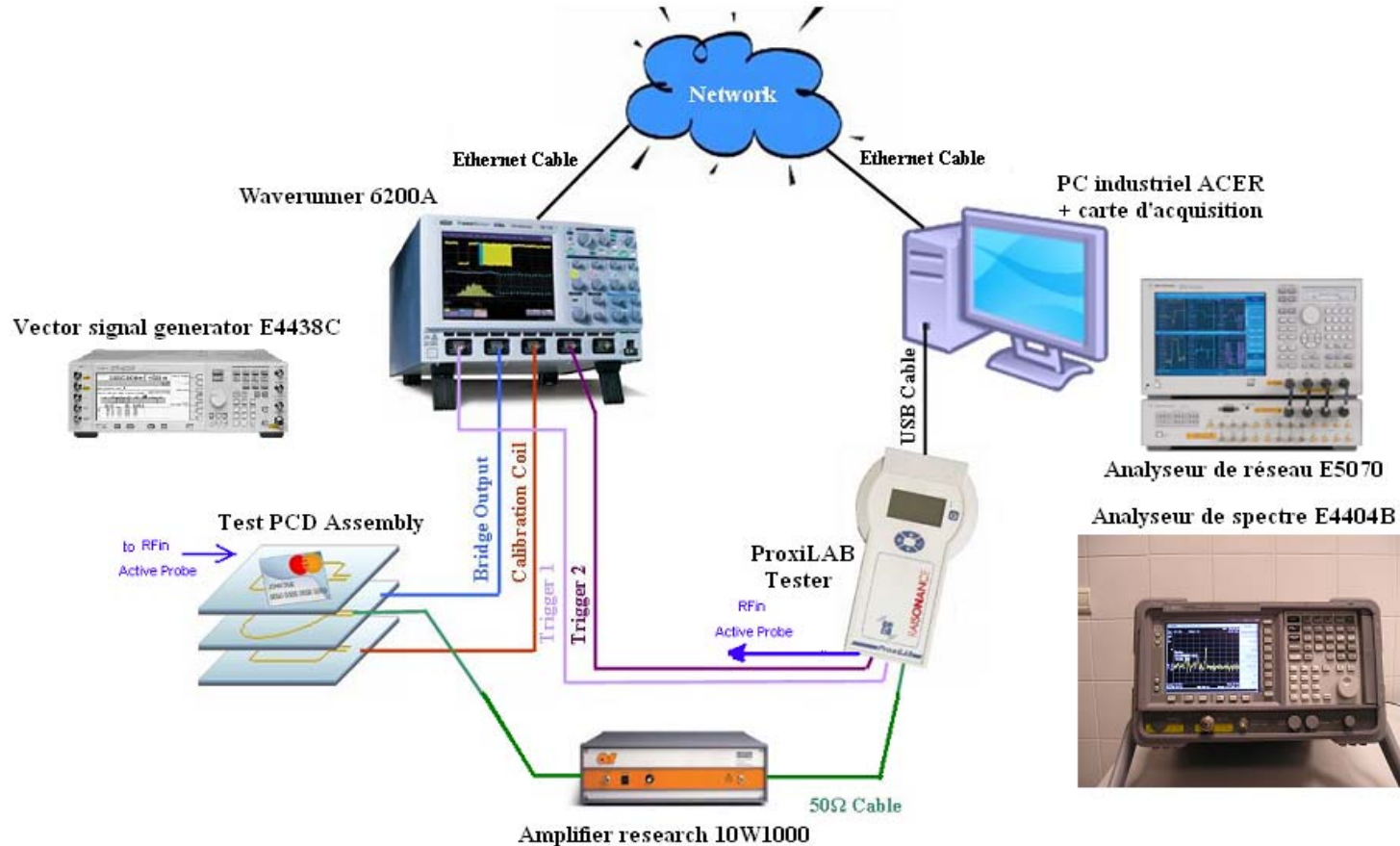
TAG UHF



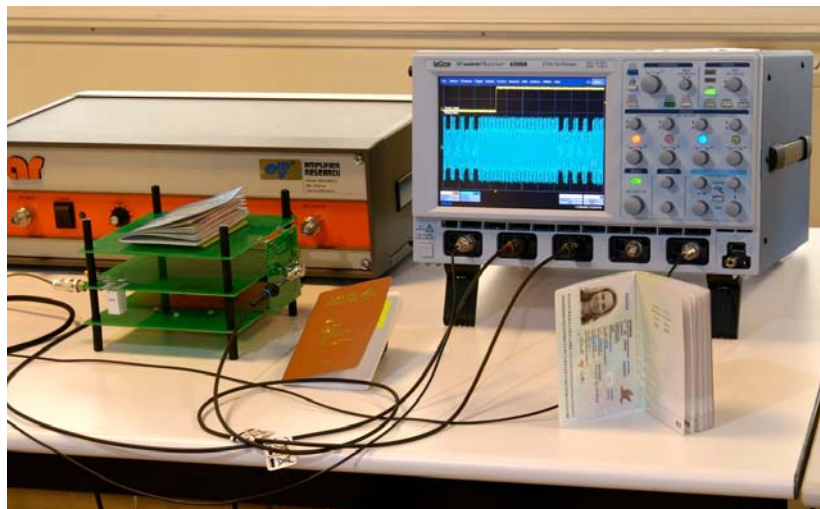
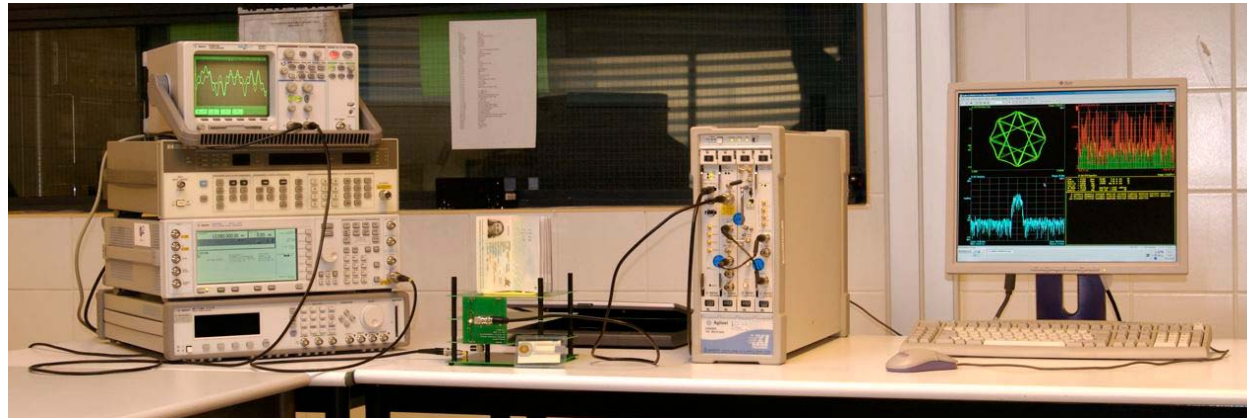
Contactless Proximity Cards

Platform precertification ISO/IEC 14443 et ICAO

Projects : E passport and smartcards

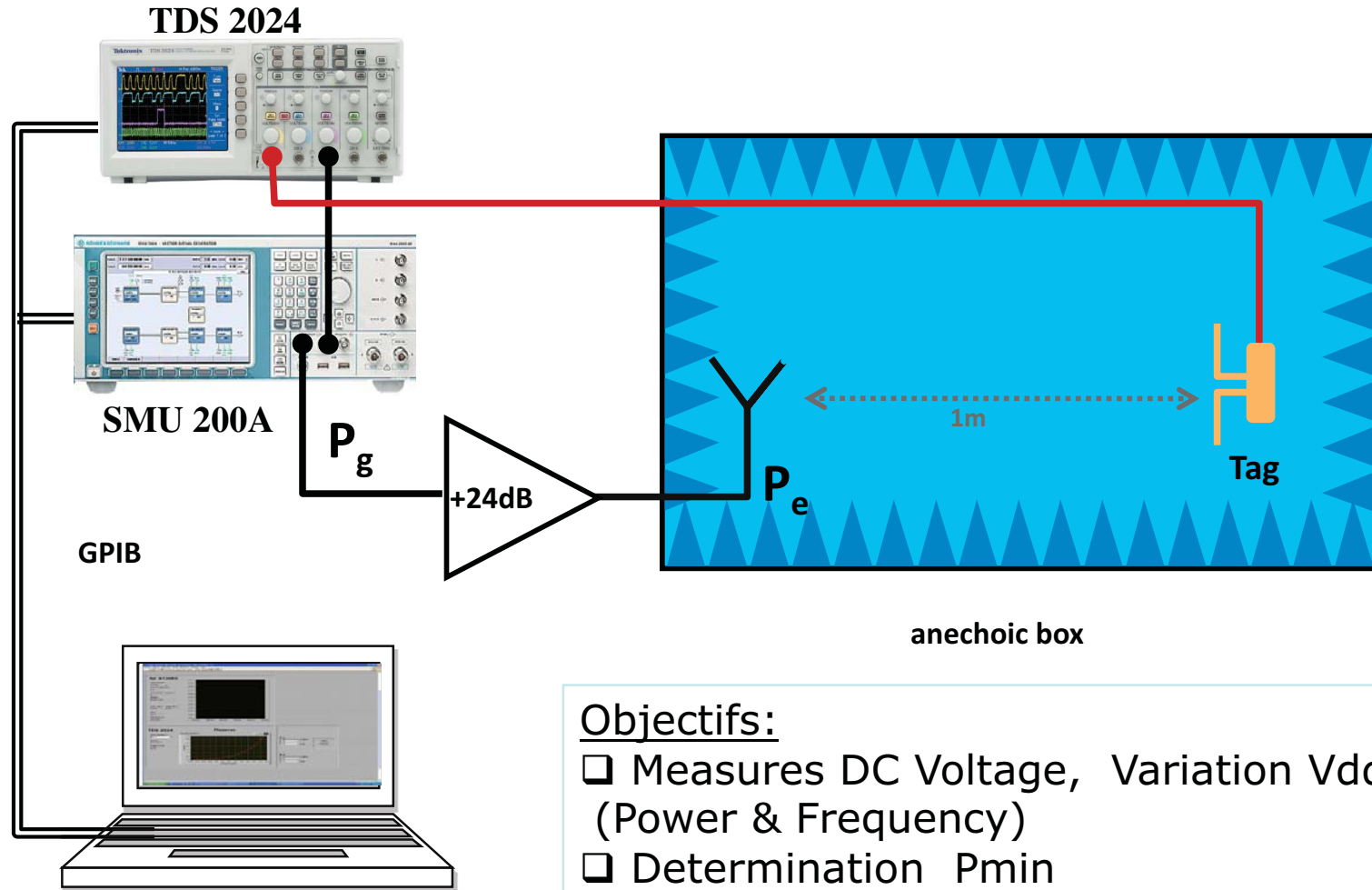


RFID Lab : Localization ISEN TOULON

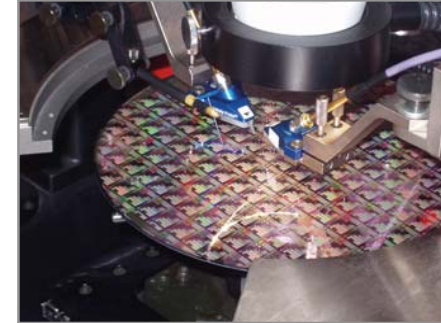
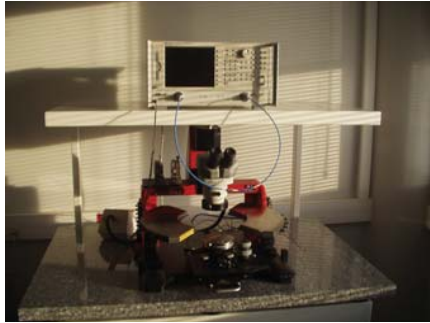


Contact : clau.de.tetelin@isen.fr

Platform precertification UHF

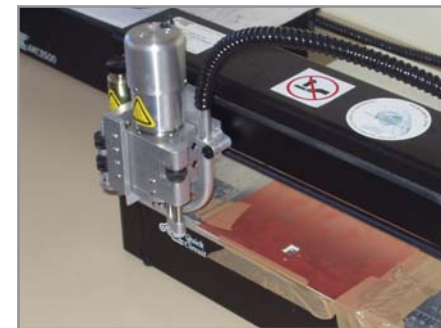


Rfid Lab : Localization Polytech MARSEILLE



Network Analyser Agilent 8720ES
Prober Karl Suse 6''
Probes RF (pitch GS-GSG 100 =>1250 μ)
Spectral Analyser Rhode & Schwartz
Signal generator de signaux Rhode & Schwartz

Signal Analyser Agilent
Anechoic box Siepel
Oscilloscope Agilent
Labview software
....



Contact : philippe.pannier@im2np.fr



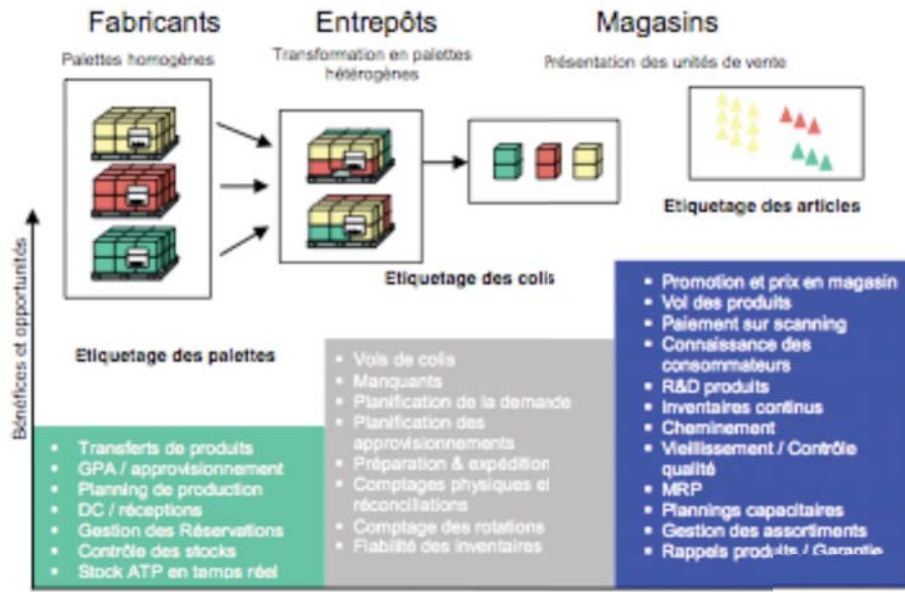
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RFID projects

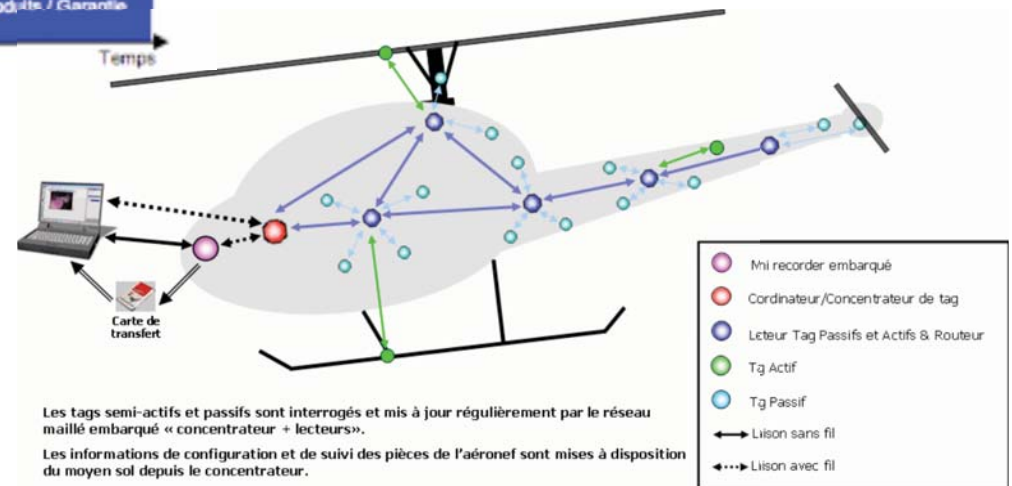
- Contactless Proximity Cards
 - ISO 14443 and 10373-6 tests
 - Simulations vs measurements of Coupled antennas
 - Communication with more than one PICC (specific antenna design, PCD noise level, ...)
 - Attacks and counter-measures
- HF systems (13,56 MHz)
 - Modulations for high data rates
 - Digital programmable PCD
 - New demodulator architecture based on microwave concepts
- UHF and Microwave Systems
 - Antenna design (multi band, large band, UWB, miniaturization)
 - Front End design (tag, reader)
 - Backscattering, BER, Range measures
 - Industrial applications (traceability)

RFID projects



Projet PAC ID-GD (DGE)

Projet RFID- AERO (DGE)



RFID projects

Traçabilité Amont
Origine des produits



Traçabilité Aval
Faire le lien amont-aval



Point Commun: Marquage des UM
(Unités de Manutention)

Identification & traçabilité encircuit fermé

Traçabilité Intrinsèque

Suivi des processus de transformation



Projet TRACE AGRO (OSEO)

Communication
GSM/3G

Vine Box
multi-standards



Lecteur
RFID

GPS



Interface
« matériels »

Industrial Partnerships

- Gemalto (CPC and Sacose)
- ST Microelectronics (CPC, Sacose, PAC id, and STSI)
- SPS (CPC, Vinetag)
- Atmel (CPC)
- ASK (CPC)
- STID (Trace Agro, RFID AERO)
- Editag (Vinetag)
- CEA-LETI (Sacose)
- Shaktiware (Vinetag)
- Inside Contactless (CPC)
- Tagsys (PAC id, improvement of RFID UHF readers and tags)
- JRC Lab Ispra (Italie) (precertification)
- Soliatis (precertification)

Other Relations

CIMPACA MicroPackS, Conception

- E-passport and SmartCards precertification lab is part of the platform
- RF front end optimization

SCS cluster

- Our lab is leader of the Traceability group

CNRFID (RFID National Center)

- Our Lab will be part of the future CNRFID

FILRFID

- National association for RFID usages promotion



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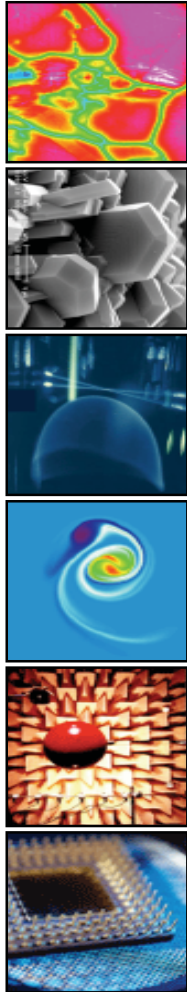
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Science and Technology for Research Applications

Missions

- Take up the main scientific and technological identified challenges of our research fields
- Strengthen our innovation offer by sustaining fundamental projects in order to solve industrial research challenges,
- Develop a strong partnership with both main corporations and small and medium enterprises of our technical fields
- Make up a scientific task force with a world class high level of expertise in the scientific and technological areas



4 Main Topics

- Materials
- Microelectronic and Nanoelectronic
- Mechanics and Energetic
- Information Processing and Systems

4 French « pôles de Compétitivité » clusters

- Secure Communication Solutions
- Capenergies
- Territory risk management and vulnerability
- Sea, security and safety and sustainable development

Université de Provence
 Université Paul Cézanne
 CNRS



Scientific and Technical Capability

STAR Carnot Institute includes laboratories CNRS (7 UMR et 1 UPR)

- LCP, IRPHE, IUSTI, LMA, IM2NP, M2P2, LSIS, PIIM

Key figures

STAFF

- 1000 researchers dont 600 permanents et 400 temporary researchers

Budget

- Contractual Incomes 10 M€
- Global budget 34700 k€

Localization IC STAR



Site de Saint Jérôme



Site de Château Gombert





Institut Matériaux Microélectronique Nanosciences de Provence
UMR 6242 CNRS, Universités Paul Cézanne, Provence et Sud Toulon-Var

Questions !



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