

# Design for Micro & Nano Manufacture – What Has Been Achieved and what Remains to be done?

The EC-funded FP6 Network of Excellence in Design for Micro & Nano Manufacture "Patent-DfMM" is now in its 5th year and in the process of transitioning to a privately funded portfolio of expert clusters. Most of the work of the network in addition to the core skills and capability has been specifically aligned to the field of "Design-for-X", where "X" denotes testability, reliability, packaging etc. This work, as with more conventional Design for Manufacture activities, aims to improve yield, reduce the cost of manufacture and improve outgoing quality and reliability.

So what has been achieved through this pan-European experiment and where is more effort justified and needed? Publications and dissemination activities through events have certainly dominated partner activities but even more importantly, it has generated new multi-disciplinary collaborations that have real potential to significantly impact the scientific AND industrial MNT community. These newly emerged clusters need to be actively promoted and supported through business models that maintain open structures, and continue the quality collaborative research activities with a focus on knowledge and capability capture in addition to maximising delivery into the knowledge-based industrial sector:

**µHUMS:** Led by iSLI Livingston who focus on sensor design and multi-sensor integration. This cluster aims to offer a resource to help companies build highly integrated health and usage monitors that typically feature a number of sensors and electronics with applications usually requiring very high reliability and tolerance against harsh environments. The cluster has positioned itself to offer engineering services to organisations needing assistance with specific design and integration challenges rather than a specific target to generate its own design IP.

**EUMIREL**, the European Microsystems Reliability Cluster: led by NovaMEMS in Toulouse is a larger cluster of experts who are offering a wide range

of reliability services to the industrial sector that includes fault and degradation modelling, stress/test programmes, characterisation, design for reliability, and training. EUMIREL has access to a wide range of test, reliability and failure analysis instrumentation available at different partners.

**Design:** This cluster has mainly addressed simulation and modelling challenges linked to MEMS integration, Design for Test and Embedded Test Engineering. The cluster is led by Lancaster University - it has made significant progress in the understanding and ability to model damping mechanisms, adhesive technology, and yield in addition to developing new embedded test strategies to reduce production test cost. This cluster is however more aligned to tackling the design challenges associated with the next phase of integration technologies, hence will be seeking further industrial collaboration and public support. The Design cluster is also an umbrella to other activities such as the MEF (Bio-Fluidics).

## International Relations

The project's efforts to build strong international relations and close contacts to other projects and programmes are already paying off with for example the first commercial contract for Eumirel coming from one of these projects. To carry results and achievements from PATENT-DfMM into future initiatives will require further collaboration with upcoming new research programmes on a regional and transnational basis. Organisations like NEXUS and MEMS Industry Group (USA) have significantly helped PATENT-DfMM achieve its objectives in terms of industry focus. An Industry Advisory Board (IAB) was established at the start of the project, which not only advised but also was invited to evaluate project ideas and thus steer the workplan of PATENT-DfMM. IAB Chairmen, Benedetto Vigna (STM, Italy) and later Alistair Sutherland (BCF Designs, UK) actively participated in the project Management Board meetings to ensure an effective interface to the needs of the industrial community.

With the project coming to an end in June 2008, this MST News will be the last issue to feature a printed version of DfMM News. However, the E-Mail Newsletter "DfMM News" will continue, not only to distribute information from upcoming work related to the PATENT-DfMM NoE but also as a source of information on Design Modelling and Simulation in the area of MNT. Registration is free of charge – just email your contact details to [dfmm-news@4m2c.com](mailto:dfmm-news@4m2c.com). Please also send us your news items for publication!

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## 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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