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## MMC Activities

# Overview of Project Planning for Fiscal 2007

## I. Basic Objectives of Activities

The Micromachine Center works to establish basic technologies relating to the micromachine, Micro Electro Mechanical Systems (MEMS) and other micro-nano fields. The Center actively promotes relevant technical development projects of the national government and the New Energy and Industrial Technology Development Organization (NEDO). At the same time, the Center is also actively engaged in environmental improvement activities aimed at the industrialization of the micro-nano field (including policy proposal projects, industry interchange and stimulation projects, research projects, projects to promote standardization and publicity projects) in order to promote dissemination and industrialization of these basic technologies and thus make a contribution to both the growth of Japanese industry and the international community.

In 2007, the Micromachine Center will continue to actively promote the High Integration/Combination MEMS Production Technology Development Project. (nicknamed the Fine MEMS Project), a three-year project that began last year. The Center will also build a support organization for the MEMS Open Network Engineering System of Design Tools Project (nicknamed the MEMS-ONE Project), for which development was completed in March 2007, and will shift to publicizing the achievements of this project. With regard to activities to improve the environment for industrialization, beginning with policy proposal activities and industry interchange/stimulation projects on the part of the MEMS Industry Forum that was established last year, the Center will continue to actively promote projects from last year including research projects, projects to promote standardization and publicity projects.

## II. Description of Primary Activities

### 1. National/NEDO Project-related Activities

In order to establish basic technologies relating to micromachines and MEMS, the Center has actively promoted research and development projects led by the national government and NEDO, combining the capabilities of industry, government and academia. In 2007, the Center will vigorously promote the High Integration/Combination MEMS Production Technology Development Project (Fine MEMS Project), a three-year project initiated in 2006. The Center will also actively promote dissemination of MemsONE, the research and development achievement of the MEMS Open Network Engineering System of Design Tools (MEMS-ONE Project), a national government/NEDO project that was concluded in March 2007.

#### (1) High Integration/Combination MEMS Production Technology Development Project (Fine MEMS Project) (NEDO)

The Center will continue to promote this project, initiated in 2006 as a national project, and carry out the plans to prepare a high integration/combination MEMS knowledge database that collects, organizes, and arranges knowledge information related particularly to 3 issues in the development of concentration/combination MEMS: (1) combination of MEMS and nano functions, (2) integration of MEMS and semiconductors, and (3) MEMS and MEMS high integration unification. A web-based database system in particular will make it easy for researchers

participating in the project to enter data, and this will help to increase the number of database entries and make the content more complete. In addition, the Center will continue to assist in overall management of this project in cooperation with NEDO, and will actively publicize midterm achievements using opportunities such as this year's Exhibition MICROMACHINE.

#### (2) Dissemination of MemsONE

The MEMS Open Network Engineering System of Design Tools (MemsONE) Project was concluded in March 2007. The Center will establish a MemsONE Support Center to promote MemsONE – the research and development achievement of the MemsONE Project. The MemsONE Support Center will vigorously publicize MemsONE in cooperation with the MEMS Industry Forum.

### 2. Activities of the MEMS Council (Policy Proposals, Industry Exchange, Revitalization Activities)

The MEMS Council was established in April of last year for the purpose of providing further support for the MEMS industry. Comprising MEMS-related businesses, the MEMS Council aims to promote policy proposal, industry activities, and revitalization activities, thus contributing to the strengthening of the international competitiveness of the MEMS industry in Japan.

#### (1) Policy Proposals

Through exchanges of opinion between MEMS Council members and representatives of the government and MEMS-related industries at MEMS Council Promotion Committee meetings, as well as by holding MEMS forums, the MMC will proactively present proposals concerning MEMS policies.

#### (2) Coordination with Industry and Academia

Interested business members will gather together for study groups on particular topics. In order to promote development of the bedrock state-of-the-art micro-nano technologies for which wide-ranging applications are anticipated, the "Micro/Nano Cutting Edge Technology Exchange" will be once again held this year (as last year) as venues for the exchange of information and in order to stimulate joint research. The MEMS Council will also work with the Standardization Committee to promote standardization activities.

#### (3) Preparation of an Infrastructure for MEMS Development

- (i) Expansion and Strengthening of a Foundry Network System
- (ii) Promoting the Diffusion of MemsONE
- (iii) Strengthening of Coordination between Public Foundries in Each Region and Regional Clusters
- (iv) Promotion of Human Resource Training
- (4) MEMS Business Exchange in Japan and Abroad
- (i) Establishment of an MEMS Mall
- (ii) Hosting "MicroNano 2007"

To promote industry interchange in the micromachine/MEMS field, as last year, a series of events entitled "MicroNano 2007" will be held. The events will comprise Exhibition MICROMACHINE, a trade show for micro/MEMS and nanotechnologies; the MEMS Forum; the International Micromachine/Nanotech Symposium; and the Presentation of National Government/NEDO Project Results. The series of events will be held July 25 - 27, 2007 at Tokyo Big Sight.

#### (iii) Participation in the 13<sup>th</sup> World Micromachine Summit

The Center will participate in the 13<sup>th</sup> World Micromachine Summit, which will be held in the Italian city of Venice from

April 25 - 29 this year, taking part in discussions of a wide range of topics, including worldwide trends in micromachine technology and its fields of application.

(iv) **Building of an International Network of Affiliates**

(v) **Dispatch of overseas missions and exchange of researchers**

### 3. Survey Research Activities

The Center conducts research relating to micromachine and MEMS technologies that are gradually becoming key manufacturing technologies, in order to accurately determine technical and industry trends and study new technical issues in domains in which these technologies are fused with nanotechnology.

#### (1) **Implementation of research relating to the BEANS Project**

The Center will establish a BEANS Project Review Committee with the aim of making the Bio & Electro-mechanical Autonomous Nano Systems (BEANS) Project a national project. BEANS was the achievement of a MEMS frontier project implemented in 2006 to study future device technologies that are expected to be created through fusion with nano-bio technologies. The Committee will study the project scheme, organization, research topic content and so on.

#### (2) **Study of national and international technical trends**

This year as well, the Center will determine, from a fixed perspective, the technical and research trends in the micro-nano fields that are experiencing dramatic technical progress both at home and abroad. In addition, work will continue on the compiling of a database that is basic to, and critical for, future process in micromachine technologies.

#### (3) **Survey of industry trends**

The Survey Research on the Analysis of the Current Conditions in MEMS Related Markets and Japan's Competitiveness was implemented last year. This year, an exchange of views will be held with overseas affiliates in the MEMS Industry Forum regarding the MEMS market, and a study of last year's market trends and the current status as well as future prospects will be completed. Information-gathering and analysis will also be conducted with regard to various issues relating to future technical development.

#### (4) **Enhancing the Micro/Nano Database**

The MMC website database will be further enhanced to enable supporting members to search for publicly disclosed documents and survey reports, research center maps, mini-research reports, and other information.

### 4. Projects to promote standardization

International initiatives to promote standardization in the micromachine/MEMS technology field will be pursued.

#### (1) **Study of standardization**

In 2006, a road map for standardization was established to serve as a guide for international standardization and normalization, which will be needed to strengthen MEMS international competitiveness and international deployment based on this competitiveness. In 2007, efforts will focus on basic common fields and device fields in accordance with this road map, and detailed study leading to the creation of draft standards will be conducted.

#### (2) **Research and development to authenticate the criteria for proposing international standards**

In 2006, accelerated life testing of the mechanisms and materials for MEMS devices was initiated, in addition to research and development of calibration materials for characteristic evaluation tests of MEMS mechanisms and materials with the objective of standardization. In 2007, the primary focus will continue to be on acquiring basic data for establishing draft standards.

#### (3) **Follow-up for proposed Thin Film Material Fatigue Test Method**

Follow-up activities aimed at international standardization will be conducted for the NP (New Work Item Proposal) fatigue test proposed in 2006.

#### (4) **Study of overseas standards**

A study will be conducted to determine how Japan can accommodate the rapidly increasing number of proposed MEMS standards in Korea and other overseas countries (relating to RF-MEMS, bonding and packaging).

#### (5) **Creation of JIS standard for thin film material tension test method**

A study will be conducted with the objective of creating a JIS standard for the tension test method and standard test specimens for which IEC standards were established in 2006.

### 5. Publicity projects

Efforts will be made to achieve wide-ranging dissemination and education regarding micromachines and MEMS through the publication and distribution of brochures, the holding of exhibitions and so on. Furthermore, information and documents on micro/nano-machine 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 Micro/Nano Public Relations Magazine**

A public relations magazine will be published periodically and distributed to those in or connected with the field; it will also be made available on the Internet through the Center's home page.

#### (3) **Publication of a Monthly Newsletter**

Information concerning research and governmental trends related to micro- and nano-machines is distributed monthly via the "MMC/MIG News" to supporting members, MEMS Council members, and other interested individual and organizations.

#### (4) **Provision of Information through the MicroNano Express Newsletter**

Through the MicroNano Mailing list, information concerning micro/nano-machine events or industry-academia-government collaboration is distributed as required via the "MicroNano Express" newsletter to supporting members, MEMS Council members, and other interested individual and organizations.

#### (5) **Maintaining and Upgrading the MMC Library by Expanding the Literature Abstract Database**

"Micromachine Index," an information magazine containing abstracts of technical documents and information on materials, is issued on a regular basis and provided to supporting members and organizations concerned with micromachines. Collected technical documents and materials are stored and maintained in the MMC library and made available to the general public.

#### (6) **Hosting "Exhibition MICROMACHINE/MEMS"**

The 18<sup>th</sup> International Trade Show for Micro/MEMS & Nanotechnologies will be held as part of a series of events entitled "MicroNano 2007." The trade show will feature exhibits of state-of-the-art products, manufacturing materials and so on relating to the micromachine and MEMS industry, and it will also serve as a forum for presenting the latest research achievements. Due to venue scheduling circumstances, this year the venue will change from Tokyo International Forum to Tokyo Big Sight. The series of events will be held from Wednesday, July 26, 2007 to Friday, July 27, 2007.

#### **"MicroNano 2007" Events**

##### **1. Exhibition MICROMACHINE: The 18<sup>th</sup> International Trade Show for Micro/MEMS & Nanotechnologies**

July 25, 2007 (Wednesday) - July 27, 2007 (Friday)  
Tokyo Big Sight (West Hall 3 & 4)

##### **2. 2nd MEMS Forum**

July 25, 2007 (Wednesday)  
Tokyo Big Sight (West Hall 3 & 4)

##### **3. 13<sup>th</sup> International Micromachine / Nanotech Symposium**

July 26, 2007 (Thursday)  
Tokyo Bay Ariake Washington Hotel (Iris)

##### **4. National Government / NEDO Project Achievements**

July 27, 2007 (Friday)  
Tokyo Big Sight (West Hall 3 & 4)