

High speed
communications
systems



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

Reconfigurable silicon platform ensures secure access for digital professional mobile radio

Secure, accessible communications are key to professional mobile radio for public safety, emergency services, transportation and utilities. The global market is growing quickly with a marked migration from analogue to digital.

The AI08 SUPERSTAR project developed a highly reconfigurable silicon application platform to meet the needs of multimode and multiband digital communications around the globe, whatever standards involved. The result is to boost the position of European actors in the world market while offering the different individual solutions required by European and non-European users.

Secure professional mobile radio (PMR) is essential for police forces, emergency services and civil protection as well as for utilities, airports/transportation and private security organisations. Particular requirements include guaranteed access to networks and security of exchanges as well as specific features and coverage. Needs can vary from narrowband for voice and limited data exchange to broadband for 'hot spots'.

Service requirements are also different between for example North America, where lots of people use PMR for security with simple services, and Europe, where fewer people employ radio communications but with higher levels of services. These diverse needs and the competition between suppliers have led to a range of incompatible PMR standards, such as Association of Public Safety Communications Officials (APCO) in the USA, and Trans European Trunked Radio (TETRA) and TETRAPOL in Europe.

Targeting digital market

While much of the PMR market is still analogue based, the worldwide market for digital PMR systems has been growing rapidly at over 40% a year recently, and is expected to be worth €5,400 million in 2007, involving 4.2 million terminals. But currently, users have to work out their greatest needs and then select

the standard and equipment accordingly. The MEDEA+ AI08 SUPERSTAR project set out to develop a single silicon application platform able to handle all current digital standards as well as new standards and requirements as they develop. It brought together industry partners EADS and Rohill that could provide complementary knowledge on standards and products with technology partners Atmel and CEA-LETI that could ensure supply of system capabilities and design at component level.

SUPERSTAR developed technologies and building blocks, including radio frequency (RF) front end, analogue baseband, intermediate frequency (IF) and digital functions, for mobile terminals and fixed base stations in the 400 and 800 MHz bands. Key technical achievements included: evaluation of silicon germanium (SiGe) for high power and high frequency devices; validation of 0.18 μm CMOS processes for higher device integration; and modelling of 0.13 μm silicon-on-insulator (SOI) technologies.

New architecture to cope with the different standards was shown in three demonstrators:

- A reconfigurable multimode TETRAPOL/APCO terminal;
- A TETRA base station that included RF components; and
- A modular base station able to handle analogue PMR, TETRAPOL and TETRA.

Market-oriented results

As a result of SUPERSTAR, individual project partners will be able to market a range of new products and technologies. Complete products using all the technologies and building blocks developed in SUPERSTAR should be available within two or three years.

The project architecture is sufficiently mature to enable delivery of the first terminals for TETRAPOL using some elements of this approach in 2006. And SUPERSTAR has offered the basis for a real multistandard base station and significantly strengthened RF development abilities in Europe.

On the component side, a multimode reconfigurable analogue baseband device has already been designed, manufactured and characterised. Repeated multiproject wafer runs in 0.18 μm CMOS technology have proved stability with the availability of advanced laboratory samples. SiGe bipolar devices have shown superior noise performance. And RF SOI models are available for new designs.

Involvement of the end-user supply industry in the project was important as it provided a clear indication of market requirements at the beginning. It also ensured efforts were kept in line with changing market needs during the course of the project.

Co-operation between the project partners varied depending on the individual companies and their experience – from arms length to co-sharing of design work in some cases. However there was a clear demonstration of the willingness for competitors to share expertise on the basic technologies while providing their own individual market solutions subsequently.

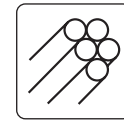
MEDEA+ played a strong role – offering a high level of support at the same time as ensuring strong discipline on building the best quality proposal for the initial project label and in the regular reporting. At the same time, the MEDEA+ approach was sufficiently flexible to allow necessary organisational and planning changes inevitable in a market-oriented research project.

Benefits at all levels

Consortium partners EADS and Rohill were already key actors in the global PMR market – EADS is second only to Motorola worldwide. But SUPERSTAR has ensured that Europe remains well placed in the global vanguard as European actors can now address all the digital technology standards involved in PMR around the world.

This is critical for Europe as these are key market areas for which customers are keen to have competitive suppliers for better equipment and lower prices. Yet European customers also want solutions that reflect a vision for services that differs significantly from that in the USA. Being able to meet the needs of both European and global competitiveness is crucial for maintaining European employment.

Results of SUPERSTAR are also important for the European microelectronics industry overall. The different partners involved in the MEDEA+ project have been able to develop technologies that can be supplied more widely than just in PMR. And another building block – use of multimedia applications that support the latest requirements of specific PMR user groups – is under development in the current MEDEA+ 2A101 SPIRIT project.



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A108: Silicon universal platform for secured telecom applications (SUPERSTAR)

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PROJECT LEADER:

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KEY PROJECT DATES:

Start: July 2001
End: December 2005

COUNTRIES INVOLVED:

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