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Tourism and Terrorism: Terrorists Threats to Commercial Aviation Safety & Security

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Abstract

If airplanes and passengers, as well as propertyand people on the ground are to be protected,potential perpetrators of aviation terrorism mustbe prevented from breaching security checkpointsand gaining access to "secure" airport areas and toaircrafts. Given the interconnectedness of the airtransportation system, a sufficiently high level ofsecurity must be provided throughout the entiresystem.In this paper we examine terrorism issuesrelevant to airline and airport security internationally, a topic that has received much attention since 9/11. Understanding the key issuesis crucial in evaluating the various methods of regulatingand providing aviation safety and security.The purpose of this paper is to review the key features of the Aviation and Transportation Security Act and the characteristics of the resulting security policy. Then we examine terrorism, previous terrorists' acts against aviation as well as current and future aviation threats. A summary of ourmajor points completes the paper.

Key Words: **t**ourism, aviation, terrorism, safety, security, policy

1. Introduction

The Transportation Security Administration (TSA) was created in response to theterrorist attacks against the United States (U.S.) on September 11, 2001 (Gonya, 2010).The TSA was createdby the 107TH Congress on November 19, 2001 as part of the Transportation and AviationSecurity Act (Gonya, 2010). The Act delegated the primary responsibility ofstrengthening security of the transportation systems throughout the nation to the TSA(Gonya, 2010).Prior to the creation of the TSA, the Federal Aviation Administration (FAA) wascharged with aviation and air cargo security (FAA, 1986). Today, much of the TSA'saviation and air cargo authority is based on previous FAA regulations (FAA, 1986). TheTSA is responsible for security oversight of all

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modes of transportation, and now includessecurity oversight of surface, rail, and mass transit (Gonya, 2010). The TSA continues toequip commercial airports with the latest advanced technology for screening forpassengers at screening check points, additional Transportation Security Officers (TSOs)to accommodate the high passenger volume, and the latest explosive detection equipment(Gonya, 2010).

Currently, there are nearly 50,000 TSOs dedicated to keeping the skies safe.These officers provide security for 450 U.S. commercial airports including those locatedin Guam, Alaska, Hawaii, U.S. Virgin Islands, and Puerto Rico (Gonya, 2010). A TSOs primary responsibility include monitoring traveling passengers as they enter and exitsecurity screening checkpoints and preventing the introduction of prohibited items intothe sterile areas of the airport or aircraft (Gonya, 2010). Nevertheless, even in theaftermath of 9/11, (Montgomery et al., 1996), the aviation industry is still viewed byterrorists as the primary avenue to carry out their plot to destroy key critical infrastructureswithin the U.S., cripple the American economy, and create mass casualties amongAmerican citizens by using aircraft as weapons (Montgomery et al., 1996).

Commercial aviation plays a central role in our daily lives and is anessential part of the national economy. The importance of aviationto both the public and the private sectors drives concerns about howsecurity threats, such as terrorism, could affect the utility, safety, andeconomic value of those sectors. It is also undeniable that the aviationsystem has long been an attractive target for terrorists across thepolitical and ideological spectrum. From hijackings in the 1970s toal-Qa'ida in the Arabian Peninsula's disrupted bombing operationin May 2012, terrorists continue to try to exploit the aviation systembecause of both the visibility and the impact that even semi-successfulattacks have produced.Because of the risk of terrorism to aviation targets, aviation securityhas grown to become a substantial commercial, political, andsocial influence in the U.S.and abroad. Federal expenditures on aviationsecurity represent only a part of the government spending picture, withadditional security expenditures made at the state and local levels (e.g.,by airport authorities) and by the private sector (e.g., airlines). Securitymeasures also have intangible costs, including the time spent by passengersundergoing security procedures, as well as the hassle and privacyimplications of security screening.

2. Background

Transportation security became a national issue since 1931. According to the FAA(1986), the first aviation hijacking took place in Arequipa, Peru on February 21, 1931.The introduction of jet airliners and a series of mid-air collisions in 1956 prompted thepassage of the FAA Federal Aviation Act of 1958 (USDS, 2011). In September of 1961, Congress amended the FAA Act of1958, in which Air Piracy (hijacking), interference with flight crews, and unauthorizedpossession of weapons aboard an aircraft became criminal acts (USDS, 2011).Subsequently, other acts of hijacking occurred which spurred additional

screeningmeasures, including vetting (clearing) flight crewmembers, searches of aircraft and cabins for international flights, additional screening for international flights, andsecondary screening of passengers at the gate area (USDS, 2011).

Although new policies by the FAA continued to be adopted, terrorism by meansof aircraft was on the rise. On December 21, 1988, Pan America Flight 103 in route toNew York crashed in Lockerbie, Scotland (USDS, 2011). According to the USDS (2011),a total of 270 individuals were killed, including the 259 passengers onboard the aircraftand 11 on the ground. As a result of the Pan Am 103 bombing, new security measuresrequired x-raying or hand searching of all checked baggage and the matching ofpassengers with their baggage on international flights; no access to the contents of bagsfollowing x-ray or hand search; and random selection of passengers for enhanced scrutiny(USDS, 2011).In December 1994, Ramzi Yousef carried out a test run on Philippines Airlines(PAL) Flight #434 to carry improvised explosive (IED) components through airportsecurity checkpoints (USDS, 2011). He exited the aircraft at the intermediate stop. TheIED detonated on the second leg of the flight and killed one passenger (USDS, 2011).Yousef was eventually captured. He was in the process of manufacturing explosives forthe final phase of the Bojinka Plot. According to the USDS (2011) his intent was to bomb12 US aircraft over the Pacific Ocean. As a result of this plot, new protocols called forthe physical search of all hand-carried baggage and temporarily prohibited all liquids incarry-on baggage (USDS, 2011).

After the attacks on September 11, 2001, it was clear that there was urgency to protect the airplane, airport terminals and associated facilities such as car parks from terrorist attacks. Passengers and baggage are not the only sources of threats to commercial aviation security. Threats can also come from the many processes that support an airport and the passengers and aircraft it serves: catering, maintenance, cleaning, ticketing, baggage handling, air traffic control, retail, food services, parking, car rental and others. These are areas where the general public has unrestricted access to before passengers undertake security screening and pass into secured areas prior to aircraft boarding. Aviation security rely extensively on cost and risk reduction data for LAX compiled by RAND in 2004 (Stevens et al., 2004), which considered bombings or shooting attacks at the airport curbside or in other pre-screening areas of passenger terminal buildings.It is important to note that this assumes terrorists only desire to attack large airports. However, there are thousands of smaller passenger airports, enhanced security measures at large airports have been done to a lesser degree at the smaller ones.

3. Methodology

An extensive literature review was conducted using published reports, 9/11 Commission report, Federal Aviation Administration, International Association of Air Transport, Civil Aviation Authority andthe Internet. In a time where vast amounts of data are being collected and archived

byresearchers all over the world, the practicality of utilizing existing data forresearch is becoming more prevalent (Andrews, Higgins, Andrews, Lalor, 2012; Smith, 2008; Smith et al., 2011). Secondary data analysis isanalysis of data that was collected by someone else for another primary purpose.The utilization of this existing data provides a viable option for researchers whomay have limited time and resources. Secondary analysis is an empiricalexercise that applies the same basic research principles as studies utilizingprimary data and has steps to be followed just as any other research method. This paper contributesto the discussion of aviation safety and security by using secondary data analysis as a research method.

4. Literature Review

4.1 Risk Perception

Travelers risk perception is a valid and convincing tool to investigate tourists' concerns prior to and/or when they are taking a trip in this era of frequent terrorist threats and attacks around the world. Risk and tourism are interwoven as the purchase of leisure trip is inherently attached to risk (March & Woodside, 2005). Similarly, tourism is service in nature and thereupon it inherits the intangibility, heterogeneity, perishability, and inseparability characteristics from services (Mitchell &Greatorex, 1993a; A. M. Williams &Baláž, 2013). Past studies have provided both theoretical and empirical evidences to support the argument that service consumers perceive greater risks than goods consumers (Mitchell &Greatorex, 1993b; Murray &Schlacter, 1990). Most of the risk studies in tourism focus on perceived or subjective risk instead of real or objective risk as tourists are only able to experience risk that is related to themselves (Budescu&Wallsten, 1985; Reisinger&Mavondo, 2005) or risk that they are able to perceive (Quintal, Lee, &Soutar, 2010). From a constructionist viewpoint, risk is socially constructed and is interpreted differently across different social structures and cultures (Douglas & Wildavsky,1982); the experience or perception of risk can be contested, incorporated, and transformed (Williams &Baláž, 2014). Similarly, post-modernists perceive risk as a blur and inconclusive concept (Hassan, 1985).

The importance of perceived risk has been highlighted in the existing literature. Roehl and Fesenmaier (1992) discovered three dimensions of perceived risks: physical-equipment risk, vacation risk, and destination-specific risk. A more recent work done by Pennington-Gray and Schroeder (2013) on international tourists' safety and security perceptions suggest seven types of perceived risk related to tourists, which include crime, disease, physical, equipment failure, weather, cultural barriers, and political crises. The concept of perceived risk is equivocal as different scholars have attached different meanings to it (Sjöberg, 1980). Reisinger and Mavondo (2005) define perceived risk as cognitive probabilities to be exposed to threats and dangers.

Probability and possibility are two distinct but interrelated concepts. The former refers to the measurable chances while the latter takes shape in fantasy (Korstanje, 2011). For example, the probability of becoming a victim of crime when travelling to rural destination is low but the possibility exists. The problem with Reisinger and Mavondo's (2005) definition of perceived risk is that, tourists who go for a vacation might not be aware of their own assessment of potential risk, in other words, tourists might not recognize the probabilities of risk, although they might have a general idea on the possibilities of risk. Williams and Baláž (2014) characterize tourism as a blend of uncertainties and fractionally known risks.

4.2 Risks

Even after the implementation of heightened airline security procedures in the USA and the rest of the world with the aftermath of 9/11, there was still evidence terrorists conducted dry run surveillancemissions on air carrier (airline) aircraft (Hofffman, 2007). This surveillance was designed to pinpoint weaknesses in the existing cockpit security procedures and todesensitize security personnel (TSA, 2008). Surveillance was an essential element ofevery terror attack, and the National Commission on Terrorist Attacks Upon the UnitedStates [9/11 Commission Report] noted numerous casing flights by the hijackers (9/11Commission Report, 2004; Dahl, 2007). Testifying before a CongressionalSubcommittee on Transportation Security and Infrastructure Protection, Captain R.Hesselbein (2007) reported that even with fortified doors, cockpits were vulnerable tobreach and seizure during door opening and crewmember transitions during flight.In consideration of these threats, it was essential for airline cockpits to beprotected to the maximum extent possible, and a program to arm airline pilots was onetool in the arsenal to achieve this goal (Skinner, 2006). Airline pilot advocates expected a majority of pilots would volunteerfor the arming of pilots program, but the expected numbers of volunteers did not materialize (Prater,2008).

In a 2004 survey of a random selection of airline pilots conducted by the WilsonCenter for Public Research, 37% of respondents were dissatisfied with the TSA'simplementation of the arming of pilots (FFDO) program (Air Line Pilot, 2005). Additionally, 27% wantedopen carry for FFDOs and 21% expressed a desire for better support from their airlines(Air Line Pilot, 2005). Only 13% had applied for FFDO training; the primary reason forlack of participation was inability to obtain time off from their airlines to attend training(Air Line Pilot, 2005). Belanger (2008) administered a survey to 624 pilots and flight attendants to assesstheir perceptions of TSA effectiveness. The goal of the study was to determine howcrewmember interactions with TSA affected their morale and professionalism (Belanger,2008).A 2009 project assessed American Airlines pilots, using a 50-question survey todetermine attitudes about threats and risks (Borowsky, 2009). The study received 658responses from a request placed on the American Airlines pilots' Internet website.Results of the study indicated pilots considered ramp security and flight deck security asthe most significant risk factors.

4.3 Terrorism

Terrorism worldwide existed for thousands of years (Deutcher, 2009). Terrorismbecame a significant threat to the United States in 1983, with the first major terroristattack against a United States target by a suicide car bombing of the American Embassyin Beirut (Helman, n.d.). There was considerable divergence on the definition ofterrorism, with over 100 definitions of the word "terrorism" in acceptance worldwide(Deutcher, 2009). The definition in the U.S. Code fell short of current thoughts onterrorism, because it did not differentiate between extortion and efforts to inflict damagefor the purpose of terror: "Premeditated, politically motivated violence perpetratedagainst noncombatant targets by subnational groups or clandestine agents" (U.S. Code,2008, para. 2656f). An alternate definition added the element of intentionally inflictingdamage to civilians:

"The act of destroying or injuring civilian lives or the act of destroying ordamaging civilian or government property without the expressly charteredpermission of a specific government, thus, by individuals or groups independentlyor governments on their own accord and belief, in the attempt to effect somepolitical change." (Picucci, 2008, p. 13)

Some acts, which were frequently called terrorism, could more correctly beidentified as extortion. The Dawson's Field multi-airplane hijacking in September 1970,for example, was an attempt to force Israel to release prisoners, rather than an attempt toinflict mass casualties (Esget, 2009). The main raison d'etre of the terrorist was toinspire terror: "The primary objective of a terrorist is not to kill but to get his or hermessage through. If the message does not get through then the act loses its purpose"(Chowanietz, 2009, p. 65). Terrorism could only be viewed in the context of the reactionto terrorism; if the event caused terror, the action was terrorism (Schinkel, 2009).

The 1950s marked the beginning of non-state nationalist terrorism from groupssuch as Irish, Basque, and Kurdish radicals (Zalman, 2009). The Israel-Palestinianconflict galvanized numerous nationalist groups to strike targets out of their respectiveimmediate area (Newman, 2006). A symbiotic relationship existed between terrorists andmedia: the terrorists needed the media to gain widespread notoriety, and the medianeeded dramatic events to foster enhanced ratings (Hildebrandt, 2009). Media reportingin many respects became an arm of the terrorists (Borowsky, 2009).Al Qaeda philosophyattributed hatred of the United States to America's supportof Israel and the presence of American forces in the hallowed land of Saudi Arabia

(Feehan, 2009; Rosthauser, 2010). It was this hatred which produced al Qaeda's warupon America (bin Laden, 1996). The 1993 attack upon the World Trade Center was anearly manifestation of this war (Shughart, 2006).Al Qaeda considered America to be responsible for every worldproblem involving Muslims, including conflicts in Russia, India, and the Philippines (9/11Commission Report, 2004). Al Qaeda had been at war with the United States well beforethe 911 attack, with plots to bomb several New York landmarks (9/11 Commission Report, 2004). The 9/11 attack was not the first al Qaeda attack upon the US homeland (Syed, 2010).

Al Qaeda had launched a previous assault upon the United States in 1993, withthe first attack upon the World Trade Center (Syed, 2010). Following that attack, in 1994in Manila, the architects of the first World Trade Center attack were in the final stages oftheir follow-on plan when a fire brought Philippine police to their apartment (Syed,2010). The plot, Operation Bojinka, to simultaneously blow up 11 US airliners over thePacific, was halted mere days before its execution (Transportation Intelligence Gazette,2007).Al Qaeda was planning additional attacks against the United States, and the 2010attempt to detonate bombs aboard US air carrier aircraft over the Atlantic was evidence alQaeda had not abandoned Bojinka (Cort, 2006; Gardham, 2010). The attempted 2009Christmas bombing and 2010 cargo package bombs exemplified this strategy (Gardham,2010; Ross, Rhee, & El-Buri, 2009). Additionally, Palestinian al Qaeda members wereplanning a coordinated attack against both the United States and Israel (Beres& Lopez,2006).

Al Qaeda was no longer a single entity; it had spawned numerous small, closeknitoutgrowths known as affiliates (Bream, 2008; Munkittrick, 2010). These radicalsub-groups operated autonomously (Crumpton, 2006). This autonomy made thechallenge of detecting these smaller groups increasingly difficult (Bergen, Hoffman, &Tiedemann, 2011).Due to the asymmetric nature of terrorism, the Islamists had no compunctionabout using nuclear and other weapons of mass destruction in their attempts to attack theUnited States (Krepinovich, 2006). Because terrorists often traveled under different names, were not endemic to oneparticular country, and had numerous passports, they were especially difficult to identify(Cozine, 2010). Most disturbing in recent terrorist activity was the makeup of theterrorist cells; three of the four London bombers were British-born Islamists (Jodie,2006).

A preponderance of captured European terrorists were either European-born orimmigrants who became radicalized after reaching Europe (Roy, 2005). The dozen-plusterrorists arrested in London in 2006 for the attempted bombing of 10 US-bound airlinerswere all British, and a British Muslim convert was involved in a plot to bomb Americanfinancial interests in London (Forest, 2007; Jacobson, Lee &Nikolaev, 2009).The concept of home-grown Islamic terrorists was not limited to England (Steyn,2006). A large number of radical Muslims in the United States were American-bornreligious converts (Steyn, 2006). Many of these members were converted in the prisonsystem, and radicalized either in the prisons or in the mosques after their release (Farrell,2009). There were numerous avenues of radicalization in the United States, from localmosques to various organizational meetings, such as the Muslim Arab Youth Association

(Emerson, 2006). U. F. Abdulmutallab, the Christmas Day airline bomber, had becomeradicalized via the Internet (Szrom&Harnisch, 2011).To support the group's operations in Iraq and Syria,Isis has launched a social media campaign and is posting (mainly on Twitter) photos and statements to highlight its military strength and territorial advances and to recruit fighters.

5. Aviation Threat

Even without factoring in the unpredictablenature of terrorism, the size of the U.S. air transportationsystem and the differences among airlines andairports suggest that providing aviation security isa complex and difficult task. Studies and legislationthroughout the 1990s identified problems with aviationsecurity and attempted to improve it.The airlines have no greater responsibility than the safety and security of thetraveling public, requiring an air carrier to "provide service with the highest possibledegree of safety in the public interest" (49USC, 1994, para. 4407(d)(1)(A)). The cost ofthe damage from the 9/11 attack exceeded $100 billion, when the damage to property,costs of insurance, and lost revenue were included (George & Watford, 2007). Damageto the World Trade Center alone exceeded $70 billion (Samuels, 2008). The Dow JonesIndustrial Average declined 14.5% in the first five days after the 9/11 attack (Larobina&Pate 2009).

A study of public attitudes toward security expenditures indicated the publicsupported spending 17% of the anti-terror budget on aviation security (Stinson et al.,2007).Although there had been numerous warnings, the United States did not takepositive steps to prevent terrorism against aviation. In 1989,Yeffet, former El AlAirlines Chief of Security, conducted a test of US airports (Kilgore, 2010). Yeffetrepeatedly succeeded in checking luggage at curbside and then not flying on thescheduled flights in New York, Chicago, Denver, Los Angeles, and Miami (Kilgore,

2010). Yeffet was prescient in the assessment of the terrorist threat to American aviation:

"Airline executives have made security a low priority. There is no reason to believe thiswill change until there is a major disaster at an American airport" (Russell & Preston,2004, p. 5). After 9/11 it became clear the reaction to terrorism was no longer an option, fighting terrorism requires a pro-active approach.

Long before the 9/11 attack, aviation was a prime target for both criminals andterrorists (Esget, 2009). There had been 12 attempts to breach cockpits between 1997and 2000 (Hester, 2000). Hijacking was a threat to commercial aviation well beforeterrorist attacks upon the United States; in 1968 alone, there were 22 hijackings in theUnited States, with 19 landing in Cuba (Russell & Preston, 2004). There were eightreasons aviation held attraction for terrorists: it was a powerful symbolic target; itprovided an international stage; it provided extensive media exposure; it was relativelysimple; the consequences were enormous for both the airline and the country; it could bepolitically embarrassing; it was a useful tool for revenge; and it was effective (Harrison,2009).

When US aviation became a target of terrorists, hijacking became a favoredstrategy (Hesselbein, 2007). In the pre-9/11 environment, the purpose of hijacking hadoften been to collect ransom (Seidenstat&Splane, 2009). It was noteworthy, prior to9/11, the instructions to crewmembers were, "comply with their instructions" (NationalTerror Alert Response Center, 2008, para. 7). Additionally, the recommended responsewas to fly the hijackers to their requested destinations (Treichler, 2006). Post-9/11,hijacking prevention depended on establishing multiple layers

including: enhancingpassenger and checked baggage screening, training flight and cabin crew for securityawareness, expanding FAMS, and placing FFDOs on passenger and cargo flights (GAO,2007).

Security screening had been a perpetual Achilles heel in protecting commercialaviation. Between December 1998 and April 1999, Transportation Departmentinvestigators breached airport security 117 times out of 173 attempts (Sumner, 2007). B.Dzakovic, leader of the FAA Red Team, testified before the 9/11 Commission, stating theRed Team had found serious vulnerabilities, but the FAA had stifled release of the team'sreports (Apaza, 2009). Because there had not been active terrorist attacks upon theUnited States at the time, it was difficult to obtain commitment on the part of the U.S.populace (Apaza, 2009). The preceding studies and legislation highlightednumerous specific problems with aviation security.Problems existed in three major areas: aviation computersecurity; access to aircraft, airfields, and otherfacilities; and the detection of dangerous objects.

6. The Future of Aviation Safety &Security

In response to these incidents, the U.S. government and many other countries have dramatically increased aviation security measures to prevent or deter future attacks. Many of these measures are well known to the public, including: the hardening of cockpit doors; federalization of airport security screening staff and the creation of the Transportation Security Administration (TSA); deployment of federal air marshals (FAMs) and federal flight deck officers (FFDOs) aboard aircraft; implementation of new detection equipment and methods, such as advanced imaging technology (AIT), often referred to as “body scanners”; increased amounts of screening for cargo; explosive trace detection (ETD), full body “pat-downs,” and behavioral detection officers (BDOs); enhanced scrutiny for visa applicants wanting to travel to the United States; and the use of watch lists to screen for terrorists to prevent them from boarding flights or from gaining employment in airports or airlines.

At the heart of aviation safety and security is that it’s always in competition for resources, money and manpower. Following the recent economic downturn, many national governments in mature aviation security markets are reducing public spending. The adoption of new risk based strategies is also determining the focus on particular security systems and technologies, most notably biometric and screening technology deployed at airports.However, the aviation sector continues to be a target for terrorism and criminal activities. In 2014, there have been high profile attacks on aviation infrastructure in Pakistan. The months of June and July, 2014 have witnessed significant tightening of security procedures at airports in the USA and Europe in response to a significant terror warning that explosive devices were being constructed to by-pass current airport security measures. It is these evolving threats to civil aviation that will continue to drive demand and investment for new security technologies and systems that can detect and mitigate

the latest security threats.One of the world's largest insurers, Allianz, has identified six major emerging risks for the aviation industry, with cyber terrorism and drones making the list. The Global Aviation and Safety Study (2015) also identified future aviation risks that included limited pilot training and lithium batteriesboth installed on the aircraft such as Boeing's 787 Dreamliner and in devices being brought on board airplanes by passengers.

Determining future threats to aviation operations is key to the aviation sector maintaining its much-improved safety record in future. In addition to the host of potential risks posed by natural hazards, technological advances, human error, war and terrorism, the aviation industry is also having to remain alert to a number of other new challenges. Disturbingly, the Allianz study warns that one of these new challenges is cyber warfare, which may replace the hijacker and the bomber as the 'weapon of choice' for terrorists. The report claims that the industry is facing risks on all fronts due to aviation's increasing reliance on computer systems for almost every aspect of its business.

High growth in air traffic volumes in China, South East Asia and the Middle East will account for and sustain growth in the aviation security sector. New infrastructure, for example airports or terminal buildings will require investment in security equipment to meet international aviation safety and security standards, thus accounting for much of the growth in the aviation security market over the next decade, (International Air Transport Association, 2014). The aviation security market is reactive and can experience rapid change in a short period of time. Demand is driven by existing and emerging security threats to the air transport sector. Additional market drivers include reviews and changes to international safety and security which lead to demand and investment for new security equipment, and product lifecycles which require the replacement of outdated and obsolete equipment and technology.

Technology challenges include Wi-Fi availability on airplanes and the growth of unmanned aerial vehicles (UAVs) commonly known as drones which are emerging threat to the overall safety of the aviation industry. The potential risks are obvious, namely the possibility of hacking into the cockpit technology controls withloss of control due to frequency interferences and collision or third party damage or injury and resulting liability. The Federal Aviation Administration dealt with drones landing on the White House lawn in 2015 and has been investigating an average of two incidents per day of drones coming within the restricted 400 feet and within five miles of airports. A drone can be sucked into an airplane engine or crash into the cockpit and injure the pilot. Commercial airlines are highly reliant upon information technology systems to handle critical functions such as reservations and crew check-in, a fact not lost upon Rajib Karim when he suggested in correspondence with Anwar al-`Awlaqi that he could erase data from British Airways' servers, thus disabling the airline's website.

The Global Aviation Study (2015) also identified pilot training not being able to meet the growth of the global jet fleet, which is set to 'almost double to 40,000 by 2030' as an emerging risk. Allianz touched on the training itself, asking whether 'airline pilots are too reliant on

automation’; particularly after the 2013 Asiana Airlines accident and the 2009 Air France crash. The report identified that pilots’ ‘failure to master the latest changes in cockpit technology will pose an increasing threat to passengers.’Efforts should be directed toward making airport security systems smarter and more flexible, not necessarily more encompassing or extensive. Intelligence on threats and adversaries can be the basis for configuring a flexible system to meet those threats and to focus enhanced security measures mainly on high-risk individuals. To this end, channels of information and coordination must be established between airport security systems and the intelligencegathering and analysis activities of national and local law enforcement agencies.

Calvin Scovel, testimony before the Senate noted that the percentage of outsourced maintenance dollars for domestic airlines increased from 37% to 64% between 1996 and 2006, and the number of foreign facilities servicing U.S. carriers increased from 344 to 698 over the last 13 years. This is challenges in FAA's ability to effectively monitor the increase in outsourcing.

While maintenance outsourcing remains a vital concern, there are other threats to airline safety. For some time now, the National Transportation Safety Board (NTSB) has published its list of "Most Wanted" safety improvements for aviation. Currently the list contains six items, including such hot-button issues as human fatigue factors; airport runway incursions and ground collisions; and the continuing need to improve crew resource management techniques in the cockpit. Then there's the nation's aging air traffic control network. Since the nation's commercial aviation safety record is so high, it's hard to conceive of our aeronautical infrastructure eroding. But without proper vigilance, it will.

7. Conclusion

Protecting the world’s aviation system demands a highlevel of vigilance because a single lapse inaviation security can result in thousands ofdeaths, destroy equipment worth hundredsof millions of dollars, and have immeasurablenegative impacts on the economy in billions of dollars, andthe public’s confidence in air travel. The terrorist attacks exploited weaknesses inU.S. aviation security on September 11, 2001 and did indeed produce the catastrophic resultsidentified in the prophetic testimony cited by testimony in congress. Immediately after the attacks, security issues roseto paramount importance in the nation’s policy agenda.Schneier (2006) concludes that the only two effective antiterrorism countermeasuresimplemented after 9/11 were strengthening cockpit doors and passengers learning theyneed to fight back.Despite general agreement on what aviationsecurity entails and the goals of an aviationsecurity system, public controversy abounds onhow to regulate and provide this important activity.

If airplanes and passengers, as well as propertyand people on the ground, are to be protected,potential perpetrators of aviation terrorism mustbe prevented from breaching security checkpointsand gaining access to “secure” airport areas and toaircraft.

Given the interconnectedness of the airtransportation system, a sufficiently high level ofsecurity must be provided throughout the entiresystem. Flexibility to respond quickly to new informationabout aviation security threats is a must.In this paper we examined safety and security issuesrelevant to airline and airport security in mainly the UnitedStates, a topic that has received much attention since 9/11. “ The hardening the cockpit doors and changing the protocols for hijacking has made itharder for terrorists to get weapons on board an aircraft and take control of it” (Maley2008). The Airport Infrastructure and Aviation Security markets are expected to continue to grow due to a number offactors. Rebounding air traffic growth across all regions, post-9/11 security concerns, and anexpected doubling or tripling of air traffic over the next 20 years are major contributors to thisupward trend. Although constrained by regulations at multiple levels, airport authorities will need to expandcapacity to keep up with current and future demand. Moreover, evolving safety and security needs bothwithin the U.S. and throughout the world will ensure long-term viability of the market foraviation security technologies. The analysis in this paper supports these conclusions.

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