A European centre of excellence in ICT research (radio-frequency and opto) in Bucharest, Romania

IMT-Bucharest (National Institute for Research and Development in Microtechologies, www.imt.ro) was the first institute of this kind in Eastern Europe (founded in 1993). Up to now IMT was or it is involved in about 20 projects in FP6 and FP7. At the national level, IMT is the coordinator of a few technological networks, and a Science and technology park in micro- and nanotechnologies, MINATECH-RO (**www.minatech.ro**).
IMT is developing a "centre" of RF and Opto MEMS called "*European Centre of Excellence in Microwave, Millimetre Wave and Optical Devices, based on Micro-Electro-Mechanical Systems for Advanced Communication Systems and Sensors*" *(MIMOMEMS)*, according to a project financed (2008-2010) through the "Regional potential" part (REGPOT call 2007-1) of the European Framework Pogramme (FP7). The coordinator is Dr. Alexandru Muller (alexandru.muller@imt.ro).

The project is related to a few selected **new niche research topics** from the areas of RF-MEMS and Optical-MEMS taking into account the latest trends in microsystems technology and priorities for long term research that have been identified by the two EU technology platforms - **ENIAC, Photonics21, and EPOSS** - and included in **FP7 ICT** Work Program.

Two IMT laboratories, for RF-MEMS (Al. Muller) and Microphotonics (Dana Cristea), respectively, already active in previous European programmes, have joint their efforts to achieve this excellence centre. The two laboratories are also involved in another two FP7 projects, namely:

- "*Enabling MEMS-MMIC technology for cost-effective multifunctional RF-system integration*" - **MEMS-4-MMIC,** STREP, FP7-ICT-2007-2**,** 2008-2010. Coordinator: IMST GmbH, Germany.
- *Flexible Patterning of Complex Micro Structures using Adaptive Embossing Technology*" – **FlexPAET**, FP 7 IP, NMP-2007-3.5-2, 2008-2010. Coordinator: Fraunhofer Institut für Produktionstechnolgie (IPT), Germany.

The RF-MEMS Laboratory activities have been largely publicized. Here we will just mention the use of MEMS technology to construct miniature antennas (see figure 1).

The Microphotonics Laboratory (Dr. Dana Cristea, dana.cristea@imt.ro) has numerous results related to photonic components. Characteristic results of this laboratory are illustrated in figures right.

Diffractive optical elements with different shapes (prism, dots, lines) and feature size in the range 100 nm - 150 µm were obtained for solar cells, microlenses, photodetectors and as diffractive gratings to couple the light into polymer-based optical waveguides. The research was founded through projects financed by the National Programme CEEX (Research for Excellence).

***The Microphotonics labs has facilities for:* Modeling and simulation (**design and simulation of advanced passive and nonlinear photonic components; CAD software tool for design of complex optical waveguides; design software for modelling integrated and fiber optical devices that incorporate optical gratings; **Characterization:** spectrophotometers for UV-VIS-NIR and IR spectral range; spectroscopic ellipsometer for materials characterization; experimental set-up for optoelectric characterization in UV-VIS-IR spectral range of opto-electronic and photonic components, circuits. The members of the team also have also **access to** the IMT's clean-room micro- and nanofabrication facilities, as well as to advanced characterization facilities.

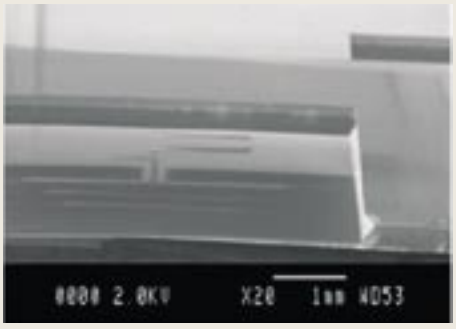

Figure1: Membrane supported Yagi Uda antenna membrane obtained by silicon micromachining – (common work of IMT and LAAS-CNRS Toulouse).

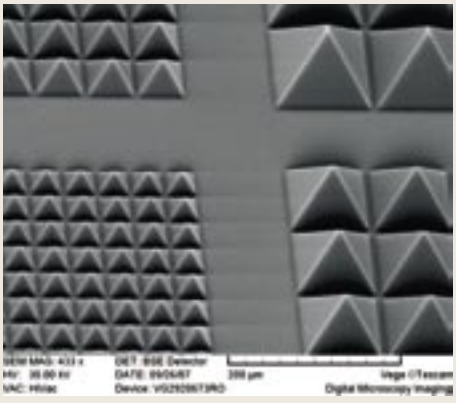

Figure 2 above, figure 3 below: Polymer-based diffractive optical elements obtained by replication PMMA DOE's (above), PDMS microlenses(below)