

PRESS RELEASE

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HOME-GROWN RFID TECHNOLOGY TO BENEFIT LOCAL BUSINESSES AND CONSUMERS

*Exploit Technologies invests \$10 m to translate A*STAR's RFID Technologies into commercially viable applications*

Shopping would be a more pleasurable experience if you know exactly where the items you are looking for are located on a real-time basis. This will be possible with the Track and Trace system under development using Radio Frequency Identification (RFID)¹ technologies from A*STAR. Such a Track and Trace System project is just one example of Exploit Technologies Pte Ltd's drive to translate A*STAR's rich pool of intellectual property and expertise in RFID technologies into commercially viable applications that will touch the lives of Singaporeans.

Exploit Technologies announced that it will invest \$10 million over three years to execute proof of concept (POC) proposals for A*STAR's RFID technologies with industry and end-users. A*STAR has a comprehensive suite of RFID technologies, the newest is what it believes to be the world's first RFID chip with on-chip antenna that has both Radio-Frequency (RF)-read and -write capabilities.

"RFID technology is a significant development that will enhance the whole value chain from manufacturing, distribution, and logistics right up to retail. Having laid the foundation for the development of RFID at A*STAR, our aim is to make it easier for companies in Singapore to implement RFID," said Mr Boon Swan Foo, A*STAR's Managing Director and Exploit Technologies' Executive Chairman.

Commercialisation of A*STAR's RFID Technology

To raise awareness of A*STAR's RFID technology capabilities and determine the assistance needed to drive development of applications across industries in Singapore, Exploit Technologies recently concluded its Call for POC (Proof-of-Concept)² Proposals. Prior to that, an industry roundtable was conducted to showcase the RFID technologies available from A*STAR, solicit industry feedback, and encourage companies to put forth proposals on how such technologies could be implemented to benefit their businesses.

Arising from this, Exploit Technologies has set aside S\$10 million over three years so that industry partners can jointly develop the applications with A*STAR's research institutes

¹Radio Frequency Identification, or RFID, is a technology that uses radio frequency communication to automatically identify, track and manage objects, people or animals. It works by using two or more devices - a reader and tag. The devices are paired and able to "recognise" each other through the transmission of radio waves.

²Exploit Technologies' RFID Proof of Concept (POC) Proposal helps identify and create new applications for RFID technology through collaboration with companies and end users. It leverages on the competitive technologies generated by A*STAR's research institutes and the expertise of the RFID researchers to create high-value Proof of Concept prototypes for trials and deployment in the shortest possible time.

(RIs). The POCs are aimed at helping local companies and end users in deploying and implementing RFID solutions quickly.

“The enthusiastic response from the local industry to our call for proposals clearly indicates the relevance of A*STAR’s RFID technologies for their business needs. With the S\$10m investment, we aim to create practical RFID solutions from which local companies and consumers can benefit,” said Ms Emily Tan, Senior Vice President of Exploit Technologies’ Science and Engineering Division and Incubation and Spin-off Management Division.

Forward-looking major consumer electronics retailer, BiG by Safe Pte Ltd³, is one of the companies which responded to the call. It is exploring developing an RFID track-and-trace system for all items in its stores and warehouses.

According to Joseph Goy, General Manager of BiG by Safe, the track-and-trace system is important for inventory management and improved consumer experience when shopping at the store.

Others that have responded to Exploit Technologies’ initiative include the National Library Board for a Smart Shelf System and Smart ID Technology Pte Ltd for passive Ultra High Frequency electronic seals. Exploit Technologies is also exploring applications such as tamper-proof RFID tags for pharmaceutical⁴ and logistic supply chain management solutions.

Strengthening The Foundation Of RFID Development

To ensure that its portfolio of technologies remain relevant and on the cutting edge, A*STAR’s research institutes, including the Institute for Infocomm Research (I²R), the Institute of Microelectronics (IME) and the Singapore Institute of Manufacturing Technology (SIMTech) continue to conduct cutting edge research in RFID.

The latest development in A*STAR’s RFID portfolio comes from IME. The institute believes that it has developed the world’s first integrated RFID tag with an on-chip antenna (OCA) that has read/write capabilities with passive RF power. It also includes an anti-collision function.

IME’s RFID tag is one of the promising RFID technologies that Exploit Technologies hopes to bring closer to market. The tag opens up new domains of applications that require small and thin tags, such as in biotechnology and pharmaceuticals, and in authenticating important documents or even currencies.

The IME research team broke new ground in designing and developing the RFID chip with on-chip antenna through an innovative process to fabricate the antenna on top of the RFID chip. The novel process technology eliminates the need for a separate and costly process for antenna printing and assembly that is needed for a separate “off-chip” antenna which is many times larger than the chip itself. In comparison with conventional RFID tags typically of a few cm² in size, this newly developed RFID chip is considerably miniaturized at less than 1 mm² and at a lower cost. (For more information on IME’s innovation, please see Annex A).

“The results of our integrative research, combining circuit design know-how and processing technologies, have contributed to our ability to offer novel solutions,” said Professor Dim-Lee

³ www.bigbysafe.com/

⁴ According to the World Health Organisation, up to 10% of medicines worldwide are fake, a problem that costs the pharmaceutical industry in excess of S\$75 billion per annum and causes huge concerns for consumer safety [Business Week, 7 Feb 2005, pp 46-53].

Kwong, Executive Director of IME. “It also demonstrates our in-house capabilities to address wide-ranging challenges, from innovative circuit and antenna design to post processing technologies.”

Annex A: IME’s Passive RFID Tag With On-Chip Antenna

Annex B: RFID Expertise @ A*STAR’s Research Institutes

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About the Agency for Science, Technology and Research (A*STAR)

A*STAR's mission is to foster world-class scientific research and talent for a vibrant knowledge-based Singapore. The Agency comprises the Biomedical Research Council, the Science and Engineering Research Council, the A*STAR Graduate Academy, the Corporate Planning and Administration Division and a commercialisation arm, Exploit Technologies Pte Ltd.

The two research councils fund and oversee 12 public research institutes in areas such as bioinformatics, genomics, molecular biology, bioengineering, bioprocessing technology, chemical sciences, materials, high performance computing, information technology and communications, manufacturing technology, microelectronic and data storage.
(website: www.a-star.edu.sg)

About Exploit Technologies

Exploit Technologies Pte Ltd is the commercialisation arm of the Agency for Science, Technology and Research (A*STAR). Its charter is to identify, protect and exploit promising intellectual property (IP) created by the Research Institutes under A*STAR. This includes facilitating the IP management process, protecting inventions through patents and copyrights, evaluating A*STAR’s IP, identifying their strengths and the markets that they can serve, and working with companies to commercialise the technologies.
(website: www.exploit-tech.com)

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About IME

The Institute of Microelectronics (IME) is a member of the Agency for Science, Technology and Research (A*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to increase value-add to the electronics industry in Singapore by engaging in relevant R&D in strategic fields of microelectronics; supporting and partnering the electronics industry; and developing skilled R&D personnel. Its key research areas are in integrated circuits and systems; semiconductor process technologies and microsystems, modules and components.
(website: www.ime.a-star.edu.sg)

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Annex A



IME Develops the World's First Integrated Read/Write RFID Tag with On-Chip Antenna and Passive RF Power

The Institute of Microelectronics (IME) successfully developed what it believes is the world's first integrated RFID tag with an on-chip antenna (OCA) that has read/write capabilities with passive RF power. It also includes an anti-collision function.

The IME research team broke new grounds in designing and developing the RFID chip with on-chip antenna through an innovative process to fabricate the antenna on top of the RFID chip. The novel process technology requires a layer of a suitable dielectric to be deposited on the chip surface and isolates the antenna from circuits below it. This eliminates the need for a separate and costly process for antenna printing and assembly that is needed for a separate "off-chip" antenna which is many times larger than the chip itself. Conventional RFID tags are typically of a few cm² in size and more expensive as well. In comparison, this newly developed RFID chip is considerably miniaturized at less than 1 mm² and at a lower cost. It is packed with powerful functions as well.

Unlike existing solutions which offer either read only capability or write with separate infrared power source, IME's RFID chip offers both read-and-write memory capabilities with a non-volatile memory of 128 bits and frequency of 2.45 GHz. Being small and low cost, this new on-chip antenna RFID chip opens up several new domains of applications. These include bio or pharmaceutical areas, tagging of important documents, tickets and currencies that require small and thin tags.

Annex B

RFID Expertise @ A*STAR's Research Institutes

Institute for Infocomm Research

The Institute for Infocomm Research (I²R) has built up expertise in RFID since 1995, by designing and prototyping many systems targeted at different frequencies, ranges and applications. System architecture, small and efficient antenna design for the tag, highly efficient RF to DC power conversion and anti-collision algorithms for multiple tag access are some of the areas of expertise. I²R has a number of patents to its credit and has successfully commercialised many of them. The current research and development is focused at UHF Readers and antennas for tags targeted at customer requirements. I²R has a range of test and measurement facilities and provides antenna measurement services with anechoic chamber.

I²R is a member of GS1 Singapore (previously SANC, the Singapore Article Numbering Council) since 2001 and is currently a member of EPC Global.

Institute of Microelectronics

The Institute of Microelectronics (IME) is a leading player in the RFIC development in general and RFID research field in particular. Its research consists of three components. The lead component is integrated circuit design to enable RFID chip solutions such as tag and Reader IC. This is supported by research activities in packaging area to devise low cost packaging methods for RFID assembly and antenna design. Its process technology research component is directed towards adding unique capabilities such as fabrication of high quality on-chip antenna on RFID chip with good reliability.

IME's research work on RFID is to pave the way for industries to incorporate the technology into their products. The challenge is to find solutions for low cost integration and small size RFID tags and reader solutions, focusing on RFIC design, packaging and process. On-chip antenna solution is an enabler for low cost RFID solution. IME's current research initiatives are targeted towards developing higher functionality tags such as adding sensing and locationing capability in addition to RF identification.

Singapore Institute of Manufacturing Technology

Singapore Institute of Manufacturing Technology (SIMTech) is a national research institute of the Agency for Science, Technology and Research (A*STAR). SIMTech's research capabilities cover a wide spectrum of high value manufacturing technologies.

In 1998, SIMTech successfully implemented one of the world's first RFID-based air cargo tracking systems for an air cargo terminal at the Changi Airport. SIMTech is keen to apply results from its research in rapid RFID system development to Singapore industries, especially in areas of RFID middleware optimization, system design, robust fault detection and networked RFID emulators.