1. Publishable summary

Today technologies, products and services are changing at lightning speed and markets are becoming more global. European industry is therefore facing enormous challenges. New ICT products are increasingly becoming more complex and development cycles must be shortened to compete in the global marketplace. Complete systems in one chip (SoC) or in one package (SiP) are heterogeneous and include sensors and actuators and must be developed by multidisciplinary teams in a highly efficient and timely manner. The complexity of microelectronics based methods, CAD tools and technologies are increasing even more rapidly than before. A huge investment is needed, both financial and in personnel, in order to be able to adopt those technologies in new product development. This continual need for investment in new technology and trained personnel will continue to be a major challenge for the foreseeable future as for example nanotechnology and biotechnology emerge in the design arena. The use of system level integration in new product developments will be crucial to the success of European industry in future world markets. However European industry currently suffers from a lack of well-trained SoC engineers. In order to increase European competitiveness, Europe needs to master both the supply and use of these new emerging technologies and needs to excel in innovation of new products.

Today 550 universities and 100 research institutes from the EU member States and “extended” Europe are supported by this EUROPRACTICE service funded by the EC. Eligible institutions are currently those in the Member States of the European Union plus those in European countries eligible to participate in FP7 (Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Croatia, Georgia, Iceland, Israel, Liechtenstein, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Norway, Russia, Switzerland, Turkey, Serbia and Ukraine). Through the service the European Academia have access to the most advanced CAD tools for IC and MEMS design from the largest CAD vendors world-wide such as Cadence, Synopsys, Mentor Graphics, Tanner, CoWare, Dolphin Integration, IntelliSense, PhoeniX, SoftMEMS, Coventor, … but also IP and programmable devices from vendors such as ARM, Xilinx, Altera, … European Academia can buy licenses at very low prices, for education and non-commercial research, through EUROPRACTICE. As such the EUROPRACTICE network of 650 European Academia is the largest network in the world having a unique and uniform tool base for IC and MEMS design. Access to these advanced CAD tools allows them to participate easily in EC-funded projects, ranging from IC design to complete systems design, working together with industrial partners.

EUROPRACTICE offers low cost prototyping fabrication for the IC and MEMS designs developed by the European universities and research institutes. Through EUROPRACTICE they have access to the most advanced IC technologies (90nm (2008), 65nm (2009) – 40nm scheduled for 2010) from the most renowned foundries in the world like TSMC (the foundry nr.1) and UMC (the foundry nr.3). It is important that students are trained in technologies from these foundries as the majority of fabless companies and design houses in Europe are making use of these technologies in their IC design for future products. Additionally EUROPRACTICE is offering, on a fully end-user funded basis, access to prototyping and initial volume fabrication to more than 150 fabless companies, startups and small companies in Europe. Through the funding by the EC in the frame of the EUROPRACTICE IC5 project it has been possible to reduce the prices of prototyping for European academia in the most advanced technologies to acceptable levels that academia can afford (mini@sic concept + funding). As such the universities and research centers can have small IC and MEMS designs prototyped at pricing levels of 2,000 € for 0.35µ-like CMOS to 15,000 € for advanced 90nm CMOS mixed-signal RF technologies. When it comes to innovation as one of the pillars to stimulate the economy and compete with the new growing Far-East economy such as China (where they buy most modern equipment), it is absolutely a must that the students are well-educated in most modern IC design flows and technologies. From discussions with top leading European Academia it is absolutely necessary that they have access to the most advanced technologies such as 65nm and 40nm CMOS for their research and paper presentations on world-class conferences such as ESSCIRC in Europe and ISSCC in USA.

The objective of the EUROPRACTICE IC5 project is to continue and further develop, over a period of 21 months (from 1 April 2010 until 31 December 2011), the EUROPRACTICE IC Service into a IC/SoC/MEMS Service offering access to CAD tools for learning and access to IC/SoC, SiP and MEMS technologies for prototyping, for European Academics

The aim of this project is not only to continue the current successful service but to extend the service to easy and affordable access to microelectronics SoC/MEMS design for universities. This will be done by discussing with other 'services' set up under other FP7 activities. Other service partners will be invited to discuss adding services to universities via the IC Service when they have reached maturity.

By having access and being stimulated to use new CAD tools and technologies for IC and SoC /MEMS design, universities will be able to keep in the technology league and enhance their curricula to deliver well-trained engineers to the market. Recent trends in the academic sector strongly indicate that without an additional stimulation action many universities will be unable to continue to offer industrially relevant courses. Although this project is not addressing the training itself, the project will continue to work closely together with Stimulation Actions like the EC-funded projects IDESA-2 and STIMESI-2. EUROPRACTICE already offers the tools and technologies that are used by both IDESA-2 and STIMESI-2 projects in the university training. Industry and in particular SMEs that can have easily affordable access to well-trained engineers and to the newest IC/SoC /MEMS technologies will be able to innovate, which is the basis for more cost-effective development, and will be able to bring new products onto the market.

The targets are:

- To continue to distribute and support CAD suites for IC/SoC, subsystems and microsystem design to over 600 European universities and research laboratories. Additionally, to maintain a leading edge portfolio of design tools by a) selecting new design tools as a function of customer needs and availability of new design methods and b) keeping the scheme affordable and manageable by phasing out tools (after appropriate customer consultation) which are no longer relevant to the needs of the academic community.

- To prototype more than 300 IC/SoC designs from those 650 universities or institutes per year on MPW runs (based on the fact that university designs have increased again over the last years – this is a realistic target). As a result and thanks to the mini@sic concept, the number of university designs has increased since 2003. Thanks to the EC discount budget, universities have affordable access to 90nm. The target is here specifically to have a shift from the older 0.7µ/0.5µ towards the more advanced technologies (0.18µ and below) and to introduce affordable access to 65nm and 40nm and have about 20 designs of the 300 in 65/40nm in 2010-2011. This is an ambitious target and can only be achieved if the price per prototype can be kept around 10,000 euro with subsidy through this project.
- To set up a MPW service in MEMS and MEMS/CMOS technologies and to have more than 10 MEMS and MEMS/CMOS designs annually prototyped. This is a realistic target as the design of MEMS designs is linked also to the STIMESI-2, training of MEMS design project.

The current business model relies on major contributions from the universities and industrial customers covering all of the CAD Vendor costs (licenses, maintenance), IC prototyping and volume production costs plus an identifiable contribution through the annual university membership fees to the overall running costs of the Service. As the MPW service is open to industrial customers, it is not a viable option to ask higher prices and to make profit on MPW fabrication of designs from European companies in order to cover university costs.

No university scheme in the world is self-funded and from interactions with the other schemes world-wide it is apparent that Europractice has by far the highest level of end-user financial contribution. Either these schemes are funded through direct funds or through government paid staff. The fact that the foundries themselves restrict MPW services to their major customers (just a service – no business) and do not give access to universities due to the large overhead (support) indicate that MPW service is not a financially viable business.

When we compare the annual funding of the EUROPRACTICE IC Service (annually ~ 1.6 million euro to support 650 European universities) to other university schemes we see that those other schemes get a much higher funding.

Websites :

General : www.europractice.com
IC fabrication : www.europractice-ic.com
CAD service : www.te.rl.ac.uk/europractice