Toward the Popularization of Foundry Services and the Broad-Based Expansion of MEMS Industries

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1. Introduction

MEMS industries are currently in transition, moving from their period of initial start-up to a period of expansion. From now on, greater and greater speed will be required for product development and creation along with the expansion of the market for MEMS products. As a result, foundries will play an even more important role from the stage of initial development through mass production.

For the past five years, the Foundry Service Industries Committee in the MEMS Industry Forum has actively worked to create a unique Japanese network, with the aim of expanding MEMS industries through foundry services. This article will introduce the achievements of these activities and discuss issues that remain to be resolved.

2. Activities of the Foundry Service Industries Committee

The Foundry Service Industries Committee began its activities in 2002 within the Micromachine Center. The Committee has held regular discussions on common issues faced by MEMS foundries, and its activities have centered on public relations targeting MEMS foundry users. At present, the Committee is made up of 11 diverse companies and organizations involved with MEMS foundries. (**Fig. 1**)

Fig. 1 Members of the Foundry Service Industries Committee

Below are the major activities that have been conducted, centering on the Foundry Service Industries Committee:

(1) Common liaison for foundry services
(2) Educational activities (MEMS workshops, etc.) and joint PR activities
(3) Activities to promote MemsONE (MEMS design and analysis tool)
(4) Study for the purpose of broad-based expansion of MEMS industries

Of these, **(1)** common liaison plays the role of contact point between the users and foundries, leading to increased foundry use on the part of users. In terms of **(2)** publicity and educational activities, workshops are held twice a year, and these have been particularly well received by engineers who have had little experience with foundry services. We will continue to hold these workshops and update their content.

The Committee is also helping to promote the MemsONE design and analysis tool in **(3)**, in order to create an environment in which it is easier to use foundries from a process perspective. With regard to **(4)**, studies into the creation of a mechanism to enable rapid, low-cost prototyping are underway, with the aim of achieving broad-based expansion of MEMS industries.

3. Future challenges and efforts

Through these activities, the Committee had been able to provide users with a certain amount of information from foundries, increasing the level of user awareness with regard to foundries. Future efforts will aim to further increase use in order to achieve a broad-based expansion of MEMS industries overall. However, there are thought to be limits to the company-centered efforts that have been conducted up to now. This is because, unlike semiconductors, there is no standardized process and design environment for MEMS., As a result, mismatches are produced between users and manufacturers in terms of specifications, costs and so on. This occurs particularly when small and medium-sized companies and venture companies pursue development and prototyping. In order to resolve this problem, a mechanism to link users and foundry companies is thought to be needed in order to provide a smooth path to mass production. In a survey of MEMS foundries conducted in the past by the Micromachine Center, too, many respondents expressed the opinion that the national government should work to build a network to accelerate the process from development to commercial application.

The Committee has just initiated a study of the possibility of creating ready-made processes and common guidelines on the foundry side, as one phase of the effort to promote the dissemination of MemsONE. The Committee also plans to actively pursue the exchange of information with public research institutions and local publicly-run trials in order to form a MEMS network. If this mechanism can function on the practical level as a network system, it will accelerate the process of creating new MEMS on the part of small and medium-sized companies and venture companies, from the development and prototyping stage to the mass production stage, resulting in broad-based expansion of MEMS industries.