HTX (Home Team Science and Technology Agency)

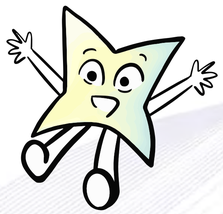
ANNUAL REPORT FY2022

HTX

HTX is the Science and Technology agency in Singapore that integrates a diverse range of scientific and engineering capabilities to innovate and deliver transformative and operationally-ready solutions for homeland security. As a statutory board of the Ministry of Home Affairs, HTX works at the forefront of science and technology to empower Singapore's frontline of security. The mission is to amplify, augment and accelerate the Home Team's advantage and secure Singapore as the safest place on planet earth. Singapore's Home Team Departments include the Singapore Police Force, Singapore Civil Defence Force, Immigration and Checkpoints Authority, Singapore Prison Service and Central Narcotics Bureau.

htx.gov.sg

CONTENTS

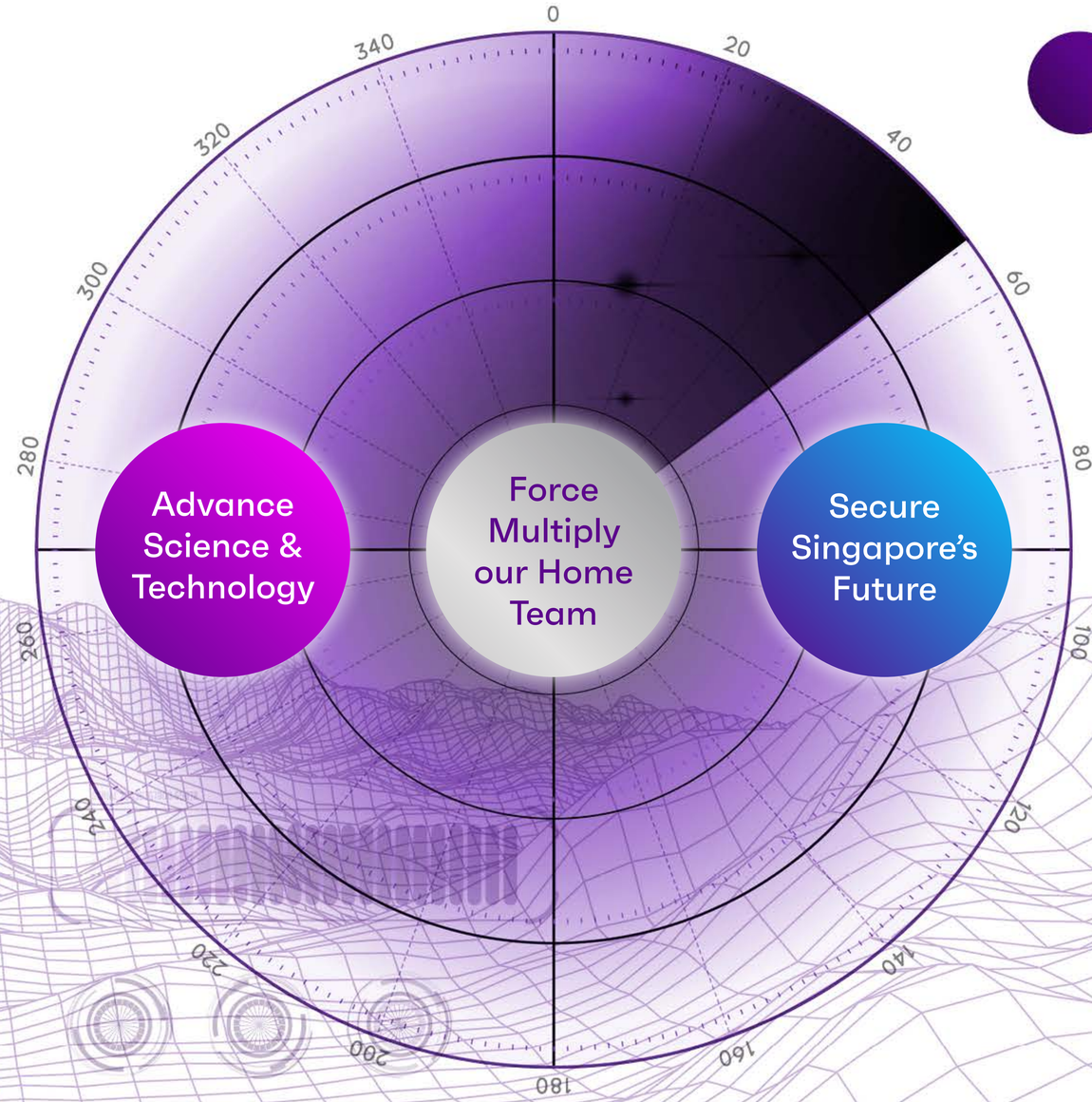


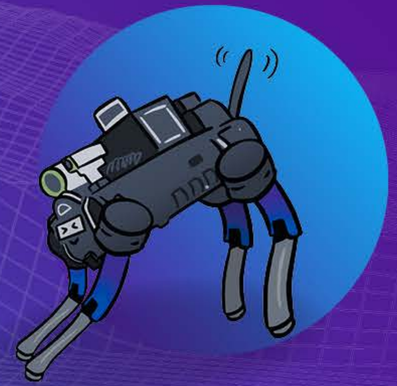

WHY WE
EXIST

HTX ANNUAL REPORT 2022

WE ARE GUIDED BY OUR MISSION

TO...





WHAT WE DO AND HOW WE DO IT

HTX ANNUAL REPORT 2022

OUR SCIENCE & TECHNOLOGY CAPABILITIES

DIGITAL

- C4I (Command, Control, Communications, Computers & Intelligence)
- Cloud
- Cybersecurity
- Data Science & AI
- Digital & Information Forensics
- Digitalisation
- Network/Communications
- Sense-making & Surveillance

SCIENCES

- Biometrics & Profiling
- Chemical, Biological, Radiological, Nuclear & Explosives
- Forensics
- Human Factors & Simulation

ENGINEERING

- Land Systems
- Marine Systems
- Protective Security & Safety
- Robotics, Automation & Unmanned Systems

CROSS-DOMAIN

- Disruptive Technologies Office
- Q Team

SAVING LIVES

Saving lives

Watch the video

A look at EXCEL – The first of its kind in the firefighting & rescue fraternity

"EXCEL will form the core of SCDF-HTX research, development and education, and provide a comprehensive and scientific approach to training and operations. It will enable us to further our research on emergency responder performance to develop new training paradigms that challenge existing norms and further push the limits of human performance to enhance the operational readiness of our Home Team officers."

- Ying Meng Fai, Director of Human Factors & Simulation Centre of Expertise

The new Emergency Responders' Fitness Conditioning and Enhancement Lab (EXCEL) was launched at the Civil Defence Academy in June 2022. Developed jointly by HTX and the Singapore Civil Defence Force (SCDF), EXCEL is a purpose-built facility that aims to enhance the capabilities of emergency responders within the Home Team.

EXCEL will serve as the core of SCDF-HTX research, development, and education, providing a comprehensive and scientific approach to training and operations. The facility aims to push the limits of human performance and develop new training paradigms to enhance the operational readiness of Home Team officers.

The facility encompasses various labs and a System Control & Data Analytics Centre. The labs include the Strength, Conditioning & Rehabilitation in Virtual Environment (STRiVE), which combines a virtual environment with biomechanics assessment tools for training in operational and unconventional terrains. The Heat Acclimatisation and Thermoregulation (HEAT) Lab prepares responders for challenging conditions such as heat and cold stress. It simulates climatic conditions for the Breathing Apparatus Proficiency Test (BAPT) and allows scientists to study the effects of environmental factors on performance.

The Fitness Evaluation Lab utilises scientific procedures to measure physiological fitness components, allowing for the establishment of benchmarks and targeted interventions. The Cognitive Lab focuses on cognitive training protocols to enhance cognitive and behavioural performance, utilising technologies such as brain activity monitoring, eye tracking, and cognitive tests. The System Control & Data Analytics Centre serves as the nerve centre, managing data from the various labs through the Test Results and Assessment Management System (TRAMS).

EXCEL aims to redefine the performance of responders and will foster collaboration between HTX's Human Factors & Simulation Centre of Expertise scientists and SCDF's Responder Performance Centre officers for in-house R&D projects.

Overall, EXCEL represents a significant step forward in enhancing the training and capabilities of emergency responders, promoting innovation and scientific approaches to optimise their performance in challenging operational scenarios.

Read more:
https://go.gov.sg/htxexcel

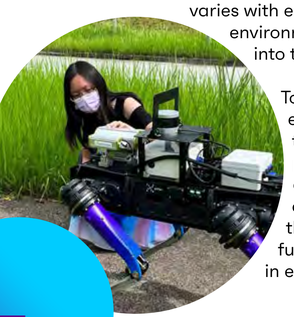
saving lives

Robotic dog Rover-X tests its sight

Rover-X, a four-legged robotic dog developed by HTX in collaboration with various organisations, is undergoing a trial to assess its image quality and video analytics (VA) capabilities. Engineers from HTX's Robotics, Automation and Unmanned Systems, and Sense-making & Surveillance Centres of Expertise are conducting the tests close to HTX's headquarters at One-North.

The trial begins with an "eyesight test" using a resolution chart similar to an eye chart used for human vision tests. The engineers evaluate Rover-X's camera's ability to resolve fine details at different distances and zoom levels. This test aims to assess the robot's image quality capabilities.

Next, the focus shifts to Rover-X's VA capabilities. VA solutions typically work well with fixed cameras mounted at a certain height and angle. However, implementing VA on a moving robot like Rover-X poses unique challenges. The robot's field of view changes as it moves, and its height varies with each step. Additionally, the dynamic environment introduces more motion blur into the captured videos.



To address these challenges, the engineers are conducting multiple tests to verify Rover-X's VA performance, including accuracy and false alarm rates in specific conditions. The goal is to ensure that the robot's VA system can effectively function in real-world scenarios and aid in early threat detection.

> *"We are doing multiple tests to verify the performance of Rover-X's VA capabilities so as to ascertain its accuracy and false alarm rates in certain conditions."*
>
> - Benjamin Lee, Deputy Director (Sensors and Sense-making), Sense-making & Surveillance Centre of Expertise

Rover-X is a collaborative effort between HTX, Klass Engineering and Solutions, Ghost Robotics, and A*STAR's Institute for Infocomm Research. It is designed to support missions that involve high-risk situations and assist frontline officers in security patrols. The robot's autonomous navigation capabilities and VA system minimise the need for human intervention and enhance early detection of potential threats.

Overall, the trial aims to validate Rover-X's image quality and VA capabilities, ensuring that it can perform effectively in various operational environments, ultimately enhancing security and safety efforts.

Read more:
https://go.gov.sg/roverxtrial

Embracing innovation and technology to save lives with OMNII

A multi-agency team in Singapore, consisting of representatives from various organisations including the Singapore Civil Defence Force (SCDF), Ministry of Health (MOH), Defence Science and Technology Agency (DSTA), HTX, and Integrated Health Information Systems (IHiS), has been honoured with the Public Sector Transformation (PST) Exemplary Innovator Award for their work on the Operational Medical Networks Informatics Integrator (OMNII). This award was presented to them at the PST awards ceremony in July 2022.

OMNII is a digital platform that facilitates real-time sharing of patient data between SCDF and hospitals, specifically for pre-hospital emergency care (PEC). Since its launch in August 2021, OMNII has significantly improved the delivery of emergency medical services, enabling better collaboration and faster patient care, leading to enhanced outcomes and more lives saved.

With OMNII, paramedics can access a patient's medical records from the National Electronic Health Record (NEHR) while transporting them to the hospital, provided the patient's identification is known. Real-time sharing of vital signs is possible, and paramedics can pre-register patients in the receiving hospital's system, allowing the emergency department to prepare in advance. Additionally, paramedics can seek medical advice through the telemedicine module within the OMNII app, enabling improved triage diagnosis and better patient outcomes.

Before the implementation of OMNII, there were limitations in information sharing between different PEC stakeholders, and paramedics had no access to patients' medical history in the field. They had to fill in hardcopy Ambulance Case Records and convert them into digital format later. Seeking medical guidance or sharing information with the receiving hospital en route was also challenging.

The development of OMNII faced several policy and technological challenges due to the integration of multiple complex systems, including SCDF's Advanced C3 Emergency System (ACES), MOH's NEHR system and Critical Medical Information System (CMIS), as well as registration systems from various hospitals. The team overcame these obstacles to ensure seamless compatibility and functionality.

OMNII is seen as a groundbreaking system that bridges the gap between pre-hospital data and the broader healthcare system, improving efficiency and patient care. Future phases of the project may include biometric authentication for patient identification and cloud-based AI technology to enhance operational and clinical decision-making.

The successful implementation of OMNII demonstrates the effectiveness of collaboration between multiple agencies and ministries, utilising technology to enhance outcomes for both users and the public.

> *"OMNII is a great testament of a multi-agency system, cross-ministry project that embraces technology to bring about higher efficiency and better outcomes for both users and the people we serve."*
>
> - Ling Kok Yong, Director, Civil Defence Programme Management Centre

Read more:
https://go.gov.sg/pstaward-omnii

Automated medical store for paramedics to 'grab-and-go'

HTX's Civil Defence Programme Management Centre and the Singapore Civil Defence Force (SCDF) Ang Mo Kio Fire Station jointly conceptualised the Automated Medical Store (AMS), a grab-and-go automated self-checkout system that uses facial recognition and weight sensors to detect items taken off the shelves.

The AMS concept is similar to Amazon Go stores, enabling paramedics to grab the items they need and automatically charge them to their account. This system reduces the manual stock management process, eliminates human errors, and allows paramedics to focus more on operational tasks and training.

Aside from greater convenience and manpower savings, the turnaround time for the ambulance to be ready for the next call is also reduced. The AMS trial was conducted at the Punggol Fire Station, a smart fire station equipped with advanced technologies, until February 2023.

The collaboration between HTX and SCDF involved process and product redesign, considering user experience, cost-benefit analysis, space constraints, and other challenges. For instance, to accurately track the weight of lightweight items such as gauze and needles, the team repackaged them into bundles or added counterweights.

The AMS trial aimed to test robustness and accounting accuracy before potential force-wide implementation. The long-term vision is for the AMS to be integrated into SCDF's supply chain management, using data analytics to anticipate inventory demands and optimise resource allocation across fire stations. This would save time in inventory management and maintain an adequate stock level to support SCDF's frontline operations.

The AMS represents a significant step towards the Smart Fire Station vision, incorporating sensors, artificial intelligence, and data analytics to enhance operational effectiveness. By adopting a 'Grab-and-Go' concept and automating stock management, the AMS enables SCDF to achieve just-in-time store management, ensuring medical items are automatically replenished as stocks run low.

HTX and SCDF will continue to collaborate on SCDF's digital transformation journey and the implementation of innovative solutions to improve firefighting and pre-hospital care services for the public.

> *"The automatic medic store is a shift from the labour-intensive and time-consuming nature of traditional inventory management, which is prone to human error. The automated medical store provides paramedics with a fuss-free experience and frees them up from administrative tasks to focus on operational needs and training."*
>
> - Darren Ang, Head, Training & Immersive Systems, Civil Defence Programme Management Centre

Read more:
https://go.gov.sg/ams

New streaming video channel for emergency calls

The Emergency Video System (EVS) is a collaborative solution developed by the Singapore Police Force (SPF), Singapore Civil Defence Force (SCDF), and HTX in partnership with ST Engineering. It allows individuals to share live video streams from their mobile phones directly with the SPF or SCDF Operations Centres during emergency situations when deemed necessary.

To initiate EVS, individuals should make the initial emergency call to 999 for the SPF or 995 for the SCDF. The operator will determine if EVS is required and safe to activate. If the operator decides to proceed with EVS, an SMS will be sent to the caller from either 'POLICE 999' or 'SCDF995', containing a web link starting with https://send.emergencyvideo.gov.sg.

It is important to note that any EVS invitation not originating from 'POLICE 999' or 'SCDF995', or any request for personal information through a web link, should be reported as a scam to the authorities.

When the caller clicks the link in the SMS, their phone's web browser will open and prompt them to grant permission for the browser to access the phone's camera. Once permission is granted, the video streaming session will begin in the web browser. EVS utilises the native video streaming capability of modern web browsers such as Chrome version 50 or Safari version 11, without requiring the installation of any additional apps.

During the video streaming session, the caller should remain in voice contact with the operator, either using speaker mode or a handsfree headset, to receive instructions on recording the video stream. If it is necessary to maintain discretion, the caller can communicate with the operator through text messaging.

The operator can utilise the caller's GPS location service to accurately pinpoint their location, which can be particularly useful if the caller is unable to provide precise details or needs assistance from the SPF or SCDF officers to locate them.

In major incidents involving both the SPF and SCDF, the caller's live video feed can be shared with both emergency services.

It's important to be aware that the video stream from an EVS session will be recorded by the SPF or SCDF and securely stored in the government's cloud storage. These videos are not circulated without proper checks. In the future, the recorded videos may be used as evidence in court proceedings when necessary or as requested by the Public Prosecutor.

The caller retains the right to decline starting a video streaming session if requested by the operator, and they can choose to ignore the SMS link if they change their mind after initially agreeing to activate the video call. Furthermore, the SMS link will automatically expire within minutes after it is sent.

Read more:
https://go.gov.sg/evs

SOLVING CRIMES

Solving crimes

Watch the video

"Our case studies are always unique – from mulch, to the burning pattern of a mattress, to the flammability of colour powder. My work keeps me inspired to view things with different perspectives to appreciate different situations."

- Anna Teo, Senior Materials Analysis Officer, Forensics Centre of Expertise

Getting to the root of mysterious road divider fires

In 2019, road divider vegetation fires along the Pan-Island Expressway (PIE) between Eng Neo Avenue and the Central Expressway exits became a concern due to their potential impact on Singapore Civil Defence Force's (SCDF) emergency resources. A multi-agency study group consisting of SCDF, National Parks Board (NParks), and National Environment Agency (NEA) was formed to investigate the spike in fires along that stretch.

The study group suspected that mulch, a layer of organic material applied to conserve moisture and improve soil conditions, could be a contributing factor to the fires. To understand the ignitability of different mulch types, a series of burn tests were conducted, involving laboratory tests by HTX and the Health Sciences Authority, a trial using different mulches along the PIE, and burn tests by the Fire Investigation and Research Laboratory.

One of the challenges faced during the study was procuring the necessary resources, especially during the COVID-19 pandemic. Despite the difficulties, the team managed to secure the materials needed for the experiments.

Communication was also a challenge due to the Circuit Breaker measures, but the team adapted by using Skype calls and emails.

Based on the study's findings, NParks and NEA revised the specifications for mulch along expressways during routine maintenance. Regular cleaning and preventive watering at hotspots during dry periods were implemented as well. As a result, the number of road divider vegetation fires significantly decreased from 213 cases in 2019 to 20 cases up until May 2021.

Looking ahead, the team is currently studying mattress fires caused by cigarettes and seeking to understand the burn behaviour of cigarettes on mattresses. The aim is to provide valuable insights to fire investigators and reduce such incidents in the future.

Read more:
https://go.gov.sg/annateo

Mixed Reality and holograms in courts of the future

HTX presented its mixed reality (MR) training system for bloodstain pattern analysis (BPA) at the Technology & Courts of the Future (COTF) 2022 programme. The showcase aimed to highlight how MR technology can revolutionise BPA training, which involves studying the size, shape, and distribution of bloodstains at crime scenes.

Traditional BPA training methods require creating mock crime scenes using synthetic blood and flipchart papers, which is time-consuming, labour-intensive, and lacks repeatability. To overcome these limitations, HTX's Human Factors & Simulation Centre of Expertise developed an innovative MR system that enhances training for Crime Scene Specialists while saving time, cost, and manpower.

The MR system combines physical and digital elements, allowing trainees to interact with virtual crime scenes and analyse different bloodstains using an MR headset. It projects holographic images onto the trainee's field-of-view, enabling them to select suitable bloodstains and perform measurements without physical props. The system also offers versatility by simulating various room layouts and providing instantaneous feedback, eliminating the need for constant instructor supervision.

"In-depth trials and evaluations were conducted with Crime Scene Specialists from SPF and very positive feedback was received from users who found the system to be useful, innovative and most importantly, effective in meeting the training objective."

- Ying Meng Fai, Director, Human Factors & Simulation Centre of Expertise

One specific challenge addressed by the MR system is teaching the "stringing" method, which helps identify the source area of an impact pattern. Trainees traditionally make manual measurements and tape physical strings based on the calculated angle of impact, which can be time-intensive and challenging for newcomers to BPA. With the MR system, holographic lines replace physical strings, allowing trainees to receive real-time visual feedback and guidance during the stringing process.

HTX conducted trials and evaluations with Crime Scene Specialists from the Singapore Police Force and received positive feedback regarding the system's usefulness, innovation, and effectiveness in meeting training objectives. The showcase at the COTF 2022 received appreciation from international participants who recognised the innovative approach taken by HTX to enhance training for law enforcement officers.

By leveraging MR technology, HTX's BPA training system offers an immersive, cost-effective, and time-saving solution that can improve the proficiency and confidence of Crime Scene Specialists in analysing bloodstain patterns at crime scenes.

Read more:
https://go.gov.sg/mixedrealitycotf

ENHANCING PUBLIC SAFETY AND SECURITY

Enhancing public safety and security

Watch the video

PASS – Not an ordinary toilet

The Prison Automated Screening System (PASS), developed by HTX in collaboration with the Singapore Prison Service (SPS), is a unique solution that automates the urine collection and screening process for illicit drugs. PASS utilises automation, robotics, sensors, and deep learning technology to collect urine samples and screen them in a hygienic and unsupervised manner.

Currently in a proof-of-concept trial at the Selarang Park Community Supervision Centre, PASS aims to improve the drug supervision programme and working environment of Home Team officers. The system automates the end-to-end urine procurement and screening process, reducing disruption to supervisees' lives and work.

The technology behind PASS allows supervisees to deposit their urine samples independently and in a contactless manner. The system incorporates features such as biometrics technology for seamless registration, an automatic door, and urinal shutter, ensuring that the process is conducted correctly and in the right sequence. A robotic gantry system handles the test kits, while safeguards and deep learning help detect and prevent tampering.

The collaboration between different Centres of Expertise at HTX, including Biometrics and Profiling, Forensics, and Human Factors & Simulation, ensures the accuracy, consistency, and contamination-free nature of the testing process. The project has undergone extensive experimentation, and the system and user experience continue to be refined based on feedback.

The successful implementation of PASS has the potential to benefit thousands of supervisees by decentralising the reporting centres and allowing them to visit any location at their convenience. This reduces disruption to their lives and helps with their reintegration into society. SPS sees PASS as an example of how innovative technology can make the supervision of offenders in the community more efficient and effective.

If the proof-of-concept trial is successful, SPS plans to deploy PASS islandwide, enabling supervisees to save time and resources while focusing on their reintegration journey and maintaining a drug-free lifestyle. The collaboration between HTX and SPS in developing PASS represents a significant step forward in enhancing the drug supervision programme and improving the lives of supervisees.

> *"We are using technology and developing this automation solution not just to help the operations of the Singapore Prison Service, but also to potentially serve thousands of supervisees. PASS can be decentralised to different parts of Singapore and supervisees would be able to go to any of the reporting centres at their convenience, even after working hours, with less disruption to their lives. This project is meaningful as I see how technology is contributing to the success of the rehabilitation programme."*
>
> - Daniel Teo, Deputy Director, Intelligence, Interactions & Inter-Ops (3i), Robotics, Automation and Unmanned Systems Centre of Expertise

Read more:
https://go.gov.sg/pass

MiniX: Mini but mighty

One of the projects of HTX's Q Team is MiniX, a customisable robot designed to navigate underground tunnels and facilities. The robot is intended to assist officers from the Police Security Command (SecCom) of the Singapore Police Force (SPF) during surveillance and ensure the safety of high-security events.

MiniX, weighing about 4.5kg and roughly the size of an A4 sheet, is equipped with a camera, waterproof capabilities, and a ground control system (GCS). It can manoeuvre through tunnels that SecCom officers would otherwise have to crawl or duckwalk through. By controlling the robot remotely from the surface, officers can minimise the risks associated with working in hazardous underground environments. MiniX also enhances efficiency, as it can complete a 40-metre tunnel inspection in just 20 minutes compared to the 30 minutes it would take for a human to do the same.

The GCS utilises AI-powered video analytics to detect and warn officers about suspicious objects. The robot's features are highly customisable, thanks to extensive fieldwork and collaboration with operations teams. For instance, the robot has tyres suited for both muddy and indoor conditions, and users can attach additional gadgets such as LED lights or cameras to adapt it to different environments.

Q Team's agile and innovative approach enables rapid progress. The development of MiniX began in November 2020, with the first prototype completed within three months. The team prioritises simplicity and finding practical solutions to challenges. For example, when MiniX had difficulty navigating a narrow indoor trench, the team attached ball bearings to its wheels using cable ties, allowing it to glide smoothly along the trench walls.

The Q Team continues to explore further developments for MiniX, such as creating a mesh network with multiple robots to cover larger areas and developing semi-autonomous and autonomous versions. Through their work, they aim to be a force multiplier for Home Team's operations, contributing to homeland security in Singapore.

> *"MiniX is testament to the agility, innovativeness, and passion that Q Team engineers have. We are proud to do our part in homeland security and look forward to seeing MiniX unleash its power as a force multiplier for Home Team's operations."*
>
> - Dr Ng Gee Wah, Director, Q Team

Read more:
https://go.gov.sg/minix

"We are working on enhancing the drone as commercial solutions are catching up, and we need to stay ahead of the curve."

- Low Hsien Meng, Engineer, Robotics, Automation & Unmanned Systems Centre of Expertise

RAUS engineer flying to new heights with innovative drone

Low Hsien Meng, an engineer at HTX, has been working on developing innovative drone technology, including his latest creation called Project APERTURE. This palm-sized, cellular unmanned aerial vehicle (UAV) is designed to operate Beyond Visual Line of Sight (BVLOS) and address the challenges of operating drones indoors.

Hsien Meng's passion for engineering started at a young age, which lead him to pursue a degree in aerospace engineering. He has contributed to the development of BVLOS drone systems, including the DroNet system at ST Engineering. In his current role as Lead Engineer (Aerial Systems) at HTX, Hsien Meng manages projects involving aerial systems and collaborates with the RAUS Intelligence, Interactions & Inter-Ops (3i) team.

The use of drones has expanded beyond aerial photography and light shows, with BVLOS drones playing a crucial role in patrolling, security operations, detection of hazardous materials, fire monitoring, and supply delivery for the Home Team. However, operating drones indoors poses unique challenges such as limited space and difficulties maintaining stability and position without GPS. To address these challenges, Hsien Meng developed a small, lightweight, and cellular-linked drone with advanced sensors and cameras for indoor use. The drone weighs only 250g and relies on cellular datalink over VPN, enabling it to operate deep within buildings. It also features forward-facing visual sensors for positioning and trajectory maintenance.

During the development of Project APERTURE, Hsien Meng had to overcome various challenges, including structural design and manufacturing, propulsion design, and thermal design. He utilised technologies from adjacent industries, such as mobile hardware architecture and additive manufacturing, to produce a minimum viable product. The project is now entering its next stage of development to enhance the drone's capabilities and stay ahead of the industry.

Read more:
https://go.gov.sg/hsienmeng

SECURING BORDERS

Securing borders

Watch the video

Breezing through immigration clearance by car with APICS

The Automated Passenger In-Car Clearance System (APICS) is a proof-of-concept project developed by HTX that aims to provide contactless and seamless immigration self-clearance for travellers returning to Singapore from Malaysia by car. The system integrates contactless biometric scanners, cameras, sensors, and other features to offer a secure and comfortable clearance process for drivers and passengers.

A live trial was conducted at the Old Woodlands Checkpoint from June to October 2022, to gather user feedback, improve the user interface, and address any shortcomings.

The current version of APICS draws from previous trials conducted in 2017-2018, which featured robotic arms handing wireless biometric devices to drivers and passengers. Based on the feasibility of self-clearance demonstrated in those trials and advancements in contactless biometric verification methods, APICS now utilises facial and iris scanning technology instead of fingerprints, offering a more convenient, hygienic, and efficient immigration clearance process.

APICS also includes a specially designed canopy that not only protects users from the elements but also optimises lighting conditions for the biometric scanners. The system incorporates an automated height-adjustable self-help kiosk, exhaust fans to remove vehicle fumes, and strategically placed traffic poles for guidance.

Motorists who have experienced the APICS live trial have responded positively, appreciating the ease, convenience, and speed of the self-clearance process. They have expressed enthusiasm for the system and its potential to reduce congestion and provide round-the-clock clearance options.

If implemented successfully, APICS would not only enhance the travel experience for motorists but also allow immigration officers to focus on more value-added tasks such as profiling and risk assessment. The ongoing trial and user feedback will contribute to further improvements and potential wider adoption of the contactless in-car clearance system.

> *"With the advancement of contactless biometric verification methods and key lessons from the COVID-19 pandemic, we have now developed the next generation APICS – a fully contactless system that offers a seamless immigration clearance process for car travellers – for the future."*
>
> - Cheng Wee Kiang, Director, Robotics, Automation & Unmanned Systems Centre of Expertise

Read more:
https://www.go.gov.sg/apics

Robotic Escort & Security System (RESS) trial at Tuas Checkpoint

A trial of the Robotic Escort & Security System (RESS) ran from 15 August to 11 November 2022 at the bus hall of Tuas Checkpoint in Singapore. Developed by engineers from HTX's Robotics, Automation and Unmanned Systems Centre of Expertise (RAUS CoE) in collaboration with the Immigration & Checkpoints Authority (ICA), RESS is an escort robot designed to guide travellers from the immigration counters to secondary office areas for further assistance.

The concept of using robots for escort duties was conceived during discussions between the Commander of Tuas Checkpoint and RAUS CoE team. They aimed to create a robot that would not appear intimidating to travellers while ensuring effective navigation and tracking. The robot incorporates navigation sensors and video analytics to manoeuvre autonomously and interact with travellers.

Lee Guoming, Deputy Director of RAUS CoE and project initiator, emphasised the importance of designing a robot with a suitable human-machine interface. They wanted to ensure that travellers could easily follow the robot and that the robot's behaviour would be appropriate when the traveller was too close or too far away.

The live trials of RESS aimed to provide valuable insights into how robots and automation can enhance the operations of the ICA. The ultimate goal is to create a safer and more seamless immigration clearance experience for travellers.

The trial at Tuas Checkpoint serves as a testing ground for the effectiveness and functionality of the RESS system. The insights gained from the trial will contribute to future developments in using robotics and automation within immigration and security operations in Singapore.

Read more:
https://go.gov.sg/resstrial

> *"We wanted to make sure that we have the correct human-machine interface in place so that the traveller can be guided to follow the robot, as well as for the robot to track the traveller. We wanted to ensure that the behaviours of the robot was acceptable when the traveller was too close or too far from it. These conditions shaped the design of the robot that you see here today."*
>
> - Lee Guoming, Deputy Director, Aerial Systems, Robotics, Automation & Unmanned Systems Centre of Expertise

securing borders

"At HTX, we are using technology to help the Home Team frontlines as well as enhance the immigration clearance process for travellers at the checkpoints, especially for those who need extra help. Whether you're a family with young children or a person using a wheelchair, the SAL is a convenient, easy-to-use, and seamless way for immigration self-clearance."

- Kamal Raja Mat, Deputy Director, Immigration and Checkpoints Programme Management Centre

Flying through automated immigration clearance

The Immigration & Checkpoints Authority (ICA) of Singapore has introduced the Special Assistance Lane (SAL) at selected passenger halls in Changi Airport, allowing family groups of up to four people and travellers using wheelchairs to enjoy automated immigration clearance. Singapore is the first country in the world to introduce an automated lane that enables multiple travellers to perform immigration self-clearance as a group, as part of ICA's New Clearance Concept (NCC) to make automated immigration clearance the norm.

The development of the SAL was a collaborative effort between ICA, HTX, and Changi Airport Group (CAG). Engineers from HTX's Immigration and Checkpoints Programme Management Centre (ICPMC) worked closely with ICA and CAG to design the SAL, ensuring it meets the needs of travellers using wheelchairs and family groups. Design thinking workshops, virtual reality simulations, and trials involving the public were conducted to determine the optimal design.

The ICPMC team, as the overall project manager, engaged various Centres of Expertise at HTX to enhance the functionalities and ergonomics of the SAL. This included considerations such as the width and depth of the lane, placement of passport and biometric scanners, and the height and angle of the display screen for standing and sitting travellers.

HTX's Biometrics & Profiling Centre of Expertise developed an in-house group traveller detection demo algorithm and test scenarios to evaluate the feasibility of automating group traveller detection.

The SAL is designed to provide a convenient, easy-to-use, and seamless way for immigration self-clearance, particularly for those who need extra assistance, such as families with young children and individuals using wheelchairs. HTX will continue to innovate and leverage technology to refine the SAL and enhance the user experience.

The introduction of the SAL demonstrates Singapore's commitment to leveraging technology and automation to improve the immigration clearance process and provide a more efficient and convenient experience for travellers at the checkpoints.

Read more:
https://go.gov.sg/htx-sal

"Experienced Home Team officers can sniff out suspicious behaviours, but it still depends on their personal experiences and judgements. At HTX, we want to detect deception scientifically and objectively, and use technology to scale up Home Team's operations."

- Kee Ein Cern, Deputy Director (Profiling), Biometrics & Profiling Centre of Expertise

Deciphering the science of deception detection

The Biometrics & Profiling (B&P) Centre of Expertise at HTX is working on scientific and objective methods to detect deception and suspicious behaviour. The B&P team designs experiments to identify Tell-Tale Indicators (TTIs) of deception, such as changes in pupil dilation and irregular heartbeat. By recording physiological responses during interviews, the team aims to identify indicators that can be used to detect deception scientifically.

Ongoing research includes exploring other potential indicators such as eye blink rate and breathing pattern. The B&P team aims to calibrate existing technology to scan for these behaviours, providing Home Team officers with more accurate and comprehensive analysis. Technology can detect subtle physiological reactions that are not visible to the naked eye, enabling a greater number of indicators to be analysed simultaneously.

The B&P team acknowledges the challenge of translating research from the laboratory to real-world environments. To overcome this, the team collaborates closely with end-users and actively seeks out new technology suitable for fieldwork. For instance, they are investigating methods like remote photoplethysmography and eye-tracking technology, which are contactless and non-invasive. These technologies can measure changes in heart rate, blood flow, and eye movements.

The team has found promising tools such as a visual stress analysis tool that uses a camera to detect facial colour changes related to heart rate and blood flow, as well as an eye behaviour analysis tool that tracks changes and movements in the eyes. These tools provide quicker assessments compared to traditional lie detector technology, taking only 10 to 15 minutes and achieving comparable results to physically-attached sensors.

The B&P team's ultimate goal is to implement these technologies in real-world scenarios to benefit users. The potential for detecting suspicious behaviour through cameras and intervening before any harm occurs is an exciting prospect. Profiling technologies are still in the early stages, but HTX is moving in the right direction to leverage these new capabilities effectively.

Read more:
https://go.gov.sg/deceptiondetection

Navigating waters with the 5th Generation PT Class Patrol Craft

Singapore faces the challenge of safeguarding its busy waters against intrusion and threats due to the high volume of shipping traffic and the porous nature of its maritime environment. The country is vulnerable to terrorist attacks, smuggling of goods and illegal immigrants. To address these concerns, the Police Coast Guard (PCG) has commissioned the 5th Generation PT Class Patrol Craft, which enhances their operational capabilities.

Engineers from HTX's Platform Systems Sustainment Centre customised these patrol craft to meet PCG's specific requirements. The vessels have improved features such as an upgraded onboard surveillance system with a greater detection range and a stabilised naval gun system, enabling accurate interdiction of hostile targets during pursuits. Compared to the 1st generation boats, the 23m-long 5th Generation PT Class Patrol Craft can travel at speeds exceeding 55 knots, more than double the previous generation's speed.

The vessels also boast unique features like foam fenders to prevent deck damage and an anti-slip paint-coated deck similar to helicopter landing pads. The design team prioritised safety, ensuring officers can patrol with confidence.

The team, which includes Steven Nathan, Head of Planning & Operations, Marine Systems and Ang Sin Ghee, Senior Principal Engineer, Marine Systems, was involved in the project from its initiation, overseeing the technical specifications, design, construction, testing, and delivery.

"We travelled at the fastest speed that I have ever travelled on a boat of this size, but it felt so safe and comfortable. It was exhilarating, impressive, and I felt that all my hard work paid off."

- Steven Nathan, Head of Planning & Operations, Marine Systems, Platform Systems Sustainment Centre

Moving forward, the Platform Systems Sustainment Centre team will work closely with Home Team Departments to ensure the boats remain technically relevant and address operational requirements. Their presence will facilitate ongoing collaboration and the ability to adapt to any changes in operations.

By enhancing PCG's maritime capabilities with the 5th Generation PT Class Patrol Craft, Singapore aims to strengthen its ability to protect its waters and maintain a safe and secure environment.

Read more:
https://go.gov.sg/5gptclass

BioXcap – Stopping biological terror from the air

The HTX's Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise (CBRNE CoE) has been developing innovative technologies to enhance the Home Team's capabilities in detecting and responding to biological threats. Two of these technologies are the Bioaerosol Threats Detector (BioXcap) and the 3rd Generation DNA Sequencer.

The BioXcap is a unique detector designed for 24/7 environmental surveillance. It combines air collection, sensor, Raman Spectroscopy, and sample archival technologies to perform on-site sampling, analysis, and real-time detection of biological threats in the air. Unlike current lab-based detection methods, the BioXcap provides near real-time results within 30 minutes, eliminating the need for samples to be transported back to the laboratory for analysis. This allows for more efficient and timely detection of biological threats such as anthrax and plague. The BioXcap is currently undergoing trials at a land checkpoint to assess its reliability and accuracy.

The 3rd Generation DNA Sequencer can analyse the DNA or RNA of a biological agent in real-time and compare its genetic sequence to known organisms. Conventional DNA sequencing takes at least two days, but the 3rd Generation DNA Sequencer can perform full sequencing and genetic database matching in a matter of hours. This allows enables new and emerging biological threats to be detected, even when targeted PCR kits are not yet available.

These technologies, the BioXcap and 3rd Generation DNA Sequencer, aim to improve the Home Team's readiness and ability to safeguard Singapore against bioterrorism and biological threats. By enabling faster and more accurate detection, these innovations contribute to enhancing Singapore's overall security and preparedness.

"We are able to strengthen our current detection methods with autonomous sample collection and onsite analysis, reducing man-in-the-loop and eliminating the frequent need to retrieve samples for laboratory-based analysis. Timely detection will enable a more effective operational response from the Home Team Departments, such as containment and mitigation."

- Kenneth Chung, Senior CBRNE Scientist, Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise

Read more:
https://go.gov.sg/bioxcap

SAFEGUARDING DATA AND SYSTEMS

Safeguarding data and systems

Watch the video

Q Team: Fighting phishing and other scams

With the increasing number of scams and cybercrime cases in Singapore, protecting the public from phishing scams has become a priority for the Home Team. HTX's Q Team has developed the Online Cybersquat Hunter (OCH), a powerful tool that uses AI and image/text analytics to identify scam websites. OCH scans millions of websites daily and flags the most suspicious ones for further review.

In collaboration with GovTech, HTX has also implemented OCH in PhishMonSG, a phishing detection tool that proactively hunts for malicious sites posing as government agency websites. To assist with the review of flagged websites, the Q Team has created the Scam-Site Indicator Digital Assessment (SIDA), which automatically checks if a suspicious website contains malicious content using machine learning algorithms.

However, the takedown of scam websites is not the end of the battle, as criminal syndicates can easily resurrect these sites under different web addresses. To address this challenge, HTX developed SYNWEB, a tool that allows officers to check if a new website is similar to previously known scam websites, making the process more efficient.

The Q Team is also working on combating other types of scams, such as the Credit-for-Sex scam. They are developing the Sex Scam Hunter, an automated machine learning tool that helps SPF officers search classified advertisements offering sexual services and identify potential scam listings.

The team recognises that the fight against scams is ongoing, and they are continuously improving their technology to stay ahead of scammers. Their dedication to developing innovative tools demonstrates their commitment to protecting the public and combating cybercrime in Singapore.

"I am glad to be able to play a part in Singapore's anti-scam efforts. As victims still fall prey to scams, helping agencies find fake websites becomes meaningful work."

- Tan Wei Lin, Lead Engineer, Q Team

Read more:
https://go.gov.sg/scamhunting

HTX ANNUAL REPORT 2022

YEAR IN REVIEW

OUR JOURNEY IN FY22

APRIL 2022

Inaugural HTX TechX Summit
Themed "Transforming Tomorrow, A Safer World for Everyone", the event brought together global leaders from governments, industry, and research institutions to share insights on leading science and technology (S&T) trends that are transforming public safety and security.

MAY 2022

HTX Promotion and Awards Ceremony 2022
The inaugural promotion ceremony recognised the outstanding work and dedication of 237 promoted officers and the recipients of 50 HTX Awards.

HTX receives OpenGov Asia Award
HTX received the OpenGov Asia Recognition of Excellence Award for the launch of Singapore's first Digital Driving Licence.

HTX at 5th International Conference on CBRNE Research and Innovation
Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise participated in the 5th International Conference on CBRNE Research and Innovation held in Lille, France.

JUNE 2022

Launch of EXCEL
EXCEL is the first of its kind in the firefighting and rescue fraternity, jointly developed by HTX and SCDF.

Mr Leo Yip, Head of Civil Service, visits HTX

HTX Scientists win Best Poster Presentation at the NBC 2022 Symposium on CBRNE threats
Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise scientists won the best poster presentation award at the NBC 2022 Symposium on CBRNE Threats, which took place in Lahti, Finland.

HTX Forensics Centre of Expertise speaks at Nanyang Technological University (NTU)
Dr Michael Tay, Chief Forensic Scientist of HTX, shared his insights on forensic science and technology at a campus dialogue organised by NTU.

JULY 2022

HTX receives the Public Sector Transformation (PST) Dare to Do Award for COVID-19 Human Swab PCR Analysis

Riding for good
Minister K Shanmugam and nine MPs joined HTX for the HTX Annual Cycle 2022. The event not only promoted healthy lifestyle among Xponents but also raised funds for Engineering Good.

HTX presents at Technology & Courts of the Future (COTF) 2022
HTX Human Factors & Simulation Centre of Expertise presented its Mixed Reality training system for bloodstain pattern analysis at the event.

AUGUST 2022

National Day Awards 2022
Sixteen HTX officers received the National Day Awards 2022 for their contributions and service to Singapore.

Minister for Home Affairs National Day Awards 2022
Four HTX officers received the Minister for Home Affairs National Day Awards 2022 for outstanding efficiency and competency in their work.

HTX makes official visit to Australia
HTX Chief Executive Chan Tsan led a HTX delegation to meet with government agencies and industry partners to discuss and collaborate on science and technology for public safety and security.

Robotic Escort & Security System (RESS) trial at Tuas Checkpoint
A trial of the Robotic Escort & Security System (RESS) ran from 15 August to 11 November 2022 at the bus hall of Tuas Checkpoint.

SEPTEMBER 2022

HTX receives Home Team Research Excellence Award
HTX's Platform Systems Sustainment Centre and SCDF's Operations Department received the Home Team Research Excellence Award for their project on the 6th Generation Light Fire Attack Vehicle (LF6G).

HTX signs MOU with Rohde & Schwarz
HTX Chairman Chew Hock Yong led a HTX delegation to Germany to deepen engagement and partnerships with German industry and academia. One of the highlights was the signing of an MOU with Rohde & Schwarz to cooperate on science and technology innovations.

HTX DeepRacer Challenge 2022
More than 300 HTX officers participated in the first HTX DeepRacer Challenge 2022, organised by the HTX House Challenge Organising Committee and Amazon Web Services (AWS).

OCTOBER 2022

HTX's inaugural Capability Sustainment Innovation Day
More than 400 Xponents from across six domains came together to discuss and share innovative ideas and initiatives.

NOVEMBER 2022

HTX signs LOI with US Department of Homeland Security (DHS)
HTX and DHS signed a Letter of Intent to deepen their partnership in science and technology

HTX turns 3
HTX celebrated its third anniversary, with more than 1,300 Xponents coming together for the first time since its launch in December 2019.

Farewell to former Chairman Chew Hock Yong and welcome Aubeck Kam as HTX's new Chairman

HTX TechXplore
The fourth edition of TechXplore drew over 600 people from the Home Team, government and industry.

DECEMBER 2022

HTX signs MOU with Civipol (France)
HTX and Civipol signed a Memorandum of Understanding to jointly organise the Milipol Asia-Pacific and TechX Summit in 2024.

Launch of the Special Assistance Lane (SAL) at Changi Airport
The SAL was launched at selected passenger halls in Changi Airport, allowing family groups of up to four people and travellers using wheelchairs to enjoy automated immigration clearance. Singapore is the first country in the world to introduce an automated lane that enables multiple travellers to perform immigration self-clearance as a group.

The HTX Annual Walk & Run
700 Xponents gathered in teams at various locations and walked to the finishing point at HTX's headquarters.

JANUARY 2023

HTX's inaugural GoCloud roadshow
The two-day event, jointly organised by xCloud and Microsoft, was held at HTX's headquarters for Xponents to learn, experiment and engage with cloud technologies.

HTX receives 27 Minister's Awards
The awards recognise outstanding Home Team officers who have demonstrated efficiency and competency in major operations, or displayed high standards of innovation and service excellence in their work.

FEBRUARY 2023

Mission to Türkiye
Two HTX officers from Platform Systems joined SCDF's Operation Lionheart in the search and rescue efforts in Türkiye following the earthquake.

MARCH 2023

Launch of Emergency Video System
The System is a new joint-capability by HTX, SPF and SCDF that enables live video streaming and location sharing from callers' mobile phones to the Operations Centres during emergency calls.

HTX and Singapore Polytechnic (SP) sign MOU
HTX and SP signed an MOU to jointly develop a customised course to help HTX's facilities management (FM) team to develop competencies in outcome-based FM.

Come together – Homecoming at the inaugural HTX Convention
The convention brought together Xponents from different offices and labs across the island to catch up with each other, celebrate the HTX values, and learn about innovation.

TRANSFORMING TOMORROW: A SAFER WORLD FOR EVERYONE

5 - 8 April 2022

HTX launches the inaugural TechX Summit on "Transforming Tomorrow, A Safer World for Everyone"

HTX's inaugural TechX Summit (TXS) on "Transforming Tomorrow, A Safer World for Everyone" took place from 5 - 8 April 2022. The summit brought together global leaders across governments, industry, and research institutions, to share knowledge and insights on leading science and technology (S&T) trends that can transform public safety and security. The summit featured a fireside chat with Satya Nadella, CEO of Microsoft, and a closed-door S&T round table with leaders from international public safety and security agencies on the theme of TXS 2022. The summit also included closed-door virtual panel discussions by S&T thought leaders on topics such as cloud, crisis and citizens in need; the evolving cyber landscape; countering new and emerging CBRNE threats; and drone strategy for the safety and security of Singapore. The summit showcased a selection of HTX's innovations in the "Man, Machine, and Mission" domains that aim to force multiply the Home Team in solving crimes, saving lives, enhancing public safety and security, securing borders, and safeguarding data and systems.

"We live in complex and volatile times where there is unprecedented disruption and relentless technological advancement. HTX and the Home Team must continually push boundaries, innovate, and leverage technology to ensure we are future-ready against new threats and challenges to Singapore's safety and security."

- Mr Chan Tsan, CE, HTX, and Deputy Secretary (Development), Ministry of Home Affairs

"Advances in science and technology have brought about a hyper-connected world and new security threats. Homeland security agencies all around the world need new approaches, capabilities and greater cooperation in order to better leverage technology, not just to tackle the threats of today, but also to be ready to anticipate and deal with the challenges of tomorrow."

- Senior Minister Teo Chee Hean

Read more:
https://go.gov.sg/techxsummit2022

MAN: Human Factors Evaluation in a Virtual Crime Scene Environment exhibit

MACHINE: SCDF Motorised Stretcher exhibit

Guest of Honour Senior Minister Teo Chee Hean, Minister for Home Affairs K Shanmugam, Second Minister for Home Affairs, Josephine Teo and Minister of State for Home Affairs, Dr Muhammad Faisal Ibrahim, attending TechX Summit Opening Conference

Fireside chat with Satya Nadella, Chairman and CEO, Microsoft

HTX Board of Directors Richard Koh (CTO, Microsoft) and Carmen Wee (C Suite Advisor) having a go at the Small Arms Target Acquisition System (SATAS) exhibit

S&T International Leaders round table with panellists from Australia, France, and the United States of America

MISSION: Home Team Sustainment Centre exhibit

Senior Minister Teo Chee Hean giving his keynote speech

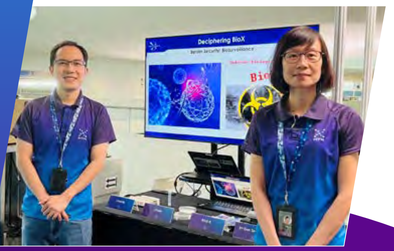
Senior Minister Teo Chee Hean touring the TXS 2022 exhibition

The TXS 2022 opening conference was viewed in-person and livestreamed to a global audience

OTHER TECHX HIGHLIGHTS

Exploring exciting innovations at TechXplore 4

TechXplore 4 was held at HTX's HQ from 28 - 29 November 2022 and coincided with HTX's third anniversary celebrations. The innovative science and technology solutions showcased included the Firefighting Unmanned Surface Vessel (FiFi USV), which can autonomously detect hotspots and perform unmanned firefighting from a remote ground control station; a palm-sized indoor drone that can operate beyond visual line of sight no matter how far or deep the UAV traverses into the building; the bioaerosol threats detector (BioXcap), which can identify biological threats 24/7 and provide early warning of the presence of potential bioaerosol threats in the environment; and eXaminer, a tool which uses artificial intelligence (AI) to automate the detection of anomalies in baggage and parcels on X-ray images.



"We add value to the Home Team by identifying the best technologies for operational deployment and work closely with industrial partners to sharpen the Home Team's capabilities."

- Anna Lim, Deputy Director (CBRNE Research), Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise

"TechXplore has come a long way. You can really see that HTX, [with] the projects it is doing, is embedded with the Home Team Departments' core operations and supporting us in pushing the innovation frontier."

- MAJ Fung Ka Kin, Commander of the Paya Lebar Fire Station, Singapore Civil Defence Force

Read more:
https://go.gov.sg/techxplore4

TECH change

TechXchange with renowned explosives expert Michael Cardash

At a TechXchange talk organised by HTX's CBRNE Centre of Expertise, Michael Cardash, a renowned explosives and bomb disposal expert, shared his insights on emerging global Improvised Explosive Device (IED) trends to 200 Home Team officers on 6 September 2022 at the Home Team Academy. He also shared the challenges and solutions for dealing with complicated IEDs that have anti-tampering features and weaponised drones.

"This TechXchange talk organised by HTX is part of our efforts to learn from leading experts and raise the awareness of global CBRNE threats and trends as we work together to advance science and technology to keep Singapore safe and secure."

- May Ong, Director, Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise

Read more:
https://go.gov.sg/techxchange-michaelcardash

HTX ANNUAL REPORT 2022

COLLABORATING WITH PARTNERS

"Partnerships and innovation are a vital part of our work in developing and delivering transformative solutions to force multiply the Home Team, and keep Singapore safe and secure."

- Chan Tsan, Chief Executive, HTX

Research Institutes & Universities

NUS National University of Singapore
Nanyang Technological University Singapore
SUTD Singapore University of Technology and Design
A*STAR Agency for Science, Technology and Research Singapore
Fraunhofer Singapore
SIT Singapore Institute of Technology
SP Singapore Polytechnic

Local Government Agencies

CSA Singapore
DSO National Laboratories
DSTA Defence Science & Technology Agency
GovTech Singapore
HSA Health Sciences Authority
Land Transport Authority
Ministry of Manpower
MSF Ministry of Social and Family Development
National Environment Agency
National Parks
ONEService
Smart Nation & Digital Government Office
S&TPPO Public Sector Science & Technology Policy & Plans Office

Strategic Partners

Accenture
Cellebrite
Safety Make Safety a Reality
Hoe technik
Klass
NCS
NEC
PCS Security
Singtel
ST Engineering
Thales
Sekisui veredus

Foreign Government Agencies

AFP Australian Federal Police
Australian Border Force
Ministry of National Security
Ministère de l'Intérieur et des Outre-Mer
CIVIPOL
Ministerie van Justitie en Veiligheid
Politie
U.S. Customs and Border Protection
U.S. Department of Homeland Security

Other Key Industry Partners

EXCHANGING IDEAS AND KNOWLEDGE IN LOCAL AND INTERNATIONAL FORUMS

HTX partners Australia on science & tech for public safety & security

HTX Chief Executive Chan Tsan led an official visit to Australia in August 2022. He met with government agencies and industry partners to discuss and collaborate on science and technology for public safety and security. He re-affirmed the commitment to work with the Australian Federal Police on various projects, such as forensics and technology detection dogs. Their meeting followed the signing of a Memorandum of Understanding (MOU) between AFP and HTX in August 2021 – HTX's very first MOU (and inked during the COVID-19 pandemic) – to cooperate on science and technology. He also explored future collaboration opportunities with the Australian Border Force and Department of Home Affairs on areas such as screening and detection, biometrics, and robotics.

Read more:
https://go.gov.sg/htxpartnersaustralia

Singapore and the US deepen partnership in science and technology for homeland security

HTX and the US Department of Homeland Security (DHS) signed a Letter of Intent (LOI) to deepen their partnership in science and technology, and explore opportunities for innovation. The LOI was signed by HTX Chief Executive Chan Tsan and DHS Under Secretary for Science and Technology Dr Dimitri Kusnezov during a recent official trip to the US by the HTX delegation. The LOI signifies the strong intent of both organisations to take the relationship further and strengthen their science and technology collaborations to solve homeland security challenges together. The HTX delegation also met with representatives from various US agencies and departments, such as the DHS Homeland Security Investigations Cyber Crimes Center, US Customs and Border Protection, New York Police Department, and Fire Department of the City of New York.

Read more:
https://go.gov.sg/htx-dhs-loi

HTX deepens partnerships with German industry and academia

HTX Chairman Chew Hock Yong led an official trip to Germany in September to deepen engagement and partnerships with German industry and academia partners. HTX Chief Executive Chan Tsan and the Rohde & Schwarz President & COO Peter Riedel signed a Memorandum of Understanding to cooperate on science and technology innovations. The HTX delegation also visited the Technical University of Munich, BMW HQ and R&D Centre, and Hensoldt where they were briefed on new projects and technologies.

Read more:
https://go.gov.sg/htx-rohdeschwarz

HTX and Accenture partner on AI and sensemaking

HTX and Accenture have signed a master agreement under a Strategic Partnership for Innovation (SPI) framework to collaborate on research and experimentation in artificial intelligence (AI) and sensemaking. The agreement was signed by HTX Chief Executive Chan Tsan and Accenture Singapore Country Managing Director Ng Wee Wei on 17 November 2022. The agreement signifies the intention of both organisations to co-create new capabilities in data, AI and sensemaking, which are essential for enhancing the Home Team's operations, and public safety and security.

Read more:
https://go.gov.sg/htx-accenture

HTX and Civipol join forces to showcase homeland security innovations

HTX and Civipol, the technical cooperation partner of the French Ministry of Interior, signed a Memorandum of Understanding to jointly organise the Milipol Asia-Pacific and TechX Summit, a premier exhibition cum conference on homeland security science and technology. The partnership marks the beginning of a new chapter to further strengthen the bilateral cooperation between Singapore and France in homeland security. HTX and Civipol will also co-organise the next edition of the Milipol Asia-Pacific exhibition and TechX Summit in Singapore in 2024.

Read more:
https://go.gov.sg/htx-civipol

New MOU by HTX and Singapore Polytechnic to deepen facilities management competencies

HTX and Singapore Polytechnic (SP) signed a Memorandum of Understanding to develop a customised course that will enable HTX's facilities management (FM) team to develop competencies in outcome-based FM, which offers more opportunities for innovation and efficiency over prescriptive approaches to FM. The new course will benefit HTX's FM team, which oversees over 200 MHA buildings and properties, and aims to train 500 staff over five years.

Read more:
https://go.gov.sg/htx-sp

CONNECTING MINDS

Stepping into the cloud universe

HTX's inaugural GoCloud roadshow was a two-day event that was held on 12 and 13 January 2023 at HTX's headquarters to bring the transformative power and potential of cloud technology to force multiply the Home Team. The event, part of HTX's digitalisation and cloud movement, was the first in a series of upcoming initiatives to build awareness, enablement, and implementation of applications leveraging cloud technologies. The event featured an exhibition and spotlight talks on topics including HTX's cloud strategy, navigating a typical cloud journey, and the sovereign cloud. HTX Chief Executive Chan Tsan and Group Director (Enterprise) Colin Tan shared their vision and experiences of using cloud technologies to deliver digital transformation for the Home Team.

"Digitalisation skills are here to stay and are fundamental for the future. The cloud gives us access to a wide spectrum of technologies to innovate and enhance the Home Team's capabilities and operations."

- Colin Tan, Group Director (Enterprise)

Read more:
https://go.gov.sg/clouduniverse

Revving up with the HTX DeepRacer Challenge 2022

More than 300 HTX officers participated in the HTX DeepRacer Challenge 2022, organised by the HTX House Challenge Organising Committee and Amazon Web Services (AWS). The challenge involved learning and experimenting with Reinforcement Learning, an advanced machine learning technique, by racing autonomous miniature cars on a physical track. The finale race was held on 23 September 2022 at HTX's headquarters. The challenge aimed to expose HTX officers to cloud technology, AI, and machine learning in a fun and interactive way.

"The DeepRacer Challenge helped me learn the basics of machine learning, and getting to tweak and improve my own car is very fun and enjoyable."

- Jonathan Goh, Senior Manager, Cybersecurity Audit

Read more:
https://go.gov.sg/deepracer

HTX at the 5th International Conference on CBRNE Research and Innovation

The Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Centre of Expertise (CoE) participated in the 5th International Conference on CBRNE Research and Innovation (R&I) held in Lille, France, from 3-6 May 2022. The conference brought together 500 scientists, responders, and industry leaders from around the world to share knowledge and insights about the current and emerging research and innovation technologies in the CBRNE domain. CBRNE CoE's Dr Kenneth Chung presented a study on bio-aerosol surveillance involving biological air samplers; and Dr Sheldon Ho spoke about optimising the placement of CBRNE sensors using machine learning methods.

"We have gained a lot of knowledge and insights from the meeting and are happy to refresh our network with gurus in the CBRNE field, as well as companies working on new and transformative technologies."

- May Ong, Director of Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise

Read more:
https://go.gov.sg/cbrneconference

EXCEL – Redefining responders' performance with science & tech

More than 60 international and local participants of a regional workshop visited the Emergency Responders' Fitness Conditioning & Enhancement Lab (EXCEL) at the Civil Defence Academy on 5 October 2022. EXCEL is the first of its kind in the firefighting and rescue community, and was officially launched in June 2022. EXCEL is a purpose-built research and development (R&D) and training facility that was jointly developed by HTX Human Factors & Simulation Centre of Expertise and the Singapore Civil Defence Force (SCDF) to enhance and redefine the capabilities of emergency responders across the Home Team. It comprises five labs that can measure and improve various aspects of human performance, such as strength, conditioning, rehabilitation, heat acclimatisation, thermoregulation, fitness evaluation, cognition, and digital learning. The participants had a chance to interact with some of the equipment and technology used at EXCEL.

"EXCEL would definitely pave the path to raise the future life-saving/incident management standards in Singapore as well as in Asian region."

- Capt. Lakshi W Siwrathne, Senior Deputy Harbour Master at the Sri Lanka Ports Authority

Read more:
https://go.gov.sg/visittoexcel

NURTURING YOUNG TALENT

Congratulations to our HTX Scholars

HTX awarded scholarships to 13 civilian scholars, a reflection of the importance of science and technology to the Home Team's work. The students received the scholarships at a virtual ceremony on 18 August 2022.

"Being part of HTX will allow me the opportunity to pursue my interest in technology and to apply my technical knowledge in meaningful work that will give back to the community. I look forward to being at the forefront of emerging technologies and innovating new solutions to enhance the Home Team's capabilities and safeguard the public."

- Cheryl Kwek Tze Theng, Singapore Government Scholarship Recipient, Science & Technology Track

Read more:
https://go.gov.sg/mhahtxscholars2022

Nurturing the next generation of robotics talents

HTX engineers mentored Singapore University of Technology and Design (SUTD) students on their capstone projects involving robotics. The students showcased their prototypes at the SUTD Capstone Design Showcase 2022 on 5 August 2022. The prototypes were A.L.A.N., a parachute system that deploys automatically when a drone malfunctions mid-flight and free falls from the sky, and SLEEK, a ruggedised life-detecting soft robot that can crawl through tight spaces between rubble and rough terrain after a building collapses.

"SUTD's capstone programme provides a platform for young engineers to have a glimpse of the work HTX does to enhance the Home Team operations and apply their engineering knowledge through hands-on development of functional prototypes."

- Lee Guoming, Deputy Director, Aerial Systems, Robotics, Automation & Unmanned Systems Centre of Expertise

Read more:
https://go.gov.sg/raussutd

RAUS Director Cheng Wee Kiang at the RoboCup Singapore Open 2022

Cheng Wee Kiang, Director of Robotics, Automation & Unmanned Systems (RAUS) Centre of Expertise, presented awards at the RoboCup Singapore Open 2022, which promoted robotics and AI research to school children. The competition, co-organised by the Singapore Polytechnic and Science Centre Singapore, drew more than 300 participants from 40 schools.

"These young talents will join the workforce in 10 to 15 years and hopefully, will join HTX as engineers to develop RAUS capabilities for the Home Team."

- Cheng Wee Kiang, Director, Robotics, Automation & Unmanned Systems (RAUS) Centre of Expertise

Read more:
https://go.gov.sg/weekiang

HTX's Chief Forensic Scientist at NTU Campus Dialogue Live!

Dr Michael Tay, Chief Forensic Scientist at HTX, shared his insights on forensic science and technology at a campus dialogue organised by the Nanyang Technological University (NTU) on 24 September 2022. He was joined by two other speakers: Dr Tan Ern Ser, Associate Professor of Sociology at the National University of Singapore (NUS), and Lim Chin Siong, Director of the Criminal Investigation Department (CID). The dialogue, moderated by Janice Lim, a final-year NTU student, covered topics such as the role and challenges of forensic science in criminal investigations, the ethical and social implications of forensic technology, and the career prospects and opportunities for forensic scientists in Singapore. Dr Tay highlighted how HTX leverages science and technology to enhance the capabilities and effectiveness of the Home Team in solving crimes and ensuring public safety. He also shared some of the innovative projects that HTX is working on, such as developing new methods for DNA analysis, fingerprint identification, and digital forensics. Dr Tay also addressed some of the common misconceptions and myths about forensic science, such as the CSI effect, which refers to the unrealistic expectations and demands that some people may have about forensic evidence and procedures due to the influence of popular media. The dialogue was attended by about 200 students and staff from NTU, as well as members of the public who tuned in via live stream.

Read more:
https://go.gov.sg/drmichaeltay

Mentoring young innovators to create Assistive Technology solutions

Dr Jonathan Pan, Chief of Disruptive Technologies Office at HTX, was a mentor and judge at the Tech For Good 2022 innovation festival, where he helped to empower young innovators developing tech solutions for persons with disabilities. The festival, organised by non-profit organisation Engineering Good, showcased 30 youth teams working on solutions to problems faced by six disability groups, such as intellectual disabilities, hearing impairments, and visual impairments. The teams had to design and prototype their solutions using low-cost materials and open-source software. Dr Pan presented the "Most Resilient" Award to Team Sapphire, a group of five Secondary Three students from Bowen Secondary School, who developed a social communication bot for the Movement for the Intellectually Disabled of Singapore (MINDS).

"It was great seeing and feeling the passion of the youths with their impactful and innovative ideas to help people with disabilities, and how they are driven to create solutions to benefit the community."

- Dr Jonathan Pan, Chief, Disruptive Technologies Office

Read more:
https://go.gov.sg/drjonathanpan

CARING FOR OUR COMMUNITY

HTX Annual Cycle 2022: eXceeding eXpectations together

HTX organised its Annual Cycle 2022 to raise funds in support of social enterprise, Engineering Good. HTX teams pledged to ride 2,022km collectively over a 10-day period. They exceeded the target distance, raising $51,555 in total. Minister K Shanmugam even joined the Annual cycle on 14 July 2022, with nine other parliamentary collegues in support.

"Having the CSR element integrated in this year's Annual Cycle also makes the event more rewarding, and I hope that the donations will be a great source of support to the beneficiaries of Engineering Good."

- Bernard Phang, Director, Policing Programme Management Centre and head of the HTX Annual Cycle 2022 organising committee

Read more:
https://go.gov.sg/htxannualcycle2022-2

"Just imagine this – we had been running away from the Home Team for our entire life of abuse and crime. Now, to be in HTX and recognised by them on our effort to restart our lives is an encouragement that needs no elaboration among our peers. We sincerely appreciate this trust in us."

- Matthew Poh, Co-founder, The Caffeine Experience

"Engineering Good is very grateful for the collaboration with HTX. Since the partnership started, HTX staff have cycled enough distance to go 1.5 times around the earth's circumference as part of their fundraiser and raised over S$50,000 to our shared cause of using technology for good, for the societal good."

- Patrick Hee, Executive Director, Engineering Good

Milky Way stays the course

Milky Way, started in 2021, is a collaboration between HTX and The Caffeine Experience (TCE) to provide employment and training to ex-offenders. A year on, not only has Milky Way grown into a natural gathering spot for Xponents, it has also supported HTX in key events such as our inaugural TechX Summit, our eXpresso! townhalls and various business meetings.









WHO WE ARE



OUR VALUES

1 thing that drives us

Mission

We are the Home Team's Force Multiplier

2 things that bind us

Teamwork

We work together to make the extraordinary happen

Empathy

We appreciate and care for one another, and celebrate our achievements together

3 things that set us apart

Exuberance

We exude energy, optimism and a can-do attitude in pursuit of excellence

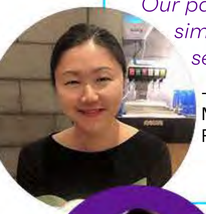
Foresight

We apply exceptional thinking to anticipate future threats and opportunities

Innovation

We constantly experiment, undaunted by failure, to create solutions for tomorrow's challenges

WE ARE THE XPONENTS...



"At IC PMC, every decision involves the collective effort of a team of Xponents as each step we make impacts the millions of residents and travellers. Our passion is real and the reward we seek is simple – to ensure our borders are safe and secure through science and technology."

- Hazel Chua, Deputy Director (Identity Management), Immigration & Checkpoints Programme Management Centre

"At HTX, you get the chance to work on pressing forensic problems, create something new, and take things to the next level."

- Crystal Tan, Senior Forensic Scientist, Forensics Centre of Expertise

"Innovation requires leaps of imagination. Our work is grounded in facts and figures, but anyone working to break our systems are not bound by such rules. And so, to create solutions many steps ahead, for the Home Team, we need to not only out-think, but also out-imagine."

- Wong Wei Yang, Head, Consultations & Solutioning, Biometrics, Biometrics & Profiling Centre of Expertise

"Our work in HTX is never dull. We support the frontline operations of our HTDs, and every effort, regardless big or small, contributes to the overall MHA mission."

- Michael Tay, Senior Deputy Director (Cybersecurity Resilience), Ops Systems Sustainment Centre and concurrently Deputy Director (Exercise & Evaluation), Cybersecurity Centre of Expertise

"The mission of HTX inspires me every day. "Stay curious and keep learning, even in the face of failure. Innovation comes from a deep understanding of the problem you are trying to solve."

- Chin Zhihao, Head (Ground Systems), Robotics, Automation & Unmanned Systems Centre of Expertise

"The goal is to understand other people's concerns, motivations, as well as strengths and limitations, so that I can help them."

- Constance Ngiam, Senior Manager, Policies, Corporate, Corporate & Finance

"The only way to do great work is to love what you do."

- Pauline Ng, Deputy Director (Investigation), Policing Programme Management Centre

"The culture here creates a safe and open space to foster innovations. I feel assured that I can experiment with new ideas and concepts without fear of failure, before generating successful outcomes. This gives me the leeway to learn new things and explore new possibilities. That's something I treasure very much!"

- Wong Swee Liang, Senior Scientist, Disruptive Technologies Office

"Instead of just focusing on their individual KPIs and working in silos, team members need to see themselves as contributing to the larger goals of the organisation."

- Elfeiz Fadhil, Head of Governance & Audit, Platform Systems

"The injections of new science and technology solutions will create a force multiplying effect that enables the Home Team to operate more efficiently."

- Cheng Wee Kiang, Director, Robotics, Automation & Unmanned Systems Centre of Expertise

"A successful production requires the support of many backstage heroes and I'm grateful to be working alongside the Sense-making & Surveillance team to make Singapore a Safe and Secure Home for everyone, including myself!"

- Felix Foo, Head, Tech Masterplanning & Reporting, Sense-making & Surveillance Centre of Expertise

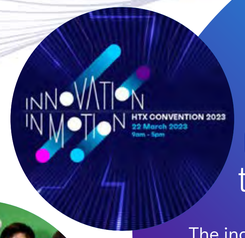
"Innovation is taking a step back and asking if we can do things differently. It does not need to be the blue-sky stuff or tech-focused, but it does require pushing the boundaries and changing status quos."

- Ng Pan Yong, Chief Innovation Officer, HTX

"At HTX, we thrive on harnessing innovations to safeguard Singapore, and fostering a vibrant blend of teamwork, professionalism and flexible work schedules that allows us to strike a good balance between work and family."

- Charmaine Ang, Principal Engineer, Data Engineering, xData, Enterprise Group

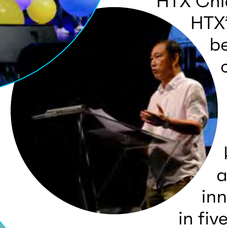
HOW WE FOSTER CAMARADERIE



Come together – Homecoming at the inaugural HTX Convention

The inaugural HTX Convention took place on 22 March 2023. The event brought together Xponents from different offices and labs across the island, and was a chance for Xponents to catch up with each other, celebrate the HTX values, and learn about innovation.

Read more:
https://go.gov.sg/htx-convention



Going the extra mile together

The HTX Annual Walk & Run was held on 1 December 2022 to coincide with HTX's third anniversary. It was part of a series of celebratory activities that included the HTX Open House as part of TechXplore 4 on 30 November 2022. The event involved 700 Xponents who gathered in teams at various locations and walked to the finishing point at HTX's headquarters.

"It was a great way for us to explore and learn more about Singapore as we walked through areas that I had not been to before. It was especially meaningful that Xponents started at various locations and made our way to HTX's headquarters, just like how we work together to solve challenges."

- Yang Chiew Yung, Senior Principal Forensic Scientist, Forensics Centre of Expertise

Read more:
https://go.gov.sg/annualwalk

Innovation is for all, collaboration is key

HTX's inaugural Capability Sustainment Innovation Day was held on 18 October 2022, bringing together more than 400 Xponents from across six domains to discuss and share innovative ideas and initiatives. The event was part of the Ministry of Home Affairs (MHA) Innovation Month, which aims to build a stronger innovation culture and community in MHA, highlight the importance of innovation for Home Team transformation, and provide opportunities for Home Team officers to come together, develop new ideas, and build skills.

HTX Chief Executive Chan Tsan said that innovation is one of HTX's core values and a strategic priority, as HTX must look beyond current operations and foresee future threats and challenges. He also emphasised the need for an open mindset and collaboration to spark new ideas. HTX Deputy Chief Executive (Operations) Chen Yeang Tat said that Capability Sustainment work is crucial to keeping Home Team operations "business as usual", and every process norm provides an opportunity for innovation. He also shared his concept of innovation in five points: "Innovators will thrive | Collaboration is key | Anticipation buys time | Norms can be challenged | Deliver Outcomes in Transformation – I can do it!" The event also featured round table discussions on innovation and the sharing of transformative initiatives by various teams from HTX's domains.

"It is very important to see committed colleagues improving their work through various innovations. It is not the size of the innovations, but the spirit of working towards a better tomorrow that counts!"

- Lim Beng Hock, Senior Deputy Director (Immigration & Checkpoints Capability Sustainment), Ops Systems Sustainment Centre

Read more:
https://go.gov.sg/cap-sus-innovation-day-2022

"Hopefully, HTX will remake the idea of how the Home Team operates."

- Minister for Home Affairs K Shanmugam

Xponents get up close and personal with Minister K Shanmugam

Over 1,000 Xponents attended a special dialogue with Minister for Home Affairs K Shanmugam on 1 July 2022. The dialogue was part of the eXpresso! or HTX townhall that was held in-person and virtually. Minister Shanmugam said that HTX is an important partner of the Home Team Departments and plays a critical role in their operations. He also answered questions on various topics such as his interview on BBC's HARDtalk, Singapore's exceptionalism and challenges, and which football club HTX most resembled. He compared HTX to the Dutch national team in the 1970s that played "total football" and broke the mould. He hoped that HTX will remake the idea of how the Home Team operates.

Read more:
https://go.gov.sg/minexpresso

The day when Mr Leo Yip, Head of Civil Service, drops by for a visit

Mr Leo Yip, the Head of Civil Service and Permanent Secretary (Prime Minister's Office) (Strategy), visited the HTX headquarters for the first time on 23 June 2022 where he learnt about some of the science and technology projects that HTX is working on, such as quantum technologies, robotics, automation and unmanned systems. He also chatted with HTX officers at conneXus, a digital space where Xponents interact and connect with one another in person and virtually through games, messages, news highlights and more.

Read more:
https://go.gov.sg/hcsvisit

Breaking down silos at HTX

An interdepartmental engagement session held by three HTX Centres of Expertise (CoEs) to break down silos and foster collaboration took place on 8 February 2023 at the Civil Defence Academy. The CoEs were Land Systems CoE, Human Factors & Simulation CoE and Sense-making & Surveillance CoE. The three CoEs showcased their work and future plans to their colleagues. The participants expressed their appreciation for the opportunity to learn from each other and identify potential areas for collaboration.

"Each CoE not only had the opportunity to showcase their work, but also to share more about their future directions and plans. This was especially helpful as we all try to synchronise our efforts together within HTX to support the Home Team."

- Jennifer Ang, Scientist (Human Performance, Interaction & Teaming), Human Factors & Simulation Centre of Expertise

Read more:
https://go.gov.sg/crossdept

"The heart of all these games is out-thinking, out-strategising and destroying our opponents... Although they are thinking games, how successful we are in our strategy sometimes depends on dice rolls, which adds to the randomness and fun of the games."

- Nicholas Lee, Protective Security & Safety Centre of Expertise

Star Wars Day with HTX's tabletop wargaming COI

The Tabletop Wargaming Community of Interest (COI) consists of HTX officers who are passionate about tabletop wargaming and its applications for homeland security. The COI was formed in May 2020 during the COVID-19 circuit breaker period, and has since grown to more than 20 members who meet regularly online or in person to play games such as Star Wars: Legion, Warhammer 40K, and Flames of War. Tabletop wargaming is a form of simulation that involves using miniature models, dice, and rules to recreate realistic scenarios and test different strategies and outcomes. The COI members apply their wargaming skills and knowledge to their work at HTX, such as designing realistic scenarios, testing new technologies, and enhancing operational concepts for the Home Team.

Read more:
https://go.gov.sg/wargaming-coi

"The journey was tough and there were moments we could not see the light. But if we had not gone through this journey, we would not have known that we could do it. We were able to perform in a scope that is beyond CBRNE and step up in the national fight against COVID-19."

- May Ong, Director, Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise

16 HTX officers receive National Day Awards 2022

Sixteen HTX officers received National Day Awards 2022 for their contributions and service to Singapore. May Ong Bee Leng, Director of Chemical, Biological, Radiological, Nuclear and Explosives Centre of Expertise, received a Public Administration Medal (Silver) for her outstanding efficiency and competence. She led the CBRNE team in various projects in the fight against the COVID-19 pandemic. Lim Beng Hock, Senior Deputy Director of Immigration & Checkpoints Capability Sustainment team, received a Public Administration Medal (Bronze). He led the Ops Systems team in maintaining the ICT systems for ICA. The other fourteen HTX officers received the Commendation Medal, the Efficiency Medal, or the Long Service Medal.

Read more:
https://go.gov.sg/ndawards2022

HTX officers receive Minister for Home Affairs National Day Awards 2022

Four HTX officers, Chua Tze Hau, Nelson Khoo Chia Meng, Koh Leng Leng, and Sim Lai Hua, received the Minister for Home Affairs National Day Award (Individual) at the Home Team National Day Observance Ceremony on 4 August 2022. The award recognised their outstanding efficiency, competency in their respective areas of work, and contribution to various projects and initiatives that enhanced the Home Team's capabilities and operations.

"The work that we do as a Home Team officer impacts the whole of Singapore, this inspires me to do my best."

- Nelson Khoo Chia Meng, CBRNE & Early Warning Systems, Civil Defence Programme Management Centre

Read more:
https://go.gov.sg/mnda2022

HTX receives 27 Minister's Awards

HTX received 27 Minister's Awards at the Minister's Awards Presentation Ceremony held on 17 January 2023 at the Home Team Academy. The awards recognised outstanding Home Team officers who have demonstrated efficiency and competency in major operations, cases, and projects, or displayed high standards of innovation and service excellence in the course of their work. The awards include the Home Team Achievement Award (HTAA), the Operational Excellence (OE) Award, the Star Service Award (SSA), and the HT Innovation Award. Mr K Shanmugam, Minister for Home Affairs and Minister for Law, highlighted some examples of how technology is being used to force multiply the Home Team, such as the Counter-Unmanned Aerial Systems Capability Development Programme and the 3D modelling of drone data boards.

Read more:
https://go.gov.sg/ministersawards2022

BOARD OF DIRECTORS

Mr Aubeck KAM Tse Tsuen
CHAIRMAN
Permanent Secretary (Development),
Ministry of Home Affairs; Permanent Secretary,
Ministry of Social & Family Development

Mr CHAN Tsan
CHIEF EXECUTIVE
Deputy Secretary (Development),
Ministry of Home Affairs

Mr HOONG Wee Teck
Commissioner,
Singapore Police Force

Mr YAP Wee Teck Eric
Commissioner,
Singapore Civil Defence Force

Mr SIM Wai Meng Marvin
Commissioner,
Immigration & Checkpoints Authority

Ms SHIE Yong Lee
Commissioner,
Singapore Prison Service

Mr TEE Chong Fui
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and Regulation),
Ministry of Communications and
Information

Prof LUI Pao Chuen
Temasek Defence Professor,
Temasek Defence Systems Institute,
National University of Singapore

Mr Prithvi Suresh RAI
Founder and CEO,
Borneo Data Pte Ltd

PASSING THE BATON

We bade farewell to former HTX Chairman Mr Chew Hock Yong...

Mr Chew Hock Yong, then Permanent Secretary (Home Affairs Development), Ministry of Home Affairs (MHA), and HTX's inaugural Chairman, retired on 1 November 2022 after 31 years of distinguished service in the Singapore Public Service. He oversaw the establishment of HTX to develop science and technology capabilities for Home Team operations. "HTX was a dream come true for many parties within the Home Team", he said, "It has a key role to ensure that it is aware of the relevant technologies, has the capability to deliver them, and integrate them with the operations within the Home Team".

Read more:
https://go.gov.sg/htxchairman

"I would like to thank Mr Chew Hock Yong, who served as HTX's inaugural Chairman from Dec 2019 until his retirement from public service in Nov 2022. Under his sterling leadership and stewardship, HTX built strong foundations and rose to meet its mission and purpose."

- Mr Aubeck Kam Tse Tsuen
HTX Chairman

...and welcomed our new Chairman and members to the HTX Board of Directors

Mr Aubeck Kam was appointed the new chairman of HTX on 1 November 2022. He was concurrently appointed the Permanent Secretary (Home Affairs Development), Ministry of Home Affairs, and Permanent Secretary of the Ministry of Social & Family Development. Four new board members who were also appointed at the same time were Prof Lui Pao Chuen, Temasek Defence Professor at the Temasek Defence Systems Institute, National University of Singapore; Mr Prithvi Suresh Rai, Founder and CEO of Borneo Data Pte Ltd; Mr Tee Chong Fui, Director, Central Narcotics Bureau; and Ms Gwenda Fong Su-Yi, Deputy Secretary (Development and Regulation), Ministry of Communications and Information.

Read more:
https://go.gov.sg/newchairman

SENIOR MANAGEMENT

WHERE WE WANT TO GO

VISION

Exponentially Impacting Singapore's Safety and Security

"HTX has lived up to its role as the Home Team's science and technology force multiplier, driving innovation, fostering synergy and improving systems and processes across the Home Team Departments. We intend to stay at the forefront of innovation to equip the Home Team with novel and enhanced technologies. We will strive to equip the Home Team to be even smarter, faster and better at solving crimes; saving lives; enhancing public safety and security; securing our borders; and safeguarding our data and systems.

The launch of Hatch – our open innovation centre – in 2023 is a strategic effort to partner start-ups and the tech ecosystem to develop innovative technologies and solutions for public safety and security. HTX will continue to expand its network and cooperate with other countries and our key suppliers and partners, to develop solutions that can vastly improve Singapore's safety and security."

Mr Aubeck Kam Tse Tsuen
Chairman, HTX

"I am proud of HTX for having achieved much in the short three years since our launch. But we are not resting on our laurels. In fact, we are continually growing and deepening our expertise so that we can better perform our role as the Home Team's Force Multiplier. We know that we can only achieve all that we set out to do if our people are guided by a clear vision, driven by a common mission and share the same values.

Moving forward, we will continue to place heavy emphasis on fostering our quintessentially HTX culture, and in developing our people. We know that when we, as one body, are competently skilled, innovative, and exuberant, and move with a common goal, we will be strong and formidable, and be ever ready to push the boundaries of technology to force multiply the Home Team. In doing so, we will continue to keep Singapore as the safest place on Planet Earth."

Mr Chan Tsan
Chief Executive, HTX

NEXT STOP...

HATCH

Hatch serves as a collaborative platform between the Home Team and global start-ups on the development of innovations. Through its programmes, Hatch seeks to examine, validate, and accelerate technologies from global start-ups, and across industries and sectors, towards innovative capabilities in public safety and security.

Milipol

TECH SUMMIT

POWERING INNOVATION: A SAFE & SECURE FUTURE

3 – 5 April 2024 | Sands Expo & Convention Centre | Singapore

Milipol Asia-Pacific and HTX's TechX Summit have come together to showcase how science and technology is central to enhancing public safety and national security in the Asia-Pacific. This landmark event will bring together top Government officials, operational experts, industry leaders and academia to discuss the latest solutions, strategies and challenges; share technological trends; and foster greater collaboration within the international Homeland Security community.

acknowledgements

We are deeply grateful for the collective efforts and commitment of a remarkable team of Xponents who have contributed to the creation of this publication. Your talent, dedication, and collaborative spirit have been instrumental in shaping this work:

Li Xin Hui,
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Timothy Tiang,
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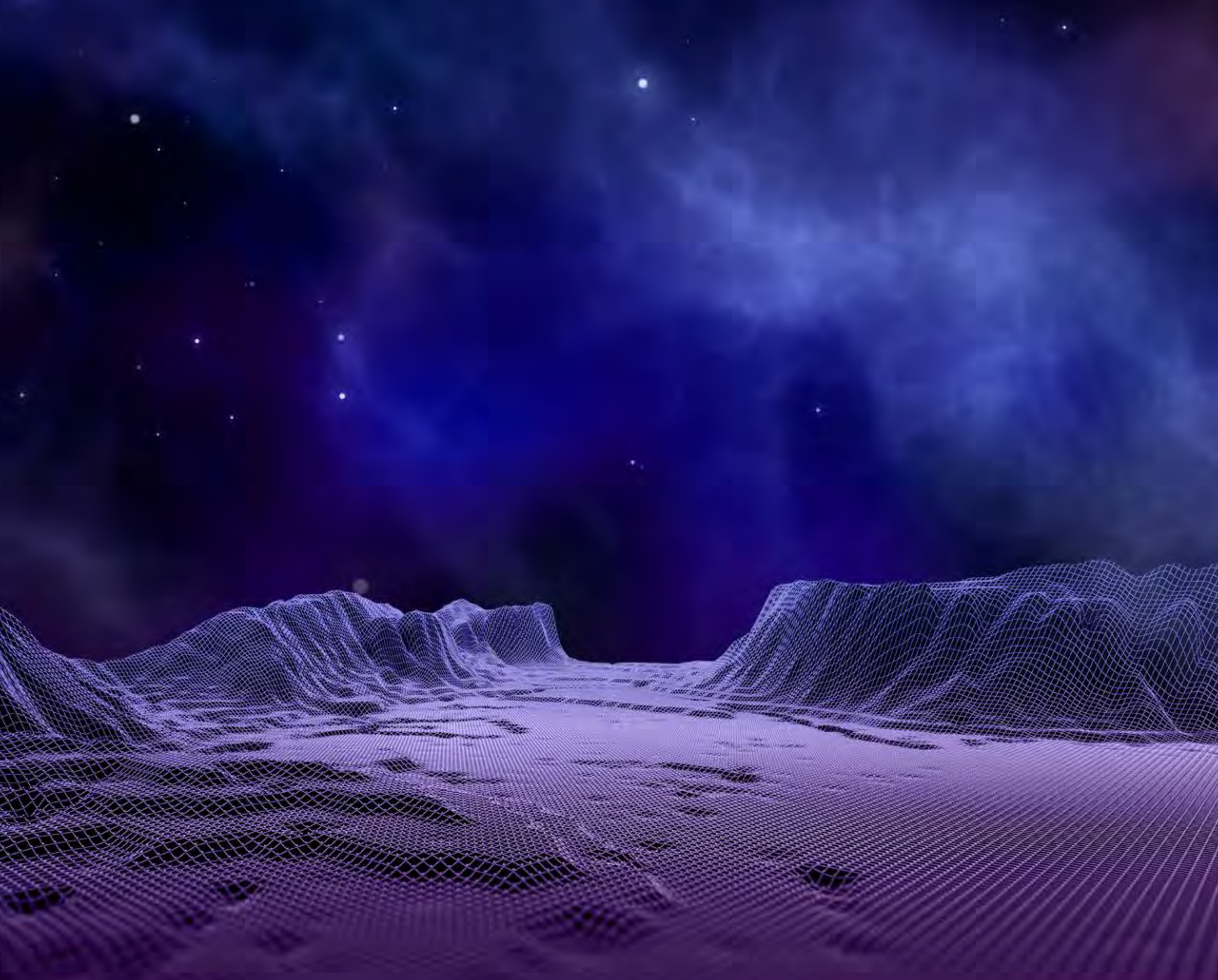
Xponents who contributed insightful quotes, photos and stories.

Senior Management,
for your guidance and support for the successful completion of this publication.



HTX (Home Team Science and Technology Agency)
1 Stars Avenue, #12-01, Singapore 138507
htx.gov.sg fb.com/HTXSG instagram.com/htxsg tiktok.com/@htxsg
sg.linkedin.com/company/htxsg youtube.com/c/HTXSG