

2015

Boarding Gate ETD Embedded Systems



Homeland Security Research Corp.

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1 Pipeline ETD Systems by Configuration and Application

1.1 Boarding Gate Explosives Scanners

(Source: Hitachi, HSRC)

In recent years, to ensure safety and security in transport services, there is a need to increase security to discourage and prevent the carrying of explosives into means of transport such as airplanes. For example, flight safety would be significantly increased if it were possible to inspect passengers for explosives at the boarding gate, the last point of inspection before boarding the flight. However, as several hundreds of passengers need to pass through the gate at once, the time taken by conventional metal detectors and X-ray inspections was an issue.

Hitachi in collaboration with The Nippon Signal Co., Ltd. and the University of Yamanashi have announced the successful prototyping of a boarding gate with built-in explosives detection equipment as part of their efforts to increase safety in public facilities such as airports. The prototype boarding gate efficiently collects minute particles which have affixed themselves to IC cards or portable devices used as boarding passes, and can detect within 1-2 seconds the presence of explosive compounds using internalized equipment. According to the company, it is possible to inspect 1,200 passengers per hour.

The technology is expected to contribute to the prevention and containment of carry-on explosives as it inspects immediately prior to boarding without disrupting the flow of passengers and provides increased security without affecting convenience.

As this equipment can be adapted to entrance security equipment for train stations, stadiums, event halls, etc, in the future, it is expected to contribute as a platform technology to achieving the safety and security of public spaces.

Features of the boarding gate with built-in explosives detection equipment are as described below.

(1) High-speed collection of minute particles adhering to IC cards or portable devices while reading the device. Technology utilizing high speed air current to collect minute particles attached to IC cards or portable devices used as boarding passes while reading the card or device was developed. The efficient extraction and collection of the minute particles within a short period of time was achieved by optimizing the timing to generate the air flow, positioning of the pass, and air current speed.

(2) High-speed concentration of the collected particles and high-sensitivity mass spectrometry analysis in order to achieve high-sensitivity mass spectrometry was

necessary to release the unnecessary gas outside the equipment and increase the concentration of the particles since the particles are collected within a large volume of air. Cyclone method centrifugal technology was employed to efficiently and quickly separate and collect only the particles from the gas, enabling the particles to be introduced into the mass spectrometer to be collected and concentrated in a short time, thus achieving high sensitivity mass spectrometry.

(3) Internalized compact high-sensitivity mass spectrometer.

A linear ion trap type high sensitivity mass spectrometer which can continuously detect explosive compounds in real-time was employed and by innovating the assembly of the power and control systems, the size of the equipment was reduced even further to achieve internalization within a boarding gate. The prototype equipment developed was on display at the Special Equipment Exhibition & Conference for Anti-Terrorism in 2012 at the Tokyo Big Sight in Tokyo, Japan while conducting a continuous operation pilot test. Further pilot tests at public transport facilities are also planned.

Figure 1 - Boarding Gate with Build-in ETD Screening Technology



Prototype boarding gate with built-in explosives detection equipment

(Source: Hitachi)

More information can be found at:

[Explosives & Narcotics Trace Detection \(ETD\): Technologies & Global Market - 2015-2020](#)