

A real sense of enthusiasm

Sensor technology is on the rise and could turn Thailand into a regional hub for the industry, writes **Suchit Leesa-nguansuk**

The made-in-Thailand silicon sensor is now ready to take off. Boasting a variety of silicon sensor-based prototype products, the Thai Microelectronics Centre (TMEC) is sending a strong signal to the industry that the fruits of their research and development are ready for commercial use.

After 14 years and more than 2 billion baht invested in the development of various technologies, TMEC Director Amporn Poyai said the centre was ready to provide end-to-end silicon sensor based products and services.

The centre will start by offering integrated circuit designs to small volume productions for support industries to add value and will create new product innovation to strengthen markets.

With 0.5 micron Complimentary Metal Oxide Semiconductor (CMOS) technology, Thailand has facilities end to end, from integrated circuit design, simulation process and prototypes to small volume production and application in silicon sensor, to linkage and transfer to companies. This also creates new sensor-related base industries, Amporn said.

The centre focuses on sensors because

the technology does not change too quickly and can be applied to many fields such as medicine, communication, agriculture, automobiles and home appliances.

The value of the sensor-based market next year is estimated to be around \$61 billion (2.1 trillion baht), up from the 2000 value of \$38 billion (1.3 trillion baht), due to an increase in the technology, especially in consumer electronics/home appliances device which have become more functional, intelligent and accurate.

Currently, TMEC is in discussions with air-conditioning manufacturers in Thailand to integrated temperature sensors with inverter technology to make a new generation of air-conditioning.

The sensors in these models could detect temperatures in automotive radiators, for example, and issue warnings to drivers if overheating is detected.

Temperature sensors could also be used in agricultural processes, especially in mushroom farming and the cultivation of orchids.

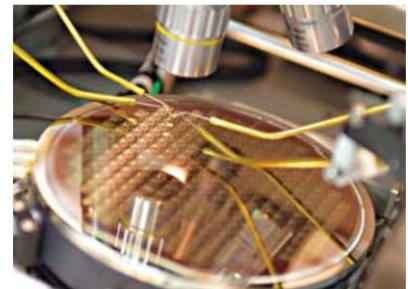
Both mushrooms and orchids require a specific temperature to grow. If technology can detect the right temperature and keep the growing environment at

that level constantly, this will help to increase productivity and predictable output.

Uplift agriculture business

The centre is also developing various types of sensor for use in agriculture. For example, recently TMEC developed a handheld moisture sensor for paddy fields which can sense moisture ranges from 10-30 percent, enabling farmers to make sure that their rice has the required moisture level before sale.

This sensor was designed and developed specifically for rice grain humidity detection. Maintaining certain humidity



Electrical Test And Measurement, one of the tools in the centre.



A clean room, one of the facilities in the factory.

and temperature levels are crucial to the quality of rice, Thailand's primary income earner.

Currently, the handheld device has been used in several provinces, such as Ubon Ratchathani, Yasothon and Roi Et. This is the first generation of the sensor following feedback from farmers in testing areas.

Later generations will be developed after feedback from users of the first model.

The sensor can withstand high temperatures and effectively measure rice hydration levels for the processing of high quality grains.

The sensor also saves on the cost of importation of similar instruments from overseas and protects farmers from being taken advantage of by rice grain buyers. This product successfully addresses the real needs of the agricultural sector.

Paving way to be an Asean leader

The TMEC director continued that the centre also expects to develop a "High Power IC" to manage power in consumer appliances — for example, air conditioners, cooking pots and irons that may save more energy and electric can help consumer electronic brands add more value to their products.

If the centre is successful, could lead to Thailand becoming a silicon sensor hub in Asean, especially in power management, which has high potential due to energy-saving concerns.

This should also attract manufacturers from Hong Kong and Japan, which are active in power management domain.

"The importance of power management will increase in next generation home appliance devices.

"Today, most consumer electronics use electric even in the standby mode, in which case IC can help to reduce power.

"This may lead to Thailand becoming a hub for silicon sensors in the Asean region," Amporn said.

Forward move in medical IC

Amporn continued that medical IC is another area of potential for which Thailand could become a hub over the next year or so because the centre has already successfully developed the blood pressure sensor MEMS at Radi Medical Systems in Sweden, for use with cardiac patients. Due to this success, Radi is to set up a factory in Phuket.

Recently, the centre developed a fourth-generation blood pressure sensor and continued developing other health monitoring systems — for example, sensors in special shoes which sense central gravity in a patient who has balance problems, or applied to senior citizens so alerts can be issued if a fall is detected.



A researcher demonstrates the Silicon Wafer technology.

Transfer to industry

The TMEC director continued that in the past, the centre consulted with local industries but they did not understand how sensors could be applied to their business, so TMEC built end-to-end from designs to small volume production to demonstrate its applications.

Moreover, TMEC will connect customers to the suppliers or outsourcing alliance factory partners to facilitate high-volume production.

Currently, most customers are foreign companies in the automotive, communication and medical sectors. After the centre demonstrates application prototypes and is ready to transfer to local industries, there should be an increase in local business customers as well.

The centre expects to increase production capacity from 500 pieces per year to 3,000 pieces per year within 2010.

"We saw huge potential in sensor technology and equipment that may apply to various industries, especially in the Thai context, such as medical equipment, consumer electronics and agriculture," said Amporn.

"We hope to increase our customer base by two times and break even this

year.

"Most importantly, our research and technology will help to enhance existing real sectors and open windows of opportunity for sensor base products."

Currently, Thailand spends several billion baht on importing sensor-based technology products. If the Kingdom develops and uses its own R&D base sensors, this will help to reduce imports of technology and create a new ecosystem, said Director of National Electronics and Computer Technology Centre (Nectec), Pansak Siriruchatapong.

The centre expects to enable Thailand to gain a share of more than 10 percent of the current import total in sensor base products.

"If we build and transfer those R&D, it will help to reduce import technology and stimulate the Thai economy, as well as develop new markets opportunities," said Pansak.