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News Release

SPARKING YOUTHS' INTEREST AND INNOVATION IN DEFENCE TECHNOLOGY

Imagine remotely controlled robots that could navigate underwater with speed and accuracy; or an unmanned ground vehicle that could be operated using human arm movements or light. These were some of the promising ideas and futuristic projects undertaken by our nation's youths that were showcased at the 10th Young Defence Scientists Programme (YDSP) Congress held this afternoon. Senior Minister of State for Defence Mr Ong Ye Kung officiated the event as the Guest of Honour.

Delivering the keynote address, Mr Ong highlighted the relevance of the YDSP in providing exposure to students, especially as Singapore seeks to invigorate interest in science and technology. "It is a great time to learn about science and technology because the advancements are so rapid and opportunities are so vast. To discover science and technology, it is not enough to just read about them from books. You learn better when the theories are translated into hands-on experiences. It is with this in mind that the various YDSP activities have been set up," he said.

Over the past year, more than 400 students embarked on a unique learning journey beyond the classroom, under the guidance of mentors from the Defence Science and Technology Agency (DSTA), DSO National Laboratories and local tertiary institutions.

A *Research@YDSP* project delved into the cutting-edge fields of robotics and gesture control technologies, to explore how they could be applied to enhance a soldier's operational capability in the field. Titled "**Gesture Control Technology**", the project

team comprising Pee Yong Han and Sandheep Ransilu Piyasanka from Victoria School, and Toh Ya Wei and Tay Kai Jun from the NUS High School of Mathematics and Science leveraged programming skills and smartphone technology to develop an unmanned ground vehicle (UGV) that could be operated by human arm movements via a gesture and motion control band worn on the forearm. With a mounted camera, the vehicle is able to scout its surroundings remotely. Team member Sandheep said, “We hope that this project could enable soldiers to scout dangerous terrain safely and react quicker to dangerous situations at the same time.”

Another *Research@YDSP* project, titled “**Light Direction Finder**”, examined how light can be used for navigation with the help of robots. In this research project, Samuel Leong from Hwa Chong Institute developed robot prototypes that could sense and detect light, and be effectively guided by the light to the desired position. This research potentially allows unmanned applications to be implemented in real-life functions, such as directing cars to available parking spots in carparks. Samuel’s project has been selected out of six projects to represent Singapore in the upcoming Intel International Science and Engineering Fair (ISEF) in May 2016, the world’s largest international pre-college science competition. His project has also been awarded the Gold Award in the recent Singapore Science and Engineering Fair (SSEF).

At the *YDSP Science and Technology* underwater robotics camp held from 30 November to 4 December 2015, 16-year-old Wayne Yeo Wei Zhong from Victoria School and his teammates worked on building a remotely operated robot that could navigate through a race course and hit a target underwater. After several rounds of prototyping, the team adopted an inverted design for their robot – with the base on top and the motor below, so that it could submerge and accelerate faster. Recalling the experience, Wayne said, “The camp gave me a chance to apply what I have learned in school. Engineering is a path that I hope to explore, as I believe it can open great possibilities in making human lives better when applied. I am particularly interested in defence engineering, as it provides an opportunity to contribute to the security of Singapore.”

The YDSP also included a series of lectures and activities for students during their June school holidays under the *World of Science* programme. Made up of modules

such as Aerodynamics, Cryptography, Electromagnetics and Signal Processing, the programme explored advanced topics that are critical to Singapore's defence needs, and inspired participants to further their interest in science modules by conducting their own research for a personal project. One of the participants is Joshua Lim from Anglo-Chinese School (Independent). Introduced to Signal Processing through the YDSP *World of Science*, Joshua conducted his own research project on detecting the location of aircraft from home. He presented on his experience during the YSDP Congress.

Guiding the students in their projects were experienced mentors from the defence technology ecosystem. Mr Bryan Ng Kin Loong, an engineer at DSTA's Land Systems Programme Centre, coached the team working on the "Gesture Control Technology" project. Elaborating on the experience, Bryan said: "It was enjoyable mentoring students on robotics which is an exciting technology with great potential. I was encouraged to see them working on such a complex project, from programming to the actual construction of the unmanned ground vehicle enthusiastically. It was very fulfilling to see the vehicle in action after months of hard work." Another mentor who provided advice and expertise to the participants is Mr Lee Jin Yu, a research scientist from DSO who mentored Samuel's project titled "Light Direction Finder". He commented, "The project scope went beyond the original intent and the victory in SSEF was certainly beyond our expectations. *Research@YDSP* is a unique and fulfilling programme as it allows students to explore science and engineering in both hardware and software. I hope this would spark students' interest in this field and join us in the future."

At the event, Mr Ong presented 32 YDSP Scholarships to students for their outstanding academic and co-curricular achievements, and another 83 Academic Awards to students for excellence in Physics and Mathematics. The event was attended by students, principals, teachers and members of the Defence Technology Community¹.

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¹ * The Defence Technology Community (DTC) includes the Defence Science and Technology Agency (DSTA), DSO National Laboratories (DSO), Future Systems and Technology Directorate (FSTD) and Defence Industry and Systems Office (DISO).

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About Defence Science and Technology Agency

The Defence Science and Technology Agency, or DSTA in short, (国防科技局), is a statutory board set up under the Ministry of Defence (MINDEF). It implements defence technology plans, acquires defence material and develops defence infrastructure for MINDEF.

DSTA provides leading-edge technological solutions to the Singapore Armed Forces by tapping the best technologies and fostering an environment of creativity and innovation for defence applications. It also builds up a strong community of engineers and scientists from the universities, research institutes, government and industry to serve the defence needs of the nation. For more information, please visit www.dsta.gov.sg.

About DSO National Laboratories

As Singapore's one-and-only defence R&D organisation, DSO National Laboratories, or DSO in short (国防科技研究院), creates the critical edge in defence technology to force multiply the Singapore Armed Forces' (SAF) combat capabilities and render potential threats irrelevant. With more than 1,300 defence scientists and engineers who work seamlessly across disciplines spanning from underwater to cyberspace, DSO is also the oldest and largest R&D institute in Singapore. For more information, please visit www.dso.org.sg.