EUROPRACTICE and FUSE: The European Commission Programs for supporting Education and Technology Transfer in Microelectronics

Anne de Baas(1) and Michel J. Declercq(2)

(1) Project Leader at the European Commission
   DG-III / F-3, rue de la Loi, 200, (N105-2/36)
   B-1049 Brussels, Belgium

(2) Professor at the Swiss Federal Institute of Technology
   and Consultant by the European Commission
   EPFL-EL-LEG, CH-1015 Lausanne, Switzerland

Abstract

Two major programs aiming at supporting academic education and technology transfer to SMEs in the field of microelectronics have been launched in mid-95 by the Commission of the European Communities (EC). The EUROPRACTICE program provides basic services including silicon foundries, training and access to MCMs, microsystems and CAD software, while the FUSE program encourages companies to use a microelectronic technology for the first time in their product.

1. Introduction

Microelectronics is a key element for maintaining a technological edge in many products and systems. The availability of highly skilled design engineers has therefore been recognized for several years as a top priority in engineering education programs. When looking back, however, at the dramatic evolution of microelectronics since the appearance of the first integrated circuits, we can have a better feeling about the complexity, cost and effort necessary to stay at the technological forefront, and therefore to stay competitive with new products. EC initiatives such as the Eurochip program launched in 1989 have widely contributed to give the Academic world a cheap and easy access to basic services in microelectronics. This action, which ended in 1995, was very successful with a membership count of more than 350 European universities which offer today a complete education program in integrated circuit design.

On the basis of this experience, The EC launched in 1995 a new set of programs covering awareness, basic services and technology transfer in microelectronics. These programs, named respectively EUROPRACTICE and FUSE, have been designed to cover a much wider range of actions, use a new management philosophy, and focus more specifically on SMEs in complement to the academic community.

2. The Europractice Program

The basic target of Europractice is to provide academic support and industrially oriented basic services in microelectronics. The services cover the provision of design software and related support, training and best practice guidance, cheap ASIC prototyping and testing, access to Multi-Chip Modules (MCM) and to various microsystems technologies. Providing an easy path to small volume fabrication as well as customer support is also in the scope of the program. Moreover, a global management center helps to coordinate the different services and creates a single link with the EC.

The EC support is both organizational and financial. A clear strategy combined with an advanced management system aims at gradually reaching financial autonomy for most of the services within a time frame of 4 years.

IC Manufacturing Service (ICMS)

The ASIC Manufacturing Service provides an interface between the foundries and the users. It offers a fully supported, low-cost route for universities and companies to design and fabricate ASICs for their individual applications. Low cost is achieved by sharing fabrication costs in multi-project wafers (MPW). The ICMS offers a broad range of fabrication technologies including CMOS, BiCMOS and GaAs. It also provides a full range of packaging options as well as testing capabilities and failure analysis. A close cooperation with the Software Support Services aims at delivering design package for the full set of technologies and CAD tools available through Europractice.
Multi-Chip Modules (MCM)

The MCM service offers design, prototyping, production and testing facilities in a variety of technologies and applications. In the field of MCM, customer support is also mandatory for addressing problems related to packaging, process compatibility, economic assessment, etc.

Microsystems Prototyping and Manufacturing Service (MPMS)

The aim of MPMS is to promote and stimulate the application of microsystem technologies, bringing down the cost and lowering the risk of entry to the users of these technologies. The service covers a range of available and economically viable technologies. It offers global solutions to customers combining microengineering, packaging, interconnect and assembly technologies.

After an initial organization phase, the MPMS started making its first applications a few months ago.

Training and Best Practice Service (TBPS)

To meet the challenge of keeping pace with fast moving technology, Europractice is providing a fast track for the continuing education of engineers from industry, and for the recycling of teachers in new or advanced topics.

Europractice-TBPS plays a key role as a central coordination office. Among many other tasks, it must identify the industrial needs for training, elaborate a training strategy and a target course program, select course providers, evaluate the quality of proposed courses and teachers, disseminate the information, manage the registrations, and assess the effective results.

More than 200 courses are offered today by a total of 25 course providers from all over Europe. Most of these courses are organized as intensive courses, delivered in a short (typically one to three week) time frame. Special attention is given to investigate and meet the training needs in hot topics such as analog design, low-power / low-voltage IC design, etc.

Software Support Service (SSS)

The SSS provides academic members with modern CAD tools at affordable prices for research and training. Software tools are also made available to enterprises and Technology Transfer Centers under certain restrictive conditions. SSS activities include negotiation with CAD vendors, acceptance of customer’s orders, management of user’s contracts, software delivery, and provision of technical support and comprehensive design kits.

PC as well as workstation based software is offered, covering the needs of both academic and SME users.

3. The First User Action (FUSE)

FUSE is an action launched by the EC to accelerate the uptake of existing microelectronics technologies in European industry. It is an awareness and technology transfer action addressing potential first users of these technologies. FUSE should demonstrate to enterprises that implementation of microelectronics is feasible and that increments to their experience can be realized more easily than feared generally and can provide them with worthwhile economic advantages.

For companies that fulfill the FUSE selection criteria, the program provides an incentive to make the first move, consisting in technical and management guidance, training and technology transfer, as well as financial support. This provides companies with a reduced risk approach to product innovation. In return the enterprises are obliged requested to provide information which can be used in furthering the objectives of FUSE.

In terms of acceptance criteria, FUSE requests from companies to be first users of the selected technology, to have an industrial product in which the chip will be integrated, and to demonstrate the technical and economical soundness of the project. Moreover, a successful FUSE project must involve training and technology transfer in such a way that the company should be able to repeat the experience by itself in further projects.

FUSE is organized around a network of 26 Technology Transfer Nodes (TTN) geographically distributed in Europe. The TTNs have regional functions. They have the technical expertise to assist companies in selecting the appropriate technology for a specific product application. They also have the business expertise to perform an economic impact assessment of the proposed improvement. These TTNs extract from each first user experiment a description of the barriers felt and the strategy followed to overcome it. These stories form together the FUSE portfolio, which supports the dissemination action adressing a large audience of companies which could benefit from microelectronics. The dissemination is done in a proactive way, with TTNs visiting companies at their premises.

4. Conclusion

One year after the programs start-up, a very positive impact has been measured on education and technology transfer, both in universities and companies. More than 1500 industrial « first users » project have been submitted to the EC in the framework of FUSE.