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Microsystems: Applications for RF MEMS

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Strategic Workshop
11 October 2009
Sinaia

MIMOMEMS

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Agenda

- Assystem
- Activities undertaken for the IMT
- Market research findings
  - > Current RF MEMS producers
  - > RF MEMS products
  - > Research topics
  - > New products and research areas
- From research to product
- Options for collaborations

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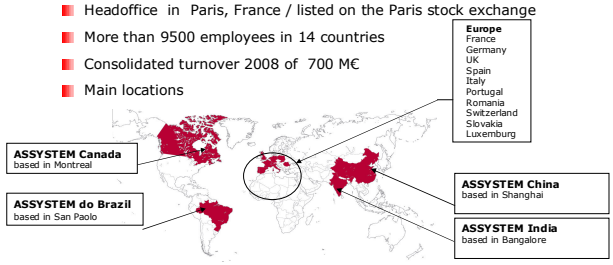
Engineering and innovation consultancy

Assystem is a French public company with an Executive and a Supervisory Board

- Headoffice in Paris, France / listed on the Paris stock exchange
- More than 9500 employees in 14 countries
- Consolidated turnover 2008 of 700 M€
- Main locations



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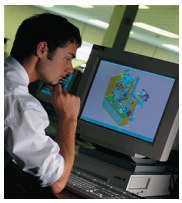
Engineering and innovation consultancy

- Operating in four operational segments:
  - > Product design & development
  - > Process & plant engineering
  - > Technology development & implementation
  - > Operations



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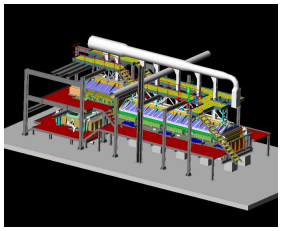
Markets

- Aerospace
- Gas Turbines
- Defence
- Marine
- Nuclear
- Research



Areas of competence

Aerospace engineering

Productivity improvement

Automotive design

Technology transfer

Activities undertaken

MEMS Market Research
- Current companies producing RF MEMS and other MEMS
- Companies supporting MEMS production
- Design tools for MEMS
- News on new products

Workshop May 2009
- To identify potential for product development and projects in Communications antennas, Filters, receivers, Sensor optics, Acoustic devices

Presentation at proposers day in June 2009 in Berlin of the
- EPoSS: European Technology Platform on Smart Systems Integration

Research findings – Current RF MEMS producers

- Mainly US
  - > RADANT, XCom, MEMtronics, Wispry
- Limited number in Europe
  - > Omron (US and Europe), Protron Mikrotechnik, Infineon, SILEX Sweden, Microtec-d
- European producers generally in low volumes
- Key issues on volume production, price and quality reliability issues

Research findings – RF MEMS products

- RF MEMS Switches
  - > Switched capacitors
  - > Tunable RF MEMS switches
- Antennas
  - > Phased Array Antennas
  - > Antenna Subsystems
  - > Radar Beam steering antennas
- Cellular Phones
- RF MEMS in Automated Test Equipment (ATE)

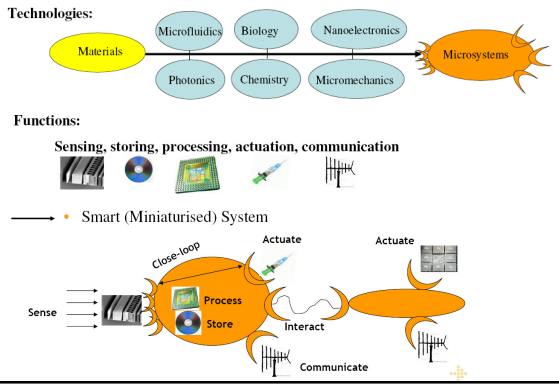
Some current research Sub Wavelength photonics and Plasmonics

- Sub wavelength photonics for use in Microfluidic biosensing
- Plasmonics looking at Surface plasmon polaritons and Optical Antennas
- Micromachined antennas looking at Slot coupled patch antennas
- Micromachined antennas fabricated on GaAs substrates and
- Air spaced micromachined patch antennas

Research findings – New products and research areas

- RF MEMS and RF devices in medical devices especially implants
- Automated test equipment (ATE)
- Automotive applications in airbags, sensors and transport telematics
- Accelerometers and motion altitude devices
- RF MEMS in Microfluidic biosensing

From research to product



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From research to product

Research areas	Example applications	Potential projects with support needed in:
Communications antennas, filters, receivers	Antenna for vehicle telematics	Signal processing electronics Packaging
Sensor optics	Chemo optical Bio photonics Optofluidics	Chemical Biochemical /DNA sensing Packaging
Acoustic devices	Filters for 4G communication	Packaging Signal processing

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Project proposals

	Title	Content	Desired outcome
1	WBG	Micro and nano technologies based on wide band gap materials	Future transmitting, receiving and sensing systems Nanosystems for safety and security applications
2	Lab on chip	New biosensor systems based on micro machined acoustic resonators	Lab on a chip with high sensitivity and wireless data transmission
3	Energy harvesters	New family of energy harvesters based on nanostructures	
4	GHz communication	Development of acoustic resonators and filters based on III-nitrides, working in the GHz frequency range	This involves micromachining and nanolithography and the integration of HEMT transistors with GaN/Si acoustic resonators and filters
5	THz receiver modules	Millimetre wave sub-millimetre and THz wave receiver modules	Tranceiver Receiver modules
6	Space arrays	Reconfigurable micro machined filter arrays	Transmitter/receivers

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