

## Mid-term Report of NoE PATENT-DfMM

As of spring 2006, over 60 activities have been launched under the project framework to improve integration, generate new collaborative intellectual property through joint research, secure commercialisation routes for key services and establish the team as a key international cluster. Activities in the first 18 months mainly targeted improved integration within the 4 Virtual Laboratories; the second 18 months have however seen more cross-laboratory activities and 2006 will focus on testing the market for services and the launch of 3 key flagship projects.

In the area of Test Integration, a 4-institute cluster has been established with skills in motionless testing of moving structures such as inertial sensors. New techniques have been developed based on bias modulation and a proof of concept demonstrated fabricated. A bio-sensor test cluster has also been developed with novel techniques published collaboratively. Work is now targeting drug discovery platforms based on a droplet transport technique. In this area work is now merging with modelling activity that over the past 18 months has focused on fault and fault free modelling of droplet transport technology.

Modelling and simulation work on design for manufacturing has been closely tied into the packaging activity. Studies have looked into Electro-magnetic coupling into MEMS structures, modelling of damping mechanisms / package environment in moving MEMS structures and enhanced stiction modelling in switches. A programme of test structure fabrication and characterisation is also active to characterise new parameterisable behavioural models for better prediction of prototype behaviour and fault effects. A major study involves both modelling and test structure characterisation; this aims at fully understanding and capturing the impact of the most important package structures and adhesives on encapsulated MEMS devices.

Database development has been active across the test, reliability and packaging domains. Initial content has been generated that covers material properties, failure mechanisms, instrumentation availability and packaging solutions. New test structures are currently under development and the characterisation work above will generate further data for this database. This database will form an internal resource for the NoE to support consultancy with industrial customers.

Training development has secured core IPR that forms key material for tutorials, CPD courses and for a future Master's degree. Tutorials in thermal engineering and failure analysis and a first 3-day course in Package Modelling & Analysis have been delivered and the Distance Learning course in Modelling Technology to support MEMS manufacture is almost complete. There are a number of additional modules under development including test engineering and an interdisciplinary course that pulls together technology, management and societal issues. Two summer schools have been successfully run, each attracting between 30 and 40 delegates.

Interfacing the NoE to the commercial environment has received much attention. A portfolio of skills, services and exploitable IPR has been developed and a market test process initiated. A number of potential business models have been assessed for future delivery of the team's knowledge and resource to the industrial community. The NoE has taken leadership of the Reliability and Test MWG within NEXUS, which will guarantee a strong pull from the NEXUS association for industrial access to PATENT-DfMM resources and optimal promotion of these resources.

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### Workshops

#### Design for Reliability and Manufacturability in MNT

25 April 2006, Stresa, Lago Maggiore, Italy

#### Second Technology PACKAGING Roadmapping Workshop

8 Jun 2006, Fraunhofer-IZM, Berlin, Germany

For more information, see article in NEXUS News of this MST News issue or the PATENT-DfMM website.

### DfMM Contact

DfMM News is provided to mst-news readers by the project "Design for Micro & Nano Manufacture (Patent-DfMM)", a Network of Excellence funded by the European Commission DG INFSO E5 within the Information Society Technologies (IST) Programme of FP6.



The NoE Patent-DfMM aims to establish a collaborative team to provide European industry with support in the field of "design for micro nano manufacture" to ensure that problems affecting the manufacture and reliability of products based on micro nano technologies (MNT) can be addressed before prototype and pre-production.



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