"Nanoelectronics - key enabler for Economic growth and Prosperity"

IMPORTANCE
of Semiconductors for Society

Electronic and information systems play an ever increasing role in the worldwide economy, representing today nearly 10% of the Gross Domestic Product. They have penetrated and transformed all aspects of life – including transportation, communications, health and wellness, government services, banking systems, entertainment and education – and have created millions of jobs in industry and services. They have also been the engine of productivity growth. Micro- and nanoelectronics are the key enabling technologies for electronics, information and communications technology and as a consequence, the semiconductor market is increasing at double the rate of the Gross Domestic Product growth.

In the foreseeable future, the role of electronics and information systems will further increase as European society is faced with structural problems such as an ageing population, exploding healthcare cost, transportation bottlenecks, rising energy costs and the need to increase productivity in order to be competitive on a worldwide basis. European citizens are expecting better health systems, safer cars, improved energy management, improved telecommunications and information access, enhanced security as well as better entertainment.

These societal challenges can also be seen as windows of opportunities for the European industry as a whole. The challenge is to be the first to address the new lead markets, to impose “de facto” standards and to become worldwide market leaders in a number of these domains.

To make new products and services affordable for the population at large, strong progress in nanoelectronics in terms of costs and integration is necessary. Indeed, the growth of the information and communication technology industry is mostly based on strong and steady technological progress in semiconductors – doubling of performance every two years, and 40% reduction in price per function each year – supported by a very high level of R&D, nearly 20% of sales.

Leadership in new markets is also strongly related to leadership in micro- and nanoelectronics. For this, a high level of R&D and major investments in infrastructure are required. The increasing technical complexity and the ever increasing demand for human and financial resources have reached dimensions, where big companies or even nations can no longer effectively solve these issues alone: European cross-border co-operation and alliances are increasingly more important and not limited to R&D.

CATRENE
Presentation

CATRENE, the **C**luster for **A**pplication and **T**echnology **R**esearch in **E**urope on **N**ano**E**lectronics, is a non-profit organisation striving for market leadership and a competitive European information and communication technology industry. It is the ambition of Europe and the European companies to deliver Micro- and nanoelectronics solutions that respond to the needs of society at large, improving the economic prosperity of Europe and reinforcing the ability of its industry to be at the forefront of global competition.

CATRENE builds on the successes of previous EUREKA programmes such as JESSI, MEDEA, and MEDEA+ in fostering the continued development of a dynamic European ecosystem with the critical mass necessary to compete at a global level in high technology industries. For applications and technology projects, CATRENE embraces all key actors in the value chain – including materials and equipment suppliers – as well as the involvement of large companies and small and medium-sized enterprises (SMEs), academia and research institutes covering a number of new market opportunities and meeting societal challenges. The programme reflects the increased importance of this industry and is also in line with a number of trends moving towards a greater focus for national programmes. It will interact with other programmes in the nanoelectronics field – national, EU framework and Joint Technology Initiatives as well as with other EUREKA clusters.

CATRENE assumes the convergence of applications and enabling technologies. As such, the following key work areas have been defined on this basis:

Application work areas:
- High quality, high speed user-centred communications systems;
- Smart-card systems, trusted platforms and secure applications;
- Transport electronics for safety and security, environmental protection and communications;
- Healthcare devices and systems;
- Energy-efficient devices and energy control systems; and
- Devices and systems for digital entertainment.

Technology work areas:
- Electronic design automation (EDA) for extreme SoC and SiP design;
- Process development including next generation CMOS process (more Moore), process options (more than Moore) and hetero geneous systems integration;
- Manufacturing science with cross cut technologies, equipment and materials;
- Smart sensor and actuator systems.

CATRENE is a four-year programme, which began in January 2008, and is extendable by another four years. This is in line with the changing landscape of the semiconductor industry as well as the present view on technology evolution and the time span over which most of the major applications will develop.

To ensure the success of the CATRENE programme and to maintain European leadership, a strong co-operation between R&D actors and Public Authorities is needed. Although CATRENE is a positive example of such collaboration, public support for R&D must be increased in order to keep up with the rising costs and also to catch up with competitors in other regions of the world.

Public Private Partnership

The CATRENE Structure

The CATRENE Public Private Partnership (PPP) was formed to unite the public sector's commitment to helping Europe achieve its long-term industrial and societal goals with private industry expertise in nanoelectronics R&D. CATRENE bridges the interests of the public and private sectors in view of resolving specific incentive and financial barriers preventing increased industry involvement in the race for regional leadership in strategic high tech domains.

National governments from European countries consider the pooling expertise and the resources under the CATRENE flag to be essential and, given the added value of cross-border co-operation, they financially support a percentage of the cost of CATRENE labelled projects.

It is, in fact, the national governments that established the CATRENE Directors Committee (CDC) to co-ordinate and monitor the execution and funding of CATRENE projects. It is the formal contact point for the CATRENE Board. The committee is supported by an intra-governmental working group, the CATRENE Public Authorities (CAPA), who are in charge of discussing with the CATRENE organisation on the day-to-day topics concerning project performance, monitoring, reporting, funding and the selection of new proposals.

Following the EUREKA principles, the CATRENE PPP is industry initiated and bottom-up guided. The executive bodies in the CATRENE organisation are:

- The CATRENE Board
- The CATRENE Support Group
- The CATRENE Steering Group Applications
- The CATRENE Steering Group Technologies
- The CATRENE Office

The composition of these bodies reflect the participation in the CATRENE programme and an appropriate mixture with respect to balancing the participating countries, fields and levels of activities, while staying at a count level compatible with effective decision-making processes.

CATRENE Board

The CATRENE Board is the high level executive body of the organisation. It is responsible for the strategy and coherence of the whole programme. It establishes the general rules of Programme Management and it interfaces with Public Authorities for programme strategy and co-funding. The composition of the Board underlines, on the one hand, the participation of contributing industry and research institutes but also reflects countries allied in the CATRENE programme. The Board nominates the CATRENE Chairman and its Vice-Chairman in charge of the execution of the entire programme. In addition, there are up to three scientific advisors from the academic world involved as non-voting members.

CATRENE Support Group

The Board is assisted by the CATRENE Support Group, which has delegated responsibilities and, which may act on behalf of the CATRENE Board in the execution of specific tasks. The Support Group decides on project labelling and deals with all operational issues regarding the management of the Programme in terms of strategic objectives and available resources in CATRENE.

CATRENE Steering Groups

The two CATRENE Steering Groups are responsible for coherence and consistency of activities related to projects. They give recommendations on strategic orientation. They are responsible for the initiation, evaluation, selection or ranking of projects as well as for their monitoring and reviewing.

CATRENE Office

The CATRENE Office, located in Paris and consisting of a team of experts, assists the entire CATRENE organisation. It is a central contact point and a meeting place for the whole CATRENE Community. It also handles the programme's interface with the outside world.

CATRENE Scientific Committee

The primary objective of the Scientific Committee is to report on the latest advances and technological trends on a worldwide basis and to accomplish annual tasks defined by the Board, dedicated to the specific benefits of the European industry. For that end, the composition of the Committee may be adjusted to obtain optimal results.

Project
Calls in CATRENE

It is foreseen that CATRENE will initiate Calls for submitting Project Proposals at least once a year. These calls are then optimised in a way that document submission and subsequent steps in the project evaluation process are fully coordinated with the CATRENE groups involved and Public Authorities of supporting Member States, thus keeping throughput times to a minimum. In addition, project proposals may be submitted to the Office at any time outside an official call.

Projects submitted for evaluation must address one or more sub-work areas detailed in the CATRENE White Book. Depending on the work-area, the structure of the envisaged consortium has to be horizontal (between competitors), or vertical (a supply chain), or mixed. Participation of all partner groups is desirable, i.e. large companies, SMEs, research institutes and universities. Proposals will also be assessed during the selection process along two additional criteria, considered to be of equal importance by the Public Authorities:

- Preference will be given to those projects demonstrating focused quantified targets and having a strategic character and orientation.
- Projects, in which the joint initiative of several European players is mandatory, that focus on strategic goals and influence or set a worldwide standard will be favoured.

The evaluation and selection process foresees several steps. In the first step, the project consortia have to prepare a Project Outline (PO) giving information on general goals, strategic relevance for CATRENE, level of innovation, state-of-the-art, market relevance and competitive situation, exploitation of project achievements, dissemination of project results, consortium description, description of work plan, resources required, project duration, planned milestones and deliverables, etc.

The PO allows for early feedback to be provided from CATRENE to the consortia and for preliminary discussions with the Public Authorities to take place.

In a second step, selected consortia will be asked to provide a Full proposal (FP). The FP is used for the final selection process and in the case of a positive evaluation, it leads to the allocation of a CATRENE label. This document also serves in a number of countries as a technical annex for funding applications as well as the reference document for the reporting and monitoring of project activities.

The main difference between a PO and a FP is the detailed work plan description given in the FP.

Reporting
and Monitoring of Projects

The CATRENE organisation was established in order to manage both the R&D programme and its projects, and to maintain its overall coherence. To accomplish these tasks, an effective reporting and monitoring procedure has been set up that covers the strategic and technical aspects of CATRENE.

Twice a year, each project consortium prepares a Technical Report emphasising the strategic business aspects of the project in the reporting period. The focus of this document does not merely highlight the scientific achievements, but also quantifies the progress whilst recalling the industrial goals, the objectives of the project, the market relevancy as well as exploitation of expected results.

In addition, for each running project, there is a project review meeting at least once a year. Projects are continuously monitored, variances of achievements are analysed and if necessary, corrective actions are initiated. Monitoring comprises the calibration of technical progress including the checking and verification of milestones and deliverables, the co-operation between project partners as well as the utilisation of human resources. The actual use of financial resources will remain, however, a subject to be treated between the individual project partners and their funding Public Authorities.

The Public Authorities are also invited to take part in the monitoring process: they nominate PA reviewers, teaming-up with the CATRENE organisation and the Steering group members in the project review meetings. Modifications or updates in the content or in the execution of a labelled project are made through a change request procedure, differentiating minor and major changes. All change requests must be accompanied by a Full Proposal in order to ensure that the project documentation on file remains constantly up-to-date and major changes have to be endorsed by the Support group members.

Results of the reporting and monitoring, at project level, are used by the CATRENE organisation and by the Public Authorities to periodically decide whether to maintain or to withdraw the CATRENE label, or whether to continue or to stop the funding process.

Project information generated for CATRENE reporting purposes is shared with the Public Authorities. It is, however, up to the National Public Authorities to require additional information from project partners according to specific national rules.

http://www.catrene.org

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EUREKA

CATRENE (Σ! 4140), Cluster for Application and Technology Research in Europe on NanoElectronics, will effect technological leadership for a competitive European ICT industry.

CATRENE focuses to deliver nano-/microelectronic solutions that respond to the needs of society at large, improving the economic prosperity of Europe and reinforcing the ability of its industry to be at the forefront of the global competition.

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