PROJECT RESULT

Integrated information/ communication/ entertainment terminals

## A207: Secure pocket multimedia (Pocket MM)

# Hardware/software combination offers effective platform for mobile consumer applications

**Highly mobile audio, video and imaging equipment must combine good multimedia performance with low power consumption compatible with the constraints of handheld appliances. Pocket MM therefore set out to define, develop and demonstrate a 'nomadic' silicon application platform as the pocket multimedia reference to meet future mobile consumer applications requirements. The success of this MEDEA+ project has resulted in innovative and cost-effect solutions in support of European leadership in imaging mobile phone, digital still and video camera, portable audio/video player and video games markets.**

Increasing convergence between mobile communications and consumer multimedia applications meant Europe had to improve handheld terminal performance while reducing power consumption. Innovations were essential in circuit integration and display technology for emerging portable audio, video and imaging applications. This was necessary to consolidate leadership in mobile phones and enable Europe to break into Asia.

Until recently, there had been no simple, low-cost solutions combining multimedia, digital rights management and connectivity. Each function was performed separately by stand-alone portable equipment. So there was a need for a cost-effective solution for handheld consumer systems combining all these features. This would enable development of innovative digital portable audio and video players, mobile and smart phones, digital cameras and camcorders, personal digital assistants, web terminals and equipment for e-shopping, e-banking, e-learning and medical care.

## Meeting mobile needs

The MEDEA+ A207 Pocket MM project set out to define and develop a silicon application platform for nomadic multimedia equipment. Chipmakers and communications specialists collaborated with multimedia software and systems companies. The mix of multimedia and low power development technologies expertise available and good co-operation were particularly important to the project's success. It also benefited from MEDEA+ projects A503 ASSOCIATE, T101 TECHNODAT, A502 MESA, and T123 CRESCENDO.

The original goal was an innovative MPEG-4 compliant toolbox solution for mobile handheld devices, including user-friendly communications capability, and offering very high audio and video quality. The toolbox can be enhanced by adding new tools for digital rights management or other applications.

While the initial intention was to develop a generic software platform based on advanced processors, it was quickly realised that a key barrier was battery life. Following a change in partners because of funding difficulties, a hardware solution was suggested. The final approach involves software and hardware with a strong development focus on multimedia hardware implementation to deliver high computing performance needing low power.

Another major difficulty was displays – the area of greatest cost; such displays mainly came from Japan. However, a display partner was found in the UK, joining Pocket MM a year into the project with low-power colour organic light-emitting diode (OLED) panel technology.

## Validated platform developed

The result has been development of a validated platform offering highly effective image, video and audio features with very low power consumption. Eight working multimedia chips were demonstrated, a good multimedia software library dedicated to mobile camera and video applications made available, and a range of nomadic OLED displays with drivers and multimedia peripherals such as micro-electromechanical system (MEMS) joysticks developed.

Major technical innovations include:

- **Improved display performance** – combining OLED technologies with innovative low power driver electronics resulted in a tenfold reduction in display power dissipation compared with liquid crystal displays (LCDs). In addition, mastery was gained in ink jet printing for producing light-emitting polymers for OLEDs – a scalable technology that offers a real European alternative to LCDs for flat panel displays.
- **More efficient multimedia chips** – very low power silicon solutions were validated that consume less than 25 mW for image reconstruction and MPEG-4 audio-video compression. This offers a fivefold improvement over the best multimedia processors previously available.
- **CMOS imaging** – offering very low power image processors together with complete software for mobile phone, video and digital camera use.
- **Cost-effective, application-specific design** – reconfigurable design methodology instead of a hardware-driven design flow achieved signal processing efficiency close to that of application-specific integrated circuits (ASICs), offering a cost-effective approach to tune to specific application domains.

Other advances include a magnetic mouse function based on MEMS technology, new test methods, embedded flash loading offering a tenfold reduction in loading times, and innovative parametric techniques for high quality audio coding. This latter has already been recognised by the MPEG4 standard committee.

## Early commercial exploitation

In 2005, Pocket MM won the 'Jean-Pierre Noblanc Award for Excellence' for the most innovative projects with high exploitation potential. The success of the technologies developed has been such that many partners already expect to be able to introduce new products or to license new technologies in 2006. These include audio, video and other mobile entertainment systems, chips with firmware for mobile multimedia applications, OLED displays for mobile applications and reconfigurable hardware for a range of uses.

A major benefactor will be mobile phones. Before Pocket MM, putting cameras in phones was practically unknown – now companies are already talking about including two cameras. Worldwide shipments of camera-equipped phones are set to grow from 178 million units in 2004 – around 28% of the market – to 860 million in 2009, when camera phones are expected to account for 89% of all mobile handsets shipped.

High growth is expected also in digital cameras with a more than doubling of the number of units between 2001 and 2007. And similar or even greater increases are forecast for portable audio and video players, and for video game handsets.

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**PARTNERS:**

Cambridge Display Technology
CMM/ARMINES
Philips
STMicroelectronics
TEMIX
Thomson

**PROJECT LEADER:**

Max Tournier
STMicroelectronics

**KEY PROJECT DATES:**

Start: October 2001
End: June 2005

**COUNTRIES INVOLVED:**

France
Italy
The Netherlands
United Kingdom

**MEDEA+ Office**
140bis, Rue de Rennes
F-75006 Paris
France
Tel.: +33 1 40 64 45 60
Fax: +33 1 40 64 45 89
Email: medeaplus@medeaplus.org
http://www.medeaplus.org

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