

Interview with Benedetto Vigna, MEMS Business Unit Director at ST Microelectronics and Chairman of the Industry Advisory Board of the NoE PATENT-DfMM

MSTNEWS: Benedetto Vigna, as MEMS Business Unit Director at ST Microelectronics, you probably have to deal a lot with manufacturing problems of microsystems based devices. What are the main problem areas that you would like to have solved?

Benedetto Vigna: MEMS is a word present in many papers and it represents a leading-edge activity for many research centres and a strategic programme for many industrial companies. MEMS means many different microsystems with different market acceptance and technological maturity.

Only a few of them are mature from a technological point of view and are widely accepted by the market. That's the case of ink-jets, accelerometers, pressure sensors and digital micromirrors for video projectors. All these commercially successful MEMS as well as many others under study are silicon-based products and they can be manufactured in the same fabs as ICs, but their testing, their assembly and reliability assessment procedures are completely different from ICs/ASICs. Moreover they are very specific and they strongly depend on the product and on the market the product is designed for. In fact a pressure sensor is profoundly different from an accelerometer and the same applies to any other couples of products we can select. Thus I'd strongly suggest the research community to focus on the three mentioned topics, whose resolution is the key for the big takeover of MEMS.

MSTNEWS: How much does the design methodology influence the manufacturing flow at ST?

Benedetto Vigna: The design methodology we currently use has been proven very effective to allow us to start selling accelerometers in a reasonable short time since the beginning of this activity. For MEMS design, we use many commercially available tools, both specific

and not specific for MEMS. These tools have proven to be very useful to verify the smart ideas designers had to fix some manufacturing and reliability issues we encountered during the product development cycle. In the last couple of years we have improved our design methodology significantly, but there is still a lot of space for improvement. We definitely have to improve our design methodology in terms of Design for Testability, Design for Manufacturability and Design for Reliability. Those are the challenging targets we gave ourselves for the coming years. I'm sure that thanks to cooperation with the right academic partners and potential EDA suppliers we will succeed as we have till today.

MSTNEWS: What would be the main benefits for industry when using a "Design for Manufacture (DfM)" methodology in the microsystems/MEMS business?

Benedetto Vigna: Today most of the times you have to run many wafers in the fab before we are able to assess the manufacturability of the product we are designing. This is time consuming and costly. That's really a pity and it implies a waste of valuable resources. I believe DfM could allow shortening the time between the design and reaching manufacturability and therefore time-to-market.

MSTNEWS: Which technical areas should be addressed by researchers?

Benedetto Vigna: Testing, Assembly and Reliability are the most important items for the MEMS industrialization and account for the biggest part of their development time, but many researchers do not consider them an interesting research activity. Usually researchers prefer to focus their attention on design since they believe they can better express their creativity.

Honestly I believe that the three topics I'm referring to represent an excellent area where innovation has to



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take place for the MEMS success. Therefore I'd like to invite many researchers to bring their outstanding contribution in the areas of testing, assembly and reliability.

MSTNEWS: Will small MEMS companies also be able to benefit from these research topics?

Benedetto Vigna: Big and small companies will benefit equally from the results the researchers will make available. Perhaps small companies can benefit even more since their culture is strongly based on MEMS and, unlikely big companies, they do not have to change the consolidated paradigm of integrated circuits reliability assessment methodology. Small companies could be more agile to accept the new research results that will be available in the next few years. That's what I believe.

MSTNEWS: Benedetto, thanks a lot for your continued support of the "DfMM community" and for supplying your in-depth industry view on the topic.

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