

# BEANS Project Promotion Organization

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The previous issue of MICRONANO featured an overview of the Project to Develop Next-generation Device Manufacturing Technologies that Fuse Different Fields (otherwise known as the BEANS Project). This issue will present the features and implementing organization for promoting the BEANS Project. As you know, there are two types of implementing organizations for national research and development projects: a centralized research framework, in which all of the organizations participating in the project are grouped at one location, and the distributed research framework, in which the organizations are distributed in separate locations for each research topic. In the centralized research framework, the researchers, instruments and equipment are centralized at a single location (a university, national research center or company) and all research activities are conducted at that location. With this system, the research budget and scale of research for the project are large, but the research can be managed efficiently. In the distributed framework, the participating institutions take the issues back to their own departments and conduct research there. For this reason, in Japan this framework is also known as “take-home research.” With this system, research is limited to individual issues, so there is a clear organization of responsibilities, but on the other hand it is difficult to efficiently manage the project as a whole. In this way, each system has its advantages and disadvantages. Although naturally it depends on the nature of the project, in general the distributed system has been used for projects that are promoted for short-term topics and for the practical application of technologies, while the centralized system has been used for long-term topics and key technology research and other major projects that are considered to be national strategies.

Both approaches are being employed to implement the BEANS project. The implementing organization is a centralized framework, but an active effort is being made to incorporate the advantages of the distributed approach, for example by distributing research activities among multiple research institutions. In the background of this approach lies the fact that the research topics for the BEANS project encompass a wide range of areas (MEMS, biotechnology, organic research and nanotechnology), and instead of centralizing the research centers at a single location, it would be more efficient to distribute them to universities and national research institutes to utilize existing research resources. On the other hand, good organization, close cooperation and common management will be needed in to organically link these wide-ranging research topics and pursue research and development that will enable the project's goal of integrating different fields to be achieved. For this reason, it was decided to establish the management organization for the BEANS project at a different location from the research centers in an effort to accelerate and improve the efficiency of research promotion. Accordingly, university researchers, company engineers and post-doctoral researchers have been assembled at research centers (national research institutes and universities that have outstanding research resources) to conduct research activities based on cooperation among industry, government and academia. Meanwhile, a separate research center that serves as the head office for the project has been established at the BEANS Laboratory to enable effective project management. For the purposes of the BEANS project, the research centers and the project management organization are collectively referred to as the “BEANS research initiative.” The following diagram shows the details of the BEANS research initiative.

Many research entities are participating in the BEANS research initiative. At present, these comprise 18 companies, 12 universities, two independent research institutes and two foundations. These entities include four organizations that have been contracted by the Ministry of Economy, Trade and Industry

to conduct research: the Micromachine Center, the Institute for Unmanned Space Experiment Free Flyer Foundation (USEF), The University of Tokyo and Kyushu University. The remaining participating organizations are places to which research has been re-consigned or companies from which employees have been transferred to the aforementioned four entities to conduct research. Currently a total of 108 researchers and engineers are engaged in project research. These include university faculty members, temporarily transferred company employees, post-doctoral researchers, interns and exchange researchers.

For the purposes of this project, research activities are organized into three areas (Life BEANS, 3D BEANS and Macro BEANS) according to research and development topic, and research is being conducted at five research centers. At present, the Life BEANS Center comprises two locations: the Ito Campus of Kyushu University and the University of Tokyo's Komaba Research Campus. The 3D BEANS Center also comprises two locations: the University of Tokyo's Komaba Research Campus and the Biwako Kusatsu Campus of Ritsumeikan University. The Macro BEANS Center is located at the Tsukuba East office of the National Institute of Advanced Industrial Science and Technology (AIST). As a result, in geographical terms the BEANS research network is a nationwide one, with centers in the Kanto and Kansai regions of Honshu and on Kyushu.

In terms of the management scheme, the BEANS Centers are placed under a project leader. Each BEANS Center has a director and a head of planning and coordination. The Center directors are outstanding research leaders 30 to 40 years of age at the universities and independent research institutes that are the driving force behind research promotion. The heads of planning and coordination are the three assistant directors of the BEANS Laboratory, individuals who have experience in research management. In this way, the research and management functions are completely separate but are designed to complement one another. This gives researchers a sense of mission and an appropriate level of intensity, enabling Center operations to be both speedy and efficient.

Overall project management is conducted by the project leader with support from the sub project leader and the office of the project leader. The office of the project leader handles daily tasks relating to research planning and management and so on, while at the same time administering the Project Promotion Committee, Intellectual Property Committee and various other committees. Particularly with regard to the Project Promotion Committee that plays a central role in project promotion, the office of the project leader periodically ascertains the progress of each research and development topic, comparing project progress with project planning and evaluating the results and then expeditiously making determinations as needed with regard to whether the project should be accelerated, downscaled, terminated or otherwise revised. The Intellectual Property Committee establishes mechanisms that enable batch sub-licensing of the patents and other intellectual property rights achieved by the project to participating institutions, in order to enable project achievements to make wide-ranging contributions to the creation of new industries and provide increased added value to existing manufacturing operations.

The innovative research and development conducted as part of the BEANS Project involves the integration of different fields on an unprecedented scale. The project organizers believe that a key factor in the success of the project will be a promotion scheme that is commensurate with the innovative nature of the project. While it may be necessary to change or revise the promotion scheme to match the progress of research efforts, in such cases this will be accommodated through a flexible approach that is not constrained by the existing scheme.

