PROJECT PROFILE

A110: Multi-standard integrated devices for broadband DSL access and in-home powerline communications (MIDAS)

HIGH SPEED COMMUNICATIONS SYSTEMS

Partners:

Alcatel
CNM-IMSE
DS2
ENS-Cachan
Ericsson
France Telecom R&D
IMEC
LEA
Seba service
STMicroelectronics
Target Compiler Technologies
Thomson
Uni Leuven (KUL)
Uni Lund (LTH)
Upzide Labs
Veyado

Project leader:

Dr Patrick Wouters,
STMicroelectronics

Key project dates:

Start: July 2003
End: June 2005

Countries involved:

Belgium
France
Spain
Sweden

Strong growth in consumer take-up of broadband Internet connection over telephone networks is forecast to continue over the next few years. Europe has already built a strong position in the ADSL technology that currently dominates the mass market, but new xDSL generations allowing faster data transmission rates are necessary to handle emerging digital multimedia applications in the home. Similar expansion will be needed for broadband in-home networks, for which signal distribution over domestic power cables is a strong contender. The MIDAS project is focusing on the development of components, plus design and test methodologies, to boost Europe's share of the global market for both these areas.

About 20% of European households subscribed to broadband at the end of 2004. Penetration will increase significantly over the rest of this decade with the growth in multimedia content for domestic entertainment, security systems and home automation. Digital subscriber line (DSL) services account for the highest number of connections, followed by cable modems; satellite broadband and wireless access trail far behind.

Incumbent telecommunications operators have an enormous capital investment in copper twisted pair wiring buried under the ground. The MEDEA+ A110 MIDAS project will be instrumental in enabling them to exploit this investment to maximum advantage, and to compete effectively with cable TV and wireless broadband multimedia service providers. MIDAS will thus strengthen Europe's position in the dominant communication technologies for the 'last mile' to the home, focusing on xDSL for the fixed access network, supported by power line communications (PLC) for broadband in-home networking.

Dynamic access development

Telecommunications utilities worldwide are making extensive use of asymmetric DSL (ADSL) technology. More than 100 million units of central office (CO) and customer premise equipment (CPE) had been shipped by the end of 2004 — and an improved version, ADSL2, is being rolled out during 2005. ADSL2 meets demand for increased bandwidth to support services such as video on demand (VoD), offering data rates up to 12 Mbps and improved reach.

The very high data rate DSL (VDSL) chip market reached 12 million lines (CO+CPE) in 2004, sold mainly in Asia. VDSL can provide either symmetrical or asymmetrical services with much higher bit rates than ADSL (up to 52 Mbps aggregate) but over shorter distances. It is intended to compete with cable modems for delivery of video and multimedia entertainment.

Further DSL generations are emerging and these are currently being discussed in various standardisation bodies. Maintaining a strong position in the DSL access sector thus demands continuous development.

MIDAS has capitalised on results obtained in two previous projects — MEDEA A114 xDSL and MEDEA+ A106 INCA — which together helped to advance Europe to the forefront of global ADSL business.

Speeding home networks

The consumer market for PLC is also growing substantially, with early penetration in the USA and China. There are several solutions for home networking — including wireless LAN and HomePNA (using existing domestic phone wiring) — but PLC may offer sufficient bandwidth and reach to distribute high quality digital television. Consequently, it will be driven by the digitalisation of video media and the proliferation of high quality flat panel screens for domestic use. In addition, it will facilitate introduction of audio distribution, Internet networking and home automation.

In contrast to xDSL, little European-level co-operative R&D effort has been directed at PLC. However, it uses digital signal processing techniques, algorithms and functionalities similar to DSL, and faces the same signal impairment problems. Knowledge acquired from xDSL therefore helps to understand and characterise the power cable communication medium. The commonalities are being exploited at both systems and IP-reuse block level for the design of next generation PLC physical layers.

MIDAS aims to establish the first PLC in-home network with speeds of up to 200 Mbps. This will enable distribution of high-quality multi-stream video and data channels over the existing power cabling of a building, with 100% coverage and very high security.

Wide remit

The project involves 16 members from four countries, coordinated by STMicroelectronics. A balance between large and small companies, research centres, universities and large network operators allows fruitful horizontal and vertical collaboration. The consortium has established a well elaborated horizontal-vertical value chain dissemination policy. Partner choice took into account know-how and expertise in the selected field of applications, as well as complementarity. Operators such as France Telecom will evaluate platforms and demonstrators and immediately feed back the results to the system equipment manufacturers. The latter will update the design houses and chipmakers on the changed requirements, supplemented by the latest findings of the universities and research centres.

The collaboration addresses in particular:

- New xDSL and PLC systems and architectures with increased bandwidth, capacity and quality of service;
- Mechanisms, protocols and associated architectures to provide security and quality of service over DSL and PLC links;
- Multi-standard wireline integrated platforms and gateways bridging xDSL and PLC technologies, including demonstrators and cost-performance evaluation;
- Development and manufacture of low-power and cost-effective wireline access building blocks and chipsets in advanced silicon technologies, using system-level design methodologies and associated computer-aided design flow;
- Interoperability of wireline access devices, either by implementing common standards between suppliers, or using different standards — such as ADSL/VDSL interoperability;
- Convergence of different wireline technologies (e.g. xDSL and PLC) at systems and architecture levels; and
- Participation in international standardisation to promote the technologies and concept developed within the project.

Meeting Europe's objectives

Exploitation of results in all of these domains will benefit the whole value chain. The ability to supply enhanced-xDSL and PLC chipsets as standard products will create a significant increase in revenues for the European microelectronics industry. Original equipment manufacturers (OEMs) will benefit from competitive technological advances in silicon process and circuit design, and will use the ensuing low-cost, low power chipsets to build inexpensive network equipment and user terminals.

European end-users will enjoy early access to new broadband multimedia services. Moreover, by developing high-speed and low-cost components and modems, MIDAS will help open Internet access to more users around the world. This will have a positive impact on all kinds of business — from telecommunications operators, Internet service providers, content providers and website creators, to companies able to reach a wider customer base via e-commerce.

Another important aspect is incubation. Working with larger organisations such as Alcatel, STMicroelectronics, Thomson and France Telecom opens the door to new business partnerships and opportunities for the small and medium sized enterprises (SMEs) participating in the consortium.

MEDEA+

MEDEA+ Office
33, Avenue du Maine
Tour Maine-Montparnasse
PO Box 22
F-75755 Paris Cedex 15, France
Tel.: +33 1 40 64 45 60
Fax.: +33 1 40 64 45 89
Email: medeaplus@medeaplus.org
http://www.medeaplus.org

EUREKA Σ!

MEDEA+ Σ!2365 is the industry-driven pan-European programme for advanced co-operative R&D in microelectronics to ensure Europe's technological and industrial competitiveness in this sector on a worldwide basis.

MEDEA+ focuses on enabling technologies for the Information Society and aims to make Europe a leader in system innovation on silicon for the e-economy.