

FP7 participation of the Optical Microsystem Laboratory Koc University



The **Optical Microsystem Laboratory (OML)** at Koc University, Istanbul, Turkey, has expertise on design, testing, and characterization of MOEMS (Micro-Opto-Electro-Mechanical-Systems) and MEMS-devices and -systems. Our expertise and facilities have been published earlier (http://www.minos-euro.net/wbm/wbm3/national_infrastructures/oml.htm) in MINOS' Web-Based Magazine. We keep expanding our capabilities, the latest additions include a sputter and a Computer aided manufacturing machine (CMM) for high resolution PCB manufacturing. OML was active in several FP6-project and are now members of two funded FP-7 projects.

HELIUM3D - High Efficiency Laser-Based Multi-User Multi-Modal 3D Display

3D Displays are often seen as the next big step in the history of visual communications. Numerous innovative 3D technologies are already present. HELIUM3D has chosen to focus on auto-stereoscopic displays (i.e. glasses free) that can create realistic 3D. HELIUM3D aims to address the efficiency and colour limitations of current and next generation displays by developing a new display technology based on direct-view RGB laser projection via a low loss transparent display screen to the eyes of multiple mobile viewers.

The major goals of the display technology are:

- ✓ Support for multiple viewers
- ✓ Allow for viewer freedom of movement
- ✓ Motion parallax to all viewers
- ✓ High brightness and colour gamut
- ✓ Viewer gesture/interaction tracking
- ✓ User-centred design, ensuring that future products are "fit for purpose" in terms of perception and usability

HELIUM3D can be seen as a continuation of the FP5 program ATTEST (Advanced Three-Dimensional Television Systems) as well as the FP6 programs MUTED (Multi-User 3D Television Display) and the 3DTV Network of Excellence. OML was a member of the latter and was invited to HELIUM3D for specific technical expertise in MEMS and laser scanning display systems.

The eight members of the consortium include, in addition to five universities, participants from large industry, SME and one research institute including one partner from China.

Acronym: HELIUM3D; - High Efficiency Laser-Based Multi-User Multi-Modal 3D Display; Call: FP7-ICT-2007-1
Start date: January 2008; End date: December 2010; Project Coordinator: Dr. Ian Sexton, De Montfort University - UK

Other research project:

- Laser imaging system development using MEMS stages and Microlens Arrays for Endoscopic Imaging (Sponsor: TÜBİTAK, FP6 Programme-Network of Excellence in Micro-Optics (NEMO), FP6 Programme-MC2ACCESS Project)



Fig.2. Microfluidic chip with housing

- Nano-biosensor using MEMS cantilevers (Sponsor: TÜBİTAK. People involved: Prof. Erdem Alaca, Prof. Hakan Ürey, Prof. Halil Kavaklı, Ilker Ocaklı, Alibey Ozturk, Natali Ozber)

This research project combines micro-electro-mechanical systems (MEMS) with microoptical sensor readout systems to develop a high-sensitivity biosensor. The biosensor is designed to recognize drug ligands in body fluids, but the same technique is possible to use for applications in medicine, defence as well as well as in pure science. Procedures available today depend on expensive laboratory equipment run by experts. Being an alternative, biosensors can provide a small and cheaper alternative with a parallel procedure and a fast response that is easy to use in both clinical and criminal environments.

MEMFIS - Ultrasmall MEMS Fourier Transform InfraRed Spectrometer

The sheer size and complexity have made FTIR-spectrometers for mid and far RI hard to use outside of the laboratory. This project aims at changing this situation. The project covers the design, fabrication and characterization of Fourier transform microspectrometers (FTS), for chemical, biological, and agricultural inspection applications. Main advantages offered by the proposed devices are long travel range (good spectral resolution), a large clear aperture (high light efficiency), and simple and robust system structure. A simple CMOS compatible process based on bulk micromachining of a silicon-on-insulator wafer will be used for the device fabrication.

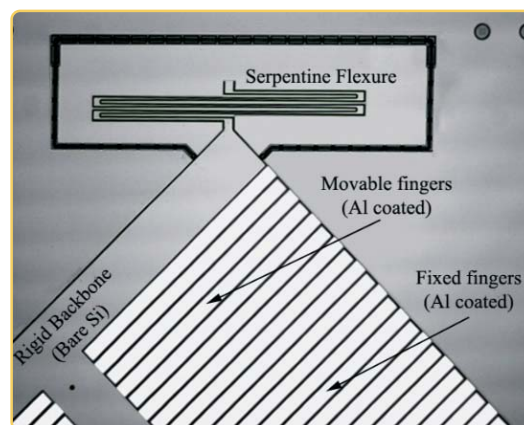


Fig.1. Grating-based FT spectrometer conceived and designed at Koç University

The consortium has a very strong base in industry with one large company and several SMEs with specific competences among its members.

Acronym: MEMFIS; - Ultrasmall MEMS Fourier Transform InfraRed Spectrometer; Call: FP7-ICT-2007-2;
Start date: September 2008; End date: August 2011.

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