

MIMOS Pursues Design-Driven Microelectronics and Semiconductor R&D

Projects poised for commercial viability include machine-to-machine wireless communications and MEMS core technology products

Kuala Lumpur, 24 January 2006 - MIMOS Berhad's Microelectronics and Semiconductor Lab is doubling its efforts on design-driven research and development (R&D) especially in the areas of chip design of machine-to-machine wireless communications and Micro Electro Mechanical Systems (MEMS).

The lab's R&D efforts are geared to shift Malaysia's microelectronics and semiconductor industry activities to the upstream of the industry value chain. This will create higher value intellectual property and knowledge assets as compared to the more established downstream chip manufacturing and assembly and test activities.

"Moving up the value chain is crucial in today's economic climate because there will come a time when it is no longer sufficient to remain in the downstream of the microelectronics eco-system. Malaysia already has a strong manufacturing base in microelectronics so what we are doing now is beefing up design driven activities to achieve higher value-add which we can then help cascade downward," explained Wan Mohd Salleh bin Wan Abu Bakar, Vice President, MIMOS Bhd.

"MIMOS has the most complete chip design tools in Malaysia. Not only does owning the core technology benefit Malaysia economically, we are also creating a culture of self-reliance where we own the intellectual property for our own indigenous capability solutions," Wan Salleh adds.

R&D project – General Packet Radio Service (GPRS) terminal chip

One of the key projects poised for commercialisation within one year is MIMOS General Packet Radio Service (GPRS) terminal. The GPRS terminal is a compact, low-cost and low-power, quad-band data-only for machine-to-machine wireless communications and internet connection using the ubiquitous Global GPRS System for Mobile Communications.

Unlike regular GPRS voice-and-data chip used in consumer cellular phones, the GPRS terminal developed by MIMOS has been built from the ground up to be data-only, so it can be used by smart machines communicating with each other to supply mission critical data.

Potential real-world applications include automatic meter reading, industrial automation, fleet management, security systems, as well as mobile Internet access.

"This is the first Malaysian wireless development on chip level. The terminal has an embedded 32-bit application processor enabling rapid and tailored customer development and a full TCP/IP stack for Internet access. All that's needed is a subscriber SIM card to activate it; and for added connectivity we've included a Universal Serial Bus (USB) interface and serial interfaces" said Dr Ahmed Mabrouk, MIMOS Berhad's Project Manager in charge of this project.

The system is going into field trials in the third quarter of 2006 with selected industry partners. An Enhanced Data GPRS (EDGE) Terminal for fast Internet connection is also under development to take advantage of higher bit rate.

R&D project – Micro-Electro Mechanical Systems (MEMS)

Micro-Electro Mechanical Systems (MEMS) are sensor and activator devices built on silicon together with electronic circuitry. MIMOS has embarked on several MEMS R&D projects in line with industry demand for miniaturised MEMS. The focus areas are Automotive, Telecommunications and Biotechnology -- important sectors driving Malaysian economy. The approach for MIMOS MEMS program is to leverage on the existing MIMOS Wafer Fabrication Facility to design and produce high performance and low cost MEMS products.

One major project is an intelligent tyre monitoring system to monitor tyre-related performances such as balancing and alignment, pressure, suspension performance and other vibration related parameters utilising MEMS sensors.

“This solution will have numerous advantages such as portability, miniaturisation, reliability thanks to better packaging, more efficient usage of a networks of sensors and more importantly: lower cost compared to current sensor technology,” said Ibrahim Mat, Head of MEMS Systems Application.

Next, MIMOS is also developing Radio Frequency (RF) MEMS components which are being hailed as the next enabling technology in telecommunications such as mobile / wireless devices. One of the first components developed is a capacitive switch. RF MEMS switches are meant to be used in applications such as cell phones, instrumentation equipment and military communications systems. RF MEMS switches have the advantage of being small, having low insertion loss, good isolation, reduced power consumption and high power handling capability. The specifications are based on third generation mobile applications (3G).

Another MIMOS' MEMS project is an integrated chemical sensor chip. MIMOS is currently developing an Ion-Sensitive Field Effect Transistor (ISFET) - based sensor which would benefit two industry sectors: namely biomedical and agriculture, including medical diagnostics, monitoring clinical or environmental samples, fermentation and bioprocess control and testing of pharmaceutical or food products. The next generation ISFET sensors will be miniaturized with better performance, higher sensitivity and robustness, making it suitable for an integrated sensor system.