

Survey of Current Trends in the MEMS Market and Market Projections

1. Objective of the Survey

The Micromachine Center conducted this survey on commission from NEDO. The objective of the survey was to gather the latest market data in order to analyze the current scale and industrial structure of the MEMS-related market and to forecast future trends, as well as to provide basic data required for conducting a rolling review on a strategic map of MEMS technology.

2. Method of the Survey

To calculate the size of the MEMS-related market, we defined two indexes: MEMS contribution and MEMS value ratio. Some components included in existing products or equipment can be replaced with MEMS technology as a result of numerous factors including technological innovation, improvements in performance, and manufacturing costs. The MEMS contribution is calculated by estimating the portion that can be replaced with MEMS technology in products or equipment that may incorporate MEMS. The MEMS value ratio is the part of the estimated portion actually employing MEMS technology that accounts for the value of the estimated portion.

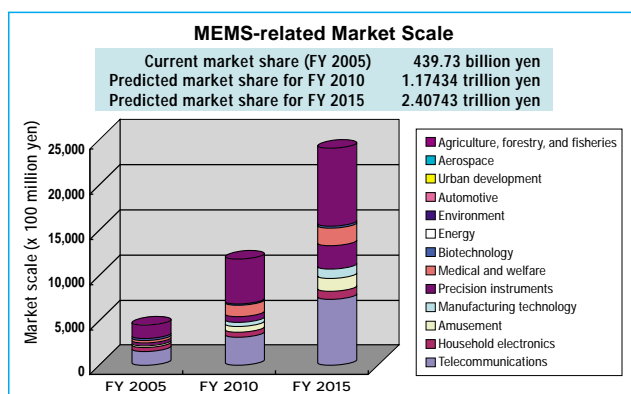
<MEMS market scale>

$$= \text{<Production volume>} \times \text{<percentage of MEMS contribution>} \times \text{<MEMS value ratio>}$$

The future market of MEMS was predicted for 2010 and 2015 with consideration for the market growth of products and an increase in MEMS applications.

3. MEMS Market Scale

The domestic MEMS market share for 2005 was about 440 billion yen. We predict this share will increase to 1.17 trillion yen in 2010 and 2.4 trillion yen in 2015.



When viewing the market share for MEMS-related products by industry, the automotive and telecommunications fields occupy 71% of the overall market. These two fields are expected to account for 70% of the overall market in 2010 and drop to 67% in 2015. However, the market share of other industries is expected to gradually increase, with particularly remarkable expansion in the fields of amusement (game machines), precision instruments, and medical and welfare equipment.

Viewing the market scale by type of MEMS device, MEMS sensors accounted for just over 57% of the approximately 440 billion yen market in 2005. This

share is expected to gradually decrease to 55% in 2010 and just over 51% in 2015, while the market share of optical MEMS, RF-MEMS, microfluidics, and chemical and biological MEMS is expected to show some, albeit gradual, increases annually.

Hence, the current MEMS market is led by the automotive and telecommunications fields, with a focus on MEMS sensors. While this trend is expected to continue, it is thought that market expansion will be linked to the fusion of optical MEMS, RF-MEMS, microfluidics, chemical and biological MEMS, and the like with optical technologies, and efforts to incorporate new key technologies, such as integrated micro-nano manufacturing technologies uniting nano and biological processes.

4. MEMS Industrial Structure in Japan

In order to see the total picture of MEMS-related industries, we distributed a questionnaire to MEMS-related companies and used the responses on this questionnaire together with the results of the MEMS market survey to analyze the domestic MEMS industrial structure.

While nearly 80% of all companies surveyed working on MEMS projects that are currently or are expected to be promising enterprises, just over 50% of these companies indicated that the MEMS-related projects accounted for less than 2% of their overall business, and nearly 90% of the companies surveyed indicated that the MEMS-related projects accounted for less than 10% of their business. Although these results imply that the current percentage of MEMS-related business conducted at MEMS-related companies is low, the responses show that expectations for MEMS are high and suggest a trend of companies actively expanding their MEMS business.

Further, MEMS device manufacturers are currently exhibiting a trend toward expanding their business into MEMS sensors, which currently carry great importance in the MEMS market, and optical MEMS and RF-MEMS, for which the market is expected to expand in the near future. However, future surveys are expected to show an interest in expanding into μ TAS-related devices such as microfluidics and chemical and biological MEMS.

Further, while a majority of the companies still have too few personnel involved in MEMS projects and research and development on MEMS and currently invest less than 5% of their MEMS-related sales in research and development, a majority of the companies indicated that training personnel in MEMS and reinforcing collaboration between industry and academia are solutions to the problem.

5. Conclusion

From this survey, it is clear that MEMS-related industries view MEMS devices as the core of Japan's future principal manufacturing industry and wish to expand into this field, although the actual scale and growth of this expansion is uncertain. Hence, while the market share for MEMS has been slow to rise, the acceleration in development in MEMS technology gives us great hope that the results of this development will be reflected in the market, leading to rapid market growth.