The effectiveness of the changes in Aviation Security in the United States of America after 9/11
Introduction
On Tuesday 11 September, 2001, the aviation security system in the United States (US) failed. Nineteen men hijacked four transcontinental flights, turning the aircraft into large guided missiles. Loaded with a large amount of jet fuel on board, the aircraft were used for several terrorist attacks (9/11 Commission, 2004). This could have been prevented if security operations had been performed more effectively. This fact sheet looks at the changes in security since 9/11 by analyzing the past and current state. However, the main question is: did US security improve after 9/11? This will be analyzed in light of the following three indicators: the number of hijackings, the number of airline bombings and the percentage of undercover investigators (mystery guests) that passed the security system.

Aviation Security before 9/11
Security is defined as precautions taken to ensure against danger. Within aviation, there are two different types of security: soft and hard. Hard security includes border controls at the point of entry to prevent potential terrorists entering countries or gaining access to potential terrorist targets. Soft security is about the interaction between stakeholders’ new information communication technology (ICT) systems in order to identify risk-posing individuals and their network. (Levi & Wall, 2016).

Hard Security
Security before 9/11 was supervised by the Federal Aviation Administration (FAA), which was responsible for all security concerns in US aviation (Price et al., 2013). They focused on two different areas in aviation security: screening baggage and screening the people boarding the aircraft (9/11 Commission, 2004), along with an air marshal on selected flights (Biles, 2013). Baggage couldn’t be loaded without the owner being on board. However, only 5% of baggage was screened for explosives (Bla洛克 et al., 2005). After bags were checked in, passengers were screened by walkthrough detectors, and X-ray machines screened their carry-on belongings (9/11 Commission, 2004). However, according to an FAA evaluation at major airports in the US, bag and passenger screeners missed approximately 20% of potential dangerous items (Bla洛克 et al., 2005).

Before 9/11, the FAA introduced the Federal Air Marshal Service. A Federal Air Marshal is a counter-terrorist agent on board a commercial aircraft to detect, deter, and defeat hostile acts targeting the US (Allison, 2015). They operated on selected flights and mainly focused on international destinations. Marshals were well informed about the security processes involved, which helped them evaluate the airport they faced on the job and where a potential threat could appear (Biles, 2013).

Soft Security
Before 9/11, limited capabilities existed to pre-screen passengers. Existing capabilities consisted of a government-generated ‘no-fly’ list and a Computer-Assisted Passenger Pre-screening System (CAPPS). CAPPS applied various rule-based algorithms to ticket purchasing characteristics to access passenger risk. While these two pre-screening tools were available prior to 9/11, they were limited in their scope and capability (Elias, 2010).

The failing system on 11 September, 2001
Authorities started to take extra precautions after the failed, ineffective security systems on 9/11. This section describes the failures on that particular day that led to this major change in aviation security. Three failures occurred in soft security. First, CAPPS, which was created to identify passengers who should be subjected to extended security measures, only recognized seven of the hijackers. Second, the airlines’ ‘no-fly’ list contained only twelve names, even though other government terrorist
watch lists contained thousands. Third, there was no communication between the government database and the airlines regarding the ‘no-fly’ lists (Elias, 2010).

In terms of hard security, a walk-through metal detector screened the hijackers and an X-ray machine screened their baggage. Nevertheless, the checkpoint supervisors didn’t find anything suspicious and let them pass. The problem here was that the airport, airlines and government all had the information they needed to capture the hijackers, but failed to communicate (Elias, 2010). Personnel also misinterpreted the systems overseeing travellers that could have been terrorists (9/11 Commission, 2004). As a result, the terror attack happened because security was not adequate enough to stop it.

Aviation Security after 9/11

After 9/11, changes within the aviation security were made to prevent future terrorist attacks within the sector. The attacks created an environment in which accidents immediately led to new or stricter security measures. The major changes are described in this section.

Hard Security

Major ‘hard’ changes include visible security, fortified cockpit doors, operations on screeners (Blalock et al., 2005) and cooperation between airlines and security officials (Kaplan, 2006). After the attacks, the government created the Transportation Security Administration (TSA) (Price et al., 2013), which took responsibility for airport security in February of 2002 (Blalock et al., 2005). They also introduced a law that airlines must tie baggage to one person on the aircraft and screen this baggage for explosives. This measure was taken due unaccompanied baggage that exploded, causing the Lockerbie crash in 1988 (Pan am flight 103). Strict baggage screening now occurred through four methods: an Explosive Detection System (EDS), Explosive Trace Detection (ETD) machines, bomb-sniffing dogs and manual bag searches. As a result, EDS and ETD screen 90% of the baggage. The remaining baggage is checked by bomb sniffing dogs and manual searches. Nevertheless, the EDS incorrectly flagged 30% of the bags as containing explosives, and it was also a time-consuming operation (Blalock et al., 2005). Operations on screeners were also changed to remove inefficiencies (Blalock et al., (2005). The TSA hired 3 times more employees after 9/11. This reduced waiting time in security lines (Blalock et al., 2005). The screeners also received more training in screen use, received better pay and benefits, and became much better at detecting dangerous objects on screens (Sweet, 2009). This caused the turnover of screeners to plummet after 9/11 (Blalock et al., 2005).

After 9/11, cooperation between airlines and security officials changed in many ways. One of these changes was the Federal Flight Deck Officer program, which permits pilots with the right training to carry guns (Peterson, 2016). TSA also placed air marshals on more routes than just international ones. However, after the TSA took over, they were not nearly as well-informed about the entire aviation system as they had been before 9/11, when the FAA was responsible (Biles, 2013).

Soft Security

After 9/11, TSA introduced a target for the new aviation screening system: intensifying security measures to identify air travellers who pose security risks. They therefore introduced Secure

Figure 1: Secure Flight

Flight” on August 26, 2004. Secure Flight is a next-generation CAPPS system (figure 1) (Ravich, 2005) that collects passenger information from airlines.
and the government and sends it to commercial data services. These commercial data services report back to the TSA, letting them know whether the information provided by the passenger via the airline matches the information in the company’s own records. The TSA also runs passengers through a Terrorist Screening Center Database (TSCD). The results of this process are then forwarded to security personnel at the airport. (American Civil Liberties Union, 2014).

**Indicators influencing the effectiveness of the changed security measures**

Three indicators measure the effectiveness of aviation security: the number of commercial airline hijackings, the number of commercial airline bombings and the percentage of caught mystery guests at US airports. The number of hijackings increased rapidly since 1967. While there were 32 worldwide hijackings from 1961 to 1967, there were 290 hijacking attempts during the following 4 years after 1968 (Rodrigues & Cusick, 2011). The history of hijackings shown in **Figure 2** illustrates a decline in hijackings after the implementation of 9/11 measures. Fifty hijackings were reported between January 2002 and October 2016. According to the Aviation Safety Network, none of these hijackings were in the US – security enhancements after 9/11 partly led to a decline in hijackings.

Bombings on board commercial airlines are plotted in **Figure 3**. An on-board bombing is the result of failure in hard security screening – security systems are built to detect dangerous goods. The bombing statistics do not show a decline after September 11, 2001. However, none of the bombings were on board an aircraft that departed from the US.

In terms of the third indicator, the Department of Homeland Security found security failures at dozens of the busiest airports in the US. Undercover investigators, mystery guests, smuggled weapons, fake explosives and other contraband made it through security. The test concluded that 95% of mystery guests were able to successfully pass security (Costello & Johnson, 2015).
Conclusion

Aviation security changed after September 11, 2001. Soft security has now been enhanced through the introduction of an advanced version of the existing CAPPS system: Secure Flight. The target of this new pre-screening system is to intensify measures to identify travellers posing potential risk – and terrorists – through a TSCD by collecting passenger data from airlines and the government. The biggest changes in hard security are visible security, fortified cockpit doors, operations on screeners for luggage and passengers, and cooperation between airlines and security officials. This research examined whether aviation security in the US improved by looking at the following three indicators: the number of hijackings, the number of bombings and the percentage of caught mystery guests. Analysis shows that neither bombings nor hijackings took place post-9/11 in the US. However, the shocking fact that 95% of mystery guests passed security raises about the improvement of security effectiveness – the indicators measured are contradictory. More indicators and research are needed to determine whether security measures really have improved in the US. This research therefore raises a question: is the US waiting for the next horrible event, or is the security system adequate?

Glossary

- **Computer-Assisted Passenger Pre-screening (CAPPS):** a counter-terrorism system in the US air travel industry.
- **Explosive Detection Systems (EDS):** a detection system used to detect explosives in baggage.
- **Explosive Trace Detection (ETD):** a detection system used to detect explosives in baggage.
- **Federal Aviation Administration (FAA):** the national aviation authority of the United States.
- **Terrorist Screening Center Database (TSCD):** the central terrorist watchlist and used by multiple authorities for screening.
- **Transportation Security Administration (TSA):** an agency that has authority over the security of the travelling public in the United States.

References


Image references (top to bottom, left to right)

1. Front page: https://www.flickr.com/photos/wefi_official/14822383593/in/photolist-pfg3M-9hn8wf-pdcYHG-mLTDrS-faAdgI-pEWtpp-gJV2Gu-gXK2ci-hI55K6-peekov-q2Qpog-hMT6r-acxJcL-HuF7r7-oqkeea-h5VMcm-h2qm2s-6H4wPs-fksiMg-p5NS8f-e4J9MF-h4uMoX-gJCmZ5-oqF5md-woxeCA-qkn82o-fm3QVd-f4RRbg-rdmh4p-oEb8x9-f7dGHQ-oYkdDQ-eZNGY7-oVivr-HxxEAD- mbYmAm-fbNGry-iGoURq-Jr8YKj-pNyxKL-qLNdUp-fdYqfS-9gPQW9-orXqZq-f9AcRb-g3GBs-ozNAeP-a5M1TC-oXkF8z-gPeLNd

Dutch Summary

Deze fact sheet doet onderzoek naar drie verschillende indicatoren om te bepalen of de beveiliging in de Verenigde Staten is verbeterd na 9/11: de hoeveelheid kapingen, de hoeveelheid aanslagen op luchtvaartactiviteiten en het percentage mystery guests dat de beveiliging weet te passeren. Sinds 9/11 hebben er geen nieuwe aanslagen of kapingen plaatsgevonden. Echter is de hoeveelheid mystery guests die bewapend door de beveiliging komt schokkend: 95%. Kan geconcludeerd worden dat het beveiligingssysteem in de Verenigde Staten is verbeterd, of is het een kwestie van tijd tot er een terroristische incident gaat plaatsvinden?