

Explosive Threat Detection Technologies Within Public Transportation

September 28, 2015

By: HDIAC Staff

Some U.S. lawmakers are concerned that public transportation in the United States is at risk for terrorist attacks. Rep. John Katko, chair of the House Homeland Security Subcommittee on Transportation Security, spoke at a joint meeting with the Subcommittee on Counterterrorism and Intelligence in mid September. Katko shared his concerns that “the surface transportation system is lacking the amount of security that it needs.” [1]

This concern arises because public transportation, specifically bus transit, remains a primary target for terrorism in developing countries and in Israel. Given the difficulty of defending against terrorist attacks in public areas, preempting attacks is the only possible deterrent measure. [2] Israeli buses are a consistent target for terrorists, especially since the period of intense rioting and civil unrest by the Palestinians, known as the Second Intifada. [3] More than 5,500 buses operate in Israel and increased vigilance has not abated the terrorist acts. [4]

Protecting surface transportation, such as trains or buses, is challenging because they must remain readily accessible, convenient and inexpensive to passengers. [5] Many initial deterrence technologies for terrorism, such as X-ray machines or armed guards, cannot be used for bus or train stations due to unreasonable delays and cost. Therefore, many countries, including Israel, are challenged to implement protective measures to its transportation infrastructure without inhibiting passenger use.

Israel utilizes protective barriers to avert terrorism within their public transportation systems. These “anti-terror” buses consist of:



Israel is using explosive-detection devices to deter terrorist attacks on its bus system. The United States might consider some of these technologies when considering bus safety.

“An explosives-detection device at the front of the bus; a turnstile through which passengers enter but which can be locked by the driver to prevent entry of suspicious persons; a device to protect the driver and passengers in the front of the bus; another turnstile at the back of the bus to allow passengers to exit but to prevent bombers from entering; and a two-way communication system between the driver and the people outside waiting to board the bus.” [6]

While these buses have some success in thwarting suicide bombers, there is an ongoing need to employ other technologies, including increased explosive-detection range and quicker notification.

Many technologies are capable of detecting explosives in an area or on an individual. Several detection technologies may be utilized within Israeli public

transportation, including: laser scanners, terahertz (THz) spectroscopy equipment, fluorescent explosive detectors, 3-D imaging and fingerprint scanners.

Laser scanners can detect improvised explosive devices by directing pulses of light toward suspicious objects and reading the unique vibration patterns. THz spectroscopy equipment works in a similar manner; sending out small amounts of radiation to objects or people and identifying the “atomic signature” of the substance. Using amplified fluorescent polymers, fluorescent explosive detectors can indicate the presence of bomb materials, due to the specific reactions that explosives have with the fluorescent polymers. [7]

Two other technologies with potential application for Israeli public transportation are 3-D imaging and fingerprint scanners. 3-D imaging involves scanning passengers with radio

waves. Software uses the data to determine or detect threatening material or objects. Fingerprint scanners are effective in detecting trace particles. Passengers provide a quick fingerprint scan to inspect for explosive residue. Both of these technologies can be implemented within public transportation systems; however, these units require the suspected individual or object to be in close proximity to detect the threat.

Developing countries remain vulnerable to conventional and unconventional terrorist attacks. Israel remains a unique exception to this classification, because it is faced with terrorism on a daily basis; however, it has classified terrorism as a one-tier threat to its security. "While the threats are not new, the lethality and number of attacks have increased significantly following the signing of the Oslo Accords in 1994 and later with the 'Al Aqsa' Intifada in 2000." [8] With global terrorism on the rise, the United States must consider a forward-thinking, proactive approach to

terrorism. Israel's unique approach to detecting and disrupting terrorist activities can assist U.S. intelligence in addressing threats, especially those posed by domestic terrorism.

References:

- [1] Harding, Robert. (2015, September 18). [Rep. John Katko: U.S. is vulnerable to terrorist attacks on buses, subways, trains](#). The Auburn Citizen.
- [2] Henriksen, T.H. (2007). The Israeli Approach to Irregular Warfare and Implications for the United States. *Joint Special Operations University*.
- [3] Butterworth, B.R., Dolev, S., & Jenkins, B.M. (2012). Security Awareness for Public Bus Transportation: Case Studies of Attacks against the Israeli Public Bus System. *Mineta Transportation Institute*.
- [4] Ganor, B. (2011). [Suicide Attacks against Public Transportation – The Israeli Case Study](#). *International Institute for Counter-Terrorism*.
- [5] Jenkins, B.M. (2001). Protecting Public Transportation against Terrorism and Serious Crime: An Executive Overview. *Mineta Transportation Institute*.
- [6] Gleis, J.L. Israel's Struggle against Palestinian Terrorist Organizations. In J.F. Forest, *Countering Terrorism and the Insurgency in the 21st Century* (408-429). Westport, CT: Praeger Publishers.
- [7] [The Growing Bomb Detection Industry: 7 Technologies that Could Stop a Backpack Bomb](#). (2013). *The Fiscal Times*.
- [8] Gleis, J.L. Israel's Struggle against Palestinian Terrorist Organizations. In J.F. Forest, *Countering Terrorism and the Insurgency in the 21st Century* (408-429). Westport, CT: Praeger Publishers.

For permission and restrictions on reprinting HDIAC's Spotlights, please contact publications@hdiac.org.



Homeland Defense & Security Information Analysis Center

Read the [HDIAC Journal](#) * [Subscribe](#) to HDIAC * HDIAC [Spotlight Archive](#)