

# Activities of MEMS Foundry Service

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## 1. Introduction

Micro Electro Mechanical Systems (MEMS) are expected to grow to become a market rivaled in size only by the markets for flat panel displays (FPDs) and semiconductors. In recent years, full-fledged adoption of these systems in cellular phones and other consumer products has begun, and the scale of the market is growing rapidly. As applications for these systems have expanded, the technology has become increasingly diversified and Time To Market needs have also increased. As a result, the role of MEMS foundries in development and manufacture is becoming increasingly important.

The MEMS Foundry Service Industry Committee conducts activities to help expand the MEMS industrial base and increase competitiveness through the creation of a foundry network in Japan.

## 2. Activities of the MEMS Foundry Service Industry Committee

The MEMS Foundry Service Industry Committee membership comprises 11 companies and organizations relating to MEMS foundries, each with its own unique characteristics (Fig. 1 and Fig. 2).



Fig. 1 MEMS Foundry Service Industry Committee Members

	Design & Simulation	Testing & Prototyping	Product Development	Mass Production
ULVAC, Inc.		Machining of various types of MEMS through a combination of dry etching, vapor deposition polymerization and dielectric film formation technologies		
Oki Semiconductor Co., Ltd.		Silicon process integration MEMS		
Omron Corporation		Technologies for creating original dies for various types of MEMS manufacture, primarily for bulk micromachining, as well as proprietary technologies: manufacture of lenses, fine masks, etc. using electroforming mass production technologies		
Olympus Corporation	Has a wealth of accumulated knowledge relating to optical MEMS and bioMEMS and offers services from design to mass production of various types of MEMS using precision bulk micromachining			
Hitachi, Ltd.	Assistance for research and development, primarily relating to bulk micromachining			
Fujikura, Ltd.			MEMS processing and through wiring on wafer level packages, silicon wafers, etc.	
Panasonic Electric Works Co., Ltd.	Sensors and actuators (silicon processes) / high-density packaging			
Mizuho Information & Research Institute, Inc.	Analysis services Simulator development			
UEL Corporation	Design / analysis support Software development			
Mathematical Systems, Inc.	Simulator and ECAD tool development and sale			
National Institute of Advanced Industrial Science and Technology (AIST)		MEMS device prototyping Micronano fabrication (joint research only)		

Fig. 2 Service Areas of Member Companies

### (1) Operating MEMS foundry service network

To simplify the process of approaching foundry companies for users who want to use MEMS foundries but do not know where to go to initiate the process, the Committee has established the MEMStation (<http://fsic.mmc.or.jp>) as a clearing-house for user inquiries.

### (2) MEMS Seminars and other educational and joint publicity activities

To support the training of MEMS development personnel, the Committee plans and holds MEMS Seminars twice each year. Designed for novice and midlevel MEMS engineers, these seminars have met with a very favorable response.

### (3) Activities to expand the MEMS industrial base

For many years, foundry companies have used equipment for manufacturing their own products and expand their business to users outside the company. As a result, in many cases the prototyping and mass production services that they are able to provide are limited to their own specific processes and materials. Investment in equipment and the development of custom processes for each customer require both time and money. So, it is not easy for small, medium-sized companies and venture firms to take university MEMS research achievement to the mass production and practical application stage.

The MEMS Foundry Service Industry Committee promotes the following activities in an effort to facilitate the use of foundries by users and expand the MEMS industrial base.

#### 1. Expansion of the MEMS foundry network system

The Committee has studied the standard process recipes that would enable even users with little experience in or knowledge of MEMS manufacture to easily manufacture the MEMS they need. These recipes are ready-made processes that utilize the abundant manufacturing experience of foundry companies. Using these recipes for prototyping is expected to make it possible for customers to save both time and cost requirements.

In the future, the Committee will work to promote activities to expand the use of these standard process recipes, and will also study the possibility of setting up organization or centers for consulting and coordination of MEMS development activities.

#### 2. Cooperative activities with public foundries and regional clusters in various locations

Working with domestic publicly-operated testing entities, regional clusters and nanofabrication companies the Committee is setting up an organic foundry network as a framework for providing support for MEMS project development and will promote activities aimed at expanding the MEMS industrial base.