

A Market Overview of Micro Electro-mechanical Systems

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ABSTRACT

The vision for making smaller and smaller things as a result of the R&D in MEMS opens a whole world of application possibilities. Today, MEMS sensors and actuators are appearing on the market in an expanding array of industrial or automotive applications. The worldwide MEMS market demand is forecasted to rapidly grow to \$19 billion with an annual growth rate of nearly 13.1% (Chappell, 2004).

Five years ago, the market for micro-machined devices was defined by sensor and actuator applications, with a large market segment being in the \$100 million plus range. Today MEMS have become an enabling technology for applications such as DNA sequencing, wireless communications and fiber optic signal routing (3G, 2002). A diffuse market, consisting of difficult to categorize segments, has also emerged, including such applications as household appliances, safety applications, and even toys. Figure 3 and 4 represent MEMS market share in 2001 and 2005 according to major industries, respectively. Figure 5 represents projected dollar sales of MEMS device in 2003 by technology area.

Estimates of the MEMS world wide total available market (TAM) range from \$9B to \$11B by 2005, with an estimated CAGR of ~37% per year to 2006 for RF MEMS and wireless MEMS sensors (3G, 2002). In addition to the market momentum created by processing advances occurring in MEMS technology, additional momentum will occur as advances in traditional silicon wafer processing technologies "obsolete" several generations of installed chip making equipment. The advent and expense of the new semiconductor chip technologies combined with ever increasing use of contract manufacturing "foundries" to manufacture semiconductor devices, will increase momentum among existing chip manufacturers to leverage their existing manufacturing installed base and transfer their older equipment and process technologies to actively engage in the less feature size demanding MEMS products.

There are currently some 60 MEMS fabs/foundries, several hundred start-ups (many of which have their own in-house prototyping and/or fabrication facilities), as well as countless universities and government labs worldwide researching MEMS technology. In spite of this ever increasing supply base, one of the next major challenges in MEMS is true high volume manufacturing on the scale of semiconductors, and getting the products to market.