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## MMC Activities

# Overview of MMC's Activities in Fiscal 2004

## I. Basic Objectives of Activities

The basic objectives of MMC activities are, firstly, to establish basic micromachine technologies and increase utilization of micromachines through promoting research and investigation of micromachines (MEMS and other minute machines and systems), collection and provision of micromachine information, and exchange and cooperation with worldwide organizations; and secondly, to contribute to the further development of Japan's industrial economy and to international society.

MMC's basic objectives in FY 2004 are, as in the previous fiscal year, The Center's fundamental policies are to promote the industrialization of micromachines/MEMS, and to strive for the establishment of next generation basic micromachine and NEMS technologies in accordance with trends in cutting-edge technological fields such as biotechnology, nanotechnology, and IT.

## II. Description of Primary Activities

### 1. Research and Investigation of Micromachines

Planned activities are aimed towards gaining a clear understanding of the trends in micromachine technologies and industries and conducting investigations of and research on new technological issues regarding the fusion of micro- and nanotechnologies, as well as making adjustments appropriate for the multidirectional expansion of micromachine technology.

#### (1) Microanalysis/Production System Project (recommissioned NEDO project and contract agreement)

This project involves creation of a database of product information useful in the research and development of microchip devices and systems, and activities aiding the creation of this database, such as information gathering and data provision.

#### (2) Studies on the future prospects of micromachine/ MEMS technology

High expectations are held for micromachine/MEMS technology as a vital technology that will support the future expansion of our economy and society. For this reason, survey research will be conducted regarding the future prospects of micromachine/MEMS technology.

#### (3) Studies on R & D trends for micromachine technology in Japan and abroad

These studies aim to identify and analyze the latest trends in the rapidly expanding field of micromachine technology, and micromachine R&D in Japan and abroad; and to develop basic technological data to aid in developing micromachine technologies.

#### (4) Studies on MEMS reliability assessment technology (application submitted to the Japan Machinery Federation as a commissioned project)

This research project involves the investigation and consideration of current status, issues, and policies relevant to the improvement of MEMS reliability.

#### (5) Studies on the potential of nano-on-micro technology (application submitted to the Japan Industrial Policy Research Institute as a commissioned project)

This survey research will look into technological issues pertaining to the development of nano-on-micro devices and study the directions of this R&D. Furthermore, these research results will be used in the formulation of a technology development roadmap and policy recommendations.

#### (6) Studies on micro/nanosystem-related processing and assembly/measurement and assessment/handling technology (Application submitted to The Mechanical Social Systems Foundation as a commissioned project)

This research will involve fact-finding missions both in Japan and overseas to examine such areas as processing, fusion, assembly, measurement, and assessment necessary for integrated nano/micro device R&D.

#### (7) Joint survey research activities concerning the industrialization of MEMS

Opportunities for the industrial application of MEMS have been opening up rapidly in recent years; in order to further accelerate the industrialization of MEMS, this research will comprehensively tackle such challenges as advancing foundry services and coordinating MEMS devices and materials fields. Joint research with businesses that provide foundry services will also be conducted, as in the previous fiscal year, on specific issues such as overseas foundry fact-finding missions, process standardization, creation of a materials database, and coordination between foundries.

### 2. Collection and provision of micromachine information

Information and documents on micromachine use in universities, industries, and public organizations in Japan and overseas will be collected, combined with survey results and MCC-produced documents, and made freely available in the MMC library. At the same time, information will be disseminated widely, both domestically and internationally, through the MCC website.

#### (1) Improved dissemination and exchange of information through the MCC website

Utilizing the MCC website, efforts to exchange and disseminate information will be made proactively. Website content aimed at supporting members will be enhanced.

#### (2) Publication of a micromachine periodical

"*Micromachine Index*," containing abstracts of technical documents and information on materials, is issued on a regular basis and supplied to supporting members and organizations concerned with micromachines.

#### (3) Publication of a newsletter

Information concerning the research and governmental trends related to micromachines is distributed monthly to supporting members and other interested individual and organizations.

#### (4) Maintaining and upgrading the MMC library

Technical documents and materials are collected and stored in the MMC library and listed in a database together with other

relevant information.

### 3. Exchange and cooperation with micromachine-related organizations worldwide

To promote affiliation, exchange and cooperation with related organizations in and outside Japan, MMC will involve itself in such activities as participating in the micromachine summits, holding international symposiums, inviting to Japan and sending overseas researchers and experts in the field, and building foundry services.

#### (1) Participation in the 10<sup>th</sup> Micromachine Summit

MMC will participate in the 10<sup>th</sup> Micromachine Summit in Grenoble, France, taking part in discussions of a wide range of topics, including worldwide trends in micromachine technology and its fields of application.

#### (2) Holding the 10<sup>th</sup> International Micromachine/Nanotech Symposium (partially subsidized by activities promoting the machine industry)

This year MMC will hold the 10<sup>th</sup> International Micromachine/Nanotech Symposium focusing on technological issues pertaining to and the future prospects for the fusion of micromachine/MEMS and nanotechnology.

#### (3) International Exchange and Dispatch of Researchers

A group will be dispatched overseas to promote the exchange of information and opinions with micromachine-related research institutes in universities and similar institutions. This group will also participate in international symposiums and academic meetings held overseas. MMC will further promote exchange by inviting experts in the field from America and Europe and by sending our experts and researchers overseas.

#### (4) Building a foundry network system

Foundries are vital to the industrialization of MEMS. In order to improve these facilities, we will undertake the establishment of a system to improve services through a network comprising members of the Foundry Service Industry Committee, who represent businesses either involved in or related to the provision of foundry services.

#### (5) Establishing a forum for the exchange of cutting-edge micro/nano technology

In order to accelerate the development of cutting-edge micro/nano technology - a basic technology expected to have a diversity of applications in various fields - MMC will hold a meeting for the exchange of technologies as an excavating opportunity of the exchange of information, and joint research as in the previous fiscal year.

### 4. Standardization of micromachines

In cutting-edge technological fields such as micromachine/MEMS, standardization is being promoted as international initiatives are being taken.

#### (1) Standardization of fatigue testing methods for micro-nano materials(application for sponsorship submitted to the Ministry of Economy, Trade and Industry)

Continuing from last year, research on standard fatigue testing methods that enable evaluation of the properties of various thin film materials measuring less than 10 $\mu$ m wide and 100 $\mu$ m long, with the aim of international standardization. Fatigue tests using conventional 1/1000 sized specimens will be conducted in order to clarify the limits of application for fatigue testing methods that use the current standard mm order specimens, and proposals for international standards will be considered.

#### (2) Standardization of tensile testing methods for thin film materials

The results of MMC research conducted between Fiscal 1999 and Fiscal 2001 as part of the NEDO project "standardization of evaluation method of properties for micromachine material" have been included in international standardization proposals submitted to IEC in Fiscal 2003, and are now at the CD(Committee Draft) stage. This year MMC will continue its activities towards international standardization.

#### (3) Standardization of micromachine terminology

The international specifications proposal "Technical Terms in Micromachine Technology" submitted to IEC in fiscal 2002 has been approved at the NP (New Project) stage and is now at the CDV (Committee Draft for Vote) stage. This year MMC will continue its activities towards international standardization.

#### (4) Research and investigation of micromachine standardization

In addition to the above, the results of relevant survey research will be transmitted worldwide to encourage international standardization, while demonstrating initiative in establishing international standards. In response to demand, the on-line International Standardization Forum will be held, and formulation of a roadmap for future international standardization will begin.

### 5. Dissemination of information and education about micromachines

By issuing and distributing quarterly magazines and by holding exhibitions, we hope to disseminate information on micromachines extensively in order to educate as many people as possible.

#### (1) The quarterly magazine "MICROMACHINE" will be published periodically and distributed to those in or connected with the field. The quarterly magazine will also be made available on the Internet through the Center's home page.

#### (2) The 15<sup>th</sup> Micromachine Exhibition and other events will be held to present the latest research achievements, as well as the latest cutting-edge micromachine/MEMS industry-related products and product materials.

#### (3) We will serve as the Federation of Micromachine Technology Secretariat to work with and strengthen micromachine-related organizations.

## Preliminary Announcement



### The 10<sup>th</sup> International Micromachine / Nanotech Symposium

November 11, 2004  
at Science Hall, Science Museum, Tokyo, JAPAN

### Exhibition MICROMACHINE 2004

November 10 - 12, 2004  
at Science Museum, Tokyo, JAPAN

