HTX
(Home Team Science and Technology Agency)

ANNUAL REPORT FY2023

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

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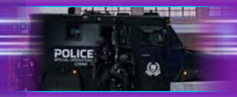
Advance Science & Technology
Force Multiply our Home Team
Secure Singapore's Future

WHAT WE DO



OUR SCIENCE & TECH CAPABILITIES

DIGITAL

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

ENGINEERING

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

SCIENCES

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

YEAR IN REVIEW

KEY HIGHLIGHTS

APRIL 2023

HTX nabs award
In a nod to HTX's excellent working environment and culture, the agency was named among the top 250 best employers in Singapore.

MAY 2023

Launch of Hatch
Minister for Home Affairs and Law Mr K. Shanmugam officiated the launch of Hatch, HTX's very own innovation centre, on 30 May 2023.

TechXplore 5
HTX held a 3-day event showcasing its latest innovations at LaunchPad @ one-north.

ST feature on HTX recruitment
Three Xponents - Forensics CoE director Lim Chin Chin, then Deputy Director of RAUS CoE Daniel Teo, and Q Team engineer Arka Ray – are featured in a Sunday Times article in which they share the meaningful and exciting work they do to force multiply the Home Team. The article was primarily about HTX's efforts to recruit STEM talent.

HTX holds first promotion dinner
HTX's inaugural promotion dinner was held to celebrate the individuals who made significant contributions to the agency's efforts of enhancing Home Team Departments.

HTX onboarded **Ensign** as a **new SPI partner**.

JUNE 2023

Careers@HTX
HTX held its first career fair at LaunchPad @ one-north on 1 June 2023 to raise awareness about what it does and attract STEM talent.

Family Day Out carnival
Xponents got to let their hair down and bond over games and food at HTX's inaugural Family Day Out carnival.

VIPs visit RAUS test bed
Minister for Home Affairs and Law Mr K. Shanmugam and Permanent Secretary (Home Affairs) Mr Pang Kin Keong visited the Robotics, Automation and Unmanned Systems (RAUS) Centre of Expertise (CoE) test bed at the Home Team Tactical Centre on 26 June 2023.

JULY 2023

Construction of Blue Dolphin begins
The construction of the Blue Dolphin commenced on 11 July 2023. This second-generation Marine Rescue Vessel (MRV) was the result of a collaboration between HTX, SCDF, DSTA, and Penguin Shipyard International.

HTX, DSTA hold 5G "network splicing" trial
A trial on Network Slicing and Multi-access Edge Computing took place at the 5G@Sentosa testbed with the aim of enhancing the operational efficiency of Home Team Departments.

HTX onboarded **Rohde & Schwarz** as a **new SPI partner.**

RI outreach
The HTXpress drew huge crowds at Raffles Institution during our outreach event on 14 July 2023.

AUG 2023

HTX Scholarship
The HTX Scholarship, formerly known as the MHA Civilian Scholarship, was presented to recipients for the first time.

SEP 2023

HTX launches profiling course
A profiling course developed by HTX's Biometrics and Profiling (B&P) CoE in collaboration with other agencies and security consultants was launched. The course covers topics such as Tell-Tale Indicators and Credibility Assessment technologies.

HTX and partners announce new 5G project
This multi-party project by HTX, IMDA, SCDF, StarHub and IBM is aimed at enhancing the operational readiness of SCDF frontliners through innovations such as smart glasses as well as AR and AI technologies.

HTX hosts Public Service Commission
Members of the Public Service Commission toured the HTX HQ on 22 Sep 2023. Mr Lee Tzu Yang, Chairman of PSC, and other members viewed HTX's labs and learned about projects like AlchemiX and Project iNsuppressible.

Camaraderie on wheels
A total of 475 Xponents embarked on a quest to clock a combined distance of around 62,000 km over 10 days at the 2023 HTX Annual Cycle challenge.

OCT 2023

Xavier trial held in Tampines, West Coast
HTX's autonomous ground robot Xavier went on trial in Tampines and West Coast and was used to support public officers in enhancing public health and safety.

HTX Associates' Graduation 2023
The graduation ceremony for the HTX Associates Class of 2021 was held, and Greenfield projects by the associates were showcased.

HTX and the **Korean National Police Agency (KNPA)** signed a **Letter of Intent.**

Shimadzu was named an **SPI partner** of HTX.

NOV 2023

Milipol Paris 2023
HTX took Singapore to the world stage by participating in Milipol Paris 2023, a major international expo themed on homeland security and safety.

4th anniversary celebrations
HTX celebrated turning four with a fun-filled Annual Dinner & Dance themed "A Night at the Movies".

A long walk to remember
The HTX Annual Walk & Run 2023 saw the participation of 800 Xponents who collectively clocked close to 60,000 km over the 10-day challenge period.

Awards galore
Dozens of Xponents received awards for their contributions to Homeland security at three award ceremonies – the Minister's Awards Presentation Ceremony, the MHA National Awards (COVID-19) Ceremony, and the MHA National Day Awards Investiture. Four of these awardees were also featured in the media, including HTX Deputy Chief Executive (Operations) Chen Yeang Tat.

HTX partners SANS Training Singapore
HTX and SANS Training Singapore signed a Memorandum of Understanding on 7 November 2023 to collaborate and develop technical competencies of HTX's cybersecurity officers.

HTX signed an Administrative Agreement with **France's Ministry of Interior** to further cooperation in science and tech.

IDEMIA became an **SPI partner** of HTX.

JAN 2024

FEB 2024

Hatch's first Demo Day
Start-ups from around the world that have developed dual-use technologies with applications in homeland security showed off their innovations at Hatch's first Demo Day.

HTX features at CBRNe Convergence Asia
Innovations jointly developed by HTX and SCDF were showcased at CBRNe Convergence Asia 2024. Among the exhibits were the Emergency Responders' Fitness Conditioning and Enhancement Lab (EXCEL), which HTX's Human Factors & Simulation (HFS) CoE had a hand in creating.

A trip to Vegas and Silicon Valley
A HTX delegation led by Chief Executive Chan Tsan engaged with the agency's key technology and innovation partners in Silicon Valley and Las Vegas.

HTX flexes its expertise on CNA
A CNA report featured Cheryl Tan, Deputy Director of HTX's Surveillance and Sensemaking CoE, who shared how HTX was developing a suite of AI-assisted assessment tools to fight cybercrimes.

HTX at Total Defence 40 exhibition
Rover-X and other cutting-edge HTX innovations wowed the crowds at the Total Defence 40 exhibition at the Singapore Discovery Centre.

HTXpress visits Hwa Chong Institution
HTX made its first appearance at Hwa Chong Institution as part of its scholarship recruitment exercise.

HTX on The Big Spark
Hatch was the official innovation hub partner of the CNA business reality programme The Big Spark. The series, which featured start-ups from Southeast Asia vying to win seed funding of up to S$1 million, also highlighted HTX's role in offering start-ups opportunities to develop dual-use tech for homeland security though Hatch.

MAR 2024

HTX makes headlines
HTX's work on deepfake video and audio technology made the front page of Lianhe Zaobao. The article highlighted HTX's AI model that could identify several types of deepfake technology.

HTX Deputy Chief Executive (Development) Ng Yeow Boon also appeared in a CNA special news bulletin in which he shared how HTX was training more officers in data science and data analytics roles, as well as attracting talent in data science and AI.

Drawing crowds at SSEF 2024
HTX attracted large crowds of young STEM talents with its array of eye-catching innovations at the Singapore Science & Engineering Fair.

Because equality matters
The Women in HTX Initiative, which seeks to increase awareness about the importance of gender diversity and equality in the workplace, was launched on International Women's Day on 8 March.

SAVING LIVES

Empowering marine rescue with AI

We might still be some way from seeing robots powered by Artificial Intelligence (AI) do chest compressions on accident victims, but did you know that this technology is already being used to save lives at sea?

Case in point? The Marine Video Analytics for Rescue and Recovery at Sea that was jointly developed by HTX's Sense-making & Surveillance Centre of Expertise (S&S CoE) and the Singapore Civil Defence Force (SCDF).

The solution comprises custom-built video analytics, Seaborne Electro-Optic (SEO) sensors, underwater sonar technology, and an array of onboard sensory instruments.

Considered a breakthrough in video analytics solutions for maritime search and rescue operations, this application allows emergency workers to perform fast and accurate human detection - both on the ocean surface and the underlying seabed – as it effectively overcomes existing challenges such as fluctuating light conditions, variable sea states and suboptimal quality of video footage.

Another AI enhancement SCDF marine vessels could be getting in the future is an AI-enhanced video security system. Developed by HTX's Q Team CoE and Platform Systems Sustainment Centre in collaboration with the SCDF, this innovation underwent a proof-of-concept trial in February 2024.

The proof-of-concept AI-enhanced video security system, which has been installed on the Red Dolphin, one of the SCDF West Coast Marine Fire Station's Firefighting and Rescue Vessels, can detect humans in normal and infrared CCTV footage and is even capable of distinguishing authorised personnel from unknown intruders with over 90% accuracy, thus reducing the risk of theft or vandalism by intruders. Furthermore, it can even be trained to identify and alert the duty watch officers to problems such as floods in the engine room.

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

Making training more immersive with XR and VR

It's no secret that the harder we train, the better we get at our jobs. This is especially important for roles like first responders because lives are at stake.

To this end, HTX has over the past few years been collaborating with the SCDF, the National University of Singapore and Dutch defence training software developer RE-liON to help our first responders train smarter.

One result of this collaboration is an Extended Reality (XR) system that features a Multi-Sensory Suit (MAV Suit) which provides haptic feedback and simulated smells, thus enhancing training realism. XR allows for safe and customisable training scenarios and is more cost-effective compared to traditional training methods that require the use of actual scrap vehicles.

The collaboration has also yielded a Virtual Reality (VR) firefighting system that allows SCDF firefighters to experience various fire scenarios. The gear comes with a mock-up of the firefighting nozzle, which recreates the sensation of different water pressures, adding to the physical and virtual experience for trainees.

Both these systems are currently on trial and used for small group trainings. Once successful, SCDF will look to scale them up for use in larger group training.

The XR project for simulation training and monitoring of training sessions received the Regional (Asia) Gold Award at the QS Reimagine Educational Awards & Conference, which was held at Khalifa University, Abu Dhabi from 11 to 13 December 2023.

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

Playing with fire

The Home Team's capabilities of understanding and dealing with fires was elevated to a new level with the launch of the Fire Research Centre (FRC) in late July 2023.

Located within the Civil Defence Academy (CDA), the new facility is being used by HTX's Forensics CoE and Protective Security and Safety (PSS) CoE, as well as the SCDF.

HTX has since its inception been providing support to the SCDF's firefighting operations, with its PSS CoE contributing its expertise to fire engineering matters and the Forensics CoE aiding with fire investigations.

Prior to the establishment of the centre, research of fires was done via small-scale burn tests that provided limited data. With the new centre, researchers will be able to obtain more data that would inform the efforts of HTX and SCDF.

For example, the burn tests in the FRC would allow forensic investigators to determine the ignitability of exhibits collected from fire scenes and identify probable ignition sources for fire scene reconstructions.

The facility can also be used by fire investigators and forensic scientists to conduct a variety of burn experiments to deepen their understanding of fire behaviour, burn patterns, flammability and thermal properties of materials. This would in turn benefit the investigation of different types of fires such as chemical fires, electrical fires, and battery fires.

In the context of fire safety regulation, the FRC can be used to study the effectiveness of fire-retardant materials used in building construction and determine how fires develop in buildings. This would strengthen overall fire safety strategy and ensure that appropriate measures are taken to protect lives and property. Such efforts will also reduce compliance costs while ensuring that high fire safety standards are not compromised.

"The setting up of the Fire Research Centre is a significant step in enhancing the fire research capabilities of the SCDF and HTX. On the forensics front, we can further our research and investigation on fire incidents and fire safety related issues via a scientific evidence-based approach. At the same time, HTX's Protective Security and Safety Centre of Expertise can further their study of fire development in buildings and assess the fire safety requirements of new and emerging products in the market."

- Lim Chin Chin, Director, Forensics Centre of Expertise, HTX

Empowering SCDF's digital frontliners

HTX's Civil Defence Programme Management Centre (CDPMC) had a highly productive year in 2023 as it developed not one but a whopping eight new applications within just three months to enhance SCDF operations.

Developed using Microsoft's Power Platform, these apps were introduced to over 300 SCDF personnel during the "Be A Digital Frontliner" event, which took place in May 2023.

The first four apps were developed in-house by CDPMC. They include the Food Indentation and Consumption App (FICA), which is used by the Civil Defence Academy and National Service Training Centre Cookhouse to track the daily indentation and consumption of meals. The other four apps were jointly developed with the SCDF. Among them is the Automated Duty Assignment (ADA), which automates the assignment of fire rescue specialists to SCDF appliances based on their appointment and skillset.

Feedback on the apps has been positive, with users commenting that they have significantly improved productivity within the SCDF.

Moreover, the use of the Microsoft Power Platform to build the apps allowed CDPMC to avoid potentially spending at least S$20 million in development and refresh costs. Instead, less than S$50,000 was spent on building the new apps.

How's that for cost savings?

Read more:
https://go.gov.sg/cdpmc-df

Dolphins to the rescue

The construction of the Blue Dolphin, the first of two second-generation Marine Rescue Vessels (MRVs), began on 11 July 2023.

The result of a collaboration between HTX, SCDF, DSTA, and Penguin Shipyard International, the new MRV will enhance the SCDF's response to fire, rescue, and hazardous incidents as it has a maximum speed of 30 knots – significantly faster than the 13 knots of the previous generation vessel. This speed upgrade allows SCDF responders to cover approximately 42 km – double the range compared to before - within their 45-minute response time.

Equipped with firefighting RHIBs and sonar detection systems, the Dolphins will be primarily used for underwater search and rescue operations.

In line with the Maritime Singapore Green Initiative, the engines of these vessels can run on hydrotreated vegetable oil (HVO). There are also plans to have these vessels powered by solar energy in the future.

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

Roaches to the rescue

To most people, cockroaches are nothing but pests that need to be eradicated on sight.

To Associate Professor Hirotaka Sato from Nanyang Technological University's School of Mechanical and Aerospace Engineering, these insects could one day save lives.

Turning his vision into reality was no easy feat, and it required the expertise of multiple entities, including HTX's Robotics, Automation & Unmanned Systems (RAUS) Centre of Expertise (CoE), NTU and Klass Engineering and Solutions.

The result is a live cockroach augmented with a suite of devices, including an IR camera, a microphone, environmental sensors and navigation sensors. To control the direction in which these cockroaches move in, human electrical signals are sent to its nerve cells.

This so-called cyborg cockroach can effectively augment search and rescue missions, especially those that involve collapsed buildings, as it can easily navigate through rubble and search for survivors, a feat human rescuers cannot accomplish.

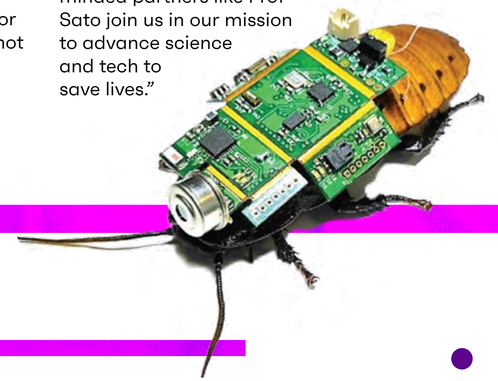
Deploying miniaturised robots for search and rescue missions has always been a challenge because a large amount of power is required for locomotion. Tiny robots just don't have enough power to operate for hours or even days, something that is required of such missions.

Live cockroaches, on the other hand, can survive for months without food.

The use of cyborg cockroaches also means that human rescuers don't have to risk their lives searching for survivors in dangerous circumstances.

"Deploying cyborgs for saving lives will protect our frontline responders and, at the same time, improve the agility and efficiency of Home Team operations," said Ong Ka Hing, Deputy Director, Ground Systems, RAUS CoE.

"The ability to mass deploy these cyborg cockroaches will significantly increase the odds of a successful mission and will surely boost the morale of the responders on the ground. We are glad to have like-minded partners like Prof Sato join us in our mission to advance science and tech to save lives."



ENHANCING PUBLIC SAFETY & SECURITY

Photo: SPF

Safeguarding our skies from hostile drones

The evolution of drone or Unmanned Aerial System (UAS) technology has been rapidly accelerating in recent times and such devices are no longer only used for recreational or commercial purposes. One example of this would be the use of militarised drones in recent conflicts around the world.

As such, homeland security agencies around the world, including HTX, have been hard at work developing Counter-UAS (C-UAS) technologies to deal with this increasingly dangerous challenge.

One product of HTX's efforts in this area is the Counter Drone System that the Singapore Police Force's (SPF) Protective Security Command uses.

The system comprises a counter drone system detector, an electro-optics sensor that locates and tracks the drone, and a counter drone system command and control display. HTX's Robotics, Automation & Unmanned Systems (RAUS) Centre of Expertise (CoE) and Policing Programme Management Centre (PPMC) worked with the SPF to create this system.

Upon being alerted by the system of an unauthorised drone, police officers will attempt to stop the flight and locate the pilot. A jammer gun can also be used to disrupt the drone's control signal and bring it down to the ground.

Punching through hostility

Featuring an imposing silhouette and highly fortified with an armoured body and protective mesh, the Tactical Strike Vehicle (TSV) used by the Special Operations Command (SOC) is one of the latest results of the collaboration between SPF and HTX.

The 14.2-tonne, four-wheel vehicle is designed to enhance the protection of officers and can be used to punch through the heart of the action during situations involving gunmen or riots.

Besides gun ports that allow officers to engage hostiles from within the vehicle, the TSV also comes with a public announcement system, flood lights, and sensemaking cameras.

The TSV was commissioned by Minister for Home Affairs and Law, Mr K Shanmugam at the Police Workplan Seminar and Exhibition 2023.

Photo: SPF

Meet our robo-cops

HTX has over the years helped the SPF develop several robots that have been used for a variety of purposes.

Photo: SPF

The autonomous Patrol Robots, for instance, have been deployed at Changi Airport Terminal 4 to augment patrols of the premises. Jointly developed by HTX, ST Engineering and A*STAR I²R, these robots are equipped with sound and visual sensors with 360 video capabilities that allow them to detect suspicious activity on the ground during their patrols. These robots were especially useful during the COVID-19 pandemic as they took on the duty of ensuring safe distancing.

There's also the Rover-X, which was developed by HTX in collaboration with Klass Engineering and Solutions, Ghost Robotics and A*STAR's I²R. Rover-X comes with a host of features, including legged-locomotion and sensors that allows it to navigate stairs, kerbs and other terrains that are challenging for traditional robots on tracks or wheels. As such, it can be used to support disaster rescue efforts and conduct routine chemical plant inspections. This robot also can carry payloads like cameras, thermal imagers and gas sensors that can detect and measure the concentration level of gases.


Photo: SPF

Another robot that HTX had a hand in developing was the Community Engagement Robot. For this project, HTX's RAUS CoE served as consultants to SPF and Ngee Ann Polytechnic, both of which developed the robot for the purpose of enhancing community engagement through novel and interesting ways.

Known as Cody (Community Outreach BudDY), the robot can play interactive videos and read targeted crime prevention advisories. Audiences can even answer quizzes displayed on the robot's panel.

Total control

Presently, Home Team officers can only control each robot using its respective controller. But this could soon be a thing of the past with the Common Robotics Dashboard, which is being developed by HTX's RAUS CoE.

When operational, the dashboard will allow officers to control all types of robots using a single system. The dashboard would be able to optimise patrol routes by adjusting the robots' schedules and evenly distributing available robots to cover different areas. It will also have a traffic management system to deconflict the robots' routes.

Chasing the nasty clouds away

Industrial accidents involving toxic chemicals can be a nightmare to deal with, not just because of the immediate threat our frontliners face, but also because the deadly vapours released find their way into the atmosphere and can potentially create poisonous clouds that affect civilians living nearby.

To prepare for such incidents, HTX's Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) CoE has been hard at work developing ways to detect and disperse toxic clouds.

In 2023, CBRNE CoE held a trial at an isolated 6,000-square-metre site in Kranji to evaluate the effectiveness of their various countermeasures to this problem.

These countermeasures – including water curtains, turbo jets, water jets, and turbo hydro jets – had previously been assessed through Computational Fluid Dynamics (CFD) simulations. The trial sought to validate the simulation results.

Thanks to this trial, the project team managed to collect extensive data to construct an experimental database, which would help them develop computational and experimental methods to further assess effectiveness.

CBRNE will continue to develop advanced chemical detection capabilities and is planning to guide the SCDF in deploying the most effective countermeasures against chemical plumes.

HTX's partners for this project include the Singapore Institute of Technology, which shared its expertise on wind tunnel operations and dispersion modelling, and the National University of Singapore, which consulted on the trial setup.

The project is expected to be completed in 2025, with operational deployment slated to take place in 2026.

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

Enhancing community vigilance

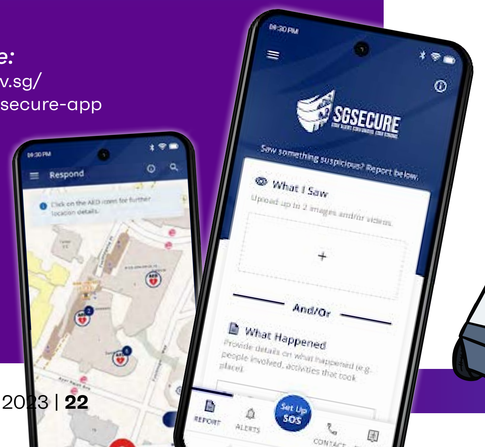
As the popular saying goes, teamwork makes the dream work. This was undoubtedly the idea behind the SGSecure app, allowing citizens to swiftly report suspicious activities.

Launched in September 2016, the app also allows users to receive emergency broadcasts and register as SGSecure Responders.

In 2023, HTX's Digital Services Programme Management Centre worked alongside the Ministry of Home Affair's SGSecure Programme Office to refresh the app so as to keep pace with changing security requirements. The project also sought to make the app more attractive and intuitive for users.

Released on 25 September 2023, the refreshed app introduced several updates to enhance user experience and functionality. For example, users can now provide more specific location details and contact information when reporting suspicious cases. The app's user interface also underwent a revamp, with the new design prioritising core crisis and emergency functions while shifting non-core features to a side menu. The refreshed SGSecure app was showcased at the Milipol Asia-Pacific – TechX Summit 2024 exhibition.

Read more:
https://go.gov.sg/refreshed-sgsecure-app



Xavier goes on trial

HTX's autonomous ground robot, Xavier, raised more than a few eyebrows at Tampines Central and West Coast Parkview during its trial from 16 October to 8 December 2023. The trial was aimed at further assessing the robot's ability to augment the work of public officers in enhancing public health and safety.

During its patrol of Tampines Central, the robot was tasked with detecting a host of things, including littering, obstruction of fire engine access ways and improperly parked mobility devices. Over at West Coast Parkview, the robot was used to detect illegal dumping of bulky waste and littering in the common areas.

Fitted with an array of sensors and cameras that provide 360-degree video footage, Xavier will trigger real-time alerts to the Command-and-Control centre and display messages to educate the public when it detects any of the above behaviours.

In the face of manpower shortages, technological innovations like Xavier could one day be used as a force-multiplier for agencies like the SPF to augment their workforce needs.

Don't be surprised if you find yourself getting summoned by a robot one day!

Simple empowerment

HTX empowers the SPF in many ways, but not all approaches require the use of sophisticated gadgets and cutting-edge technology.

Here's one example: the innovative yet inexpensive solution to air lock issues in Police Coast Guard (PCG) vessels.

Designed byHTX's Platform Systems, this solution involves installing an automatic self-purge relief air valve in the seawater system that "burps" the vessel, thus expelling ingested air bubbles that can lead to overheating in aft generators.

Prior to this solution, the traditional method of manually releasing trapped air pockets posed risks, particularly during choppy seas or blackouts.

The team, which was led by Robin Ng and Eric Chia, was the recipient of the Undaunted (Team) Award at the 2023 HTX Awards. In addition, it also won the Most Popular Pitch Award at the HTX Convention Pitch Day event!

Read more:
https://go.gov.sg/deus-ex-machina

Enhancing event security with an emotion detector

HTX's Biometrics and Profiling (B&P) CoE has been exploring a new Artificial Intelligence (AI) tech that uses micro-vibrations of facial muscles to determine one's emotions.

How would an emotion detector like this be useful for security purposes? It would allow profilers on duty at major events to quickly identify individuals who are in a state of agitation and anxiety through Tell-Tale Indicators such as fidgeting or shivering.

The team behind this project conducted a trial at a public event in Singapore in September 2023.

How the tech works:

- A high-resolution camera picks up moving targets in crowds and outdoor environments. Points on their neck and face are identified and mapped as pixels.
- The AI-trained algorithm detects minute pixel movements, or micro-vibrations, of their facial muscles when they exhibit behaviours such as fidgeting or shivering.
- The micro-vibrations are then translated into frequencies and classified into emotions based on a heat map, determining a person's emotional state.

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

"Instead of having profilers on the ground to manually profile everyone, using the micro-vibrations detector allows profilers to prioritise which individuals to flag out. It's fast, contactless, and accurate."

- B&P CoE profiling engineer Liang Kaiying

SOLVING CRIMES

HTX develops award-winning Crime Scene Specialist Course

To augment the operational capabilities of forensics specialists within the Singapore Police Force (SPF), HTX's Forensics Centre of Expertise (CoE) has developed a 12-week Crime Scene Specialist Course for entry-level specialists to hone their chops.

The course was the recipient of SPF Training Team of the Year Award in the 2023 SPF Training Award category, as well as the Home Team Training Unit of the Year (Merit) Award at the 2023 Home Team Training Excellence Awards. Both awards were a first for the department.

Covering foundational crime scene investigation and evidence management skills such as photography and fingerprint search techniques, the course aims to enhance the problem-solving skills, critical thinking and decision-making abilities of trainees.

Part of the course is delivered using the flipped classroom approach. Trainees are first divided into groups before they are tasked with researching selected topics and subsequently teaching their fellow trainees their assigned topics. This independent learning approach aims to challenge trainees to think critically about how their theoretical knowledge can be applied in the real world.

To enhance training realism, trainers make use of their practical experience to create realistic mock scenes of various crimes for participants to process. During these sessions, the trainers take on the roles of investigation officers, ground response force officers, and members of the public. Creating a diverse range of crime scenes helps participants develop adaptability and better prepare for the variety of actual crime scenes that they will encounter in the future.

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

Converging realities: Bloodstain Pattern Analysis Simulation

To improve the training of Crime Scene Specialists in Blood Pattern Analysis (BPA), HTX's Human Factors & Simulation (HFS) CoE worked together with the Criminal Investigation Department (CID) to develop a technology that leverages both Augmented Reality (AR) and Virtual Reality (VR).

Conventional BPA training requires the creation of mock crime scenes using synthetic blood and flipchart papers mounted onto walls. This approach is not only time-consuming and labour intensive, but also lacks repeatability and consistency.

With this mixed reality technology, realistic virtual crime scenes are projected onto the field of view, offering users an interactive and highly immersive learning experience during which they can practise what they have learnt in theory and build their skills and confidence prior to processing an actual bloodied scene.

As conventional BPA training involves spending up to two hours to set up mock crime scenes, this mixed reality technology provides significant time savings.

How long does it take to set up a mixed reality crime scene? No more than 20 minutes.

The technology also provides cost savings as there isn't a need to procure physical props to set up the mock crime scene.

Another key benefit this mixed reality training system offers is the provision of instantaneous feedback that guides the trainee to select suitable bloodstains. This also removes the need for one-to-one instructor supervision. In addition, the system allows trainees to draw holographic lines in real-time to visually track the angles of impact of the computer-generated bloodstains.

Read more:
https://www.htx.gov.sg/techx/techxplore-bloodstain-pattern-analysis-simulation

"In-depth trials and evaluations were conducted with Crime Scene Specialists from the SPF and we received very positive feedback from users who found the system to be useful, innovative and most importantly, effective in meeting the training objective. We are happy to be given the opportunity to showcase this system to the participants of the Technology & Courts of the Future (COTF) 2022 programme who were amazed and appreciative of the innovative approach taken by HTX in augmenting training for our Home Team officers."

- HFS CoE director Ying Meng Fai

Fighting Novel Psychoactive Substances with Artificial Intelligence

HTX could potentially play a major role in global drug enforcement practices in the future thanks to a self-developed AI-powered solution that can help tackle the distribution of novel psychoactive substances (NPS).

Designed to emulate existing psychoactive substances such as ecstasy and heroin, NPS have been posing a challenge to law enforcement authorities around the world because of their unique molecular structures, which make them more difficult to detect using existing measures.

To tackle this problem, HTX scientists from the Disruptive Technologies Office, the Forensics CoE, and the Chemical, Biological, Radiological, Nuclear, and Explosives CoE developed an AI tool to identify NPS, even those which have not yet been recorded.

Showcased at Milipol Paris in November 2023, this new tool outperforms traditional methods in identifying NPS classes.

The team behind this solution is currently looking to increase the diversity of chemical classes in the training data, further validate the Machine Learning models involved, and integrate the AI solution with actual testing instruments before proceeding to deploy the solution at Singapore's checkpoints.

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

The high-tech oracle for forensic handwriting analysis

Conventional forensic handwriting analysis can be an extremely labourious process as it involves comparing numerous samples to determine whether there is a match.

But spending inordinate amounts of time on such a task could soon be a thing of the past thanks to AI.

Tackling this issue are two HTX departments - Forensics CoE and Q Team CoE, which conceptualises and implements innovative initiatives that enhance the capabilities of the Home Team – that have been working closely to develop TextOracle, an AI-powered tool that automates the identification and extraction of handwritten text segments and streamlines the comparison process between suspected forgeries and authentic samples.

This advancement significantly reduces the time required for generating comparison charts and allows the task to be completed in a matter of hours or a few days, as opposed to the previous manual method that could take as long as weeks.

TextOracle currently has an accuracy rate of 85% for neat, regular handwriting, and a 60% success rate for cursive handwriting.

Though it hasn't been officially deployed, the application has already won acclaim in several circles. For example, HTX forensic scientist Michelle Ho's presentation of TextOracle at the 23rd Triennial Meeting of the International Association of Forensic Sciences in Sydney, Australia garnered significant recognition and even earned her the Best Oral Presentation Award in the field of Document Examination. This major event was attended by over 1,700 forensic experts from 70 countries.

The project was also awarded the 2024 Home Team InnovA Dare-To-Try award.

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

Upping the ante in physical training

It goes without saying that our police officers need to be fit to stop crime. To help our police officers stay in tip-top condition, HTX has joined hands with the SPF to develop a centralised system to monitor trainees wearing physical training wearables that measure vital signs such as heart rate and skin temperature during physical activities.

These devices have advanced features such as fall detection, monitoring of peripheral capillary oxygen saturation levels, and an electrocardiogram that detects cardiac problems, all of which go a long way to reducing the risk of injury, improving physical performance, and enhancing training safety.

The centralised system that HTX and SPF are collaborating on will be useful as physical training instructors may not always be able to spot instances of over-exertion in trainees. With this system, instructors can better monitor each trainee's physical condition and tailor their training accordingly.

SECURING BORDERS

FORGING THE FUTURE OF IMMIGRATION CLEARANCE

The Immigration & Checkpoints Authority (ICA) had in 2019 first announced its New Clearance Concept (NCC), which would transform the delivery of its immigration and registration services.

HTX has since been involved in multiple projects that are related to this initiative.

Here are some of the most notable results of our collaboration with our peers from ICA.

Passport-less clearance

HTX is involved in the development of ICA's Automated Border Control System (ABCS), which now allow Singapore residents and other travellers to clear immigration without a passport.

ICA had starting in the first quarter of 2024 commenced efforts to progressively replace the manual counters at the passenger halls of all checkpoints in Singapore with about 800 new automated lanes using ABCS. This would allow ICA to cope with rising traveller volumes and limited manpower resources.

On our part, we conducted a technical feasibility study as well as served as technical consultants for the assessment of suitable biometric technologies that could be used to implement the passport-less concept.

HTX also provided project management for the development and implementation of the solution, and helped with the development of the user interface (UI) and user experience (UX) of the new clearance process.

"HTX, as the force multiplier for the Home Team, continues to secure our borders with the relentless innovation of our dedicated staff. By empowering travel with technology where identity is verified in the blink of an eye, we are pioneering a future of seamless journeys and secure borders."

- Jacqueline Chan, Head, Clearance Lanes, Immigration & Checkpoints Programme Management Centre, HTX

Land clearance without leaving the car

The Automated Passenger In-Car Clearance System (APICS), too, was developed following a collaboration with HTX and ICA. For this project, HTX's Robotics, Automation & Unmanned Systems (RAUS) Centre of Expertise (CoE) helped develop a system that allows travellers to perform self-clearance while in their cars.

During the APICS trial at Old Woodlands Checkpoint, about 94 per cent of travellers were able to self-clear without officers' assistance. The majority of travellers found the process to be intuitive and faster compared to manual clearance.

ICA will be working with HTX to further improve the concept of operations before rolling out APICS in phases at all the land checkpoints.

Green and convenient: NCC Cargo

The paperless clearance of conventional cargo at air cargo and ports checkpoints that was rolled out in January 2023 was made possible by the collaboration between ICA and HTX.

Thanks to this new initiative, dubbed NCC Cargo, drivers and freight forwarders can now seek cargo clearance simply by submitting their vehicle licence plate number and Cargo Clearance Permits (CCP) via the SGAC Cargo Module on ICA's website or the MyICA mobile app.

Compared to the past when ICA officers had to manually process the hardcopy CCP, NCC (Cargo) has reduced clearance time for each vehicle considerably, and this has brought greater efficiency to our cargo supply chain, and time and cost savings for logistics and transport companies.

This initiative was extended to land checkpoints in March 2023.

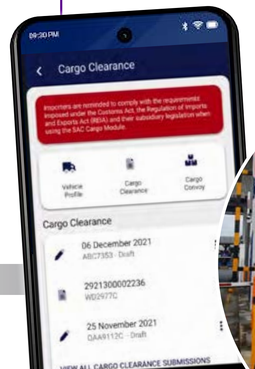


Photo: ICA

Biometric registration, DIY style

Today, at the ICA Visitors Services Centre, officers spend almost 14,000 man-hours each year helping travellers enroll their fingerprints, faces, and irises.

Because of Project eXtramural, a joint innovation project between HTX and ICA, officers may soon be able to spend their time on more important tasks that directly impact security.

The result of Project eXtramural is a Biometrics Self-Enrolment Kiosk which automates the biometrics enrolment process, thus allowing one officer to oversee a group of kiosks. This kiosk will also reduce users' waiting time and shorten the biometrics enrolment time required for Singapore residents and pass holders.

As there was no commercially available integrated solution for self-enrolment of multimodal biometrics – in particular, rolled fingerprints – the Project eXtramural team had to select and customise the placement of biometric scanners in the kiosk prototype and design the automated guidance process to facilitate self-enrolment without human assistance.

But biometrics enrolment will likely not be the only task this kiosk can perform. The Project eXtramural team foresees that the kiosk can be adopted for other security services that use biometrics, such as onboarding processes at high-security facilities.

The Biometrics Self-Enrolment Kiosk was among the many innovations on show at Milipol Paris in November 2023.

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

TACKLING THE THREAT OF PRECURSOR CHEMICALS

Officers at our border checkpoints used to have to read labels and use internet searches to determine if a cargo contained precursor chemicals that can be used to produce drugs and explosives.

Today, a piece of technology called HOMA (HTX OCR Mobile Application) has automated this labourious checking process.

This innovation can be said to be a shining testament to the quality of the young STEM talent within HTX's ranks. After all, a significant amount of the work that went into developing this innovation was done not by highly experienced engineers, but by a team comprising young HTX associates and even interns.

The first iteration of HOMA was the Explosive Precursors Application (EPA), which was created by Gina Leow and her teammates at HTX's Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) CoE.

Gina, who is presently an engineer with CBRNE CoE, was just an intern when she first worked on the application, which caught the attention of ICA during the inaugural TechXplore showcase by HTX.

Soon after, following the end of Gina's internship, ICA worked with CBRNE engineer Ken Yoon to customise the EPA for use at the checkpoints. This customised version later became known as HOMA, which is today incorporated in ICA's Cargo Screening System (CASS) at the checkpoints.

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

HTX GOES GLOBAL AT MILIPOL PARIS 2023

One of HTX's biggest achievements since its inception five years ago was flying the Singapore flag at Milipol Paris 2023, a global homeland safety and security event that was held in Paris in November 2023.

Milipol Paris was organised under the auspices of the French Ministry of Interior and carried out in partnership with a host of agencies, including the French National Police, French Customs, and Interpol. The event featured 17 international pavilions, including Singapore's, and was attended by 1,100 exhibitors from 48 countries.

The Singapore Pavilion, themed "Exponentially Impacting Singapore's Safety and Security", profiled selected cutting-edge homegrown homeland security innovations across five domains: solving crimes, securing borders, saving lives, safeguarding public spaces, and seeding innovation.

The HTX delegation comprised Xponents from various centres of expertise as well as representatives from our industry partners like ST Engineering, Singtel and NCS. Together, they showcased an array of transformative S&T solutions at the Singapore Pavilion, including Project eXtramural, a Biometrics Self-Enrolment Kiosk that was the result of a collaboration between HTX and the Immigration & Checkpoints Authority (ICA).

This kiosk, which reduces wait times and manpower requirements by automating the enrolment process for fingerprints, faces, and irises, is part of ICA's Services Centre Next Generation initiative, which involves providing streamlined service delivery by 2025. The kiosk was the recipient of the Gold Award at the 2022 Home Team Innovation (InnovA) Awards.

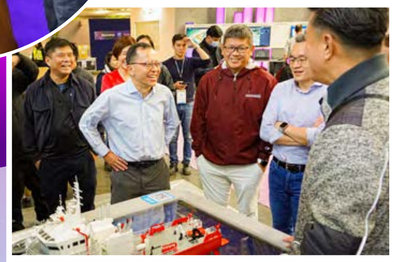
Milipol Paris was a prelude to the Milipol Asia-Pacific – TechX Summit (MAP-TXS) 2024, an international gathering in Singapore focused on driving discussions related to the security landscape in the Asia-Pacific region.

MAP-TXS 2024 was jointly organised by HTX, GIE Milipol, and Comexposium under the auspices of the Ministry of Home Affairs (Singapore) and the Ministry of the Interior (France).

Read more:
https://go.gov.sg/showcasing-singapore-milipol-paris

"As HTX works to enhance the Singapore Home Team's Science and Technology capabilities, it is important that we look to the international stage and work with other leading government agencies and industry players. By bringing our key local industry partners to Milipol Paris to showcase Singapore's transformative S&T solutions on the international stage, we believe we can better engage and expand our networks of partners and grow Singapore's homeland security ecosystem."

- HTX Chief Executive Chan Tsan



ESTABLISHING STRATEGIC PARTNERSHIPS

Other Key Industry Partners

HTX and IDEMIA ink strategic innovation and research partnership

HTX signed a master agreement under a Strategic Partnership for Innovation (SPI) with IDEMIA on 16 November 2023 to collaborate on research and development in biometrics and forensics technologies.

A global leader in identity technologies, IDEMIA has a strong presence in Singapore and boasts more than 3,000 global R&D experts.

The partnership aims to accelerate the development of cutting-edge solutions to ensure the safety and security of Singapore, and will see both sides work together to design and pilot solutions that address present and future challenges in Singapore.

"Fostering innovative technology is critical to keeping Singapore safe and secure. This partnership will provide opportunities for HTX and IDEMIA's engineers and scientists to work together to develop cutting-edge homeland security solutions. I look forward to the outcomes that this partnership will bring in the near future," said HTX Chief Executive Chan Tsan.

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

HTX signs MoU with SANS Training Singapore

HTX and SANS Training Singapore signed a Memorandum of Understanding (MoU) on 7 November 2023 to collaborate and develop the technical competencies of HTX's cybersecurity officers.

SANS Training Singapore is the Singapore subsidiary of SANS Institute, a leading provider of cybersecurity training.

The signing of the MoU marked the beginning of a two-year collaboration in which HTX's officers will be trained according to SANS Institute's proficiency training roadmap. HTX's xCyber division will also work with SANS Training Singapore to develop an intensive Capture-the-Flag (CTF) programme as part of this collaboration.

In the field of cybersecurity, CTF is an exercise in which participants seek out text strings, also known as "flags", that are hidden in purposefully-vulnerable applications or websites.

Read more:
https://go.gov.sg/htx-sans-training-singapore-mou

HTX in Las Vegas and Silicon Valley

A HTX delegation led by Chief Executive Chan Tsan visited Las Vegas and Silicon Valley in the United States to engage with key technology and innovation partners and gain deeper access to US-based start-ups in January 2024.

Comprising engineers from HTX and its innovation centre Hatch, the delegation first visited CES 2024, one of the world's best-known tech expos that is held annually in Las Vegas. Here, our Xponents visited booths from global tech firms, including those of two Singaporean start-ups - Microtube Technologies and Gyrogear.

Hatch Centre Director Mok Shao Hong and Alice Hu from the Customs and Border Protection (CBP) Innovation Team also participated in a panel discussion with representatives from the US Department of Homeland Security's Science and Technology directorate (DHS-S&T).

The HTX delegation then visited Silicon Valley, where it toured DHS-S&T's Silicon Valley Innovation Programme, interacted with executives from major tech companies, and hosted a networking event for start-ups in conjunction with BLOCK71 Silicon Valley.

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

HTX and partners announce new 5G project

HTX, the Infocomm Media Development Authority (IMDA), the Singapore Civil Defence Force (SCDF), StarHub and IBM announced a new 5G project on 13 September 2023.

The project is aimed at enhancing the operational readiness of SCDF frontliners through innovations such as smart glasses as well as Augmented Reality (AR) and Artificial Intelligence (AI) technologies that improve efficiency.

The project is being test-bedded in Punggol Fire Station – Singapore's first smart fire station.

The smart glasses that are part of the project, for example, will allow SCDF personnel to conduct AI-powered visual inspections of their equipment, thus reducing the time needed for such tasks.

Meanwhile, AR-assisted real-time remote assistance will provide SCDF commanders with live access to fire investigation specialists through real-time augmented annotations video interactions.

SEEDING INNOVATION

Read more:
https://go.gov.sg/hatch
https://go.gov.sg/demo-day

HTX's very own innovation hub

HTX's quest to enhance Home Team operations with cutting-edge technology was given a major boost on 30 May 2023 when it launched Hatch, its own innovation centre focused on public safety and security technologies.

Established in partnership with innovation platform SOSA and Singaporean technology company Knovel Engineering, Hatch serves as a collaborative platform between the Home Team and the start-up world that will provide HTX another dimension through which it can develop technologies that exponentially empower the Home Team.

Through its programmes, Hatch will examine, validate, and accelerate innovations from around the world that can address problems faced by various Home Team Departments. The start-ups will work closely with Home Team officers as well as HTX engineers and scientists to refine their products before launch.

The centre's key programmes include the biannual Open Innovation Challenge, an accelerator programme to crowdsource and validate innovative technologies from global start-ups. The inaugural challenge attracted applications from 60 start-ups across the globe, with five eventually selected for the programme.

Another programme is the Technology Scouting Programme, which actively scouts and curates emerging technologies across industry sectors.

Hatch held its first Demo Day on 24 January 2024. The start-ups that showcased their innovations on this day were the finalists from the initial cohort of 60 which joined Hatch's inaugural Open Innovation Challenge.

Cyberbee

One common challenge rescuers face is the lack of GPS coverage indoors which prevents their colleagues from pinpointing their location should they run into trouble. Imagine a firefighter lost within a massive building that has gone aflame. The consequences would be dire.

Cyberbee, a developer of compact and cost-effective navigation and localisation technology, has just the solution for this – a computer vision prototype with custom algorithms for mapping, localisation and navigation suited for environments that do not have GPS coverage.

Dr Saravana Kumar, Deputy Director (Modelling & Simulation) of HTX's Human Factors & Simulation (HFS) Centre of Expertise (CoE), hailed this innovation as a "gamer changer" and a "lifesaving technology" as it allows rescuers to quickly triangulate the location of lost or incapacitated colleagues in emergency situations.

FlyzRobotics

This tech outfit has created a "Drobot" that can cling to vertical walls and deploy sensors that provide continuous live video streaming and extended sensing capabilities for hours or days, something that would be particularly useful for gathering data for first responders in emergency scenarios.

In fact, HTX's Forensics CoE has already been working with this company to explore ways their technology can enhance forensic work.

According to Justin Tan, a senior forensic scientist at HTX, the sensors in this autonomous system allow investigators to obtain a forensic-centric situational picture and capture transient evidence, something that is particularly important for scenes where forensic officers cannot immediately gain access to, such as a post-blast scene. This paves the way for more efficient forensic scene processing and reconstruction.

NeuralGuard

This company's proprietary solutions can be used to enhance security in key installations as they enable highly accurate, automated detection of threats during the baggage screening process.

Dr Goh Ho Wee, Deputy Director (Threat Scanning & Analytics) at HTX's Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) CoE, said that Neural Guard's latest AI-powered solution is able to detect even detonators and explosives from X-ray images, thus significantly improving the chances of detecting improvised explosive devices in places like airport gate-hold rooms and border checkpoints.

"This could not have come timelier as we are now in a period of rising geopolitical tensions and we need to step up our vigilance against terror attacks," said Ho Wee.

Vayyar

This company manufactures imaging sensor products that were initially meant for detecting early-stage breast cancer. Thanks to Hatch, Vayyar's innovations, which leverage radio frequency technology to produce high-resolution real-time images, could one day be deployed for security screening purposes.

"The existing screening process is manpower intensive and its pain points have been studied. The non-invasive walk-through scanner prototype by Vayyar has proven to be feasible, scalable in detecting more objects of interest and deployable for more security applications," said Ng Jiunn Shyong, Head (Protective Security Technology) of HTX's Protective Security and Safety CoE.

Wonder Robotics

Drones are today a key asset in organisations such as the Singapore Civil Defence Force because they can be quickly deployed to provide support to frontliners as well as augment search and rescue operations.

With WonderLand, the flagship product of tech outfit Wonder Robotics, drones can be equipped with capabilities that allow them to autonomously perform tasks such as delivering packages and making emergency landings in unprepared locations.

"The new suite of features and functions that Wonder Robotics have developed with us is a key technology piece we've been eyeing for long to fit into our range of drone capabilities," said Low Hsien Meng, Lead Engineer (Aerial Systems) of HTX's Robotics, Automation & Unmanned Systems (RAUS) CoE.

"Working directly with startups like Wonder Robotics gives us flexibility in the technical approach to solve our challenge statements. I'm excited to see the solutions being implemented eventually."

REACHING OUT TO STEM TALENTS

careers@HTX

ACCELERATE YOUR CAREER WITH HTX

HTX holds inaugural job fair

To attract STEM talent and show the public the exciting work HTX undertakes to empower the Home Team, we held our first job fair, Careers@HTX, at LaunchPad @ one-north on 1 June 2023.

During the event, attendees got to meet HTX scientists and engineers, who shared about the agency's work and how it ensures Singapore's safety and security. Xponents also spoke about the agency's vibrant culture and values, which was exemplified by the colourful Lego sculptures representing the various divisions within HTX.

In addition, the HTXpress, a mobile game room, showcased to visitors the meaningful work of an Xponent and hosted several games that tested one's reflexes and pattern recognition skills.

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

A test of wits: HacX

Jointly organised by HTX and Microsoft, the inaugural HacX! - Hack for Public Safety brought pre-university, polytechnic and university students together for a hackathon that involved leveraging science and technology to do exactly what HTX does - develop solutions that enhance safety for our frontline, deter and solve crimes, and safeguard lives and properties.

Spanning 5 weeks, the challenge saw nearly 100 team applications, with 10 teams making it to the finals held at Hatch, HTX's innovation centre, on 3 November. Throughout this journey, the student contestants received mentoring from Home Team Departments and Microsoft.

Besides raising awareness about the work HTX does to empower the Home Team, the event was also a shining example of our commitment to forging meaningful industry partnerships to nurture the next generation of STEM talents in Singapore.

Wowing the crowd at the Home Team Festival

HTX was out in full force at the Home Team Festival, which took place from 24-26 November 2023, as it brought a bevvy of its cutting-edge equipment and solutions aimed at enhancing public safety, solving crimes and securing Singapore's borders.

The innovations on display included Rover-X, a robo-dog used to aid SCDF officers during HazMat operations, 3D scanning equipment for crime scene investigations, the Automated Passenger Clearance System (APCS) and the Next-Generation Border Clearance Technology, which revolutionises cross-border clearance processes.

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

Visiting Hwa Chong Institution for the first time

Reaching out to young STEM talents has always been a priority for HTX, and this was why the agency made its maiden trip to Hwa Chong Institution on 28 February 2024 to share with students the meaningful work it does in the homeland security field.

Besides playing games within the HTXpress and learning about what HTX does, Hwa Chong students also got the chance to pilot the Spirit-40 robo-dog and hear from Hwa Chong alumni who are working in HTX about their careers and aspirations.

The event also gave HTX Chief Executive Chan Tsan and Policing Programme Management Centre Deputy Director Pauline Ng the chance to hang out with their children, who were students of the school.

Read more:
https://go.gov.sg/htx-at-hwachong

Shining bright at SSEF 2024

Another major event that HTX attended in the past year was the Singapore Science & Engineering Fair (SSEF), which served as a platform for budding scientists and engineers aged 15 to 19 to showcase their talents and win a chance to represent Singapore at the prestigious International Science and Engineering Fair (ISEF).

Held in early March 2024, the event saw dozens of students experience the games within the HTXpress, try their hands at controlling the Spirit-40 robo-dog, and find out about career opportunities in the STEM field at HTX's booth.

Read more:
https://www.htx.gov.sg/news/featured-news-htx-at-ssef-2024

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

OUR CULTURE & PEOPLE

eXpresso!

HTX's eXpresso! is a unique town hall that brings people together in a relaxed and fun setting to learn about the latest happenings in HTX and interact with senior management. These casual sessions help to foster open communication and strengthen the sense of community within HTX.

Growing HTX's culture of innovation

One of the secrets behind HTX's quick growth over the past five years is our culture of openness and sharing, and this was reflected in the various events that HTX's innovation lab TIGER held in partnership with industry veterans to take Xponents behind the scenes of the innovation process.

Among these events was the Learning & Innovation Festival in October 2023 and the "Undaunted" fireside chat series, which kicked off with a talk by Marvyn Lim Seng, a near-space entrepreneur who has attempted to send the first Singaporean into outer space.

In another one of the fireside chats, HTX Chief Innovation Officer Ng Pan Yong shared how leaders can drive innovation and encouraged industry veterans to share their experiences with failure.

Shee Gim Leng, Deputy Director of HTX's Training and Learning Systems Office, also shared how he has learnt to connect possibilities and opportunities to improve products for the Home Team.

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

Undaunted Award

Recognising those who dare to fail

As an organisation that constantly experiments with technology, HTX is keenly attuned to the fact that failure is part and parcel of the innovation process and not something to be ashamed of.

To us, failure is not the opposite of success. Rather, it is an inevitable and valuable aspect in the journey towards success. As such, we encourage all Xponents to view failure in a different light - as a "classroom" that yields new knowledge which we can leverage to improve not just ourselves but the capabilities of the Home Team as well.

This is why we founded the new Undaunted Award category under the HTX Awards in 2023. As the name suggests, this award is presented to Xponents who demonstrated that they were undaunted in the face of failure and were quick at learning from mistakes to better their innovations.

"We must reframe the way we look at failure and success. There is no dichotomy here. Rather, failure is part of success. No one succeeds without first learning from the mistakes they make along the way."

HTX Chief Innovation Officer Ng Pan Yong

Family Day

At HTX, we play just as hard as we work, and this was reflected in our inaugural Xponents' Family Day Out carnival on 23 June 2023. The event gave Xponents the chance to relax and bond with their colleagues and family members over a variety of activities, including carnival rides, arcade games, and performances.

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

HTX Annual Walk & Run 2023

Aptly themed "Engineering Good Health", HTX's Annual Walk & Run 2023 on 29 November 2023 saw some 800 Xponents set off from various locations around Marina Bay and East Coast before converging at the Singapore Sports Hub for the official flag-off event.

Read more:
https://go.gov.sg/awr2023

HTX Annual Cycle 2023

The 2023 edition of HTX's Annual Cycle took participants on an idyllic course stretching from the Road Safety Park to the National Sailing Centre and Marina East Park and back. The event transitioned into a Virtual Cycling race from 8-17 September allowing teams to cycle at their own pace and record mileage with apps.

At the end of the challenge, 475 Xponents clocked a whopping 62,000km. Six individuals even cycled more than 1,000km each!

Read more:
https://go.gov.sg/annualcycle2023

Bringing the X-Factor to the Purple Parade

Our Xponents don't just have big minds. They have big hearts too.

One person who exemplifies this is Director of Platform Systems Sustainment Centre Tan Teck Chuan. An avid balloon sculptor, Teck Chuan has been crafting balloons to support charitable causes for over a decade.

On 4 November 2023, he and a team of kind-hearted balloon sculptors participated in the Purple Parade to support charities for persons with disabilities. All proceeds from their balloon sales were donated to the cause.

Additionally, a contingent of Xponents from the Building and Infrastructure (B&I) Sustainment Centre also participated in the Purple Parade and helped raise awareness and support of the event. The combined efforts of the balloon sculpture team and the B&I contingent resulted in over S$6,000 raised for charity – the highest the balloon sculpture team raised in over a decade. The balloon sculptures proved to be a big hit at the Purple Parade, and Teck Chuan's team continues to teach this craft at community centers across Singapore.

Read more:
https://go.gov.sg/htx-purple-parade-2023

"The atmosphere, the camaraderie, the joy and laughter from everyone there while soaking in all the festivities is so enriching and touching. I strongly encourage all Xponents to spend a meaningful Saturday wherever the Purple Parade is held!"

Building and Infrastructure (B&I) Sustainment Centre Director Chan Ai Lynne

National Day Awards 2023

Thirty-one Xponents received the Public Administration Medal, Commendation Medal, Efficiency Medal and Long Service Medal in 2023. Kudos to all of the awardees!

Read more:
https://go.gov.sg/ndawards2023

OUR COMMITMENT TO SUSTAINABILITY

Sustainability goes beyond trends. It is a necessary undertaking with profound implications for not just the environment but our lives.

This is why HTX has set the goals of lowering our Energy Utilisation Index and Water Efficiency Index by 10%, and Waste Disposal Index by 30%, by 2030. Furthermore, we will strive to achieve net-zero emissions by 2045.

HTX will also work with our landlords across Singapore to help them decrease their carbon emissions, as well as take steps to lower our own, including purchasing energy efficient office equipment and switching lights off during lunch hours. Educational initiatives will also be rolled out to inculcate a green mentality in all HTX staff.

Read our Sustainability Disclosure here:
https://go.gov.sg/htx-sd-23

OUR GOALS

↓10%
Energy Utilisation Index*

↓10%
Water Efficiency Index*

↓30%
Waste Disposal Index*

NET-ZERO
Emissions^

* by 2030
^ by 2045

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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

SENIOR MANAGEMENT

Mr NG Yeow Boon
DEPUTY CHIEF EXECUTIVE
(DEVELOPMENT)

Dr LIM Kia Yong
ASSISTANT CHIEF EXECUTIVE
(OPERATIONAL ICT)

Mr CHAN Tsan
CHIEF EXECUTIVE

Mr ANG Chee Wee
ASSISTANT CHIEF
EXECUTIVE (DIGITAL)
ASSISTANT CHIEF
EXECUTIVE (ENTERPRISE)

Mr CHEN Yeang Tat
DEPUTY CHIEF EXECUTIVE
(OPERATIONS)

Mr Colin TAN
ASSISTANT CHIEF EXECUTIVE
(PROGRAMMES)

WHERE WE WANT TO GO

VISION

Exponentially Impacting Singapore's Safety and Security

"HTX continues to make strides, while maintaining a relentless focus on nurturing our people, attracting top-notch talent, driving innovation and growing our footprint, not only within the Home Team Departments, but also globally.

Even as we develop, HTX will continue to share and learn from others as we forge more ties with partners from around the world. We are certain that doing so will further expand our capabilities to achieve our goal of force multiplying the Home Team.

I am also delighted that HTX is developing a compelling strategy to position itself in a world that stands to be transformed by generative artificial intelligence. This will enable it to continue to excel as the Home Team's force multiplier."

Mr Aubeck Kam Tse Tsuen
Chairman, HTX

"Since our inception, HTX has made great strides in deepening our expertise and developing transformative capabilities to force multiply the Home Team. We could not have done this without the tireless efforts of our Xponents, who live and breathe HTX's mission and values. The strategic partnerships forged with Home Team Departments, industry, academia and research institutes, and other government agencies also played a key role. Looking ahead, we are now on an exciting journey to evolve HTX into an AI-first organisation that will empower the Home Team with transformative AI capabilities. We must do this to stay ahead of the curve. We will be investing heavily in this field — training and developing our Xponents as well as hiring new AI talents. We will also redouble our efforts to strengthen HTX's culture so that we will move forward as one body with the common purpose of securing Singapore's safety, security and future."

Mr Chan Tsan
Chief Executive, HTX

UP NEXT...


TECH SUMMIT
AI AND HOMELAND SECURITY
03 - 05 Apr 2024
Sands Expo & Convention Centre, Singapore


HTX
Saving Lives
Securing Borders
Designed and Built
Safeguarding Public Spaces


INAUGURAL MAP-TXS 2024
OFFICIAL LAUNCH


HTX
Turns Five!
Celebrate with us!


HTX


Hands Across HTX
RIDING THE NEXT WAVE

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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/HTXSG