HI-MISSION PROJECT DEVELOPS SOC AND SIP MICROWAVE DEVICES

A European collaboration is designing a platform for system-on-a-chip (SOC) and system-in-a-package (SIP) microsystem applications for radar and microwave communications. These will enable shorter and more flexible development microwave designs and enable the reuse of existing devices in new applications.

High performance modules will be designed and demonstrated using multichip technology on a silicon substrate, with enhanced functionality optimised for high frequency and speed.

There is an increasing demand in the telecommunications and automotive fields for devices providing improved performance in smaller packages at lower cost. Some problems in the integration of functions not suitable for silicon technologies can be overcome by the use of multichip modules (MCMs) with specific functions, as separate devices that can be interconnected. MCM techniques are preferred if they are cheaper than integrating all functions in a single chip, but fully integrated devices may be considered if high volumes are required.

It is necessary to chose between SOC and SIP to achieve optimum performance against cost. SOCs are not generally very cost-effective for RF and microwave applications when much integration of passive microwave components is required, especially if gate lengths of less than 100nm are to be used. In the near future many microwave and mixed signal systems will be MCMs, with cost and performance balanced in each sub-circuit. Silicon is a good substrate for MCMs, as various components such as delay lines, tuneable filters etc can be fabricated on it.

MCM techniques are being developed that can integrate not only silicon and gallium arsenide chips, but also components such as high-Q passive devices.

This Medea+ Hi-Mission (Hi-frequency Microsystems on silicon) project, coded 2T401, began in October 2005 and will finish in December 2008. The project leader is Thomas Lewin of Ericsson, other partners being Acreo, Infineon Technologies, Signal Processing Devices Sweden, STMicroelectronics and United Monolithic Semiconductors. The project results should strengthen the competitive position of Europe in automotive and communications applications, boosting market share, exports and jobs.