

Lieutenant-Colonel Lian Wee Teck, Director Hazmat Department, Singapore Civil Defence Force, talks to *CBRNe World* about enhanced bio-detection, nanotechnology and the SCDF's hopes for GSA 2009

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**CW: Is there any desire to increase the SCDF's mobile biological detection capability to a higher standard and to include pre-positioned detectors? Is there any attraction in working with the Department of Health to combine health monitoring – for SARS, avian flu, etc and for more exotic agents such as anthrax and Y. Pestis – through permanent bio-detectors, along the lines of Bioshield? The ICA has invested in a new laboratory for analysis of samples – is this a path the SCDF might follow too?**

LWT: The SCDF started building bio-detection capabilities in 2002, which enabled field sampling, detection and identification at site. The SCDF's focus for point-source releases, like "white powder" incidents, would be to provide field detection and identification at incident sites. As such, we continuously work to enhance our field testing capabilities to ensure accurate information can be provided to make informed decisions to effectively manage the incident. Different types of BA detectors are employed for detection and verification, utilising technologies such as DNA fluorescence, immunoassay and Polymerase Chain Reaction (PCR). Our Hazmat Control Vehicle includes facilities where such tests can be conducted safely. Further laboratory analysis of samples collected would still be provided by the National Laboratories.

**CW: You have recently increased the radiological capability of the SCDF with the new radiological containment and detection teams. How have these worked out, and will this capability been increased, either in quantity or capability?**

LWT: Over the last few years, SCDF has progressively built-up its radiological handling capability, including the procurement of specialised radiological equipment and vehicles. One such example is the commissioning of a newly customised radiological vehicle that is fitted with integrated detectors and software for wide-area monitoring. Besides specialised equipment for detection and identification, all SCDF first responders are also equipped with individually issued radiological dosimeters for personal monitoring.

**CW: What low-level CBRE challenges has the SCDF faced over the past 12 months? Have white powder incidents, for example, lessened? Are you handing over more white powder incidents to the police, unless there has been serious "chatter" that there might be an attack?**

LWT: The SCDF works closely with the police to provide critical field information to investigate reports of white powder cases. Besides conducting biological field tests, SCDF responders also screen for the presence of radiological or chemical agents. As far as possible, we will seek to identify the material using either Fourier Transform Infrared (FTIR) spectroscopy or Raman technology. In many cases, the SCDF's detection has identified the powders as non-threat; for example, normal talcum powder, bleached flour, fire extinguisher dry powder or plaster compounds, to name a few. This has helped the police in their investigations and also reduced



Mass decon and detection have long been strengths of SCDF's response ©CBRNe World

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the need to send such hoax samples for costly laboratory analysis.

**CW: Singapore has been very good at looking at other nation's incidents – such as 7/7 in London – and learning from them. Have there been any recent incidents that you have seriously considered – such as the ricin incident in Las Vegas, the Litvenenko incident or the anthrax clean-ups in the UK?**

LWT: SCDF has been closely monitoring the development of incidents involving CBRNE in all parts of the world. SCDF will continue to work on this approach to enhance not only response but also preventive measures to avoid related incidents from happening in Singapore. For example, SCDF closely monitors its licensing and regulations to prevent potential misuse of security-sensitive materials, as we have observed there is a growing trend overseas where non-traditional sources such as toxic industrial chemicals (TICs), explosive precursors, industrial radioactive materials, and flammable materials have been exploited due to their relative ease of availability.

**CW: Many other forces are looking at trying to bring the forensic understanding of the first responders up to a stage where they don't lose evidence. Fire services throughout the world are often credited with being the worst offenders for this, since their focus is saving lives. What is the SCDF doing about this?**

LWT: While forensic evidence is crucial to the investigation of the case, the primary concern for the SCDF is still to save lives. The SCDF and Singapore Police Force (SPF) have been working closely in developing joint standard operating procedures (SOP), however, to integrate our response so that each agency's goals can be achieved.

Various steps have been taken to operationalise this SOP. Firstly, the training of first responders in basic forensics would provide them with the ability to recognise certain objects which may hold critical evidence and minimise unnecessary damage.

Secondly, responders can also establish protocols which would reduce interference with the scene. Thirdly, we are working together with our forensics counterparts from the police on training and procedures for entering the hot zones together with first responders, if it was so required, for the collection of evidence.

The SCDF and SPF also hold joint exercises. As each agency is an expert in its own field, having regular joint exercises promotes further co-operation and sharing of expertise, and also allows agencies to fine tune the co-ordination aspects when both agencies are required to respond to the same incident.

**CW: What are the next developments in the SCDF's CBRE capability in the next three – five years? What are you looking forward to seeing at Global Security Asia?**

LWT: The next few years will be a challenging yet exciting phase in the SCDF's CBRE developments. In addressing the CBRE threat, we adopt a two-pronged approach: first, to continually enhance the skills of our frontline responders in providing effective response, and second to leverage on emerging technologies and innovations.

For the first approach, we are currently revising upwards the skill set of our frontline responders based in the fire stations. The intention is to significantly increase the number of hazmat specialists who are able to effectively sample and mitigate CBRE incidents. This will definitely enhance our island-wide CBRE response, as all our fire station personnel will be equipped with additional specialist know-how and tools. We have also looked into implementing a more realistic training for our frontline responders through the use of live agents like Technetium-99m (radiological agent), DMMP (simulating sarin), chlorine and ammonia. Responders will then be able to receive actual readings on their detectors, hence adding realism to the exercise.

Our second approach will be to leverage emerging technologies and

innovations. The hazmat department in SCDF Headquarters will be the bridge between the operational and science realms. The SCDF is certainly keen on exploring and researching the very latest that technology has to offer. In particular, the SCDF has identified acoustic technology and nanotechnology as areas of interest. Acoustic technology can be used to quickly inspect sealed containers to identify liquid and bulk solid contents, including chemical warfare agents and industrial reagents. The device will be beneficial in our approach to suspicious items, in order to verify their contents. Such technology also makes these determinations non-intrusive, thereby protecting our responders and the public from disastrous exposure to lethal vapours from hazardous materials.

Meanwhile, nanotechnology can potentially pave the way for the development of highly sensitive detectors for safety and security applications – enabling the detection of CBRE materials even at minute quantities. In addition, nanotechnology can be employed together with ergonomics to revolutionise the design of detectors – for example, in producing miniaturised detectors. Detectors utilising nanotechnology offer advantages such as easier deployment and broader coverage. Using such detectors will further enhance our CBRE capabilities.

The looming threats of terrorism, coupled with the spread of radicalisation ideals through the media, makes it ever more important to stay updated with the latest trends and happenings in this security environment. GSA 2009 is a good platform for the SCDF to network with worldwide industries, government officials and professionals to develop solutions to combat global terrorism. The exhibition will also allow us to get to know any state-of-the-art technologies and equipment, and hearing the experiential feedback from users and experts will certainly help us to zoom in on the most suitable types of equipment to complement our own needs.