

12 June 2025

## Fact Sheet

### **BRAINHACK – SOWING SEEDS OF DEFENCE INNOVATION**

BrainHack 2025 was organised by the Defence Science and Technology Agency (DSTA) from 1 May to 12 June 2025 to generate interest in emerging technologies including cybersecurity, artificial intelligence, robotics, space technology, extended reality, misinformation and fake news detection, app development and more.

Incepted in 2019, the learning festival saw more than 4,300 post-secondary to undergraduate students pick up knowledge across its various components this year. Through BrainHack activities, participants get a glimpse of how cutting-edge technologies are applied to solve real challenges in defence.

### **Competitions**

#### **a. Cyber Defenders Discovery Camp (CDDC)**

CDDC offers a comprehensive exploration of cybersecurity self-learning modules with hands-on exercises to equip participants with essential skills and problem-solving capability to defend against online attacks. Teams competed in a 24-hour virtual qualifier Capture-The-Flag competition where the final stretch of the competition saw the teams duke it out in a mixture of physical and virtual challenges on 12 June.

#### **b. Today I Learned – Artificial Intelligence (TIL-AI)**

TIL-AI introduced students to the exciting world of AI and autonomous robotics. Participants learned how to build AI models capable of understanding voice commands, interpreting visual data, and taking action accordingly, all while working on a defence-inspired challenge. This exciting journey culminated in a physical final showdown on 11-12 June where teams deployed their AI algorithms to control robots

to autonomously reconnaissance over unknown terrain, gather intelligence, analyse ground situation, and all while avoiding capture by adversaries.

c. CODE\_EXP

Through CODE\_EXP, students stepped into the shoes of a software developer, learning the software development lifecycle. From ideation and prototyping to coding and pitching, teams developed mobile applications addressing real-world needs. Workshops covered application design, mobile frameworks and deployment with edge artificial intelligence (AI) use-cases, culminating in a dynamic hackathon. After refining their skills and rapid prototyping, finalists pitched their Minimum Viable Product (MVP) in front of the judging panel to compete for the winning prize.

d. SpaceCube

SpaceCube brought students into the orbit of space innovation. Participants learned about CubeSats — miniature satellites — and gained hands-on experience building and testing their own CubeSat modules. Students also discovered more about additive manufacturing and 3D-printed satellite parts. Teams also took part in a remote Earth imaging mission, using their CubeSats to capture data and simulate actual satellite operations.

## **Workshops**

a. SeeTrue Workshop

In this digital age, critical thinking and digital literacy are key. SeeTrue armed participants with skills to analyse, verify, and detect misinformation. Through expert talks and a hands-on workshop, students learned how generative AI is being used and misused, experimented with generative AI content generation tools and content manipulation detection — a crucial skill in today's information landscape.

b. Counter-Drone Workshop

Participants learnt about counter-drone technologies, and develop a counter-drone system using the concept of radio frequency interference. Participants also got to experience bringing down a drone using a simulated gun and their counter-drone system that was developed during the workshop.

### c. Drone Workshop

Through the Drone Workshop, participants configured and coded a drone light show using Python programming by testing synchronised flight paths in simulation before launching a live show in the drone cage. Through this, they learned how to program and optimise an algorithm to allow drones to conduct a mission efficiently.

### **Tech Showcase**

The showcase featured a series of interactive exhibits that offered BrainHack participants a behind-the-scenes look at DSTA's tech innovations that strengthen Singapore's defence and national security. The demonstrations were designed to spark curiosity and inspire the bright young minds to explore the frontiers of science and technology.

Marine Robots	Participants got to experience autonomous robotic operating in the maritime environment with self-navigation capabilities. Participants saw first-hand how DSTA applies computer vision and AI at sea, using props to simulate obstacles and observed how the robots could detect them to adapt their navigation.
Humanoid Robot & LiDAR Maze	Participants played out a real-time stealth and detection scenario. One team would navigate a maze undetected, while the other positions LiDAR sensors and humanoid cameras via a C3 interface to catch them. Through this, they learned how robotics, sensors and C3 systems come together in surveillance and tactical defence.
The Immersion Zone (XR)	Participants paired up to experience mission-based Extended Reality (XR) simulations; one player would wear a Virtual Reality (VR) headset for parachuting or drone ops, while the other guides using a VR map or a Mixed Reality (MR) sand table. Through the gameplay, participants saw how XR enables strategic planning, collaboration and situational awareness.

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About Defence Science and Technology Agency

The Defence Science and Technology Agency (DSTA) is a top-notch technology organisation that drives innovation and delivers state-of-the-art capabilities to make the Singapore Armed Forces a formidable fighting force. Harnessing and exploiting science and technology, our engineers and IT professionals leverage multidisciplinary expertise to equip our soldiers with advanced systems to defend Singapore. DSTA also contributes its technological expertise to support national-level developments. To achieve our mission, DSTA excels in systems engineering, digitalised platforms, cyber, software development and more.

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