MIMOSA

MIcrosystems platform for Mobile Services and Applications

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WP5 – Dissemination and Networking

Deliverable report

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Approvals

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Documents history

Revision	Date	Modification	Author
V0	22/11/05	Set of documents provided by LAAS-CNRS	A. DRAGOMIRESCU
V1	24/11/05	Integration of LAAS documents	C. ROBET

Content

1 Event details

Title:	**TUTORIAL AMBIENT INTELLIGENCE**
Date:	9 and 10 March, 2006
Location:	LAAS/CNRS Toulouse, France
URL:	http://www2.laas.fr/laas/1-5414-MIMOSA.php
Contact :	Dr. Daniela DRAGOMIRESCU (daniela@laas.fr)
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2 Event agenda

March 9, 2006

09:00 am - 09:30 am : Registration

09:30 am - 10:00 am : Opening talk

Pr. Adrian IONESCU - EPFL, Lausanne, Switzerland - MIMOSA WP5 Leader
Pr. Jacques GRAFFEUIL - LAAS/CNRS, Toulouse, France - Head of Doctoral School on Electronics and Telecommunications

10:00 am-12:00 a.m : Ambient Intelligence Tutorial Review

Dr. Marketta NIEMELA - VTT Information Technology, Tampere, Finland

12:00 am - 01:30 pm : Lunch break

01:30 pm - 03:45 pm : Technology Integration Platform

Dr. Xavier GAGNARD - ST Microelectronics, Crolles, France

03 :45 pm - 04 :00 pm : Coffee break

04:00 pm- 05:00 pm : Above and In-IC RF MEMS

Pr. Adrian IONESCU - EPFL , Lausanne, Switzerland

March 10, 2006
09:30 - 11:00 am : RFID Technology – State of the art (Part One) Dr. Timo VARPULA - VTT Information Technology, Tampere, Finland
11:00 am – 11:15 am : Coffee break
11:15 - 12:00 am : RFID Technology – State of the art (Part Two) Dr. Timo VARPULA - VTT Information Technology, Tampere, Finland
12:00 am - 01:30 pm : Lunch break
01:30 pm - 3:30 pm : Wireless Sensor Networks for Environmental Monitoring Applications Pr. Masateru MINAMI - Shibaura Institute of Technology, Tokyo, Japan
03:30 - 03:45 pm : Coffee break
03:45 – 05:45 pm : Smart Sensor System Architecture in MIMOSA Dr. Iiro JANTUNEN, Nokia Research Center, Finland

3 Tutorial organisation

Technical Committee	Dr. Daniela DRAGOMIRESCU - LAAS/CNRS, Toulouse, France Pr. Adrian IONESCU - EPFL, Lausanne, Switzerland
Organizers	LAAS/CNRS, Toulouse, France ❖ Dr. Daniela DRAGOMIRESCU, ❖ Brigitte DUCROCQ
Student registration :	Brigitte DUCROCQ, LAAS/CNRS, Toulouse, France (ducrocq@laas.fr) Already 10 students registered

4 Tutorial content & summaries

4.1 Ambient Intelligence Tutorial Review

Speaker : Dr. Marketta NIEMELA – VTT Information Technology, Tampere, Finland

Definition :

- Background and motivation
- Visions and scenarios
- Current technologies and applications
- Challenges

The presentation aims to answer to such questions as :

- What is Ambient Intelligence?
- How is it related to Ubiquitous Computing and Pervasive Computing?
- Why do we have Ambient Intelligence research and development?
- What is the short history of the concept, and what are we hoping to gain with it?
- How is Ambient Intelligence thought to be realised in the future?
- What is the state of the art of Ambient Intelligence?
- Do we already have applications that could be called instances of Ambient Intelligence?
- What problems are we going to face and how should they perhaps be solved ?

4.2 Technology Integration Platform

Speaker : Dr. Xavier GAGNARD, ST Microelectronics, Crolles, France

- Integration methodology
- Analyze & define the best choice for the integration of demonstrators
- Ensure the compatibility of the technologies used for the demonstrators
- Development of each discrete component in a way that allows the best future integration of the device
- Evaluation of the relevance of the various strategies possible for integration
- SOI platform
- Packaging platform
- Polymer platform
- Demonstrate the benefit of the MIMOSA developments in term of technology integration

In the MIMOSA project, one important task is the Integration methodology. In cooperation with MIMOSA partners, we analyse & define the best choice for the integration of demonstrators and to ensure the compatibility of the technologies used for the demonstrators.

The prospect is to foster the development of each discrete component in a way that allows the best future integration of the device. Within a work package, the integration partners evaluate, according to each application, the relevance of the various strategies possible for integration.
We will explain the different scenario developped like SOI platform, packaging platform or polymer platform. For each platform, we will try to demonstrate the benefit of the MIMOSA developments in term of technology integration.

4.3 Above and in-IC RF MEMS

Speaker: Pr. Adrian IONESCU, EPFL, Lausanne, Switzerland

- RF MEMS presentation : switches, passives, resonators, transmission lines and antennas
- Above- and In-IC integration of RF MEMS is foreseen in direct connection with the use of these devices in RF and in wireless applications
- Design of a reconfigurable transceiver for GPS, local/home level, 3G mobile terminals with respect to power consumption

- ***Two problems:***
  - Monolithically integrate the MEMS device with the electronics
  - Ensure full operational compatibility (voltages, current, impedance) between MEMS and IC
- ***The technological point of view :***
  - most part of RF MEMS switches and/or passive devices fabrication requires surface micro-machining → integration with CMOS active devices is achievable

RF MEMS looks attractive for RF IC telecommunication applications, especially wireless, because they offer: (i) device and system miniaturization, (ii) integration above- and in- ICs and lower costs, (iii) power savings, (iv) novel integrated functionality together with high performance (supporting, for instance, future reconfigurable mobile communication systems and (v) better reliability in harsh environment.

One challenge for the future is to design a reconfigurable transceiver dedicated to different applications such as GPS, local/home level, 3G mobile terminals. In this case, particular attention is paid to the power consumption of the building blocks of the transceiver where RF MEMS could significantly contribute. Typical device blocks such as switched capacitors arrays, switched inductors arrays, will be used in order to achieve reconfiguration of key analog blocks such as filters, Voltage Controlled Oscillators (VCOs), impedance matching circuits, etc. Particular gains and advances in terms of real new MEMS-adapted transceiver architectures can be made by the use of recently demonstrated MEMS resonators.

Above- and In-IC integration of RF MEMS is foreseen in direct connection with the use of these devices in RF applications and especially in wireless. It raises two basic

problems: (i) to monolithically integrate the MEMS device with the electronics (avoid

wiring between two separate dies) and (ii) ensure full operational compatibility (voltages, current, impedance) between MEMS and IC.

From the technological point of view, because most part of RF MEMS switch (contact or contact-less) and/or passive devices fabrication requires surface micro-machining, integration with CMOS active devices is achievable: Use of materials such as metals (Al, Au, AlCu, Cu, Ni, Pt, W) or polysilicon for both suspended and fixed membranes/cantilevers and of sacrificial layers (1-10mm) such as polymers (polyimide), SiO2 or silicon, are the most versatile solutions for above- and in-IC integration. Above- and In- IC RF MEMS process also requires a low-temperature (<400°C) budget and tight control of the degradation of the electrical characteristics of associated electronics.

4.4 RFID Technology – State of the art

Speaker: Dr. Timo VARPULA - VTT Information Technology, Tampere, Finland

- RFID systems and techniques are presented
- RFID applications, limitations and recent developments are discussed
- Regulations, standards, frequency ranges and communication protocols are addressed
- Present and future trends in RFID and in physical browsing are discussed

Different RFID systems and techniques are introduced. Their applications, limitations and recent developments are discussed. Regulations, standards, frequency ranges and communication protocols are addressed. Present and future trends in RFID and in physical browsing are surveyed and discussed.

4.5 Smart Sensor System Architecture in Mimosa

Speaker: Dr .Iiro JANTUNEN - Nokia Research Center, Finland

- Definition of smart sensor systems

- Open architecture for smart sensors in Mimosa with public and open Simple Sensor Interface (SSI) protocol
- Open networking between sensors and terminals with nanoUDP/nanoIP protocol
- Mimosa - a flexible architecture for smart sensors over wired or wireless connection
- Bluetooth LEE (low end extension) as a radio interface for smart sensors

Definition of smart sensor systems. Open architecture for smart sensors in Mimosa with public and open Simple Sensor Interface (SSI) protocol. Open networking between sensors and terminals with nanoUDP/nanoIP protocol. Open source implementations of SSI and nanoUDP/nanoIP and open APIs for developing applications using smart sensors in Symbian phones or Linux. Mimosa - a flexible architecture for smart sensors over wired or wireless connection. Bluetooth LEE (low end extension) as a radio interface for smart sensors. RFID sensor tags implemented.

5 Tutorial poster

MIMOSA
MAKE AMBIENT INTELLIGENCE A REALITY

TUTORIAL AMBIANT INTELLIGENCE
9 and 10 March, 2006
LAAS/CNRS, Toulouse, France
organized by IP-Mimosa
sites : http://www2.laas.fr/laas/1-5414-MIMOSA.php http://www.mimosa-fp6.com

TUTORIAL AGENDA

9 March, 2006

9 a.m-9.30 a.m : Registration
9.30 a.m-10. a.m : Opening Talk
Pr. Adrian IONESCU - EPFL, Lausanne, Switzerland - MIMOSA WP5 Leader
Pr. Jacques GRAFFEUIL - LAAS/CNRS, Toulouse, France - Head of Doctoral School on Electronics and Telecommunications
10 a.m-12 a.m : Ambient Intelligence Tutorial Review
Dr. Marketta NIEMELA - VTT Information Technology, Tampere, Finland
12 a.m to 1.30 p.m : Lunch
1.30 p.m-3.45 p.m : Integration Technology Platform
Dr. Xavier GAGNARD - ST Microelectronics, Crolles, France
3.45-4 p.m : Coffee break
4p.m-5 p.m : Above and In-IC RF MEMS
Pr. Adrian IONESCU - EPFL , Lausanne, Switzerland

10 March, 2006

9.30-11. a.m : RFID Technology - State of the Art - Part One
Dr. Timo VARPULA - VTT Information Technology, Tampere, Finland
11. a.m-11.15 a.m : Coffee break
11.15-12. a.m : RFID Technology - State of the Art - Part Two
Dr. Timo VARPULA - VTT Information Technology, Tampere, Finland
12 a.m to 1.30 p.m : Lunch
1.30 p.m-3.30 p.m : Wireless Sensor Networks for Environmental Monitoring Applications
Pr. Masateru MINAMI - Shibaura Institute of Technology, Tokyo, Japan
3.30-3.45 p.m : Coffee break
3.45 p.m-5.45 p.m : Smart Sensor System Architecture in Mimosa
Dr. Iiro JANTUNEN, Nokia Research Center, Finland

Technical Committee :
Dr. Daniela DRAGOMIRESCU - LAAS/CNRS, Toulouse, France
Pr. Adrian IONESCU - EPFL, Lausanne, Switzerland
Organizers : **LAAS/CNRS, Toulouse, France : Dr. Daniela DRAGOMIRESCU, Brigitte DUCROCQ**
Student registration : Brigitte DUCROCQ, LAAS/CNRS, Toulouse, France : ducrocq@laas.fr

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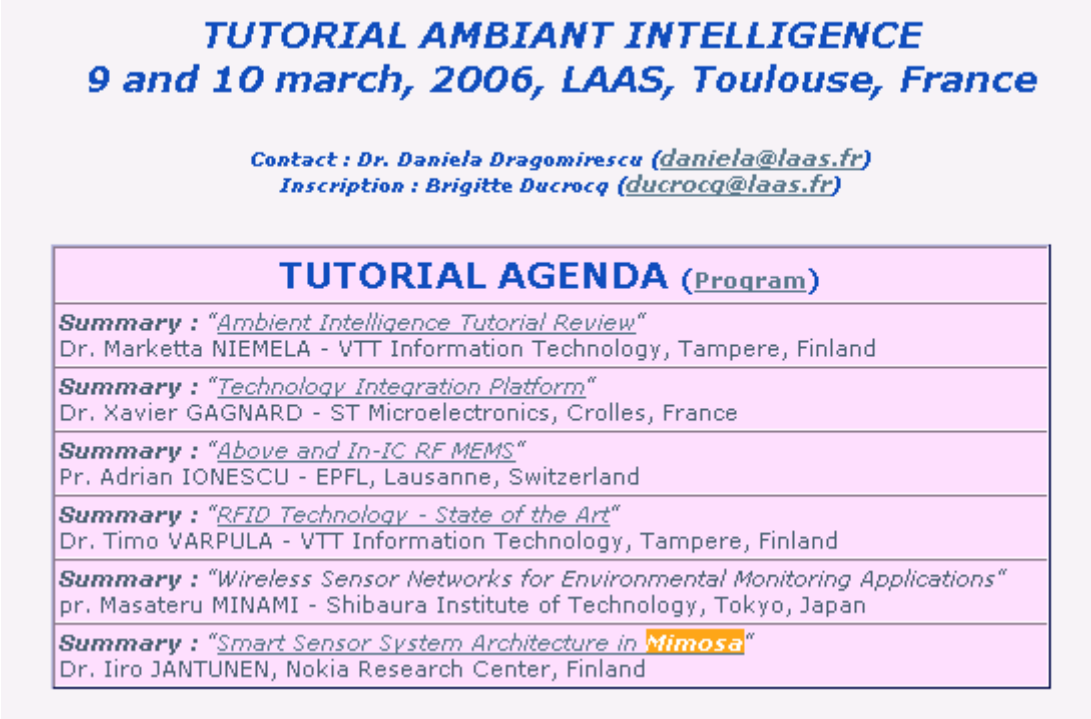
6 Internet reference :

http://www2.laas.fr/laas/1-5414-MIMOSA.php



TUTORIAL AMBIANT INTELLIGENCE
9 and 10 march, 2006, LAAS, Toulouse, France

Contact : Dr. Daniela Dragomirescu (daniela@laas.fr)
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TUTORIAL AGENDA (Program)

Summary : *"Ambient Intelligence Tutorial Review"* Dr. Marketta NIEMELA - VTT Information Technology, Tampere, Finland
Summary : *"Technology Integration Platform"* Dr. Xavier GAGNARD - ST Microelectronics, Crolles, France
Summary : *"Above and In-IC RF MEMS"* Pr. Adrian IONESCU - EPFL, Lausanne, Switzerland
Summary : *"RFID Technology - State of the Art"* Dr. Timo VARPULA - VTT Information Technology, Tampere, Finland
Summary : *"Wireless Sensor Networks for Environmental Monitoring Applications"* pr. Masateru MINAMI - Shibaura Institute of Technology, Tokyo, Japan
Summary : *"Smart Sensor System Architecture in Mimosa"* Dr. Iiro JANTUNEN, Nokia Research Center, Finland