Europe looks to lead in nanoelectronics

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Wafer News
December 2004

Illustrating the need to ensure European technological and industrial competitiveness in the nanoelectronic sector as essential for industrial and economic growth, the recent MEDEA+ (Microelectronics Development for European Applications) annual forum in Paris revealed successes of many pan-European collaborative projects carried out under its umbrella.

MEDEA+ focuses on the enabling technologies required to make Europe a leader in system innovation on silicon. It strives to stimulate innovation and provides technology platforms that will allow European microelectronics companies to maintain their positions as worldwide leaders.

As the first four-year phase of MEDEA+ comes to an end this year, there are 54 MEDEA+ projects in nano- and microtechnology running or successfully completed. These projects involve R&D resources of nearly 14,000 person-years and an annual cost of about 500 million euros ($655 million) per year. In the second phase, which will run from 2005 to 2008, the concepts of the MEDEA+ program have been updated in a major review and aligned with the most recent technological challenges. Project proposals now being evaluated show an increasing engagement of all partner categories, including small and medium-sized enterprises (SME). MEDEA+ involves a total of more than 280 partners from 16 European countries, 38% being SMEs and 30% universities and research institutes. Nevertheless, the larger companies account for about 74% of the resources.

MEDEA+ has two project domains -- applications and technologies. The main application targets are high-speed communications, with 11 projects and 2600 person-years in network access and system-on-chip design methodologies. Another six projects and 1750 person-years involve the use and reuse of IP, new design practices, debugging, and testing and design tools, as well as projects in multimedia terminals, automotive electronics, and smart cards. The average size of the projects is some 250 person-years -- significantly larger than the former MEDEA projects that vaulted Europe's three largest semiconductor companies (Infineon, Philips, and STMicroelectronics) into the world's top 10, and gave Europe a commanding lead in key technology areas such as communications and system-on-chip design.

In the technologies domain, the major challenges deal with sub-100nm CMOS and extreme UV lithography. Ten projects with 3000 person-years are to be involved in core and dedicated CMOS process development, all in line with the International Technology Roadmap for Semiconductors.

Arthur van der Poel, MEDEA+ chairman, stressed that while European companies hold leading positions in the fields of silicon technologies, telecoms, automobile electronics, consumer electronics, and smart cards, it is vital that Europe remain an attractive base for industry and continues to be master of its own destiny. Possible solutions could

include joint commitments of all stakeholders involved in private-public partnership, helping Europe achieve long-term industrial and social goals. He emphasized that political action and support are required for an attractive and competitive operational environment across the region. "Industry, institutes, and academia are well prepared to trigger growth by innovation -- and nanoelectronics is the vital cornerstone for almost all industries," he concluded.

MEDEA's Van der Poel pointed out that China is becoming the major electronics manufacturer, already bypassing Europe and in a few years matching Japan. Meanwhile, he noted, the European Union supports agriculture by 45 billion euros, yet information and communication technologies receives only 1 billion euros, much the same as the tobacco industry.

Independent external auditors suggested that the public authorities involved in MEDEA+ should continue to support its second phase. Their top recommendations for the future: closer coordination with the European Commission Framework programs, a clear vision and strategy on key issues for Europe, and emphasis on the role of SMEs.

"The fact that projects have not been successful in areas like 42V for automobile and 157nm lithography is a sure sign that we are at the leading edge," delegate Ian Burnett of JEMI UK, a trade association of equipment and materials suppliers, told WaferNews. "A few years ago we participated in the launch of three video standards, which resulted in very many products being sold only to become obsolete a few years later. This does enormous damage to consumer confidence in electronics and we must avoid making this kind of mistake in the future."

MEDEA's approach of involving customers at an early stage enabled these technologies to be halted early and the investment redirected before product launch. "We have a real responsibility to ensure that, with the rapidly increasing pervasion of semiconductors into people's everyday lives, we do not release products that do not work properly," said Burnett. "We must ensure our technology remains invisible and only the benefits are felt by the consumer if we are to maintain this volume business and not be marginalized to only high-tech markets."