

Honeywell Romania Sensors and Wireless Lab Bucharest

Octavian Buiu

Honeywell



Honeywell's Diverse Businesses....

Honeywell

*A Fortune 100 company that invents and manufactures technologies to address tough challenges linked to global macrotrends: **safety, security, and energy***

Specialty Materials



- Light weight armor materials for body, vehicle and structure protection;
- Electronic materials;
- Advanced Fibers and Composites

Automation and Control Solutions



- Security & Access Control
- Video Monitoring
- Fire & Safety
- HVAC & Security
- Applications & Products

Transportation



- Standby Power Systems
- Turbo Chargers

Aerospace



- Safety of Flight Products
- Flight Control Systems
- Flight & Voice Recorders
- Aircraft Data Management
- Mechanical Systems / Engines

**\$ 33 Billion
2010 Sales**

Honeywell Research Organization

Honeywell

Aerospace



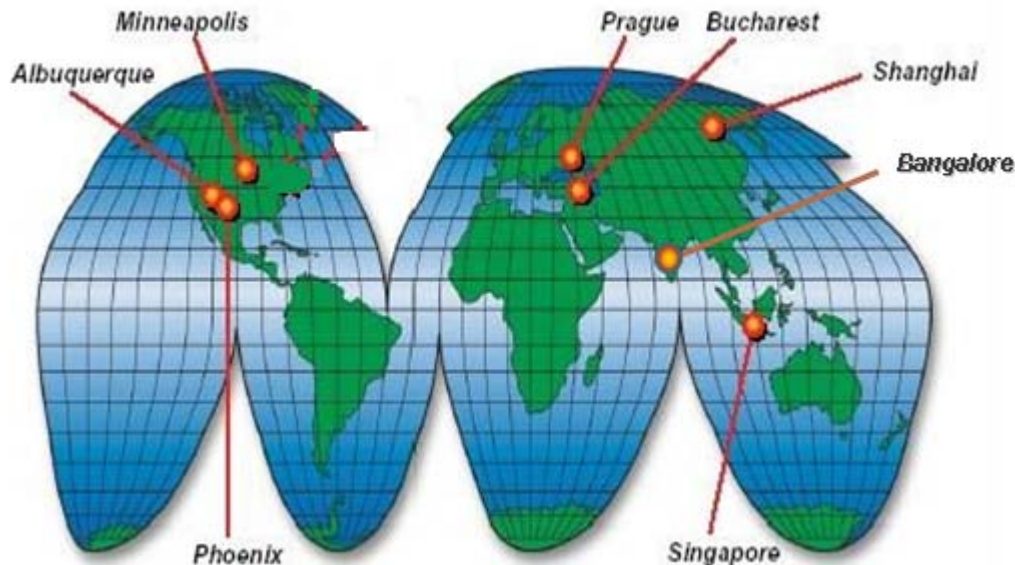
Automation & Control Solutions



Specialty Materials



Transportation Systems



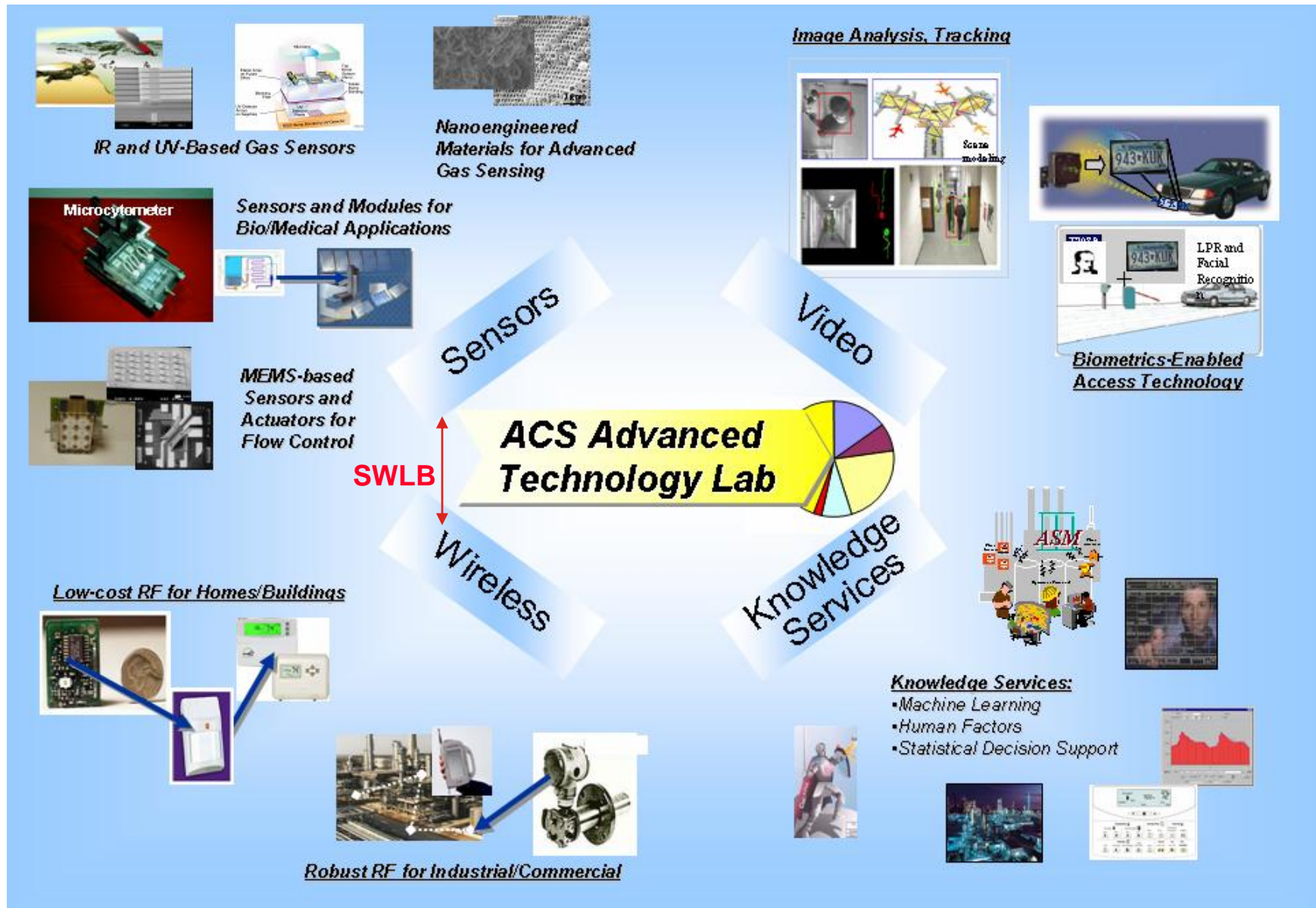
Honeywell Labs Worldwide

- **Advanced R&D supporting all business segments;**
- **Approx. 19,000 researchers & eng. across the globe; 24/7 global R&D cycle**

Over \$750 million spent annually on R&D

Honeywell ACS Labs - 4 Thrusts

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ACS-Sensors & Wireless Global Labs

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Minneapolis, MN

- MEMS, Microsystems, Wireless, Nanotechnology
- US Government funded research programs
- Ties to top US universities

Bucharest, Romania

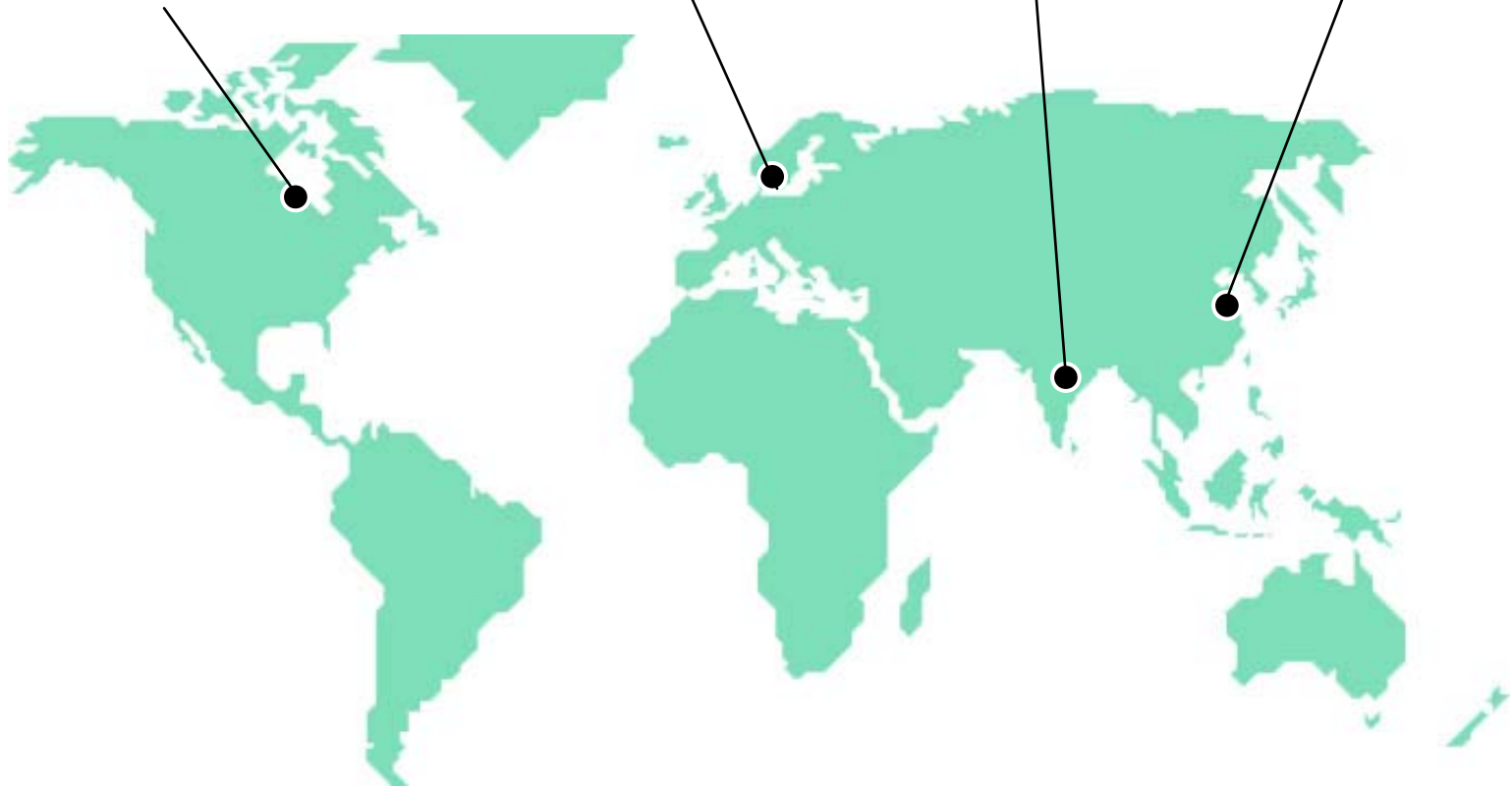
- SAW, Nanotechnology
- EU/RO funded research programs
- Ties to top European universities

Bangalore, India

- Wireless technologies research and development

Shanghai, China

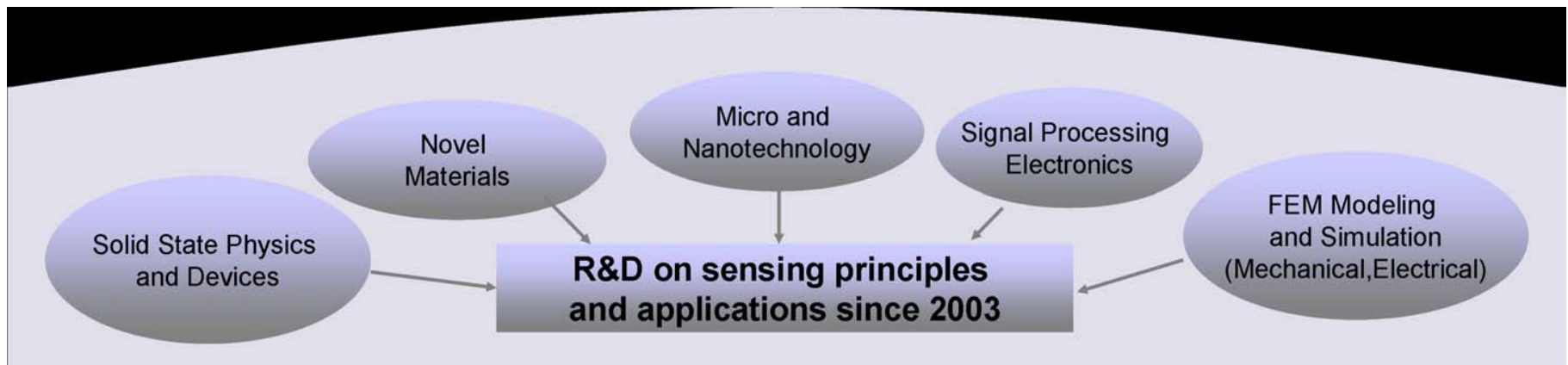
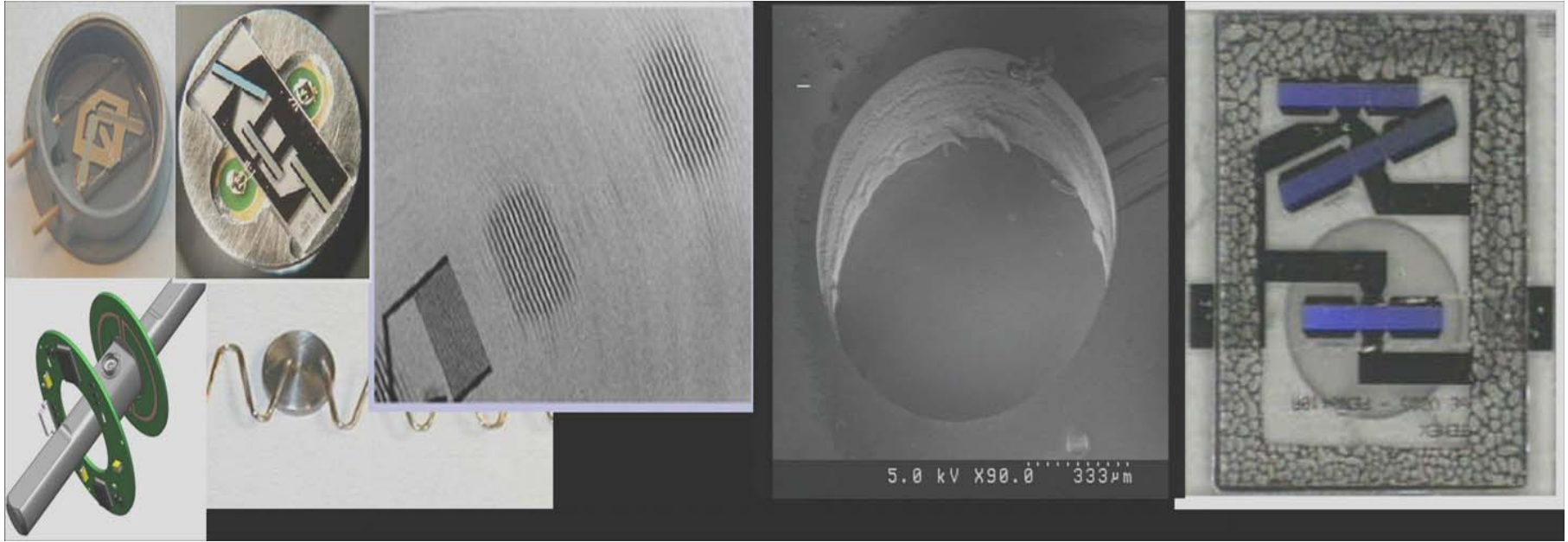
- Biomedical Sensors, Magnetics, Energy harvesting
- Ties to top Chinese universities



Global talent developing next generation of sensors and wireless technologies for ACS

Sensors & Wireless Laboratory Bucharest

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- **High efficiency low cost solar cells (nano-technology enabled)**
 - nano-material research and characterization
 - low cost thin film technology for device realization
 - electrical and optical assessment of the solar cell
- **Wireless sensing platforms**
 - new nano-materials and technologies for low cost sensor realization
 - new concepts for wireless sensors interrogation
- **Harsh Environment Sensing**
 - nano-material research and characterization
 - new concepts and technologies for sensor realization
- **Computer Modelling and Simulation at Nano Scale**
- **Next generation of NEMS-MEMS gas sensing**
 - new sensing (nano) materials and their preparation
 - new concepts for NEMS/MEMS realization and their proof of concept
 - enhanced sensitivity and selectivity by nano-material/sensor design

*New nano-materials and nano-processes for
next generation products*

SWLB - People

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15 People:

- 14 active in R&D
- 1 Admin Support

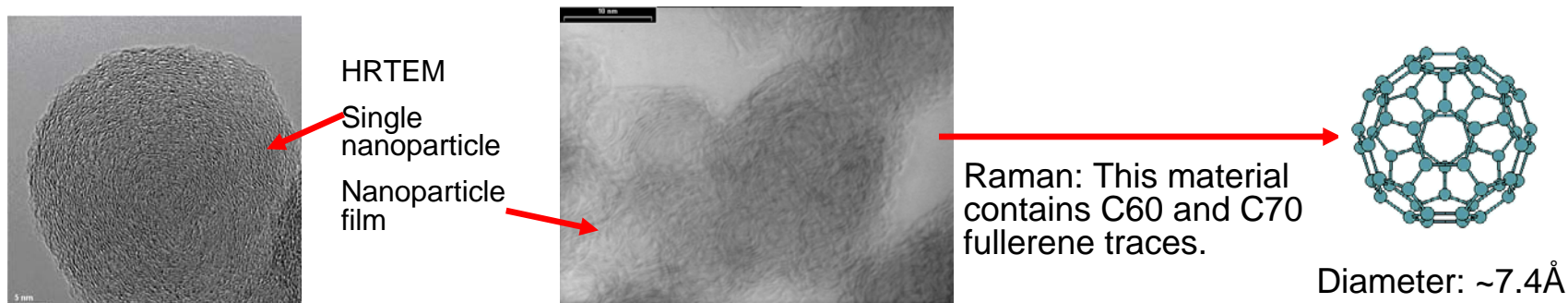
Background:

- Physics
- Chemistry
- Microelectronics
- RF engineering
- Mathematics
- Computer science

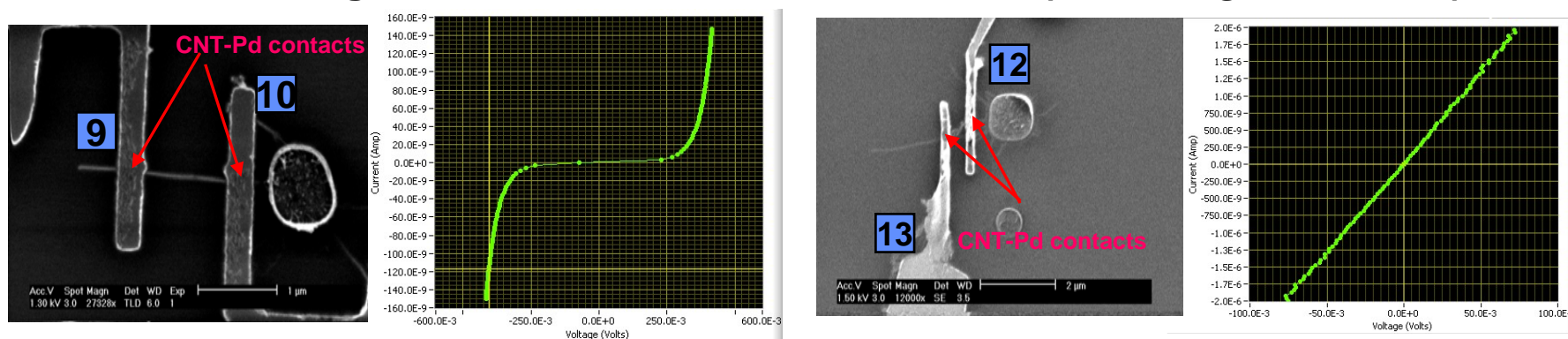
Nanomaterials characterization in SWLB

2004: Disruptive sensing concept: use noise to sense molecules

- Measurements on: Carbonic nanoparticles with C60 traces (*INLPRP-Bucharest*)



2005: Individual Single Walled CNT – Palladium Contact (Cambridge Univ., UK)



2005: European project CANOES (CNT for Optoelect. Appl. and Sensing),
Partners: EPFL- Lausanne, U. of Cambridge, Honeywell Sensor Lab-Bucharest

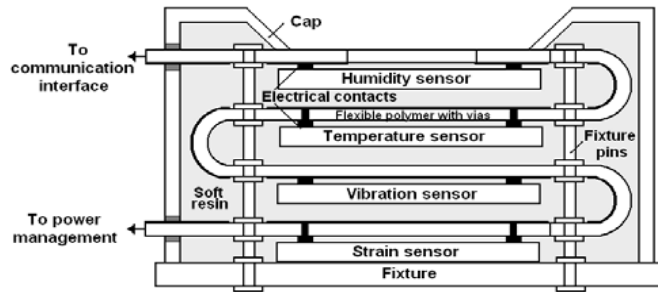
2005: Horizon III-Start Molecular Dynamics Simulation CNT – gas for sensing

Participation in EU projects

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FP6 (2006-2009): Completed

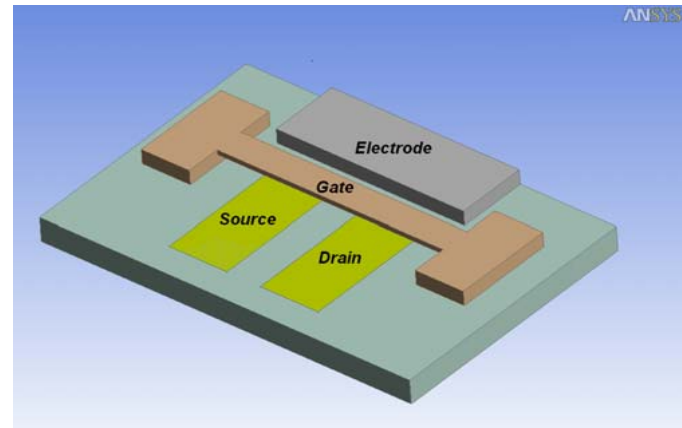
- 3-D-Integrated Micro/Nano Modules for Easily Adapted Applications
- Infineon, NXP (Philips), Thales, Honeywell and several academic EU organizations



SHCMA chips/sensors mounted on a flexible polymer tape

FP7 (2008-2011) – On-going

- Hybrid Nano-Electro-Mechanical IC Systems for Sensing and Power Management Applications
- No. 1 out of 160 proposals at the nanotechnology section
- Nanomaterials synthesis for gas sensing



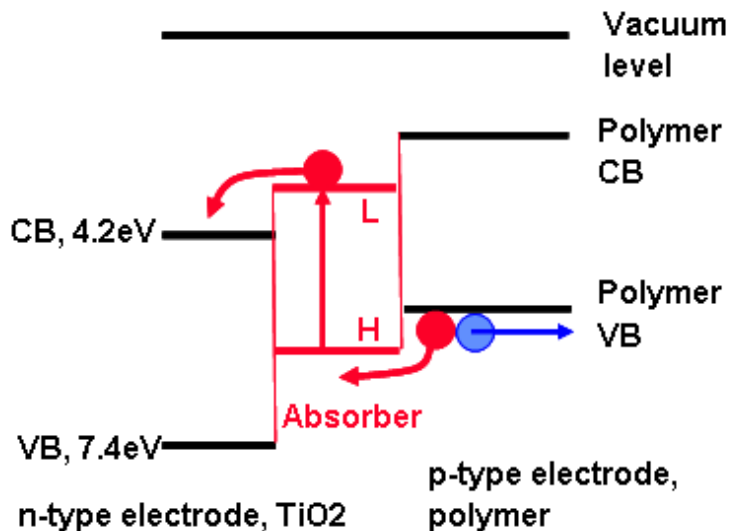
EU programs - excellent opportunity for public-private research partnership in Europe

Participation in EU / RO Structural projects

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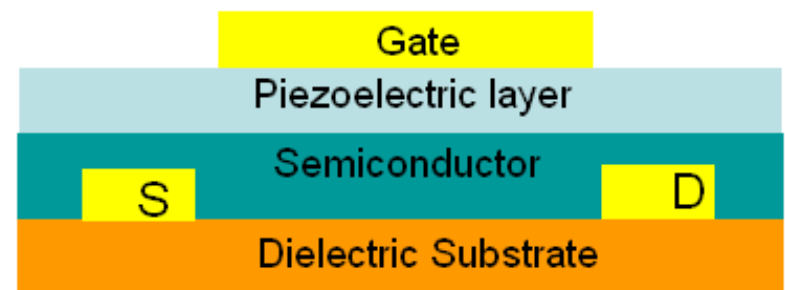
NOVOCELL - Nano-photovoltaic Solar Cell;

- Dye Sensitized Solar Cell using organic hyperpolarizable molecules (HM) as photon absorbers (chromophores);



VIPRES - Vibration/Pressure Sensor for Industrial Asset Monitoring

- Low cost-high sensitivity vibration sensors/arrays integrating the piezoelectric materials with thin film transistors (FET) or nanowires-field effect transistors (NW-FET);



Romanian Structural funding - excellent opportunity for public-private research partnership in Romania

SWLB and the RO R&D community

- **Strategic Partnership with IMT Bucharest (National Institute for R&D in Microtechnologies) on:**
 - Joint EU/RO funded projects;
 - Access to technological facilities;
 - Agreement on IP issues;
- **Joint submission on EU and RO funded research projects:**
 - HITSENZ (High Temperature Sensors) Project Proposal: submitted in February 2008;
 - Consortium: HON, INCDFM (National R&D Institute for Materials Physics), ICF (Romanian Academy Institute for Physical Chemistry), UPB (Univ. Politehnica Bucharest)
- **Participation at projects and scientific events organized by the “Nano” community**
- **Partnerships for technological services (including new developments) with Institutes and R&D groups from Universities:**
 - INCDFM
 - ICF,
 - “Politehnica” University of Bucharest

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www.honeywell.com

