MMC

2004 8

MICROMACHINE



MMC Activities

# Activities of the Micromachine Center in Fiscal 2003

## I. Investigation and Research on Micromachines

Research activities were aimed at 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 by New Energy and Industrial Technology Development Organization [NEDO])

A mostly "*Namazu*" full-text search system was completed in accordance with the specification, and data was input. In addition, investigations into technological trends in microchemical devices were conducted at "Transducers'03" in June and "MEMS 2004" in January.

### 2. Studies on the future prospects of micromachine technology.

The long-term vision subcommittee (chairman: Prof. Isao Shimoyama, Graduate School, the University of Tokyo) met three times, and decided on the orientation of book content.

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

Subcommittee of trends in R&D for micromachine technology in Japan and abroad (chairman: Prof. Shuichi Shoji, Waseda University)met three times, and conducted exploratory analysis of the latest situation regarding the rapid expansion, both domestically and internationally, of micromachine technology and research trends; and of basic technological data that contributes to the advancement of micromachine technology; and compiled the results of investigations on technological trends into the 2003 report of investigation into trends by category.

### 4. Studies on the micromachine market

The 2002 investigation into the domestic market scale for micromachine technology put forward preparations for the compilation of relevant statistical data, etc.

### 5. Development of new functional materials for MEMS (commissioned by the Japan Machinery Federation)

Recommendations were made for the promotion of the development of new functional materials for MEMS, and compiled into a report. Recommendations included exchange between researchers from different fields, a top-down and bottom-up fusion area approach, and the necessity of meeting the needs of society.

### 6. Investigative research into the current state of the MEMS related market and an analysis of Japan's competitive power (commissioned by Japan Industrial Policy Research Institute)

With a view to building up an economically consistent database of micromachine-related market statistics, and investigating the current state of MEMS development and strategy in the U.S., as well as making recommendations in order to maintain and improve Japan's competitive power, an investigative research committee to study the current state of the MEMS related market and to conduct an analysis of Japan's competitive power; a subcommittee to consider issues related to the creation of a market-estimation system (chairman: Prof. Isao Shimoyama, Graduate School, the University of Tokyo) met and compiled a report of their findings of this fiscal year.

### 7. Joint survey research activities concerning the industrialization of MEMS

Foundry manufacturer Olympus Corporation, Omron Corporation, and Matsushita Electric Works, Ltd. took part in the business activity promotion committee (chairman: Ryo Ohta, Olympus Corporation), which carried out joint survey research into identifying issues that needed to be addressed in order to facilitate the early industrialization of MEMS, together with measures to achieve this goal. This fiscal year in Japan public hearings were held in MEMS related universities and national research institutions, MEMS foundries, MEMS users, and venture companies, and fact-finding was carried out in the U.S. and in Europe.

## II. Collection and Provision of Micromachine Information

Information and documents on micromachines in universities, industries, and public organizations both in Japan and overseas have been collected and combined with survey results compiled and documents produced by MMC, and made freely available in the MMC library.

### 1. Maintenance and expansion of the MMC library

Information and documents such as periodicals and books on micromachines in universities, industries, and public organizations both in Japan and overseas have been collected and combined with survey results compiled and documents produced by MMC and made available in the MMC library. (49 books collected in FY 2003, making a total of 1,037 books as of March 31.)

### 2. Publication of a micromachine periodical ("*Micromachine Index*")

The above-mentioned collected documents were made freely available in the MMC library for perusal by interested parties. Moreover, a micromachine periodical entitled Micromachine Index gathering together abstracts of important documents was published and distributed to interested parties, as well as being incorporated into the database. (FY 2003: Nos. 84-91 issued [8 volumes])

### 3. Publication of a newsletter

Information concerning research and governmental trends related to micromachines was distributed monthly to supporting members. This was posted on the Internet homepage for the first time from January, resulting in a substantially higher hit count.

### 4. Database construction and data management system operations

Along with revisions of its Internet homepage, a new page for supporting members was opened, and the content of the database was transferred.

## III. Exchange and Cooperation with Worldwide Organizations Involved with Micromachines

To promote affiliation, exchange and cooperation with related organizations in and outside Japan, MMC involved itself in such activities as participating in the Micromachine Summit, holding international symposiums, inviting to Japan and sending overseas researchers and experts in the field.

### 1. Participation in the 9th Micromachine Summit

The 9th Micromachine Summit was to have been held for three days from April 28-30, but was cancelled due to the spread of SARS to Beijing.

### 2. Held the 9th International Micromachine/Nanotech Symposium

The 9th International Micromachine/Nanotech Symposium was held on November 13 at the Science Museum in Kitanomaru Park, Tokyo, with the aim of promoting micromachine technology and educating a wider public audience. The event was well attended, with a total of 297 participants including speakers and media representatives.

### 3. International exchange and dispatch of researchers

For four days from June 9 to 12, 2003, Etsuro Shimizu, manager of the Research Department attended "Transducers'04" held in Boston, U.S.A., where he carried out an investigation into trends. For five days from July 7 to 11, 2003, Takayuki Hirano, Executive Director, and Yoichi Toguchi, manager of the Research Department made official trips to Switzerland, France, and the U.K. to carry out surveys into research institutions, foundry companies, design houses, and marketing companies in Europe. For 5 days from January 25 to 29, 2004, Yoichi Toguchi, manager of the Research Department attended "MEMS 2004" held in Maastricht, the Netherlands, where he carried out an investigation into trends.

### 4. Constructing a foundry network system

In order to further the industrialization of micromachines, particularly MEMS, MMC organized the foundry service industry committee (chairman: Takashi Mihara, Senior Researcher, Olympus Corporation) six times to organize businesses providing foundry services, to set up a network system to improve services and to consider ways such a system could be developed. As a means of disseminating information, the MMC also upgraded its own Internet homepage and held two MEMS lectures.

### 5. Establishing a forum for the exchange of micromachine technology

A demand study in respect of the themes of forums for exchange was carried out, and a forum for the exchange of cutting-edge micro-nano technology was held for supporting members.

## IV. Standardization of Micromachines

In micromachine technology and other newly established fields of systemized techniques as well, there is an urgent need for the standardization of terminology, measurement, and evaluation methods. The MMC worked toward this, taking international initiatives into perspective.

### 1. Standardization of fatigue testing methods for micro-nano materials (commissioned by Ministry of Economy, Trade and Industry)

In order to achieve this goal, a committee for the promotion of standardization was formed in 2003, which conducted a comprehensive investigation into investigation into trends in technological development in Japan and overseas, and the formulation of recommendations and guiding principles, appropriate areas for standardization, requisite conditions, and so forth. In addition, an investigative research committee was formed, which carried out improvements and optimization of strain measurement methods and test specimen equipment methods, for the standardization of fatigue testing.

### 2. Standardization of tensile testing methods for thin film materials

Japanese standard proposals in respect of tensile testing for thin film materials and test specimens were collected together, and a NP (New Project) proposal was submitted to IEC/TC47/WG4 based on the results.

### 3. Support for standardization of IEC terminology

In respect of the terminology approved as CD (Committee Draft) proposals by IEC/TC47, the terminology subcommittee met and carried out the task of adding terminology as well as handling comments for the CDV (Committee Draft for Vote).

### 4. Investigation and research on micromachine standardization

The results of this research have been transmitted worldwide, encouraging international standardization while exercising initiative in establishing international standards. This fiscal year, the standardization committee met three times. (chairman: Prof. Emeritus Hiroyoshi Sato, the University of Tokyo). Activities were consolidated in respect of "standardization regarding fatigue testing for micro-nano materials" scheduled for implementation for 3 years from 2003. International standardization activities regarding IEC terminology presented the CDV in March, 2004, and subsequently supported this international proposal activity. As for the standardization of material properties, a test specimen NP and a tensile testing method NP proposals were submitted to IEC, and were recommended to the CD stage. In addition, activities for JIS were carried out.

## V. Dissemination and Education about Micromachines

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

### 1. Publication of public relations quarterly magazine "*MICROMACHINE*"

Vols. 43 to 46 were published in Japanese only. English versions are available on the MMC website: http://www.mmc.or.jp/

### 2. The 14th Micromachine Exhibition

The 14th Micromachine Exhibition was held from November 12 to 14 at the Science Museum in Kitanomaru Park, Tokyo. 238 companies, organizations, etc. participated (the total number of booths was 323), and the total number of visitors was 8,793, making it the largest scale event to date.

### 3. Administration of the Federation of Micromachine Technology

Served as secretariat for the Federation of Micromachine Technology to link and strengthen micromachine-related organizations.

### 4. Workshop presenting the results of grant recipient projects for the 9th Micromachine Technology Research Grants (FY 2001)

A Workshop presenting the results of grant recipient projects completed in March, 2003 was held on Friday, September 12, 2003, with 6 themes from applicants in FY 2000 and 3 themes from applicants in FY 2001, a total of 9 themes being presented.