



Australian Government

Department of Infrastructure and Transport

Optimal Technologies Proof of Concept Trial Report

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Executive Summary

The Optimal Technologies Proof of Concept Trial (the trial) was conducted at Sydney (Kingsford Smith) Airport from 2 – 19 August and Melbourne International Airport from 5 – 30 September 2011. The main objectives of the trial were to measure the impact that the introduction of body scanners and multi-view X-ray equipment might have on passenger facilitation, and to assist the eight international gateway airports prepare for their introduction.

The trial attracted a high number of volunteers, with 23,577 body scans being conducted over a total of seven weeks. It was observed that, although alarm rates were higher in the body scanner due to its ability to detect both metallic and non-metallic items, 57 percent of passengers were cleared to proceed immediately after being scanned. Whilst the higher alarm rate associated with the body scanner did slightly reduce throughput, the trial demonstrated that effective and efficient screening operations can be maintained with the new technologies in place.

It was determined that human factors will play a significant role in ensuring the successful introduction of these technologies. In particular, it was noted that training for screening officers will require a much greater focus on customer service. A strong communications strategy will be another essential element to ensure a successful rollout. Overall, public reaction to the trial was positive. A post-screening survey of volunteers indicated that passengers were very satisfied with the body scan process, with most remarking that it was quick and easy.

Key Findings:

- The average time taken to process a passenger in the trial lane was several seconds longer than in the regular screening lanes. This was due to a body scan taking slightly longer than walk through metal detector screening and the higher alarm rate.
- Alarm resolution following a body scan was often quicker than alarm resolution for the walk-through metal detector due to the fact that the body scanner indicates the area that has alarmed, making it easier for screeners and passengers to identify what has caused the alarm.
- The most common removable items that alarmed in the body scanner included high boots with buckles, currency, hairclips, watches and jewellery. There were also some non-removable items that caused alarms, these included pockets on cargo pants and studs and additional zips on jeans and pants.
- Human factors will play a significant part in ensuring the successful rollout of the technology. Particular focus on customer service is required to ensure that screening officers are prepared for the increased level of passenger interaction. Effective and clear communications to inform passengers about the process will also be essential.
- The trial found that most volunteers were happy with the body scanning experience and very few had difficulty with the body scan process.

Introduction

Following the attempted bombing of North West Airlines flight NW253 over the United States of America on Christmas Day 2009, the Australian Government announced a package of measures to strengthen aviation security in Australia. The package, now referred to as the Strengthening Aviation Security Initiative, included the introduction of body scanners and multi-view X-ray machines for the screening of passengers and their carry-on luggage at Australia's eight international gateway airports.¹

Body scanners are a proven technology and have been used overseas for aviation security screening purposes since 2007. The Department has previously trialled both body scanners and multi-view X-ray machines to determine their suitability to the aviation security screening environment. In addition, these new technologies must be tested and approved by an overseas regulator that is recognised by the Department before they can be used for aviation security screening in Australian airports.

The purpose of this trial was to test operational policies and procedures in order to determine the impact the new technologies may have on the passenger screening process. The trial was also used to examine communications strategies and determine the key messages and mediums to be used in supporting the introduction of this equipment.

Trial Design

The trial was conducted at Sydney (Kingsford Smith) Airport from 2 – 19 August and Melbourne International Airport from 5 – 30 September 2011. Each airport established one trial lane at their main international aviation security screening point and departing passengers were invited to be screened through the trial lane on a voluntary basis.

Publicity

The Department conducted a media launch at Sydney Airport on 1 August 2011 with the Honourable Anthony Albanese, Minister for Infrastructure and Transport, in attendance. Invited media were given the opportunity to view the body scanner in operation and ask questions about the technology. A webpage was established on the Department's 'TravelSECURE' website for the travelling public, providing general information about the trial and specific information regarding the use of body scanners. The website included fact sheets and answers to frequently asked questions, as well as details



The Hon Anthony Albanese MP, Minister for Infrastructure and Transport, launching the trial at Sydney Airport.

¹ The eight international gateway airports are Sydney, Melbourne, Brisbane, Gold Coast, Cairns, Darwin, Perth and Adelaide airports.

of how to obtain further information or lodge complaints. At each airport, banners and postcards were available and displayed to make passengers at the screening point aware of the trial.

Privacy

To protect the privacy of the travelling public, the body scanner used during the trial was equipped with automated threat recognition (ATR) technology. ATR eliminates the need for a screening officer to review raw images of the person being scanned. Instead, when a scan is conducted, the ATR automatically analyses the data received from the scan and uses a generic human outline, which does not display gender, size, shape or any distinguishing features, to highlight any area on the body that may require further examination. Individual scans are not able to be stored or transferred to other devices. The Department also released a draft privacy impact assessment for comment during the trial.

Trial Process

Passengers waiting in the main queue were asked if they would like to volunteer to participate in the trial. Volunteers were directed to the trial lane where they were randomly selected to go through the body scanner. Volunteers with metal joints, pacemakers and other metallic implants that make it difficult for them to be screened by a walk-through metal detector were also allowed to opt in for body scanner screening. Those not selected for the body scanner proceeded through the walk-through metal detector in line with current procedures. Every volunteer's carry-on baggage was screened by the multi-view X-ray equipment. Volunteers were then randomly selected to undergo explosive trace detection screening.



The trial lane at Melbourne Airport (photo courtesy of Melbourne Airport).

Data Collection

Lonergan Research Pty Ltd was contracted to undertake data collection during the trial. Data collected included alarm rates and causes, processing times and a qualitative passenger survey.

Trial Results

Data captured during the trial indicated that the average passenger screening time was several seconds longer in the trial lane than in the regular screening lanes. This was caused by a number of factors, some of which can be mitigated through refining processes and procedures, and some of which will be minimised as screening officers and passengers become familiar with the new technology.

Equipment Detection Capability

As expected, due to its ability to detect both metallic and non-metallic items, passengers alarmed considerably more frequently when screened by the body scanner than the walk-through metal detector, with the data suggesting that the average passenger is six times more likely to alarm in the body scanner. The trial comprised of 23,577 body scans, with 57 percent of passengers cleared to proceed immediately after being scanned.

Due to the ability of the body scanner to detect a greater range of items than the walk-through metal detector, passengers were required to divest items that they were not accustomed to divesting at aviation screening points, such as tissues, pills etc. A divestible item is any personal effect within or underneath a person's clothing, or on a person's body, which can be easily removed by the person and screened by X-ray equipment. On average, the body scanner detected 230 divestible items per 1000 passengers compared with 49 divestible items per 1000 passengers for the walk-through metal detector. The five most common divestible items detected by the body scanner were high boots with buckles, currency, hairclips, watches and jewellery including bangles, bracelets and necklaces. As watches and many jewellery items are worn on the wrist or hand, body scanner alarms resulting from these items could usually be resolved by a quick visual inspection. The table below provides further details on divestible alarms captured during the trial. The communications strategy for the implementation of this new technology will inform the travelling public of those items that will be required to be divested if they are selected to undergo a body scan.



Item Type	As a percentage of all divestible alarms
Hair clips	21%
Jewellery (including bangles, bracelets and necklaces)	20%
Currency (including notes, coins and wallets)	17%
Watches	7%
High boots with buckles	5%
Miscellaneous items	30%

Data collection revealed that a higher number of non-divestible items caused alarms on the body scanner than on the walk-through metal detector. The five most common non-divestible items

detected by the body scanner during the trial were clothing items such as pockets on cargo pants, studs on jeans, additional zips and buttons, baggy clothes that created folds in the material and sequins on shirts. As the majority of these alarms occurred in the leg area, they could usually be resolved by a quick targeted frisk search to determine that there were no other items present. These results demonstrate that the body scanner is able to detect a greater range of metallic and non-metallic items than a walk-through metal detector. Once screening officers became familiar with these types of alarms, it was easier for them to identify the source of the alarm and quickly resolve it. As the technology is deployed, screening officers will become increasingly familiar with non-divestible items that may cause the body scanner to alarm.

Alarm Resolution

A range of options were available to screening officers for the resolution of body scanner alarms, including the use of visual inspections, targeted frisk searches and explosive trace detection tests. The data indicated that in situations where a targeted frisk search was used to resolve a body scanner alarm, the process was often as quick, or quicker than the process that occurs when a passenger causes the walk-through metal detector to alarm. This, in part, is due to the fact that the body scanner indicates the area that has alarmed, hence making it easier for screeners and passengers to determine what has caused the alarm.

Human Factors – Screening Officers

There is a much greater element of human interaction associated with body scanner screening and therefore a greater requirement for screening officers to possess strong communication skills. It was noted that the introduction of body scanners will alter the skill-set that is required by screening staff, with an increased need for screening officers with superior customer service skills.



There was a recognised need for screening officers to exhibit empathy and be able to put themselves in the shoes of passengers who may believe that they are being unduly inconvenienced or mistreated. As such, screening officer training for the trial focussed on factors such as tolerance, cultural and disability awareness, good manners and conflict resolution. With the increased need for screening officer/passenger interaction, language barriers will become more apparent. Multi-lingual instruction cards may provide some assistance in overcoming this challenge and the Department will consider this in its communications strategy.

Human Factors – Passengers

A voluntary post screening survey was conducted to capture passengers' views of the body scanning process. The survey indicated that overall, volunteers were very satisfied with the process with most remarking that it was quick and easy.

Of those passengers who expressed dissatisfaction (less than 2 percent), most had experienced longer processing times due to alarms that required additional resolution. A very small number of volunteers had difficulty adopting the required pose for the body scan. It is intended that when body scanners are introduced, passengers physically incapable of holding the required pose for a body scan will be screened using alternative methods appropriate to their circumstances.

It was observed that there were some passengers who preferred to be screened by the body scanner rather than a walk-through metal detector as it was more suitable to their circumstances. This included people with pacemakers and metallic implants such as hip joints. As the body scanner is designed to detect items worn or carried on the body, it offers an effective method of screening for those passengers with metallic implants who cannot be screened by a walk-through metal detector and instead currently must undergo a frisk search.

Previous experience with using random and continuous selection for security methods at airports has shown that a percentage of those travellers randomly selected form a belief that they have been personally and deliberately targeted. An electronic randomiser mat was used during the trial to randomly select which volunteers would go through the body scanner. Overseas experience indicates that using technology to perform the random selection, rather than having screening officers manually performing this task, is much more readily accepted by the passenger.

Communications

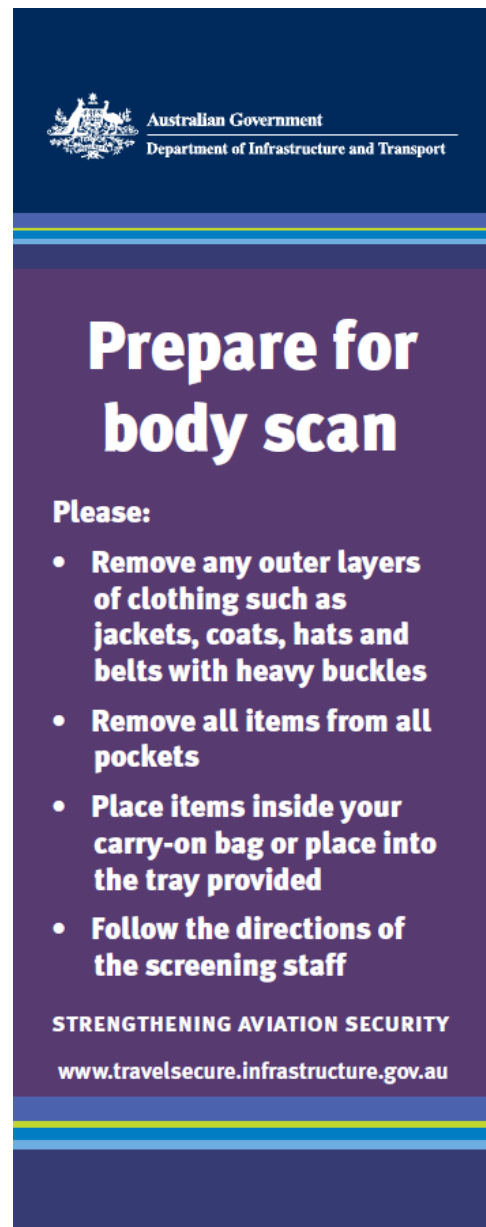
A number of communications products were developed by the Department in consultation with the airports to communicate information about the body scanner to passengers during the trial. Given the active nature of a screening point, the communications materials developed were short and direct to quickly convey key messages to passengers.

These communications products included:

- banners and signs;
- slideshows on video monitors; and
- information postcards.

The key messages contained in the communications material were:

- that the body scanner protects privacy and only displays a stick figure image;
- that body scanners are safe;



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Prepare for body scan

Please:

- **Remove any outer layers of clothing such as jackets, coats, hats and belts with heavy buckles**
- **Remove all items from all pockets**
- **Place items inside your carry-on bag or place into the tray provided**
- **Follow the directions of the screening staff**

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www.travelsecure.infrastructure.gov.au

A banner used during the trial to instruct passengers.

- information on how and what to divest; and
- how to stand in the body scanner.

The Department also published information including fact sheets, answers to frequently asked questions and a privacy impact assessment on its website. While the website goes some way to informing some passengers of the introduction of body scanners, the majority of passengers will be exposed to this information for the first time when they are already at the airport.

During the trial, a screening video was developed and the Department will work to make this available to airports to display on monitors at the screening point when body scanners are permanently in operation. This will provide passengers with a demonstration of what to expect if they are selected for a body scan.

Conclusion

Overall, the trial held at Sydney and Melbourne International Airports in August and September 2011 is considered to have been highly successful. Through data analysis, it was determined that the passenger screening time through the trial lane took slightly longer than the passenger screening time through a standard screening lane. However, the trial demonstrated that effective and efficient screening operations can be carried out using the new technologies. The lessons learnt from the trial will be taken into consideration to ensure that the use of body scanners and multi-view X-ray equipment for passenger screening is optimised. When body scanning technology is introduced, it will be essential that screening officer training focuses on effective passenger interaction to ensure that processes such as divesting and undertaking a body scan flow smoothly. Results from the trial will also inform the development of alarm resolution methods that are quick, effective and palatable to the public, whilst achieving a strong security outcome. A comprehensive communications strategy is being developed to address the needs of the public, including the needs of special circumstances passengers.