

Recognizing bogus explosive and drug detection technology

Fake bomb and drug detection devices are finding their way into port and terminal facilities – here’s how to tell yours isn’t one of them

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Ports are offered a bewildering array of products that claim to meet the ISPS code and today’s security demands to detect explosives, drugs and stowaways. One particular class of hand-held scanner on the market does not work.

Such devices have been used in Iraq and Afghanistan with significant lack of success against bombers and have been responsible for deaths in Thailand.

A Chinese-made device is said to be in use in harbors in Belgium, by the Shekou Container Terminal in southeast China and Yangshan deep-water port in Shanghai, as well as Hong Kong’s Fire Department. Mexico’s PEMEX bought several similar devices in 2008 for its oil terminals.

Promotional literature for one ‘detector’ says: “The sheer number of containers entering a port makes other methods of detection for explosives inefficient. The XK-9 however, can quickly and categorically identify any containers that may have explosives present. Port security staff can then carry out further specific X-Ray and manual searches”. Unfortunately the XK-9 could do nothing of the sort. The British company that marketed the XK-9 has stopped selling it.

In at least one case, the GT200, the device was promoted around the world with the help of the UK government and the Royal Engineers.

A BBC Newsnight expose in mid-2010 led to a UK government ban on exports of the ADE651 to Iraq and Afghanistan. Sales continue unrestricted to other countries, however. The UK Foreign and Commonwealth Office is reported to have issued alerts to governments that the devices do not work as advertised.

At last year’s International Carnahan Conference on Security Technology, Dale Murray of Sandia National Laboratories, who has tested several of these devices, told the delegates: “Rather than enhancing the security of police and military personnel, the reliance on these unproven and disproven devices is creating a sense of false security that is actually lowering the safety of front-line forces in places like Iraq and Afghanistan”.

In addition to Sandia National Laboratories, the FBI and the US Navy has tested and found them worthless, as has the UK’s Alford Technologies on behalf of the Royal Engineers. The US Department of Justice has warned against using this class of device.

If such devices are lowering the safety of frontline US and UK military forces, then they are also creating hazards for ports, terminal facilities, security personnel, seafarers and the ships they sail on.

Double-blind trials show that they do not do what it says on the tin, or at least in the manufacturer’s literature. In most cases the Sandia tests were the first scientific tests carried out on the detectors – the manufacturers had not tested their product under controlled conditions.

They have various names and minor differences in operations. Most claim to detect almost anything at ranges of up to a kilometer, like the ADE651 and HEDD1, while others, like the DKL Lifeguard limit their claims to detecting human presence at a distance and under almost any conditions.

How to spot bogus devices

These devices are characterized by a swiveling telescopic radio antenna, which rotates towards a detected target. Manufacturers



The Hedd1 with telescopic antenna extended. This type of antenna is a characteristic of an ineffective detector.



HEDD1 with antenna folded against handle.

use a number of terms to explain how the devices function, from dielectrophoresis, electro-magnetic attraction, magneto-electrostatic detection, magnetic resonance, and so on. In fact, the only ‘technology’ used is subconscious muscle movement by the operator, which causes the finely balanced radio antenna to point to where the operator thinks the target is. That alone makes these devices pointless; they are only of value if they respond when the operator does not know the location of the target, or even if a target is present.

The principle of dowsing is called ‘the ideomotor effect’. A bent welding rod or wire coat hanger is just as effective and accurate but more cost effective than the devices, which are often more than US\$20,000 apiece.

Some of the more ‘sophisticated’ versions include cards that are supposed to tune the device to detect specifics, like certain explosives or drugs. Sometimes there is nothing actually in the cards; sometimes there is an RFID chip of the sort used in shop security tags to ensure that no one sneaks knickers out of the store. Most makers of these fraudulent devices don’t even go that far – the devices are actually empty inside.

Some companies selling the detectors merely market them without an understanding of how they are supposed to work.

The history of the wandering wands

There are two basic designs: the ‘swivel on a stick’, where the telescopic antenna is attached through a swivel to a handle or pistol grip; and the ‘phaser’, where the antenna is attached to a case that resembles the famous weapon from the *Star Trek* series.

Stick and Swivel

Granddaddy of the ‘stick and swivel’ device was the Quadro Tracker produced by the Quadro Corporation in the mid-1990s. Originally designed to locate lost golf balls, it was sold to schools, local governments and law enforcement agencies to find drugs, guns, explosives and almost anything else one could think of.

FBI laboratories checked out the Quadro Tracker and declared it a fraud, and its manufacture, advertising or sale in the United



The Moore GT 200, another variant of the notorious GT200.

States was banned. Quadro Corporation closed shop but the basic device inspired others such as the MOLE, Sniffex, Sniffex Plus, HEDD1, GT200 and ADE 651, XK-9 among others. Some devices have electronic circuits that have no function and others are connected to boxes on belt-clips.

The Sniffex and ADE 651 failed controlled tests in which the location of the target was unknown to the operator. In the case of the Sniffex, its designer, Yuri Markov was indicted for fraud in the US in 2008, the Managing Director of the British company selling them has been charged with fraud and is currently out on bail. The device was found to consist largely of an empty plastic box with no electronics.

The GT200, responsible for the deaths of four people in Thailand, was examined and, like the ADE 651, found to contain nothing. Althorpe Technologies tested examined the GT200 and concluded, “This device does not detect explosives.”

Perhaps the last word on ‘stick and swivel’ devices should be left to Colonel John Walsh (retired) who markets the HEDD1: “This is intangible science – I would not use it in a life or death situation.” An astonishing bit of advice regarding a piece of kit of which the accuracy, reliability and ability to function as advertised is, literally a matter of life and death.

‘Phasers’

‘Phasers’ are less common but feature the same swinging telescopic antenna. They are based on a device called the Electroscope – not to be confused with the scientific device of the same name – which is sold to treasure hunters in the US.

One such device, the AL-6D, claims to be able to detect just one kilogram of TNT at 1km – an extraordinary claim, unsubstantiated by any evidence.

Also marketed as appropriate for maritime use is the H3Tec, essentially a ‘phaser’ with a semicircular board against which the antenna moves.

The Chinese-made DKL Lifeguard, a direct descendant of the Electroscope, limits its claims to finding living persons such stowaways in containers, and victims buried under rubble or located in the wild. Sandia National Laboratories tested a

In a double-blind test the operator does not know the location of the target. An experimenter might place a target in one of several numbered boxes out of sight of the operator. The operator then attempts to locate the box containing the hidden target. If the operator scores no better than chance, then he has failed to show that the device works. It accurately represents conditions in a container yard.

Model 2 in 1998, under conditions within the device's published capabilities to see whether it worked as advertised and it failed. Later, a physical examination of a Model 3 DKL Lifeguard revealed a jumble of components on an open circuit – one through which electricity could not travel – and a bit of human hair sandwiched between pieces of plastic.

That the electronics within the device adhere to no known principles of electronics and its literature describes a phenomenon effective only at a millimeter ranges is irrelevant. The Sandia report – and there are others by US Army laboratories albeit less public – show that it does not work as advertised.

In its criticism of the Sandia report, DKL says that its device is unreliable when detecting stowaways who are in a crouched position, which is why it worked when the operator knew the location of the target but not when the target location was not known.

There is no evidence that DKL had tested its device in blind trials before marketing it. Only after the negative reports from Sandia did the company hire a consultancy to do such a critical test. The full report is not public and the protocols used are unknown, so these trials cannot be assessed.

Is your detection device bogus?

Here's a checklist:

Does the device have a telescopic 'transistor radio' style telescopic antenna that points to the target?

Does the antenna swing freely, i.e. it is not directly connected to a motor or any other mechanical means of providing movement?

Are any of these mentioned in the vendor's literature?

- Vibrational Energy
- Modulated magnetic field
- Electro-magnetic attraction
- Nuclear quadrupole resonance.

Google is your friend. Search for reports on the offered device. There is rarely controversy about devices that work.

To help ship security officers and port personnel with security responsibilities, Maritime Accident Casebook has made a briefing paper available free of charge, which may be distributed freely. The briefing provides advice on the devices, why they may appear to work and provides an identification table of those most commonly in use.

Maritime Accident Casebook maintains a database of the relevant devices and will be pleased to assist those who may have concerns regarding equipment being used.



Dale Murray of Sandia National Laboratories tested the DKL Lifeguard. It failed.



A tiny hair, shown here against a coin for comparison, sandwiched between bits of plastic 'sensitize' the DKL Lifeguard to human presence.

ABOUT THE AUTHOR

Bob Couttie has been involved in maritime education for more than 10 years and currently administers Maritime Accident Casebook, a web-based resource for maritime safety. His book, *Forbidden Knowledge* (Lutterworth Press, 1988) includes an overview of dowsing, the principle on which the devices discussed here are based.

ENQUIRIES

The Maritime Accident Casebook
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