HTX (Home Team Science and Technology Agency)

Annual Report FY2021

HTX

HTX is the world's first science and technology agency that integrates a diverse range of scientific and engineering capabilities to innovate and deliver transformative and operationally-ready solutions for public safety and security.

As a statutory board of the Ministry of Home Affairs and integral to the Home Team, HTX works at the forefront of science and technology to empower Singapore's frontline of security. Our shared mission is to amplify, augment and accelerate the Home Team's advantage and secure Singapore as the safest place on planet earth.

htx.gov.sg

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→ **Watch: How HTX is force multiplying the Home Team**

why we exist

MISSION

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

Solving crimes

→ **Watch the video**

Enhancing public safety and security

→ **Watch the video**

Saving lives

→ **Watch the video**

TURBOCHARGING THE HOME TEAM

HTX is developing innovative technologies and science to force multiply the Home Team's capabilities to solve crimes, save lives, secure our borders, enhance public safety and security, and safeguard data and systems.

Click on the links or scan the QR codes to watch the videos that encapsulate the work that HTX is doing to augment the frontline to keep Singapore safe and secure.

Safeguarding data and systems

→ **Watch the video**

Securing borders

→ **Watch the video**

SECURING SINGAPORE'S FUTURE WITH SCIENCE & TECH

Motorised Stretcher for SCDF's emergency medical services

Engineers from HTX's Robotics, Automation and Unmanned Systems (RAUS) Centre of Expertise developed a prototype motorised stretcher by combining classical mechanism with modern actuation schemes to improve the operational efficiency and crew well-being of Singapore Civil Defence Force (SCDF) Emergency Medical Services (EMS).

The prototype motorised stretcher, with features including a scissors mechanism and power assistive wheel, can assist the EMS crew when they lift and load the patient, and will only need one operator, instead of three currently.

The prototype motorised stretcher will undergo further development in different phases with SCDF in the coming months. These enhancements will transform SCDF's existing manual stretcher into an automated unit that can address current concerns and better aid the EMS crew in their duties.

→ **View the key features of the motorised stretcher in the video**

"We developed the motorised stretcher with Singapore Civil Defence Force (SCDF) in mind – to improve operational efficiency by reducing the amount of labour and time required by paramedics to convey a patient to the ambulance. Combining our technical expertise with SCDF's operational experience, the motorised stretcher is designed to be easy to deploy and nimble to suit the local terrain; all of which, collectively, will enhance the conveyance experience for both the patient and the operator."

– Dr Daniel Teo, Deputy Director, Intelligence, Interactions & Inter-Ops (3i), Robotics, Automation and Unmanned Systems Centre of Expertise

Breakthrough application of moisture trapping film to reduce heat stress in personal protective suits

Researchers from HTX's Human Factors & Simulation (HF&S) Centre of Expertise and the National University of Singapore collaborated on a breakthrough application of moisture-trapping film to reduce heat stress in personal protective suits. The new composite film brings down the heat index or 'felt air temperature' by about 40%.

This research breakthrough demonstrates the positive outcome of leveraging the complementary strengths of NUS and HTX to create tangible benefits for the Home Team and the wider community. By combining the NUS team's scientific knowledge of advanced hydrogel materials and HTX's deep understanding of the Home Team's needs and engineering capabilities, the joint research team was able to customise and optimise the novel moisture-trapping material for practical applications to enhance the performance and productivity of frontline officers.
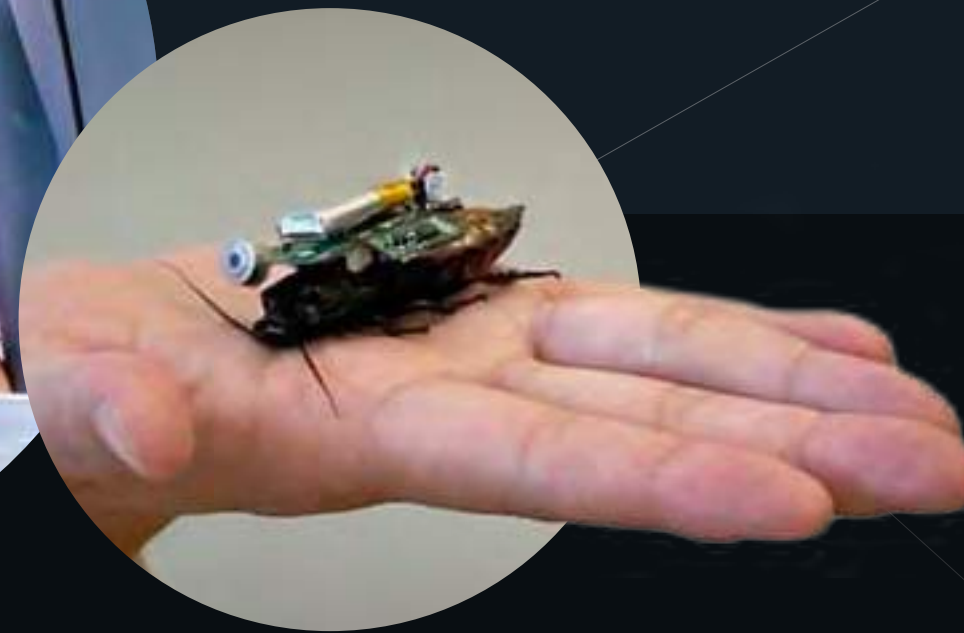
read more

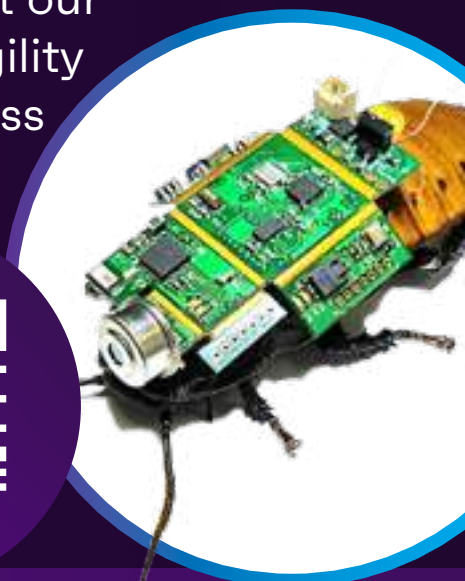## Deploying cyborg cockroaches in search and rescue missions

Using cyborg cockroaches in search and rescue missions is a shared vision between Professor Hirotaka Sato from Nanyang Technological University's School of Mechanical and Aerospace Engineering, HTX's RAUS Centre of Expertise, and Klass Engineering and Solutions.

The cyborg cockroaches will be sent on search and rescue missions with a "backpack". The tiny chip in its backpack contains a suite of devices including an IR camera, microphone, environmental sensors, and navigation sensors.

As the cockroaches navigate through the rubble, the IR camera captures and processes the images collected. The IR camera's machine learning algorithm detects thermal images of humans, successfully identifies human presence, and reports the results to frontline responders at the command centre in real-time. This enhances the entire rescue process from human detection, to location identification, to the deployment of frontline responders, to be a seamless transition with no time wasted, preserving the best chances for survivors to escape their perilous ordeal.

Deploying cyborgs cockroaches for saving lives will protect our frontline responders and, at the same time, improve the agility and efficiency of Home Team operations. The ability to mass deploy will significantly increase the odds of a successful mission and will surely boost the morale of responders on the ground.

read more

"From the findings of various studies in this project, we are hopeful that the moisture-trapping film can be embedded to Personal Protective Equipment (PPE) and/or Personal Protective Clothing (PPC) of the Home Team officers, to enhance thermal comfort and improve performance of the frontline officers."
– Ying Meng Fai, Director,
Human Factors & Simulation Centre of Expertise

"Search and rescue teams battle threatening situations in a race against time to seek out survivors during disaster rescue. To augment the Home Team's capabilities in such missions, HTX is working with Prof Hirotaka Sato to explore the deployment of a team of insect-hybrid robots (or cyborgs) in the future to navigate small and tight spaces that may be dangerous for, and inaccessible to, humans."
– Ong Ka Hing, Deputy Director,
Ground Systems, RAUS Centre of Expertise

Opening of Punggol Fire Station, Singapore's first smart fire station

The Punggol Fire Station – Singapore's first smart fire station and SCDF's 23rd fire station – officially opened on Feb. 25, 2022. It will serve as a testbed for the smart applications to be introduced to other fire stations in Singapore.

The next-generation fire station has a wide range of features leveraging cutting-edge technologies and data analytics to optimise resources and enhance operational efficiency.

The smart features in this next-generation fire station were conceptualised in partnership with SCDF. They include the automated fire station access control, grab-and-go self-checkout Automated Medical Store, and Integrated Building Management System (IBMS) for the automated control of the building's sub-systems such as air-conditioning, mechanical ventilation fans, and lighting. The IBMS optimises energy consumption, one of the key thrusts that makes the fire station environmentally sustainable.

→ **read more**

"As SCDF transforms itself towards an organisation driven by data and technology, the traditional fire station also needs to transform itself into a Smart Fire Station, which harnesses leading-edge technologies such as sensors, analytics and automation.

A Smart Fire Station will help SCDF to improve both its operational and administrative effectiveness, thereby bringing a more effective and efficient service to members of the public."

– Ling Kok Yong, Director,
Civil Defence Programme Management Centre

Dressed to save: HTX's wearable exoskeleton

The soft exoskeleton, also known as exosuit, is a wearable technology that supports the torso and redistributes part of the load away from the spine during operations. By reducing repetitive stress on responders, injury rates are reduced. This means shorter recovery time so that responders can be deployed more readily.

HTX designed and conducted a trial to study the efficacy of soft exoskeletons and assess if the application would enhance SCDF's capability and resilience in emergency response operations, in particular those that impose high physical loads on the responders.

The soft exoskeleton is designed to passively generate assistive forces due to the natural movement of the responders.

Unrestricted range of motion, speed, and agility are especially critical for successful task performance of responders. Weighing less than 3kg, the soft exoskeleton is easy to don or doff and adjusts seamlessly to the responder's natural postures and movements.

Features of the exoskeleton include chest pads that support the chest when leaning forward. It redistributes the pressure and at the same time provides support without hindering the responder's body movements. Structures help fit the soft exoskeleton around the chest and pelvis while allowing for width and length adjustment to suit wearers of different heights. Smart joints reduce the responder's strain on the lower back and an on/off switch activates the assistive force.

"Seeing the potential in using the soft exoskeleton to ergonomically augment Home Team frontline responders to perform their roles, we made it our mission to design a rigorous trial to assess the suitability of using soft exoskeleton for emergency operations. The trial provides SCDF with a deeper understanding on how best to reap the most out of the exosuits, in function and efficacy, and hopefully reduce accumulated fatigue and stress on frontline responders, especially in the face of the pandemic."

– Ying Meng Fai, Director, HF&S Centre of Expertise

→ **read more**

Rover-X and Common Robotics Dashboard

Rover-X, a four-legged robotic dog, can be used in missions that are highly risky, and to partner frontline officers in their security patrols. It has been developed to move through a variety of difficult terrains and overcome obstacles. As opposed to a robot on wheels or tracks, Rover-X has greater mobility as it can go up and down stairs and curbs.

It is also ideal for high-risk missions. For example, imagine there's a chemical plant with a hazardous gas leak. Instead of sending emergency responders from the SCDF to the plant to find out where the gas leak is, Rover-X can be deployed to the chemical plant where it can sniff out the noxious gases with the gas sensor on its body.

Rover-X is one of the many robots that HTX's RAUS Centre of Expertise is developing. "As part of our overall robotics strategy, we are exploring the use of different types of robots for different roles, thus we are developing a variety of robots for a wide range of purposes," said Ong Ka Hing, Deputy Director, Ground Systems, RAUS Centre of Expertise.

The RAUS engineers are also developing a Common Robotics Dashboard to allow officers to deploy and control a wide range of robots to multiple locations and on a variety of missions.

"Without the Common Robotics Dashboard, the Home Team's user cognitive workload will be increased as they need many officers to operate different types of robots. The Common Robotics Dashboard's ability to enable officers to command multiple robots simultaneously will help officers focus on managing critical tasks," Ka Hing said.

"The development of Rover-X will transform the way homeland security operations are carried out in the future. This is part of the robotics strategy that HTX is helming, in partnership with the rest of the Home Team. Rover-X adds to HTX's array of ground robots and offers different mobility options and payloads to support diverse homeland security operations. Its deployment will enable the Home Team to achieve enhanced efficiency and effectiveness."
– Cheng Wee Kiang, Director,
RAUS Centre of Expertise

→ **read more**

Xavier goes on trial at Toa Payoh Central

Xavier, an autonomous ground robot, made its debut on Sept. 5, 2021 at Toa Payoh Central, in a three-week trial to patrol and survey a public area with high foot traffic to augment the work of public officers in enhancing public health and safety.

The trial was a joint project involving five agencies, namely HTX, National Environment Agency, Land Transport Agency, Singapore Food Agency, and Housing & Development Board.

Xavier is fitted with an array of sensors, including safety features, to enable it to navigate autonomously and avoid stationary and dynamic obstacles such as pedestrians and vehicles along its patrol route. It is also equipped with cameras that can provide 360-degree video feed to the command and control centre. Data captured from Xavier's cameras are streamed to a video analytics system with artificial intelligence capability developed by HTX's in-house computer vision engineers. With real-time sensing and analysis, public officers can gain insights on these behaviours more efficiently and effectively, and activate additional resources to respond to on-ground situations when necessary.

Xavier is similar to HTX's Multi-purpose All-Terrain Autonomous Robot (M.A.T.A.R.) that was developed by HTX and the Agency for Science, Technology and Research's (A*STAR's) Institute for Infocomm Research (I²R). M.A.T.A.R. has been developed by the Singapore Police Force (SPF) as patrol robots to support frontline operations during major security events such as during National Day parades, Marina Bay Countdown, and Chingay.

"HTX's ground robots are highly versatile and can be customised for broad and widespread application in different fields and operational environments. With Xavier, we are able to force multiply agencies beyond the Home Team by augmenting their workforce needs and achieve greater operational efficiency on a single robotics platform. This synergy enables government agencies to build a strong ops-tech ecosystem and continue enhancing public health and safety."
– Cheng Wee Kiang, Director, RAUS Centre of Expertise

→ **read more**

eNose: The Nose that knows

The eNose is an intelligent chemical sensor developed to detect anomalies present in the air. Its name is derived from how it mimics the human nose by sniffing out strange scents, but it is also capable of detecting odourless gases, which the human olfactory system cannot pick up.

The eNose consists of an array of four metal oxide semiconductor sensors, which respond to gases present in the air through a reaction between the gas and the metal oxide surface. Each semiconductor sensor responds differently to each class of chemical compounds.

Upon detecting anomalies in the air, the eNose will alert SCDF of the detection via SMS, prompting SCDF personnel to check a web-based application that shows a map indicating which eNose(s) triggered the alert. The eNose functions 24/7, improving the timeliness of SCDF response as they no longer need to depend solely on information from the public or reports from first responders before taking action, but can rely on instantaneous alerts from the eNose. When deployed as a fixed network, the eNose could also track the development of hazardous material plumes for public protection planning and triangulate the potential source of release.

In addition, to overcome the problem of emissions being blown away by the wind before SCDF personnel arrive, CBRNE Centre of Expertise is experimenting with incorporating an auto-sampler to collect air samples promptly for analysis, and will enable mitigation measures, if any, to be executed in a timely manner, significantly improving the efficiency of SCDF in responding to anomalies in the air.

→ **read more**

"We are envisioning a future with a network of eNose that can aid our first responders to respond efficiently and mitigate chemical threats."
– May Ong, Director,
Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Centre of Expertise

Digital Driving Licence

Singapore's first Digital Driving Licence (Digital DL) was launched on March 7, 2022 by HTX and SPF, in collaboration with the Government Technology Agency (GovTech).

Residing within the Singpass app, the Digital DL is an alternative official identification document for motorists in Singapore.

The Digital DL comes with a number of measures to protect personal information. Authentication is needed to access the user's full details, and an animated and holographic lion crest displayed on the Digital DL will deter image tampering and screenshot spoofing.

In addition to displaying identification details, the digital DL will also displays accurate, up-to-date information useful for drivers. These include the issuance date, driving licence status, number of demerit points accumulated, and eligibility for the certificate of merit when buying motor vehicle insurance.

In designing the user interface and user experience for the Digital DL, the HTX and SPF team sought feedback from ground officers to customise the Digital DL to prioritise information critical to their work into design, so as to cut down their enforcement turnaround time.

→ **read more**

"The Digital DL will enable our Traffic Police to carry out their duties more efficiently and provide motorists with a convenient, secure, and most up-to-date way of verifying their driving licence information."

– Bernard Phang, Director,
Policing Programme Management Centre

Numbers at a Glance

15
Centres of Expertise

6
Programme Management Centres

4
Capability Sustainment Teams

8
Capability Planning Teams

1,500
Xponents

Our Science & Tech Capabilities

DIGITAL

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

SCIENCES

- Biometrics & Profiling
- CBRNE
- Forensics
- Human Factors & Simulation

ENGINEERING

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

CROSS-DOMAIN

- Disruptive Technologies Office
- Q Team

HTX'S JOURNEY IN FY21/22:
Some highlights

Apr 1, 2021 to Mar 31, 2022

APRIL 2021

- **HTX 10K steps** event to bring HTX officers from satellite sites to HTX HQ and explore our neighbourhood

- Launch of **HTX Values Co-Creation** Project

- **CBRNE Centre of Expertise** featured in CBRNe World magazine

JUNE 2021

- **Motorised stretcher prototype** in the news

JULY 2021

- **E-commerce surveillance tool** for contraband goes on trial

- Launch of HTX's e-magazine *TechXplain*

- Four Xponents receive 2021 **Minister for Home Affairs National Day Award (Individual)**

AUGUST 2021

- MOU with **Australian Federal Police**

- Development of **eNose** to sniff out anomalies in the air

- Launch of Operational Medical Networks Informatics Integrator **(OMNII)**

MAY 2021

- Over 1,200 people attend HTX's **TechXplore** exhibition

- **Online Cybersquat Hunter,** a fake website detector, in the news

SEPTEMBER 2021

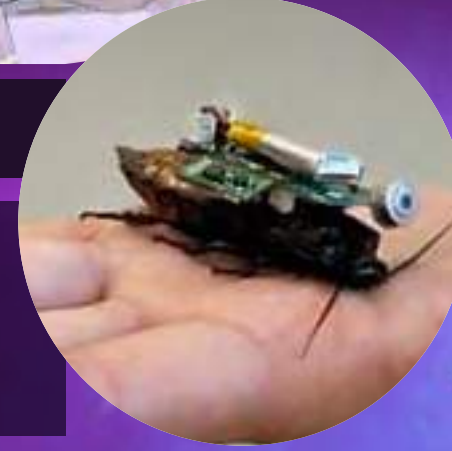- **Xavier** debuts at Toa Payoh Central

- HTX participates in the **Beauvau de la Sécurité** organised by the French Ministry of Interior

DECEMBER 2021

- HTX's **second birthday!**

- **Cyborg cockroaches** for search and rescue missions in the news

- Inaugural **HTX Investigators' Challenge** takes place

MARCH 2022

- Launch of **Digital Driving Licence** in the Singpass app

- CE leads working trip overseas and delivers keynote address at the **Fusion Forum** organised by the UK Home Office

- NUS and HTX researchers announce breakthrough application of **moisture trapping film** to reduce heat stress in personal protective suits

OCTOBER 2021

- HTX participates in the 2021 inaugural **Silicon Valley Innovation Program Demo Week**

- Launch of **HTX-Thales Co-Lab**

- **Soft exoskeleton** for first responders debuts to the media

- HTX receives 24 **Minister's Awards**

- HTX supports the **Purple Parade**

JANUARY 2022

- **Rover-X and Common Robotics Dashboard** go on trial

FEBRUARY 2022

- HTX and Microsoft announce strategic agreement to develop Singapore's **first sovereign cloud**

- Opening of **Punggol Fire Station**, Singapore's first smart fire station

CONNECTING MINDS

2ND TechXplore

More than 1,200 people attended HTX's TechXplore exhibition in May 2021, of which 930 attended it virtually.

Themed "Future Proofing Singapore's Safety and Security", the event brought together experts, leaders, government and Home Team Department officers, and Xponents to share knowledge, exchange insights and collaborate on innovative science & tech for homeland security.

The event showcased science & tech solutions in engineering, digital and science, including drone detection and take down capabilities, fake website hunter & e-commerce surveillance, and visual stress analysis.

Engineering Zone

Digital Zone

Sciences Zone

Some prominent guests included Second Minister for Home Affairs Mrs Josephine Teo, Minsters of State for Home Affairs, Assoc. Prof. Faishal Ibrahim and Mr Desmond Tan, as well as Chairman and members of the Public Service Commission

Assoc Prof Muhammad Faishal Ibrahim
17 May at 12:44 ·

I was shown the transformative Science and Technological (S&T) capabilities that HTX is developing for the Home Team.

With competencies cutting across the fields of engineering, digital and applied sciences, officers demonstrated solutions in harnessing drones for emergency operations like medical responses, making sense of data for command and control, and forensics to investigate fires and cybercrimes.

Our S&T talent are working at the forefront of technology and I am excited by the possibilities they bring to enhance Home Team operations!

#HTXSG #HTScienceandTech #OneHomeTeam

Desmond Tan 陈国明
11 May at 15:07 ·

Visited HTX TechXplore last week at the new HTX HQ@Mediacorp Campus. Was impressed by the suite of Science & Tech capabilities that HTX is building up with its team of experienced and young engineering talents. Can sense their passion and excitement to develop cutting edge solutions in support of the Home Team. Counter drones, data analytics, forensics, first aid response, etc, are some examples of exciting tech and digital solutions developed in house or tailored to needs. With increased pressure to meet higher ops tempo, coupled with manpower constraints, technology is a key multiplier to improve home team's operational effectiveness. #mha #htxsg

194

6 comments 9 shares

1 comment 14 shares

170

"We really enjoyed the visit and to see the development of HTX. It is a very good start to the new venture."

– Lee Tzu Yang, Chairman, Public Service Commission

Feedback from Home Team officers:

A good job done by the committee given that we were suddenly reverted back to heightened alert for Covid-19. Thank you for the effort.

TechXplore is a very good platform to have better insights of projects that can potentially be scalable to use cases Home Team-wide!

Learnt a lot about the tech developed by HTX (very wow-ed by our in-house capabilities)!

Overall excellent display and presentation. Could feel the enthusiasm and effort of exhibitors and ambassadors. Thank you!

Really an amazing effort for TechXplore and having the content pre-filmed allows for even more officers to know of the developments and for maximum outreach across MHA.

Very well-organised event. Superb effort from the organising committee and those involved in putting up the exhibits.

ENGAGING YOUNG STEM TALENT

Inaugural HTX INVESTIGATORS' CHALLENGE

On Dec. 20, 2021, HTX launched her first-ever HTX Investigators' Challenge (HTXIC), which took place in a three-dimensional gamified world.

Participants came together to help uncover and stop a terror attack as they competed in over 50 Capture-the-Flag (CTF) challenges that offered a glimpse of the work that HTX's scientists and engineers do to keep Singapore safe and secure.

HTXIC attracted more than 1,400 students from Junior Colleges, Institutes of Technical Education (ITEs), Polytechnics and Universities as well as fresh graduates from Institutes of Higher Learning. The Challenge eventually saw 500 participants in 118 teams race against the clock to win a top prize of S$10,000.

Second Minister for Home Affairs Mrs Josephine Teo said, "Unlike other hackathons, here you also get a chance to experience what some of our HTX scientists or engineers do behind the scenes to keep Singapore safe and secure."

read more

Minister officiated the challenge in the virtual world through her avatar

"It is so heartening to see so many young people... come together to pit your wits and skills against one another in this special Capture-the-Flag event."

– Mrs Josephine Teo, Second Minister for Home Affairs

"Gamifying the Capture-the-Flag experience allows us to create a fun and engaging environment for participants to learn about the science & tech ecosystem of homeland security."

– Lee Kok Thong, co-chairman of HTXIC, and Director of Cybersecurity Centre of Expertise

Participants' view of the challenge at the F1 Grandstand in the virtual gamified world

COLLABORATING WITH PARTNERS

from governments, industry, academia and research institutes in Singapore and abroad

Local Government Agencies

DSO
NATIONAL LABORATORIES

DSTA
Defence Science & Technology Agency

GOVTECH
SINGAPORE

CSA
SINGAPORE

HSA
Health Sciences Authority

IIM
INFOCOMM MEDIA DEVELOPMENT AUTHORITY

SMART NATION
& DIGITAL GOVERNMENT OFFICE

S&TPPO
PUBLIC SECTOR SCIENCE & TECHNOLOGY POLICY & PLANS OFFICE

Research Institutes & Universities

Industry

Our partners from further afield

Exchanging ideas and knowledge
in local and international forums

MOU with the Australian Federal Police (AFP) on working collaboratively to harness science & tech to combat crime. With this partnership, HTX and AFP will share knowledge in forensics and technology and innovate together.

→ **watch the video**

DCE (Development) Ng Yeow Boon and Dr Saravana Kumarasamy (HF&S Centre of Expertise) joined the 7th roundtable session of the inaugural **French Ministry of Interior (MOI) Beauvau de la sécurité**, to share on how HF&S equipment and technologies can augment frontline operations.

→ **read more**

DCE (Operations) Chen Yeang Tat represented HTX as a panellist at the **2021 inaugural Silicon Valley Innovation Program Demo Week** organised by the United States' Department of Homeland Security (DHS). The panel, titled "Global Perspectives on Pandemic Future Proofing", discussed key homeland security lessons learnt by countries during their management of the pandemic and how countries can leverage science & tech to prepare for the future pandemics.

→ **read more**

HTX and Thales form first CO-LABorative Partnership
HTX and Thales launched the HTX-Thales Co-Lab to co-create game-changing science & tech solutions in homeland security through experimentation, and the building of prototypes and proofs-of-concept.

→ **read more**

HTX and Microsoft announced a strategic agreement to develop a sovereign cloud to accelerate digital transformation and innovation for HTX and MHA. The agreement included new skilling, job development, and training initiatives.

→ **read more**

CE's keynote address at the **2022 Security & Policing** event organised by the UK Home Office.

HTX entered into a **strategic partnership for innovation with Israeli deep-tech company Cellebrite** in the area of digital forensics.

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

WHAT XPONENTS SAY ABOUT HTX

Xponents, that's the name we call ourselves!

Arka Ray
Engineer, Q1,
Q Team CoE

HTX to me means working behind the scenes to maintain the very peace in Singapore that allows families to not have to worry if their children are safe in the middle of the night. That drives me to create better solutions and products that enhance our safety and keep us a step ahead.

Aw Rui Huan
Engineer, Ground Systems,
RAUS CoE

Being in HTX means that I can explore my interest in engineering. It is also a place where one can develop meaningful solutions for the Home Team and work with like-minded individuals. It motivates me to do better whenever I see our solutions improving the efficiency of the Home Team.

Cassie Ong
Engineer, Biometrics,
Biometrics & Profiling CoE

My favourite part of the job is that we get to trial new technologies with Home Team Departments and the public, which gives us much more relevant and practical insights into the technology and its usability.

Chong Yong
Scientist, Research, CBRNE CoE

"

HTX gives me a sense of purpose knowing that my work can contribute to keeping Singapore safe. There are plenty of opportunities for me to learn from scientists who have years of experience in this field, allowing me to constantly hone my skills and be inspired to achieve greater things.

Anna Teo
Senior Materials Analysis Officer, Forensics CoE

"

Every day is always a fresh day with new challenges waiting for me to accomplish. However, with supportive team members around, my day becomes less stressful and more meaningful.

Nicholas Lee
Principal Consultant, Performance-Based, Protective Safety & Security CoE

"

I love how HTX is constantly building an inclusive culture to bring Xponents together. eXpresso! sessions are great for reaching out to everyone. Creating Communities of Interest is just another great way for Xponents to connect over our common interests.

Goh Jie Xiang
Engineer, Enterprise Systems, Joint Capabilities Programme Management Centre

"

My work here at HTX is meaningful as I know that my projects help in the operations of the various Home Team Departments, in line with the bigger vision of keeping Singapore safe.

Valencia Yoong
Engineer, Cloud Transformation Team, Joint Capabilities Programme Management Centre

"

HTX provides plenty of growth opportunities. There's never a dull day when you're exploring cybersecurity and cloud domains through projects that span Home Team Departments.

Pauline Ng
Deputy Director, Investigation Systems, Policing Programme Management Centre

Unique. It is a place where scientists and engineers come together to support Home Team agencies, and it covers a diverse range of scientific, engineering and digital technologies (almost everything!). It is also a place that fosters a culture for innovation at all levels.

Xu Yuan Xing
Engineer, Modeling and Simulation, Human Factors & Simulation CoE

HTX is a place where new ideas and innovations are constantly surfaced and developed. The ability to impact Home Team officers' lives and operations keeps me going daily and the opportunity to be exposed to new technologies makes my job interesting.

Dr Saravana Kumar
Deputy Director, Modelling & Simulation, Human Factors & Simulation CoE

HTX embraces a culture of innovation and collaboration where all of us are encouraged to excel and realise our true potential. Underpinning this is the spirit of service to the Home Team and nation as a whole that motivates and drives me to achieve greater heights. It is for all these reasons and more that I found my calling in HTX.

Trevor Heung
Engineer, Protection & Special Ops Capability, Vehicle Systems Land Systems CoE

HTX is a place where I can connect my Engineering knowledge (from tertiary education) and Operational experience (from my Police NS days) together. The challenge to find the right technology and solution to augment the Home Team has always been an excitement to me.

Elfeiz Fadhil
Head, Governance & Audit,
Marine Systems, Platform Systems
Sustainment Centre

" *In HTX, I work with the brightest, friendliest and most hardworking people. I couldn't ask for more effective mentors who have served as my role models and have helped with my professional growth. I am also grateful for the opportunity to work on wide-ranging projects such as decommissioning, disposing, and the acquisition of the replacement vessels.*

→ **read Elfeiz's story**

Roi Tai
Head, Frontline Mobility
Systems,
Civil Defence Programme
Management Centre

" *I find the work that we do at HTX very meaningful. It gives me great satisfaction knowing that my contribution in project OMNII (Operational Medical Networks Informatics Integrator) helps SCDF bring emergency care faster to save lives and improve patient outcomes.*

Beh Ming Wei
Engineer, Sustainment Plans
and Policy, Ops Systems
Sustainment Centre

" *At the Ops Systems Sustainment Centre, our work directly impacts the lives of Singaporeans as downtime of ops systems affects operations on the ground. Having the opportunity to work on the Home Team Sustainment Centre has been an eye-opener for me.*

Jason Ng
Data Scientist,
Risk Profiling Analytics,
Data Science & AI CoE

" *HTX provides many opportunities for me to enrich myself, so that I can better design ways to equip the Home Team Departments with better technical and operational capabilities.*

FOSTERING A SENSE OF COMMUNITY

Xponents started FY2021 with our 10,000 steps challenge and made huge strides throughout the year building up our culture and community. The Covid-19 circuit breaker might have kept us working from home, but we continued to build our camaraderie through virtual events including eXpresso! and house challenges.

Co-creating our HTX values

HTX values workshops

For a young organisation like HTX, a slew of initiatives have been launched to build the HTX culture brick by brick.

A microcosm of more than 200 Xponents particpated in eight values co-creation workshops to identify the HTX values in April 2021.

Following the roll-out of the HTX values, Xponents across HTX participated in a half-day immersive and experiential session designed to help Xponents understand, embrace and apply the HTX values.

CHEER
CHECKS
cherish

eXpresso! 22 April 2021

eXpresso!

10 **eXpresso!** or Town Hall sessions held with an average of 800 participants per session

HTX

HTX Can-Tab Challenge

HTX HOUSE CHALLENGE

An original initiative for staff to compete in various challenges such as the HTX Virtual Cycle, HTX Arcade and HTX Can-Tab Challenge.

All HTX officers are grouped into five houses to facilitate mingling across the different work teams and foster the HTX culture.

HTX Virtual Run

Nov. 27 to Dec. 12, 2021

HTX Virtual Cycle

June 26 to July 11, 2021

conneXus

172 Xponents recognised for their eXtraordinary work with a **"Thanks a Latte"** from senior management

Feel Good Friday

A brand new initiative for Xponents to keep Friday afternoons free to engage in an exciting range of TGIF! activities the HTX way.

T Team Time: get to know your team better

G Growth: time to learn more

I Introspection: reflect, think, or catch up with email

F Fun: join HTX House Challenge activities, Community of Interest (COI) meet-ups, and other activities to get to know more Xponents

! eXpresso!: bimonthly townhall

110 Xponents received the **inaugural HTX Awards**. The HTX Awards aim to recognise and appreciate outstanding HTX officers and teams in various areas as we work towards making HTX a great place to work

HTX Awards 2021

Congratulations to 110 Xponents at the inaugural HTX Awards 2021!

GIVING BACK TO SOCIETY

Milky Way takes off

HTX collaborated with The Caffeine Experience (TCE), a social enterprise cafe that provides employment and training to ex-offenders, on a cafe for Xponents at our HTX headquarters. In supporting TCE, Xponents now have a place to have good coffee, mingle, and connect with friends at HTX.

"Tasty and power local Kopi to start the day!"

- Jenny Khoo, Head, Financial Operations, Corporate and Finance

"Great to have a cafe at HTX HQ where we can grab a coffee and connect with fellow Xponents. Milky Way has been my go-to place whenever I'm at HTX HQ for meetings.

The lattes are as good as any outside cafe, prices are reasonable, and the staff are friendly and professional."

- Benson Lim, Head, Security & Mobility Systems, Operations System (Infocomm), Policing Programme Management Centre

HTX supports the Purple Parade

At HTX, purple represents creativity, innovation and independence – qualities essential in science & tech that propel the HTX community to keep exceeding expectations.

In October, over 100 Xponents across all functions and locations decked themselves out in their HTX purple polo t-shirts in support of Purple Parade, a movement that promotes inclusion and celebrates the abilities of persons with disabilities.

→ **read more here**

"Everyone is unique, special and equal. Let us stand in solidarity with and celebrate the abilities of our friends with special needs. Let's Go Purple!"
- Chan Tsan,
Chief Executive

"Let's celebrate as we move towards an inclusive society where every individual is equal."
- Immigration & Checkpoints Programme Management Centre (ICPMC) Team

"We are glad to show our support for persons with disabilities & the purple parade. We should embrace differences and support each other!"
- Heng Chai Liang and Randy Tan,
Protective Security and Safety (PSS)

where we want to go

VISION
Exponentially Impacting Singapore's
Safety and Security

"The past year continued to be a challenging time because of the Covid-19 situation. Despite this, HTX worked closely with the Home Team Departments and partners to push ahead with many ground-breaking projects that help improve the effectiveness and efficiency of Home Team operations. HTX also aimed to better synergise support systems across the Home Team, thereby creating new opportunities for collaboration and joint operations. All these efforts have helped to bring the Home Team concept to a higher level.

But there is more that we can and should do. HTX will strive to be at the forefront of relevant science and technology, and deepen our capabilities in areas that are relevant to the Home Team. We will work hard to ensure good ops-tech integration, so that our science & tech value-add remains highly relevant for the frontline units. Through doing so, we hope to exponentially enhance Singapore's safety and security.

Mr Chew Hock Yong,
Chairman, HTX

"While still in our infancy, HTX has made significant contributions to the Home Team by innovating and developing technologies to save lives, solve crimes, secure our borders, and enhance public safety and security. The projects and capabilities cited in this annual report are just some examples.

Moving forward, HTX will redouble our efforts to add value to, and force multiply, the Home Team to keep Singapore as the safest place on Earth.

At the same time, we also want to create value for all Xponents – that each person finds meaning, joy and fulfilment in the work he/she does, and views HTX as the best place to be in."

Mr Chan Tsan,
Chief Executive, HTX

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Ministry of Social & Family Development

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