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Exploit Technologies Partners All Five Local Polytechnics to Accelerate Pace of Bringing “Research to Markets”

- A Master Collaboration Agreement and Five Memoranda of Understanding signed to kick off collaboration efforts

Singapore, 31 August 2006 – Test for water-borne infectious diseases with a chip and obtain instant results anywhere, anytime? Or need the help of a robotic arm which does not use sensors, electronics or motors to help patients with weak arms to hold daily items or for training to strengthen their arms? These are two of five projects which will be undergoing prototyping and testing under a Master Collaboration Agreement (MCA) signed today between Exploit Technologies Pte Ltd, the commercialisation arm of the Agency for Science, Technology and Research (A*STAR), and all five of Singapore’s polytechnics to accelerate the pace from research output to “productization”.

At the same time, five Memoranda of Understanding (MOUs) on ready productization projects were signed with Ngee Ann and Temasek Polytechnics. The signing ceremonies were witnessed by Mr Gan Kim Yong, Minister of State for Education.

Under the 5-year Agreement, the polytechnics will leverage on their technical expertise and industrial innovation to develop research output from A*STAR’s 12 research institutes to the stage of prototype or proof of concept.

Over the next five years, the polytechnics will have access to a \$10 million fund set aside by Exploit Technologies, or \$2m a year on a rolling basis. The partnership provides a platform for frequent and formal exchange of ideas and updates of projects. Funding will be granted on technical merit and market readiness based on assessment by a joint committee chaired by Exploit Technologies.

This partnership marks the first time that all five local polytechnics come together under an umbrella agreement with an agency to utilize research output for prototype development.

Signing of Five Memoranda of Understanding (MOUs)

To kick off the collaboration efforts, five MOUs on projects ready for productization were signed with Ngee Ann and Temasek Polytechnics.

The five projects are:

- Personalised Health Status Monitoring
- Miniature Fuel Cell Stacks & Systems Education Kit
- “Lab-On-Chip” for Water Quality Monitoring
- Improved Glass Inclusion Inspection System
- Rehabilitation Aid for Patients with Weak Arms

(More details of the projects in [Annex A](#))

“This collaboration marks our efforts to get research out of the labs and into the hands of users in a timely manner. It is a win-win partnership as it will accelerate A*STAR’s race to the market, enabling research to pay for itself and at the same time exposing the staff and students at our local polytechnics to cutting edge research and applications, helping them to stay relevant to the industries which they serve,” said Mr Boon Swan Foo, MD, A*STAR and Executive Chairman, Exploit Technologies Pte Ltd.

“Nanyang Polytechnic is pleased to support this initiative by A*STAR as it offers opportunities for joint development in research and technology. The collaboration initiative is in line with our technology development focus and it will further strengthen NYP’s capabilities and expertise,” said Mr Edward Ho, Deputy Principal for Technology, Nanyang Polytechnic.

Mr Chia Mia Chiang, Principal of Ngee Ann Polytechnic said, “We are excited at the prospect of being a partner working alongside the research institutes and industry to translate inventions into final products for the marketplace. The collaboration offers an excellent avenue for our staff and students to work with some of the best brains in a wide array of research areas.”

Prof Low Teck Seng, Principal and CEO of Republic Polytechnic said, “Republic Polytechnic believes in developing the core competencies of our staff through R&D projects with leading Research Agencies and the Industry. Through our unique Problem-Based Learning pedagogy, the experiences and expertise gained will lead to enriched learning objectives for our students. The collaboration with A*STAR will lead to more opportunities to work on A*STAR’s portfolio of Intellectual Property for the mutual benefit of both organisations.”

Mr Low Wong Fook, Principal of Singapore Polytechnic said, “This partnership gives our students and lecturers the opportunity to apply cutting edge technologies coming out of A*STAR research laboratories for the benefit of society. The up-to-date knowledge that our lecturers will gain will enable them to help our students when they work on real life projects. It is also exciting for

them to apply new technologies in the development of prototypes which could eventually lead to commercialisation, thus further strengthening our links with industry.”

Mr Boo Kheng Hua, Principal and CEO of Temasek Polytechnic said, “This partnership will allow Temasek Polytechnic and A*STAR to tap on our mutual expertise in R&D, so as to achieve synergies in our respective niche areas. We hope to be able to add value to A*STAR’s efforts to turn its patents into prototypes and commercial products that will benefit the industry. At the same time, our students and staff will be able to develop relevant skills across various disciplines, and gain the essential industrial exposure necessary for a holistic education.”

Media Contacts :

Ms Ng Koon Ling
Asst Head, Corporate Communications
A*STAR/ Exploit Technologies Pte Ltd
Tel: (65) 6826 6338
Email: ng_koon_ling@a-star.edu.sg

Ms Jesmine Ong
Assistant Manager, Corporate
Communications
Institute of Microelectronics
DID: (65) 6770 5375
Email: onggk@ime.a-star.edu.sg

Ms Lee Swee Heng
Business Communications Manager
Singapore Institute of Manufacturing
Technology
DID: (65) 6793 8368
Email: shlee@simtech.a-star.edu.sg

Ms Sandra Tan
Manager, Public Relations
Nanyang Polytechnic |
DID: (65) 6550 0223
HP: (65) 9479 1033 |
Email: sandra_tan@nyp.gov.sg

Ms Sadiyah Ahmad
Corporate Communications Office
Ngee Ann Polytechnic
DID : (65) 6460 6232
Email : sadia@np.edu.sg

Ms Leo Kwang Lin
Manager
Office of Corporate Communications
Republic Polytechnic
DID: (65) 6510 3022
Email: leo_kwang_lin@rp.sg

Adrian Lim
Manager
Corporate Communications Dept
Singapore Polytechnic
Tel: (65) 6772 1350
HP: (65) 9455 3445
Email: adrian@sp.edu.sg

Ms Vimala Christie
Corporate Communications Officer
(Media Relations)
Temasek Polytechnic
DID: (65) 6780 5019
HP: (65) 9790 0319
Email: vimalac@tp.edu.sg

BACKGROUND INFORMATION

About A*STAR and Exploit Technologies

The **Agency for Science, Technology and Research (A*STAR)** is Singapore's national agency for science and technology, supporting the development of industry clusters. Its 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, A*STAR Graduate Academy, Policy and Personnel, and Corporate Planning and Administration Divisions, and a commercialization arm, Exploit Technologies Pte Ltd. The two research councils fund and oversee 12 public research institutes engaged in cutting edge research in the physical sciences, engineering and biomedical sciences. Our institutes build up intellectual capital and trains research talent to deepen Singapore's scientific capabilities.

(website: www.a-star.edu.sg)

Exploit Technologies Pte Ltd (ETPL), the commercialisation arm of A*STAR, manages the intellectual property portfolio of A*STAR's research institutes and centres. ETPL facilitates the efficient transfer of A*STAR's technologies to industry, ensuring that new intellectual property generated by our researchers is exploited to produce tangible products and services.

(website: www.exploit-tech.com)

About Nanyang Polytechnic

Nanyang Polytechnic is a modern tertiary institution that offers quality education in engineering, design, IT, business management, health sciences, chemical & life sciences. With the mission to prepare its graduates for life and work, NYP has continuously been involved in numerous projects in cutting edge technology, to keep pace with the technological developments and demands of the industry. For more information, visit <http://www.nyp.edu.sg>.

About Ngee Ann Polytechnic

Ngee Ann Polytechnic is one of Singapore's leading institutions of higher learning. The polytechnic offers both business-related and technology-based diploma and advanced diploma programmes. The polytechnic aims to provide relevant, balanced and value-added curricula by creating an effective teaching and learning environment. A key thrust for the polytechnic is forging partnerships with industry and other institutions in order to keep students close to current industry and market practices. For more information, please visit www.np.edu.sg.

About Republic Polytechnic

The first educational institution in Singapore to adopt the Problem-Based Learning approach for all its diploma programmes, Republic Polytechnic has five schools offering nineteen diploma courses in Information & Communications Technology, Engineering, Applied Science, Technology for the Arts, and Sports, Health & Leisure. Republic Polytechnic is committed to nurturing innovation and entrepreneurial learning in an environment that develops problem-solving process skills and a life-long learning attitude. Its holistic, broad-based curriculum, covering culture, enterprise development and cognitive processes, prepares students for an active and meaningful role in society. Republic Polytechnic strives for excellence by achieving various national and international accreditations, including People Developer Standards, ISO9001, ISO14001, OHSAS 18001, Singapore Quality Class, Singapore Innovation Class, and the Singapore Health Awards (Silver). For more information, visit <http://www.rp.sg> .

About Singapore Polytechnic

Singapore Polytechnic, the nation's first educational institution of its kind, was set up in 1954 to train technologists and professionals to support the industrialisation and economic development of Singapore. Since then, its development has paralleled the progress of modern Singapore. Over the last 50 years Singapore Polytechnic has produced 135,000 graduates, some of whom have gone on to become Parliamentarians, captains of industries, senior executives of multi-national corporations, and successful entrepreneurs and professionals in Singapore and overseas. Over 16,000 full-time and part-time students are pursuing a total of 63 diploma and post-diploma courses in its Schools of Business, Chemical and Life Sciences, Design, Electrical and Electronic Engineering, The Built Environment, Media & Info-Communications Technology, Mechanical and Manufacturing Engineering, and the Singapore Maritime Academy.

About Temasek Polytechnic

Temasek Polytechnic (TP) is a significant contributor to the field of para-professional education in Singapore. It is a pioneer in Problem-based Learning (PBL). The PBL concept forms the cornerstone of the Polytechnic's educational philosophy to prepare school-leavers adequately for the world of work and a future of dynamic change. The Polytechnic is a firm believer in forging partnerships with industry to keep students close to current industry practice. TP currently offers 38 full-time diploma courses in the areas of Applied Science, Business, Design, Engineering and Information Technology and over 40 part-time courses, up to the Advanced Diploma level. For more information, please visit www.tp.edu.sg

Details about the Projects under MOU

Project	Polytechnic	A*STAR Research Institute
Personalised Health Status Monitoring	Ngee Ann Polytechnic	Institute of Microelectronics (IME)
“Lab-on-Chip” for Water Quality Monitoring	Ngee Ann Polytechnic	Institute of Microelectronics (IME)
Miniature Fuel Cells Stacks & System	Ngee Ann Polytechnic	Singapore Institute of Manufacturing Technology (SIMTech)
Rehabilitation Aid for Patients with Weak Arms	Temasek Polytechnic	Singapore Institute of Manufacturing Technology (SIMTech)
Improved Glass Inclusion Inspection System	Temasek Polytechnic	Singapore Institute of Manufacturing Technology (SIMTech)

Personalised Health Status Monitoring

Biomedical monitoring devices require ultra-low power and high precision circuits with relatively low speed, which poses design challenges to both front-end amplifier and backend digital signal processing.

IME is developing integrated circuits (ICs) that are ultra low-power, operate at 1.0V supply voltage, and consumes merely tens of micro-amperes current. These ICs are pre-amplifiers, analog-to-digital converters, and digital signal processing units which can be used for biomedical applications such as heart rate sensors.

The collaboration between Ngee Ann Polytechnic (NP) and IME focuses on the design of a low power, low voltage and low noise sensor interface circuits for electrocardiogram (ECG) applications. Based on IME’s bio-signal sensing technology, NP will develop a series of healthcare applications that are more compact, portable and easy for personal use. Possible devices are portable heart sensors and pulse monitors.

NP will also explore how the technology can be packaged and applied to new biomedical applications, and improve its design to increase its commercial appeal.

“Lab-on-Chip” for Water Quality Monitoring

As economies develop and pollution problem grows, the testing of water quality becomes more important to ensure good food safety and environmental hygiene against water-borne diseases such as Cholera. The typical water analysis method requires time and depends largely on manual sampling and clinical analysis in a physical laboratory setting. The “Lab-on-Chip” to be developed by IME and NP is a bio-chip device that will test and analyse the quality of water on the spot.

IME has developed a series of silicon-based microfluidic devices for carrying out different biological analyses from sample preparation, biological molecule amplification, to signal detection. These devices can be further integrated as a palm-size device or “Lab-on-Chip” system to carry out analytical procedures for on-site detection or point-of-care purpose, such as detection of biological contaminants in water, hence minimizing the possible outbreak of infectious diseases within the community.

The new “Lab-on-Chip” to be developed is a miniature system that contains the full apparatus needed to analyze water quality, all within a single device. It is highly portable and acts like an all-in-one laboratory that can generate test results almost immediately on-site. The device will enable the tests to be carried out anytime, anywhere.

This new technology has huge possibilities. Other than water quality monitoring, NP will work with IME to explore potential products and applications based on this innovation to apply in areas like genetics, environmental microbiology as well as clinical and forensic analysis.

Miniature Fuel Cells Stacks & System Education Kit

Created by the Singapore Institute of Manufacturing Technology (SIMTech), the miniature fuel cells stacks & system education kit is a low cost educational tool for promoting awareness in the emerging fuel cell technology.

Fuel cells offer a means of making power more efficiently and with less pollution. Electricity is generated from electrochemical reaction of oxygen and hydrogen. While most commercial fuel cell kits are supplied with pre-assembled fuel cells, this kit encourages users to exercise their imagination to build and design their own variation of fuel cell units from scratch. It can be assembled and dismantled by hand without any tools and used repeatedly.

NP will explore the development of a miniaturized fuel cell education kit to stimulate interest in the design and operation of a fuel cell among tertiary students.

Rehabilitation Aid for Patients with Weak Arms

Researchers at SIMTech have invented and patented a fully balanced robotic arm using the gravity compensation system, without the use of sensors, electronics or motors. Initially developed as a 3-D measurement arm for manufacturing / machining purposes, the system has been further exploited as a rehabilitative arm.

The arm, which can be used in robotic movements, does not drop when released and is effortless to move. It will be small and light enough to be wheelchair-mounted and be configured for both upper and lower arm exercise. It can be used to help patients with weak arms to hold daily items, or for training to strengthen their arms as the resistance level can be adjusted. Potential users of this system include stroke patients or patients who have injured their arms in accidents.

Temasek Polytechnic (TP) will help to develop the idea into a working prototype for rehabilitation aid to patients with weakened arms from post-injury stress.

Improved Glass Inclusion Inspection System

SIMTech researchers have successfully developed a novel and highly effective technique for detecting impurities in toughened glass panels.

Toughened glass panels are widely installed in high-rise buildings. However, there is a growing need for regular inspection to detect the presence of detrimental inclusions known as nickel sulfide (NiS). NiS is a residue in the manufacture of toughened glass panels. It exists in about 20% of toughened glass panels. At room temperature, it can expand by 4% in volume over time. An inclusion size of greater than 110µm will cause the glass to crack or shatter resulting in property damages or possible injuries.

SIMTech researchers designed a device that introduces light into the toughened glass panel. Any inclusion in the glass will cause the light to scatter, resembling a sparkling star in the dark background. The technology used in the device can also be applied in detecting defects in transparent polymer and glass panels of display monitors. A portable inspection apparatus has also been created for on-site inspection.

TP will explore building a mechanized TV camera mount to inspect windows, replacing humans when inspecting tall buildings.