

Body Scanners within Airport Security Systems: Security or Privacy Issue?

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Abstract

It is interesting to see how airports have treated airline passengers, especially after the 9/11 tragedy and with rising apprehensions and tensions due to the potential for radical attacks and terrorism. Technology is being used by airports to ensure that the highest security measures have been taken. The invention and utilization of the full-body scanner is considered one of the solutions. In order to provide security and be more efficient, airports are relying on these innovations. Some airports in the European Union and United States already use full-body scanners as their main standards. However, this new technology poses a potential threat to passengers' privacy. A high level cyber security system together with a legal framework on data protection to secure the processed data must be established and well maintained. Not to be forgotten, an important issue which must also be addressed is whether an infringement of a natural person's fundamental rights under the European Union legal framework exists.

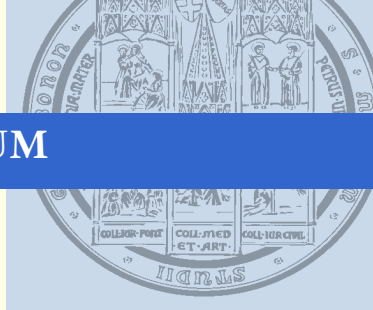
Increasing Security Threat to the Airline Industry

The tragic September 11 attacks have raised more concerns on airport security all over the world. Many countries have reacted by maximizing their airport security in order to protect their citizens. As one way to enhance airport security, states have chosen to privatize the airport security screening process. One of the reasons why states privatize airport security is to ensure they receive sufficient insight to maintain and enhance the security level¹. Although territorial borders between countries used to be the state security point, unknown borders which exist at international airports should be considered as a new type of security point.

Threats to airport security are also being innovated. In 2001, Briton Richard Reid attempted to blow up a flight from Paris to Miami with plastic explosives hidden in his shoes². In 2009, there was an attempt to blow up the Northwest Airlines Flight 253, which is infamously known as the Christmas Day bombing attempt.

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Umar Farouk Abdulmutallab managed to outwit the security system at the Amsterdam Schiphol Airport in the Netherlands, and smuggled 80 grammes of highly explosive PETN in his underwear³. However, his attempt to bomb Flight 253 failed and he became enveloped in a fireball until four passengers extinguished the fire and restrained him⁴. As the bomb was liquid, metal scanners, the prevalent technology at that time, would never have been sufficient⁵.

These attempts, and in particular the Christmas bombing attempt, have raised global consent that airport security technology and security management systems must develop, especially within European global hub airports such as Schiphol, Heathrow, and Frankfurt⁶. Underdeveloped or poorly maintained security systems would trigger the loss of customers, including airlines, passengers, shops and restaurants. A huge amount of investment and economic development at airports is at stake.

The security threat to airlines, especially to their aircraft, is more serious compared to the threat in the past. The aftermath of the September 11 attacks has shown that aircraft can be used as a mass destruction weapon, terrorizing people on the ground. The fact that air transport gains more media attention than any other transportation mode makes it a main target for radical attacks or terrorism. In comparison, trains and buses have a limited reach as they can only follow their track or stay on the road. On the other hand, a hijacked aircraft can attack anything in the air, on the ground, or in the ocean. Considering the importance of airport security, airport stakeholders should always be aware of the most current developments in security technologies.

Full-Body Scanners: The Last Guardian

Today we are witnessing a radical shift in security at airports⁷. Security threats have evolved from older stories of passengers hiding a gun or knife, to passengers hiding explosive liquid or powder. The combination of explosive liquid and powder poses more problems than a gun or knife. It is therefore evident that the use of full-body scanners is a solution for fully screening everyone to detect threats that traditional metal detectors could not detect without slowing down the security check process. Full-body scanners need only take a few seconds to identify potentially prohibited items located on the passenger's body, while other modes could take longer.

There are two types of full-body scanners: the millimetre wave machine and the backscatter machine⁸. The former works by sending radio waves over a person and producing a three-dimensional image by measuring the energy reflected back, while the latter uses low-level X-rays to create a two-dimensional image of the body⁹. Both types of full-body scanners aim to detect what only a physical pat-down check could turn up, but what a metal detector would not find, including plastic or chemical explosives and non-metallic weapons in a pocket or even strapped to one's body. Even on rare occasions, guns, knives, and other metallic objects set off a metal detector, which should not happen¹⁰. It delivers a very strong message to airport authorities that there should be developed methods to prevent such unfortunate events.

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Within European airports, the use of full-body scanners is optional, not mandatory¹¹. Following the advent of their usage, the European Union (EU) Commission introduced a legal framework dealing with the use of security scanners, namely Regulation No. 1141/2011 and Regulation No. 1147/2011¹². The use of any types of security scanners must be in compliance with the legal framework dealing with various issues, such as protection of EU classified information¹³ and health and safety issues of the airport employees¹⁴ and passengers¹⁵. The establishment of these legal frameworks prove that high level standards have been set up within the EU.

However, Europe, especially EU Member States, has started debates on the enforcement of this regulation with regards to the use of full-body scanners. The Netherlands, which failed to detect or prevent the Christmas Day bombing attempt, agrees with the use of scanners, as does the United Kingdom. On the other hand, the Germans call the body scanners *nachtscanners*, meaning a virtual strip search¹⁶. Berlin had strongly expressed the fear when the regulation was still a proposal that German authorities may be transformed into the 21st century ‘Peeping Tom’¹⁷. Most likely Berlin’s reaction has something to do with its past, when citizens were living 24/7 under Stasi reconnaissance. Thus the country is trying to prevent something similar from happening again.

Passengers’ health issues are also a concern in the use of the full-body scanner, due to its side effect on human health. It is estimated that among the 750 million security checks for 100 million airline passengers per year, six passengers might get cancer due to the use of old-fashioned X-ray scan technology¹⁸. There is also a chance that the use of full-body scanners could damage passengers’ DNA, which can also trigger cancer; relevant research is still in progress¹⁹. Hopefully research and following developments will advance technologies in a safer manner for the human body.

With regards to privacy, new technologies have been developed to decrease the invasion of passengers’ privacy. Schiphol Airport has introduced software to reflect any findings from original scanned body images on standardized images, and renamed full-body scanners “security scanners” in order to avoid potentially sensitive privacy issues²⁰. The name is a response to growing concerns on the right to privacy of persons with physical particularities, which they may not want to expose to anyone, and of persons with religious reason²¹. There was a case of Muslim woman who were rejected boarding at Manchester Airport after she refused to be scanned citing a religious reason. Even Pope Benedict XVI expressed this machine may violate human dignity²². In the UK, it has been recognized that the utilization of full-body scanners on children could violate the UK’s Child Pornography Laws²³. Thus a comprehensive security scanner along with the mentioned software should be used as the last guardian for airport security and also aircraft.

Does Privacy Still Exist in Airports?

Privacy is a very vague term. The Merriam-Webster dictionary defines it as freedom from unauthorized intrusion²⁴. Simply speaking, privacy means certain areas of one’s personal life which are hidden from unwanted view²⁵; or elimination of body details²⁶. The latter definition seems more suitable when describing the current situation in airports. However, not every country recognizes the importance of one’s privacy²⁷.

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This leads to the situation that airport security standards in states where the importance of privacy is not recognized will lack concerns for personal privacy when it comes to security standards.

In the United States (US), there are debates on the right to privacy and the right against unreasonable searches and seizures in airport security. Security reasons may present an exception to these rights, as long as the methods of searches and seizures are reasonable, but there is uncertainty in the definition of reasonableness²⁸. Passengers in the US are given a chance to express consent, by deciding to board the aircraft before walking through to the security check²⁹. Thus the passenger's 'free' choice is seen as consent³⁰.

The limits of a reasonable search may depend upon the involvement of physical contact in the inspection. Preferences may vary between a full-body scanner and pat down measures depending on one's personal nature or experience. Therefore, passengers are given a choice to choose one of the measures. However, passengers often are not provided with sufficient chances to choose between the two measures, especially within jurisdictions where the right to privacy is less recognized. Airport ignorance is one main cause. Another main cause is none other than the commercial aspect, especially the pressure to maintain the high level of airport efficiency.

Promoting passengers' right to privacy may be achieved simply by placing an announcement before the security check. The problem is that airports may not be in favour of such a promotion due to operational and management efficiency issues. The more passengers are made aware of their right to choose, the slower the entire security check process may become. Further, higher operational costs of the airport would be required, for instance in order to hire more employees and maintain a sufficient level of training for these employees related to security check procedures.

Within the competitive atmosphere following the airline industry liberalization, there is no doubt that airports are more afraid of losing their major clients - airlines, which contribute to airport profit and play a vital role in promoting the airport's reputation. In other words, passenger privacy may be lessened to keep the efficiency level high.

Notwithstanding, passenger's privacy in airports, which is at stake, must be well guarded. This could be achieved by raising public awareness on passengers' rights to privacy.

Potential Privacy Concerns at Airports in International and Domestic Human Rights Law

Article 12 of the United Nations' Universal Declaration of Human Rights³¹ states that no one's privacy is subject to arbitrary interference and recognizes one's right to be protected by law against such interference or attacks. The Declaration of Human Rights does not provide a definition of one's privacy right, nor is there consensus on a definition of privacy³². Therefore, it is required for signatory states to interpret the term according to Article 31 of the Vienna Convention on the Law of Treaties³³. In the European Charter of Human Rights there is a provision which ensures the right to respect one's private life, which is interpreted as privacy³⁴.

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As provided, international treaties do not provide a specific definition of privacy in respective provisions. This may trigger difficulties in applying the concept of privacy to the use of full-body scanners at airports.

Nevertheless, in general, national regulatory authorities do recognize one's privacy and reflect more detailed definitions in their provisions. As an example, in Australia, the right of privacy may be categorized as four different concepts: information privacy, bodily privacy, privacy of communications, and territorial privacy. Among others, territorial privacy is related to the use of full-body scanners at airports. The Australian Law Reform Commission defines territorial privacy as a right not to be interrupted in domestic or public environments by searches, video surveillance, or ID checks³⁵. The use of full-body scanners therefore falls under the scope of territorial privacy, which should not be interrupted.

The right of privacy is recognized also in the United States. The US government mentions that privacy is that one's private information is collected, used, stored, protected, and shared, and that one is able to determine how the information is shared³⁶. According to the aforementioned understandings of both states, everybody has the right to enjoy privacy. However, such general understanding on privacy is not fully applied to the use of full-body scanners at airports.

Current Domestic Practices within Airports

A former guard from a private security company pointed out that the role of guards within airport security is that they are only trained to respond to the beeps emitted by metal detectors instead of observing people's behaviour³⁷. Human factors, including the sense for security awareness, are more crucial than any technology development. Airport security guards as humans have instincts which could allow them to be more 'aware' than those machines, for example in the ability to recognize someone's gestures.

In the US, common comprehensive security measures consist of biometric identification, bottled liquids scanners, explosive trace detection, and lastly full-body scanners, also known as Advanced Imaging Technology³⁸. Thus do not be surprised if they scan everything, namely your fingerprint, iris, hands, cabin baggage, and your whole body. By passing these checks, passengers get really naked.

In Israel, a different method has been used. The country recognizes privacy through its Basic Law³⁹, although with an exception in case the action benefits the country⁴⁰. That provision becomes the ground for personal interaction and group profiling methods which are encouraged within Israeli airports due its long history of terror attacks⁴¹. The security check process is started even before entering the airport, when cars approaching Ben Gurion Airport are approached by trained guards asking one or two questions on their visit; no doubt a nervous response, or one revealing an Arab accent, could trigger further scrutiny even before entering the airport⁴².

Two tracks are available at Ben Gurion Airport. The first is for Jewish Israelis, who usually will be waved through after a brief conversation. The second is for Israeli Arabs and non-Jewish visitors who will be taken aside for lengthy questioning with thorough luggage and physical checks⁴³.



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Besides the passengers' ethnicity, religion, and nationality, their tone, gestures, behaviour patterns, travel information, and intelligence reports also play a role when conducting profiling and deciding whether the passengers need to be further screened⁴⁴. Despite Israeli Arab citizens' protests of discrimination by Israeli polyglot security agents and the absence of full-body scanners in Ben Gurion Airport, their successful methods deserve recognition; in 1986 they were able to prevent a bombing attempt when a bomb was planted within the terrorist's girlfriend's bag targeting the El Al 016 flight to London Heathrow Airport⁴⁵.

South Korea is one of the countries which has supported the use of full-body scanners since 2010. A noticeable point is that national authorities have enacted a legal framework to validate the use of full-body scanners at airports. There were however objections brought by the National Human Rights Commissions of Korea and various non-governmental organizations. Arguments against the use were mostly of their low efficiency in detecting potential terrorists or that there was very thin legal basis for the introduction of their use, but usage obviously may harm one's privacy and freedom, as well as the potential for discrimination on nationalities and religions⁴⁶.

Currently, full-body scanners may be used to check only those people who have been analysed as a threat to the safe operation of aircraft and safety of other passengers, or who have been reported by international or domestic authorities. If these subjects object to going through the full-body scanners, the subject's body must be inspected thoroughly directly by airport security officials⁴⁷. The airport operators should facilitate and operate full-body scanners screening the detected result on fixed artificial images of human bodies without detailed image analysis. This should enable the on-spot security officials to confirm the dangerous or suspicious part of the body.

With regards to Japan, a full-body scanner underwent a trial operation for a twelve-day period at Kansai International Airport⁴⁸. The Ministry of Land, Infrastructure, Transport and Tourism of Japan stated that four different types of scanners would be tested until December 2015 at other major airports in Japan. As in Korea, Japan did a trial operation of a full-body scanner which showed body shapes in 2010, but due to the issues of invasion of privacy, the use had stopped. The newly developed scanner to be tested was more enhanced and partially solved the problem by not defining the passenger's body shape on screen. Moreover, radiation levels of waves from the scanner are lower than ones from usual cell phones, so it decreased the concerns of the hazardous effect on human health⁴⁹. The ministry planned to install the scanner at all international airports by 2020, precisely before the Tokyo Olympics.

The situation in Indonesia, which is the biggest country with rapid aviation growth in ASEAN, is another story. Outside of Soekarno-Hatta International Airport, there are airports which are still without proper airside security fence installations⁵⁰, or even have no airport security fence at all⁵¹. There was a case in which someone snuck out into the aircraft wheels in Sultan Syarif Kasim II Airport, on the Pekanbaru-Jakarta GA 177 flight⁵². In cases such as this, any security measures towards the passengers with their cabin luggage at the airport become useless, since someone could put dangerous goods into the aircraft from the other side of the airport. This is more important than debating what kind of machine should be used within Indonesian airports.

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Fortunately, since 2015 the Indonesian Ministry of Transportation has announced its priority to build airside security fence in all Indonesian airports, then follow by installing metal detectors and X-ray scanners⁵³. From that official announcement, it could be concluded that currently there is no room for full-body scanners in Indonesia.

The burden lies with the airport management authorities to authorize and supervise the professionalism of their employees. Any sharing of scanned images online cannot be tolerated.

From Stoma Patient to Peeping Tom(s)

What happened in Nigeria really has shocked the world. The full-body scanners used within major airports in Nigeria were being abused by airport security staff members from the Federal Airports Authority of Nigeria (FAAN), who used the machines to watch naked body images of female passengers for fun⁵⁴. In 2010, it was discovered that during off-peak periods the Nigerian airport security officials would often stroll from a cubicle located in a hidden corner on the other side of the body scanner⁵⁵. It seems that they were being the 21st century's Peeping Tom, substituting the digital version for reality.

Passengers may become victims of the enhanced technology of full-body scanners at airports just because they lack awareness on their own privacy rights. For instance, employees behind the scanner's cubicle do not always have the same gender with subject passengers. This can lead to another debate over gender or religious issues. Considering this posed danger of the use of full-body scanners to human dignity, the industry, governments and also the International Civil Aviation Organization (ICAO) must seek measures to prevent infringing upon relevant human rights.

Those who are under medical treatment also have a high potential for their privacy being infringed. Stoma patients could trigger a beep when passing through a metal detector or full-body scanner, which is more sensitive to whatever the device is made of. The normal reaction from the security staff is asking and investigating what triggers the beep. When the answer comes out, most likely the passenger, being watched also by other unknown passengers, will be subject to embarrassment. In the Netherlands, the Dutch stoma patients' association has agreed with the airport security authorities that the patients may identify themselves beforehand, so that the patients will be treated in a more prudent way⁵⁶.

Ironically, this Dutch method of announcing: "I am a stoma patient"⁵⁷, infringes on their privacy and medical records from the onset. Similar privacy concerns also arise in other health cases, for example for people with pacemakers following heart transplants, and those with other diseases which need devices to be implanted within the human body. Full-body scanners should have a technology identifying a medical device placed on or in the human body, which would then be followed by a professional airport security treatment which respects privacy.

The case of US Marshals was interesting in considering human factor issues. A full-body scanner operator at the security check-point of a Florida court house collected thirty-five thousand body images of public servants and citizens, most likely illegally⁵⁸. A gap from the machine allowed saving images for further testing, training, and evaluation purposes, but they were being used for another purpose.

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Even though the agency announced that such capabilities are not normally activated when the devices are installed at airports⁵⁹, it does not mean that bad airport security staff could not turn these capabilities on.

To prevent passengers' from feeling as though they are being haunted by Peeping Tom surveillance, in the EU, passengers are entitled to opt out of going through a body scanner⁶⁰. Passenger profiling could become the other solution. This method has been actively used in Israel with great success. Following Israel, Australia has combined profiling methods with intelligence data collected from the Customs' Enhanced Passenger Assessment and Clearance Program⁶¹. The program, since its initiative in 2010, has cost USD 24.9 million⁶². Such a high price for keeping the security high and protecting passengers' privacy and even further, their dignity.

Success implementing profiling methods could be combined with limiting the usage of full-body scanners only for specific destinations where the existence of threats has become real. For example, security measures for flights to the US and UK could be tightened by requiring all passengers, or those who do not pass a metal detector test (if any), to pass a full-body scanner, while passengers flying to other destinations could still opt out of passing through the machine.

Promoting Passenger Privacy and Data Protection Awareness

A legal framework on data protection does not exist in every state. In the EU, data protection is regulated under Directive (EC) No. 46/1995⁶³ and Regulation (EC) No. 45/2001⁶⁴. However, there is no specific legal framework in relation to airline passengers' personal data protection. Generally, the purpose of this legal framework is to protect consumers from their personal data being used for commercial or any other research purpose without their consent. Furthermore, the legal framework becomes the ground for airports to set up a checklist of what to do and what not to do while screening and processing the passengers' images.

While the Europeans can be glad to have a harmonized standard on data protection and privacy, unfortunately, the same situation does not appear in other parts of the world. For example, Indonesia, as one of the countries with rapid growth of aviation industry, still has not enacted any legal framework on privacy; currently the Indonesian Data Protection Law is being processed within the House. Thus, legally speaking, there should be no high expectation for the highest respect for privacy within airport security measures. The latter depends on public pressure and awareness of human dignity or even the Good Samaritan Principle.

Technology inventions in the form of automatic processing could become one of the solutions to promote passenger privacy. The idea would be to gather databases on medical and any other life supporting devices so that when they appear on the full-body scanner screen, the airport security staff would have special procedures for handling the situation privately. Children must also be well protected and prioritised. There is the potential that full-body scanners could frighten children and cause trauma, thus there must be special procedures for parental or guardian accompaniment. This issue has even escalated into the potential for a child pornography issue within some states⁶⁵.

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Body Scanners and Cyber Security: Does it Ring a Bell?

Considering how powerful a full-body scanner can be when being used properly, terrorists would probably like to distract this system in order to successfully launch an attack on the targeted aircraft by passing through with the dangerous items. The distraction itself could be conducted using cyber attacks into the machine or airport security server aiming to create loopholes. In our digital era, cyberspace has become a new battleground for the terrorist which poses a potentially catastrophic threat for airport and aviation industry stakeholders as well as beneficiaries⁶⁶.

As one of the worst scenarios, free or pre-paid Wi-Fi within an airport could potentially become the gate for cyber attacks, paralyzing or damaging airport security systems, in this context full-body scanners. Old-fashioned servers and their security systems could also become another gateway for the threat. It is time for ICAO to accept and realize that aviation safety also relies heavily on cyber security, thus a call for amending ICAO Annex 17. The last amendment was adopted by the ICAO Council on 7 December 2001 in order to address challenges posed to civil aviation by the events of 11 September 2001.

International organizations such as the Airports Council International (ACI), International Air Transport Association (IATA), International Federation of Air Line Pilots' Associations, and International Criminal Police Organization (ICPO-INTERPOL) must also be invited to provide their input. There is no room to underestimate and further delay the realization of how dangerous cyber attacks could be.

Conclusion and the Way Forward

One of the main questions in regard to the use of full-body scanners is a definition. Is the ultimate airport security check equal to undressing passengers? The definition may be dependent on states' interpretation on privacy and human rights.

The use of security machines, from old-fashioned metal detectors to newly invented full-body scanners, has become common. Sad to say, the full-body scanners in Nigeria are more useful for spying on female passengers than preventing terrorism attacks like the Christmas Day bombing. Without a doubt, full-body scanners can be considered as the Peeping Tom of the 21st century. Fortunately, an alternative method, which does not by any means reduce the security level, in this case profiling, is also used in Israel with great success.

However, implementing Israeli Ben Gurion Airport's successful profiling method is not that easy, considering that each airport has its own characteristics based on national law and its citizens' standard on privacy, also not to be forgotten, traffic volume. While both international and domestic passengers' traffic volume in Ben Gurion Airport is relatively small, only around fifteen million in 2014 and 2015⁶⁷, it was between three or four times higher in Tokyo Haneda (72,826,565), London Heathrow (73,408,489), and Atlanta Hartsfield-Jackson (96,178,899)⁶⁸. Due to the large volume difference from Ben Gurion Airport, the question will be how many security agents with thousands of training hours are needed to implement the Israeli profiling method in global hub airports. Thus the effectiveness of machines and humans vary depending on passenger volumes, the status of airport, local political situation and such.

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An efficiency issue during airport security checks also must be stressed at regional and global hubs. Sometimes airports distinguish the security check based on types of carriers, such as full-service and low-cost airlines. For example, when flying with EasyJet from Amsterdam Schiphol, passengers will be directed to gates designated for low-cost carriers. Most of the security measures are metal detectors, while the other passengers for full service carriers are allocated to gates equipped with full-body scanners. This dual security system must be further reviewed considering metal detectors usually end up in additional body checks, since they often do not know where the beeps come from, thus leading to an additional few seconds per passenger.

The urgency of having a data protection legal framework has become real. Its existence could become the ground for protecting passengers' personal data and establishing standard operation procedures among airport staff. Furthermore, cyber security must also be considered as one of the main pillars within airport security, especially considering today's reliance upon the internet.

No doubt, a balance between innovation in effectiveness, efficiency, and privacy within the airport security issue must be discovered.

Finally, recent Zaventem Brussels Airport and Istanbul Atatürk Airport attacks in 2016 lead us into further questions whether terrorists have shifted their target from aircraft to airport. If so, airport security must be expanded to points far before the airport entrance; from the parking lot or until metro stations.

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- ⁴¹ http://www.slate.com/articles/news_and_politics/explainer/2011/01/whats_so_great_about_israeli_security.html accessed 20 March 2016. See also Courtney L. Taylor, *op.cit.*, 520.
- ⁴² <http://forward.com/news/122781/israel-s-airport-security-object-of-envy-is-hard/> accessed 20 March 2016.
- ⁴³ *Ibid.*
- ⁴⁴ *Ibid.*



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⁴⁵ http://www.slate.com/articles/news_and_politics/explainer/2011/01/whats_so_great_about_israeli_security.html accessed 20 March 2016.

⁴⁶ [http://goodofall.org/archive/Article%2012/Government%20Orders%20and%20Statements/%5B%EB%B3%B4%EB%8F%84%EC%9E%90%EB%A3%8C%5D%20%EC%9D%B8%EA%B6%8C%EC%9C%84,%20EA%B5%AD%EB%82%B4%EA%B3%B5%ED%95%AD%20%EC%A0%84%EC%8B%A0%EA%B2%80%EC%83%89%EC%9E%A5%EB%B9%84\(%EC%A0%84%EC%8B%A0%EC%8A%A4%EC%BA%90%EB%84%88\)%20%EC%84%A4%EC%B9%98%20EA%B8%88%EC%A7%80%20EA%B6%8C%EA%B3%A0.pdf](http://goodofall.org/archive/Article%2012/Government%20Orders%20and%20Statements/%5B%EB%B3%B4%EB%8F%84%EC%9E%90%EB%A3%8C%5D%20%EC%9D%B8%EA%B6%8C%EC%9C%84,%20EA%B5%AD%EB%82%B4%EA%B3%B5%ED%95%AD%20%EC%A0%84%EC%8B%A0%EA%B2%80%EC%83%89%EC%9E%A5%EB%B9%84(%EC%A0%84%EC%8B%A0%EC%8A%A4%EC%BA%90%EB%84%88)%20%EC%84%A4%EC%B9%98%20EA%B8%88%EC%A7%80%20EA%B6%8C%EA%B3%A0.pdf) accessed on 19 June 2016.

⁴⁷ South Korea, Notification at the Ministry of Land, Infrastructure and Transport of Republic of Korea No. 2016-93, art. 7(3).

⁴⁸ <http://www.japantoday.com/category/national/view/full-body-scanners-being-tested-at-three-airports> accessed on 19 June 2016.

⁴⁹ http://ajw.asahi.com/article/behind_news/social_affairs/AJ201510220001 accessed on 19 June 2016.

⁵⁰ <http://bisniskeuangan.kompas.com/read/2015/09/16/173123426/Keberadaan.Pemindai.Tak.Berarti.Bila.Bandara.Tak.Berpagar> accessed 20 March 2016.

⁵¹ <http://megapolitan.kompas.com/read/2015/04/08/13171121/AP.II.Ungkap.Ada.Bandara.Lain.yang.Lebih.Rawan.Disusupi.Orang> accessed 20 March 2016.

⁵² *Ibid.*

⁵³ <http://infopublik.id/read/133781/tiga-program-prioritas-menhub-jonan.html> accessed 20 March 2016.

⁵⁴ <http://allafrica.com/stories/201009210101.html> accessed 11 March 2016.

⁵⁵ *Ibid.*

⁵⁶ G. Valkenburg, *op.cit.*, 259.

⁵⁷ *Ibid.*

⁵⁸ <http://gizmodo.com/5690749/these-are-the-first-100-leaked-body-scans> accessed 21 March 2016. See also <http://www.cnet.com/news/feds-admit-storing-checkpoint-body-scan-images/> accessed 21 March 2016.

⁵⁹ <http://www.cnet.com/news/feds-admit-storing-checkpoint-body-scan-images/> accessed 21 March 2016.

⁶⁰ European Union, Commission Implementing Regulation (EU) 2015/1998 of 5 November 2015 laying down detailed measures for the implementation of the common basic standards on aviation security, annex 4.1.1.

⁶¹ <http://australianaviation.com.au/2010/02/government-beefs-up-aviation-security-measures/> accessed 12 March 2016.

⁶² *Ibid.*

⁶³ European Union, Directive 95/46/EC of 24 October 1995 on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data, OJ L 281.



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⁶⁴ European Union, Regulation (EC) No. 45 Year 2001 of 18 December 2000 on the Protection of Individuals with Regard to the Processing of Personal Data by the Community Institutions and Bodies and on the Free Movement of Such Data, OJ L 8.

⁶⁵ <http://www.theguardian.com/politics/2010/jan/04/new-scanners-child-porn-laws> accessed 22 March 2016. See also <http://www.nydailynews.com/news/world/airport-full-body-scanners-breach-child-pornography-laws-critics-article-1.457981> accessed 22 March 2016.

⁶⁶ Deepika Jeyakodi, "Cyber Security in Civil Aviation", *The Aviation & Space Journal* Vol. 14(4) (2015): 2.

⁶⁷ <http://www.iaa.gov.il/he-IL/airports/BenGurion/Pages/Statistics.aspx> accessed 21 March 2016.

⁶⁸ <http://www.aci.aero/News/Releases/Most-Recent/2015/08/31/ACI-releases-2014-World-Airport-Traffic-Report-Airports-in-advanced-economies-rebound-in-2014--global-passenger-traffic-up-by-over-5-air-cargo-volumes-rise-after-three-years-of-stagnation-> accessed 22 March 2016.