

Gadgets galore

Semiconductor technology drives innovation in consumer electronics

Consumers now expect better quality audio, high-definition video and ubiquitous access to multimedia content – from their favourite TV programmes to their holiday pictures – anywhere, on any terminal, using any network, at any time. The EUREKA CATRENE micro- and nanoelectronics Cluster is set to ensure that the necessary device technology is available in Europe, to supply this at prices consumers are prepared to pay, and to be heavily involved in setting the required global standards.



Enrico Villa, chairman of CATRENE and its predecessor MEDEA+

"Developments in semiconductor technology are key to offering consumers continuous price reductions and greater functionality," insists Enrico Villa, chairman of CATRENE and its predecessor MEDEA+. "Volume production means we can constantly reduce costs and therefore prices to consumers, leading to a greater increase in volume – a sort of avalanche effect. This has long been the driver behind semiconductor development."

Villa sees two major goals for the European semiconductor industry: to stay ahead of the global competition, particularly in infotainment where volume is key and competition tough; and to innovate. The latter requires research co-operation to obtain the large resources required and to ensure a fair return on the resources committed.

Future developments for semiconductors in Europe require:

- New architectures and the ability to implement new requirements in these architectures;

- Novel process technology using all possibilities offered by building on current technologies and developing new approaches;

- Reduced power demands to save energy; and

- Greater design automation.

"We need all this to develop new standards and to keep Europe at the leading edge," says Villa. This is a key role for CATRENE as co-operation is essential for finding solutions.

Massive improvements achieved

Advances already achieved in EUREKA Cluster programmes have led to massive improvements in communications systems, major enhancements in storage and home networking, and enormous progress in display technologies. These developments have opened up a much wider choice for the consumer as well

Increased public funding essential

Despite fast product and technology evolution and strong growth, more spending is required on microelectronics R&D in Europe. The European semiconductor industry already invests nearly 20% of its annual €28 billion turnover on research, with some 80% of this in Europe. This means the total research effort in this sector here is worth around €4 billion; however public funding is only in the order of €650 million a year – to match public support in North America and Asia, this should be nearer €1.8 billion.

as helping protect the rights of distributors and programme makers, making it possible for Europe to establish a highly competitive entertainment and information industry.

Moreover, despite a massive shift of consumer product manufacture to the Far East, Europe has been able to more than hold its own in the design and application of world-beating consumer electronics technologies. The MEDEA+ BLAZE project developed a highly effective digital storage system that is helping Europe extend its lead in high-definition TV (HDTV). It designed an overall architecture and developed single-chip solutions for an innovative Blu-ray Disc application.

Following on the success of BLAZE, two complementary projects are looking at different aspects. The TRITON project is using Blu-ray in three-dimensional (3D) TV – the expected driving force behind the next phase of consumer electronics chips. The high capacity of Blu-ray discs is essential for storing the mass of data required. And, while TRITON is concentrating on the overall content delivery chain for a single 3D view, the iGLANCE project is focusing on a futuristic vision of multiple views of a 3D scene and the requirements for 3DTV displays that fully support such an approach.

These three projects are the beginning of a longer trajectory supported by CATRENE towards full deployment of 3DTV from Europe. Many professional applications of 3DTV are foreseen – such as medical and healthcare, 3D infrastructure, civil engineering, aerospace and transport, as well as military.

Getting devices talking

High-speed access and increased intelligence in all types of devices means the Internet will be increasingly pervasive, available anywhere and at any time. Direct communication between objects – the so-called Internet of Things – is set to become a reality as more and more objects become intelligent and generate ever more data. This will make it possible

for example, for domestic appliances to communicate or domestic heating and cooling systems to adapt automatically to individual requirements and timetables.

MEDEA+ supported major strides forward in communications. One ambition in CATRENE is to support the availability of broadband access for every citizen in Europe, regardless of personal economic situation. Challenges include developing broadband wireless and fixed access linked to powerful backbone networks at a cost that is affordable for the vast majority of users.

"I am confident that we can repeat our historic successes," says Villa. "Already in CATRENE we have projects that will continue this effort – focusing on low-power designs for communications-centred applications, on multiprocessor platforms, and on devices offering high-definition imaging and 3D display.

"It is MEDEA+ and CATRENE but more so the partners involved that have allowed and will continue to enable Europe to stay ahead and compete with Asia. Semiconductors are driving innovation, relying on new architectures and new process technologies. Research co-operation is vital for obtaining standards and to help cut prices, increase volume and enable European companies to be more competitive than others."

Hardware and software

Innovation is coming from both hardware and software. CATRENE concentrates much more on innovation in hardware and associated software. Partner EUREKA Cluster ITEA 2 focuses more on all kinds of software – but there is and will continue to be co-operation between the two programmes, essential for ensuring greater opportunities for all players.

And then there are the EU technology platforms such as ENIAC in nanoelectronics and ARTEMIS in embedded software that are playing important roles. "There are complementarities between the various programmes and we need to avoid overlapping while optimising the partner-

ship with the existing EUREKA Clusters," points out Villa.

"I'm convinced that the bottom-up approach of EUREKA and the possibility to adapt to the new requirements and opportunities that the market is providing is a big advantage of the CATRENE and ITEA approach. Through this bottom-up approach, you can obtain much more than any fixed, top-down priority and objectives."

CATRENE and ENIAC have separate roles. "We need to work efficiently and be focused. But Europe has many players and many opportunities. We will find overlaps but we will also find areas where one framework is better than the other and may achieve better results. But I have no doubt that EUREKA Clusters will stay and be the most effective. However, there is a need for better specification and we are working with the Commission and the Member States to better define the role of the different programmes."

Consumer electronics achievements

- Improved digital storage such as Blu-ray Discs for high-definition film entertainment;
- New world-standard video-compression technology boosting capacity of terrestrial and satellite distribution;
- Better and cheaper displays for large-screen, high-definition TV as well as mobile communications terminals;
- Wired and wireless home networking for easy access to shared music, films, TV programmes and digital photographs;
- More secure digital rights management, giving greater consumer quality while protecting the rights of programme makers; and
- Turning car radios into systems able to inform, entertain, communicate and guide.