



AI08: Silicon universal platform for secure telecom applications (SUPERSTAR)

HIGH-SPEED COMMUNICATIONS SYSTEMS

Partners:

Atmel
CEA-LETI
EDSN
Rohill
STMicroelectronics

Project leader:

Olivier Melamed,
EDSN

Key project dates:

Start: July 2001
End: December 2004

Countries involved:

Belgium
France
Germany
The Netherlands

Secure radio communications are essential to meet the communications needs of public authorities, utilities, airports, transport and private security services. The MEDEA+ SUPERSTAR project is aimed at the elaboration of a silicon application platform to enhance the development of multi-mode and multi-band digital secure mobile radio communication chipsets for volume production. The project includes specification of platform architecture, design of reusable blocks and hardware-related software (firmware), and production of chipset demonstrators. Application software development is being carried out in parallel within the EUREKA Information Technology for European Advancement (ITEA) framework.

Secure radio communications have long been slowed by national and proprietary approaches. Private mobile radio (PMR) and public access mobile radio (PAMR) and more general secure radio communications have therefore not been able to benefit from the full capacity of the state-of-the-art integration possibilities of microelectronics.

The MEDEA+ A108 SUPERSTAR project is intended to be the driver of the unified European market for secure mobile communication, creating a mass market for dedicated semiconductors within five to ten years. This mid-term European target will be achieved by using a silicon application platform that enhances the development of multi-mode and multi-band digital secure mobile radio communication chipsets for volume production.

Exploration of advanced technologies – such as radio frequency (RF) and silicon-germanium (SiGe) processes – and research to optimise the cost/performance trade-off of the chips to be released will make it possible to achieve the highly demanding specifications of such professional communications. The resulting platform will give Europe a unique opportunity to lead the world market in digital secured mobile communications,

which is growing by 15% a year in the multi-billion euro range. Due to economies of scale, the multi-standard approach will enable cost effective integrated circuits (ICs) to be produced with the new functions required by professional customers in Europe as well as by those in the USA and Asia.

An experienced partnership

Project co-ordinator is EDSN (EADS Group) – a principal player in Europe from the application, industrial and scientific points of view. It is leading a balanced consortium of large companies (STMicroelectronics and Atmel), an SME (Rohill) and a research laboratory (CEA-LETI) from four European countries.

Their task involves both horizontal and vertical co-operation, with system manufacturers EDSN and Rohill working together to merge existing PMR standards on a multi-mode platform. System and IC manufacturers STMicroelectronics and Atmel will jointly ensure availability of the multi-mode chipset and platform.

The general objective of the SUPERSTAR project is to make volume production of PMR chipsets possible through the exploitation of a common silicon platform, whatever the

AI08: Silicon universal platform for secure telecom applications (SUPERSTAR)

digital radio standards in the 400 to 800 MHz range are employed – TETRAPOL, the European Telecommunications Standards Institute TETRA (TErrestrial TRunked RAdio) standard in Europe or the US APCO25 Phase 1/2. This will create a unique opportunity for semiconductor manufacturers to invest in this market with strong economic motivation.

Large market opportunity

Recent consultation with component suppliers confirmed that there is no 'off-the-shelf' chipset for PMR whereas the market expects to be fully digital within a few years and will certainly require dedicated devices. There are only a few functions available for the TETRA standard, while there is one baseband chip for TETRAPOL – Elodie, which was co-developed by EDSN and Atmel and is publicly available.

On the other hand, GSM/UMTS mobile phone components do not match PMR/PAMR specifications which forces PMR equipment manufacturers to design their own application-specific integrated circuits (ASICs), so decreasing the potential for IC manufacturers to secure volume orders. Consequently, more than 1000 surface mount device (SMD) discrete components are today assembled to manufacture a digital terminal.

Obviously, a multi-standard PMR chipset will improve this poor situation with lower costs and better performance for end-users and market volumes for semiconductor manufacturers.

SUPERSTAR is therefore addressing three major issues:

1. Interoperability – the chipsets to be demonstrated should be capable of multi-band and multi-standard operation;
2. Achievement of a high standard of performance with volume production and good economic value – professional communications are more demanding technically but prices are not as competitive as in the consumer market; and
3. Integration – moving from SMD assembly to system-on-chip (SoC) solutions for radio terminals.

In terms of the MEDEA+ roadmap, SUPERSTAR completes the picture with secure radio communication applications that push technologies to the limit due to stringent needs – for example, level of RF specifications, multi-standard architecture, frequency bands, innovations with SiGe and silicon-on-insulator (SOI) processes.

Although the generic principles may be the same for public mobile communications – particularly GSM and UMTS – as in the MEDEA+ A107 4G Radio project, SUPERSTAR does not overlap due to different specifications and markets. For example, GSM or UMTS type components cannot fit PMR specifications. Nevertheless, views are being exchanged at a scientific level on general topics such as RF SOI and SiGe research and development as well as re-use of results on wireless interfaces such as Bluetooth.

Securing world leadership

Overall benefits from the SUPERSTAR project will include securing world leader-

ship in private mobile radio communication for European industries, achieving interoperability between different PMR networks, making available cost-effective products for public services, promoting best practices in design, offering a range of intellectual property (IP) blocks for the European wireless industry – with a SoC for radio terminals – and creating a value-added chain with a chip platform.

Public services are the main users of secure radio. Private mobile radio serves European public bodies that have a responsibility to take advantage of economic innovations. This project supports European convergence by delivering a multi-standard platform that will enable new PMR/PAMR products and features to be developed with the use of integrated chipsets.

In addition, European PMR manufacturers are leaders in their markets due to their excellent R&D capabilities and good digital products. This project will reinforce their competitiveness and enable them to take their leadership position to world level with the benefit of competitive chipsets.

Project results also have generic applications for mobile radio communication – particularly by making available multi-mode radio architecture and advanced process development in RF SiGe. SUPERSTAR is creating a new market for IC manufacturers, reinforcing the competitive position of European suppliers at world level, contributing to European public services needs and helping to fulfil the demand for personal security.



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>



MEDEA+ Σ !2365 is the new 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.