



## Multi-domain platforms for integrated micro-nano technology systems – Service Action INTEGRAMplus

**Contract No. IST-2005-027540**

INTEGRAMplus

## COORDINATOR

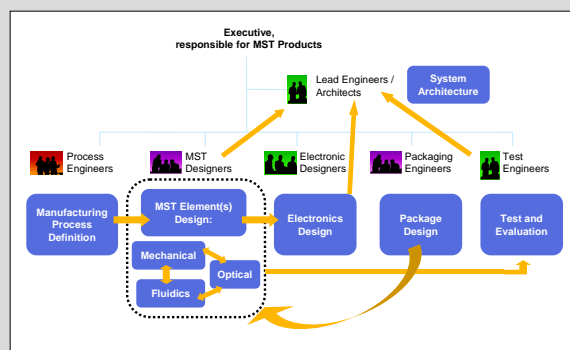
- Chris Pickering, QinetiQ Ltd, QinetiQ, Malvern, UK

## PARTICIPANTS

- QinetiQ Ltd, QinetiQ, UK
- Coventor Sarl Coventor, France
- Centre Suisse d'Electronique et de Microtechnique SA CSEM, Switzerland
- Epigem Ltd, Epigem, UK
- Institut für Mikrotechnik Mainz GmbH, IMM, Germany
- National Institute for R&D in Microtechnologies, IMT, Romania
- Institute of Electron Technology, ITE, Poland
- Silix Microsystems, Silix, Sweden
- University of Lancaster, ULAN, UK
- Yole Développement, Yole, France

## PROJECT DESCRIPTION

The aim of IntegrAM+ project is to provide a technology development prototyping platform with a route to manufacture of highly integrated microsystems, combining smart silicon functionality with polymer platforms in a multi-domain environment. This will be achieved by extending the Europractice manufacturing Cluster INTEGRAM, which focused on Silicon sensors and electronics, to multi-technologies (Silicon, polymers, glass) and multi-domains (fluidic, optical, mechanical, electrical, biological). This new ambitious multi-polar centre is a unique combination of complementary competences across Europe linked with a network of supply chain partners and aims to provide European industry with a world-leading facility to stimulate take-up and accelerate time-to-market of smart mixed-technology components and solutions.



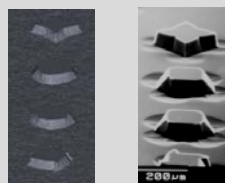
## OUR ROLE IN THE PROJECT

The whole I+ consortium makes an effort to prepare and disseminate the IntegrAM+ offer. Within workpackage **Customer acquisition and support** about 200 companies and institutes will be contacted as potential customers of the consortium during the project. From these contacts a target of 80 qualified meetings will be planned with the objective of leading to commercial collaborations with INTEGRAMplus partners.

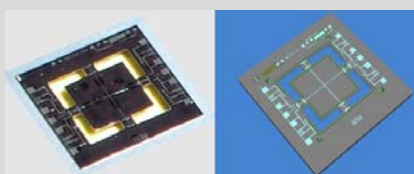
**Workpackage 6 „Design and Virtual Manufacture”** is devoted to study, development and an offer of service in a simulation, modelling and design in a multi domain environment covering electro-mechanical and microelectronic domains. Special efforts will be made to co-simulate micromechanical and electronic control modules using signal flow simulators as Matlab/Simulink. ITE in close cooperation with partners works on development of MEMS/CMOS test structures for technology characterization and data extraction, together with development of measurement procedures and data extraction tools. ITE performs validation and tuning of silicon etch simulators (ETCH3D/SEMulator3D from Coventor) with existing ITE technology.

Within **Workpackage 7 „Technology Convergence and Integration”** ITE works on silicon/polymer processes and materials development. ITE will develop and offer a technology for thinned silicon chips integration with polymer devices. The feasibility of providing a MEMS/electronics polymer encapsulation service (e.g. for smart card applications) will be investigated. Anisotropic wet etching of silicon as a standard process will be incorporated into the INTEGRAMplus offering. Integration with other processes will be investigated for multi-domain functionality, such as providing V-grooves for fibre interfacing in SOI MEMS processes, with a view to offering an add-on service based on anisotropic wet etching. A bulk micromachining process will be integrated with other MEMS processes developed by other I+ partners

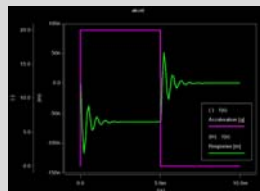
## RESULTS



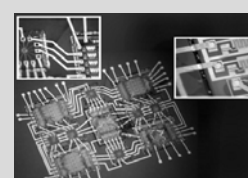
Anisotropic etching of silicon. Etch3D emulation results (left) and test structures (right)



ITE piezoresistive accelerometer photo (left) and Etch3D/SEMulator3D model (right)



Results of Architect/Simulink co-simulation: ITE accelerometer and sigma delta controller



ITE electrostatic micro-motor chip integrated with control IC

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