

**MEMS Panel – Globalpress Electronics Summit
March 30, 2009**

“Where is the growth in MEMS?”

Moderator - Patrick Mannion, Editorial Director of TechOnline

Panelists:

- Mark Martin, Vice President and General Manager, Analog Devices
- Vijay Ullal, Group President, Maxim Integrated Products
- Ian Brown, Vice President of Sales & Marketing, Microvision
- Scott Smyser, Vice President and General Manager, VTI Technologies
- Eric Eisenhut, Vice President of Sales & Marketing, Kionix

Main points of panel during presentations:

- MEMS is the third transformation of society; existing companies will have to do MEMS or they will go away
- It's what MEMS enables that is important – it's the algorithms behind MEMS technology that enables a system that adds functionality; this will thrust forward the electronics industry
- Through MEMS, user interface is taken to a new level; the underlying technology of MEMS becomes a part of the fundamental user interface.
- The task (for MEMS companies) is to make MEMS something easy to work with
- Sensor integration is critical across industries/markets

Questions from the Audience/Editors:

- Steve Ohr, Gartner – to enable the proliferation of MEMS – what are the perceived barriers to MEMS proliferation? Cost?
 - Cost isn't everything – have to also consider the functionality (algorithms are critical)
 - Innovation drives increased user interface
 - The process of MEMS is driving down the cost curve very effectively; the process is maturing; yield is coming in line within IC industry (moving along the learning curve)
 - Over time we'll see further differentiation of products enabled by MEMS
- MEMS industry is bad at promoting the proliferation of MEMS – you seem to be “lead” by your customers rather than you leading them- why and what are you going to do about it?
 - ADI, Kionix mentioned the customer education they provide through their algorithms
 - There is a synergy between MEMS companies and their customers that is driving innovation; it's an important part
 - MEMS industry needs to provide and develop more kits for people/engineers to play with; to push the innovation further
- What about the potential ramp-up issues of entering the mobile handset space – where you need to get to high volumes (2-5 million) quickly?
 - The customers are driving this activity and MEMS is responding through that collaboration
 - MEMS is different than traditional digital IC technologies; MEMS technologies shrink silicon area through design rather than geometry shrinks that drive digital IC technology. You have to work at the system level. Once MEMS gets to a system level (within one package) – that's when you'll get market penetration.

- What about the lack of standardization within the MEMS industry; starting with equipment? What about the success of fabless models?
 - MEMS industry is still on a learning curve but there's a lot of movement in the industry. Foundries are going up the learning curve yet we are several years away from standardization and when we have standardization in MEMS it will be product specific and niche.
 - MEMS is able to utilize common equipment with IC; common packaging technology and the industry is trying to leverage what the industry has already invested.
 - As prices go down, we'll see a greater rate of MEMS adoption
 - With respect to fabless model; there is concern about outsourcing IP
 - However you really need volume to do a foundry model. Right now in MEMS it doesn't lend itself to a pure foundry model...
- Is there a Moore's law for MEMS? What's beyond MEMS?
 - You aren't going to see it in MEMS; the way to add functionality is to integrate
 - Beyond MEMS you are talking about nanotechnology – but in 10-15 years. You'll see miniaturization and self-assembly, lower power; but you need to be in MEMS to get to nano...
- How big is the MEMS market?
 - Referred to iSuppli and Yole Development reports
- What about integration?
 - You see combined circuits and sensors; you are going to fit sensor to applications; multi-chip integration is cost-effective b/c it gives you a lot of degrees of freedom. The electronics industry pushes for savings through integration, there are trade-offs to address this through multi-chips in a single package vs. single chip technologies.
 - What matters is that the MEMS device lasts, has the right function and costs less than the original technology (IC).
 - Wafer Level Packaging (WLP) – many see as the right solution because it adds functionality and flexibility
- Is the onus on EDA to drive software?
 - Yes, complex 3D modeling is a key attribute
 - There is a push in the industry to increase EDA software, but it's not the biggest issue in the industry, because the software is getting better –companies like Coventor are doing a good job at addressing the needs of the MEMS industry
- Is there a lot of acquisition/consolidation in the MEMS industry on the near future?
 - MEMS is a growth area and the MEMS industry is not in consolidation mode – you see more companies entering the industry; the market is in expansion, the only exception is the current economic strain.
- Where are the growth areas where government funding could help (much like gov't mandates for Electronic Stability)? Healthcare?
 - Not likely beyond automotive
- What about CMOS MEMS?
 - It's one way to do MEMS; there are different ways to do it based on the product being manufactured.