The X factor

The new Home Team Science and Technology Agency (HTX) is the world's first to integrate diverse scientific and engineering capabilities to take homeland security to the next level. The Straits Times takes a look at some of the technologies.

SAFEGUARDING BORDERS

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR AND EXPLOSIVES TECHNOLOGY

Cargo coming into Singapore is subjected to X-ray and radiation portal monitor scanning. Cargo with any anomalies detected from the initial scan will go through secondary checks.

During secondary checks, a team of two officers will be deployed to screen cargo using primary radiological, chemical and explosives detectors in this sequence:

1 Chemical detection

Handheld chemical detectors (below) will be used to detect and identify any chemical agents in the form of vapours and aerosol.

2 Explosives detection

The officer will obtain swabs from the cargo (right) and test them using a highly sensitive bench-top system for the real-time detection and identification of trace amounts of explosives and narcotics.

3 Confirmatory analysis

- Swabs and samples with positive detection will be taken back to the laboratory for confirmatory analysis using analytical instruments.
- The checks have detected many cases of drug abuse through swabbing of the vehicles and the drivers.

Biosurveillance

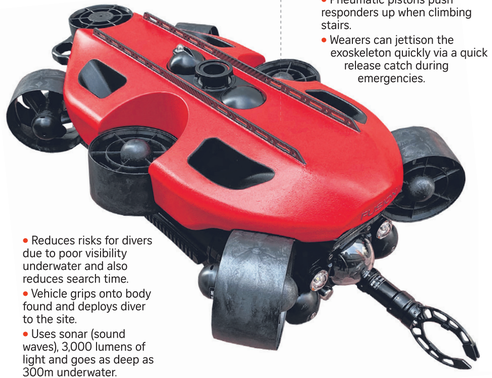
Samples from the bus hall are collected and analysed for presence of biological agents anthrax, tularemia, plague and smallpox. This screening helps to provide early warning of a biological attack.

Chemical detector AP4C detects nerve agents, blister agents, flammable and explosives precursors in vapour and aerosol forms.

SAVING LIVES

ROBOTICS AND UNMANNED SYSTEMS

1 Underwater remotely operated vehicle



- Reduces risks for divers due to poor visibility underwater and also reduces search time.
- Vehicle grips onto body found and deploys diver to the site.
- Uses sonar (sound waves), 3,000 lumens of light and goes as deep as 300m underwater.

2 Exoskeleton

- Reduces muscle stress by allowing responders to carry heavy firefighting equipment with greater ease.
- Up to 40kg of load-bearing will be transferred from the wearer to the exoskeleton, while pneumatic pistons assist in movement.
- Pneumatic pistons push responders up when climbing stairs.
- Wearers can jettison the exoskeleton quickly via a quick release catch during emergencies.

SOLVING CRIMES

DNA TECHNOLOGY

- Provides DNA forensic support to help with criminal investigations.
- All-in-one rapid DNA system that allows quick identification of individuals within two hours.
- Another tool, DNA Phenotyping Lab-On-Chip, provides quick leads for gender, blood and biogeographical groupings.

Alternative light source, Leeds LSV2, to enhance visualisation of forensic evidence not easily visible to the naked eye.

Source: MINISTRY OF HOME AFFAIRS
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