

Workshop on Design for Reliability and Manufacturability in MNT, 25 April

This workshop, co-organised by PATENT-DfMM and the NEXUS Methodology Working Groups "Reliability & Test" and "Design Modelling Simulation", was held in conjunction with DTIP 2006 in Stresa, Italy. It attracted 35 participants, mostly from industry. Presentations from MEMS manufacturers, EDA providers, PATENT-DfMM and service providers EnablingM3 and Nova MEMS were well received. Suss Microtec also presented the MEMUNITY collaboration between Polytec, Suss, Delta and Fraunhofer IZM in MEMS test engineering.

The meeting captured some important discussions for the future of R&D in the Reliability and Test field that was driven by key MEMS manufacturing industry from both the USA and Europe. It was noted that the field of MEMS and "Integrated MEMS" has moved on from "one product, one process" to a point where the industry is starting to recognise emerging "standard" processes and key product types. Here it was felt that progress in the understanding and modelling of failure and degradation is now urgently required. It was noted that for reliability verification, acceleration ageing was still based on the microelectronics industry despite the acceleration factors in MEMS being very difficult. The community was encouraged to launch work in this area, especially in model-based reliability modelling. It was, however, recognised that MEMS degradation behaviour tends to be highly non-linear with a vast parameter space that creates difficulty. It was also noted that the analogue electronics field has been working on similar problems for many years.

Of interest was experience of quality and yield issues. Two examples of where stable and fully functional MEMS are currently being produced from extremely low yield processes were cited. On the other extreme

prioritising yield optimisation over extensive quality screening was felt to be the only sensible strategy for the future of the industry.

Test also received much attention. Of interest was the degree of penetration nanotechnology was expected to make in the integrated MEMS market. There was a general feel that outside the domains of nanoelectronics and nanostructured materials, the main applications are likely to be surface functionalisation of MEMS. In for example devices with bio-chemical mono-layers, it was felt that the test issue needs to take priority over reliability analysis is many target products, test destroys the function, the devices need to be low-cost and in many cases single use and the manufacture flow in many cases involves post-processing by the customer.

The move towards further miniaturisation concluded the discussion with significant time dedicated to the possibilities of utilising redundancy to address test and dependability requirements.

In addition to the workshop, a panel on "Design for Reliability and Test of Microsystems" was organised within DTIP – there was a report on the conclusions reached by the NEXUS MWG meeting, the conference was briefed on activities within PATENT and experience and trends within Philips, Alcatel Space and NovaMEMS were reported. The academic community was encouraged to strike a balance between applied research on industrial technologies under development and more speculative and theoretical work on such issues as self-repair and nanoscale degradation. A complete report is available from the PATENT-DfMM website.

Report by Andrew Richardson, Pascal Nouet and Patric Salomon

Workshops

Second Technology PACKAGING Roadmapping Workshop

8 Jun 2006, Fraunhofer-IZM, Berlin, Germany

Presentations now available from **Design for Reliability and Manufacturability in MNT**

25 April 2006, Stresa, Lago Maggiore, Italy

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

DfMM Contact

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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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