



Region 2

UNIVERSITY TRANSPORTATION RESEARCH CENTER

Final Report

Reaching the Potential: The Imperative for Forming National Aviation Policy in a Post 9/11 Environment

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16. Abstract The air travel industry is in turmoil. Bankruptcies of commercial air carriers has become commonplace. Increasing fuel costs make profitability wishful thinking for many carriers, and many cities are losing scheduled air service as carriers focus on only the most profitable routes. Complaints about delays are the norm. The benefits that will result from technological improvements are years away. Many in both the private and public sectors describe the system as “broken” and call out for changes in national aviation policy.			
Why should we care about the state of the aviation system? By connecting cities with quick and affordable transportation, economies expand from cities to regions to mega regions, creating jobs and improving quality of life, even for people who never board a commercial airliner. Regions with access to airports leads experience greater job growth compared to regions without airports. In a little over a century, air travel grew from a curiosity to the source of over five percent of the U.S. Gross Domestic Product. Few question the need for a robust U.S. air transportation system.			
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**REACHING THE POTENTIAL:
THE IMPERATIVE FOR FORMING
NATIONAL AVIATION POLICY
IN A POST 9/11 ENVIRONMENT**

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Introduction

This report looks at one of the key issues faced by policymakers today. Does the United States need a national aviation policy, and, if so, what are the major challenges faced by policy makers. Part 1 presents the issues facing the air travel industry today. Hardly a day goes by without one key issue or another being reported in a newspaper: flight delays are rampant, airlines face enormous financial problems (typically caused by skyrocketing fuel costs), passengers demand better treatment after being confined on an airliner for hours without access to the most basic services. The Federal Aviation Administration, responsible for the management of the air traffic system, finds itself without a permanent and reliable source for financing current operations, let alone the billions of dollars needed to make the improvements needed to handle expected increases in passenger air traffic. Aviation advocacy groups find themselves at odds as different financing schemes seemingly favor one group over another. In the spite of this turmoil, the air travel system continues to serve over 700 million passengers annually. That number is expected to increase to over 1.1 billion by 2010.

As demonstrated in Part 2, the economic imperative for a national aviation policy is overwhelming. The impact of aviation on jobs is so substantial that the failure to develop a national aviation policy that can effectively guide policymakers at federal, state and local levels threatens our economic future. Unfortunately, airline security has dominated aviation policy formation, almost to the exclusion of all other issues, at least in regard to the public eye. The events of September 11, 2001, were so traumatic that an entirely new cabinet level department, Homeland Security, was formed. A major new administration – the Transportation Security Administration – was formed to oversee all aspects of transportation security, but air travel security has garnered most of the TSA's attention, at least, that which can be seen with the public

eye. Part 3 provides some insight into how air travel security has dominated the policy arena by presenting two examples of policy formation, one successful and the other not.

One objective of this report is to stimulate a national debate on the need for a national aviation policy by demonstrating the importance of the industry to the national economy. As important as air travel security is, allowing it to crowd out all other issues not only sets a dangerous precedent, but also could be self-defeating, especially given the propensities for such deleterious events. In attempt to protect the nation, the nation has been changed into something quite different than most Americans envision.

This is a first step towards developing a consensus that, at the very least, the debate needs to take place. Subsequent work will entail collecting from industry experts in both the public and private sectors the key factors that must drive the formation of the national aviation policy.

Part 1: What Are The Issues

PART 1: What Are The Issues?

The air transportation system in the United States is, by all accounts, vital to the economic health of the nation. The Federal Aviation Administration (2008) reported that in 2006, aviation accounted for just over \$1.2 trillion in economic activity, contributing 5.6 percent to the U.S. economy. Aviation-related fields employed eleven million Americans, resulting in \$369 billion in earnings. In this same year, commercial airlines carried 738 million commercial passengers and forty billion revenue ton-miles of freight. A 2000 Wilbur Smith report called aviation “America’s not-so-secret weapon in the battle to retain world economic leadership in the era of global competition,” noting that the U.S. economic activity driven either directly or indirectly by aviation is greater than the gross national product of all countries but the United States, Japan, Germany, France, United Kingdom, Italy and China.

Yet, as important as the nation’s air transportation system is to the economic health of the nation, the United States lacks a comprehensive national aviation policy. Why is this important? Without the guidance that a national policy might provide, different government agencies¹ address serious issues that affect the efficiency and the effectiveness of the country’s air transportation system in a piecemeal manner, with departments focusing solely on their own perceived missions. Policies developed by agencies working in isolation can work at cross-purposes with those developed by other agencies. As long as agencies judge themselves on the effectiveness with which they address their own missions, however, they can consider themselves successful even if the nation’s interests are harmed in the process.

This report explores one of the major challenges confronting policymakers today:

¹ For example, the Departments of Transportation (DOT) and Commerce each have influence over transportation policy. DOT and the National Aeronautics and Space Administration both conduct aeronautical research. The Department of State has the lead in negotiations of air transportation treaties with other countries. The Department of Homeland Security and the Federal Aviation Administration both regulate different aspects of airline operations.

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developing a national aviation policy in a way that successfully addresses the vastly different worlds of commercial aviation and general aviation.² To accomplish this goal, we first develop a theoretical framework by examining some of the important factors that could inform national policymakers. These factors include the growing congestion at the nation's busiest airports and advances in technology that might enhance the use of regional and community airports.

In Part 2, I establish the basis for the need for a national aviation policy. In this chapter, I examine more fully the importance of civil aviation to the United States economy by studying the importance of general aviation to business for the movement of people and goods. While some research has examined the relationship between large commercial airports and regional economic development, the regional impacts of smaller airports and their importance to business travel have remained largely unexplored. To address this gap, I present the results of three studies I conducted: a qualitative analysis of the importance of corporate aviation, a quantitative study of the relationship between general aviation airport infrastructure and regional economic development, and a study of business potential use of an alternative to commercial air travel in Florida.

Why is this Study Important?

Why are these issues important? As I stated earlier, the United States today does not have a clearly stated, comprehensive, unified and actionable national aviation policy. Most of the discussions at the federal level center on either air travel security or annual appropriations levels

² The Federal Aviation Administration classifies aviation into three general segments. The first is commercial scheduled airlines, the largest (at least in terms of financial impact to the country) and the most easily recognized by the general public. The second is military operations. The last is general aviation, which includes all other types of aviation operations, including air freight, air taxi, air charter, medical evacuation, agricultural aviation (e.g., crop dusting), corporate aviation and personal aviation. Commercial aviation and general aviation are regulated by different parts of the Code of Federal Regulation (CFR), with commercial aviation being subjected to the most stringent requirements.

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and temporary reauthorizations of continuing activities by the FAA. Indeed, some industry experts look at that inability of the federal government to provide multi-year funding authorizations as a major obstacle to accomplishing many key goals. In a recent report, the Government Accountability Office found that “short-term funding extensions and continuing resolutions could delay key capital projects” (GAO 2009, p. 4). If the improvements needed to expand the capacity of the nation’s large commercial airports are delayed, the need to employ existing capacity at smaller, less congested airports might well become even more important.

Just as critical, people in multiple federal departments, each with their own set of priorities, drive aviation policy in directions without consideration of the other Departments’ priorities, a phenomenon known as stove-piping.³ The Department of Transportation, for example, focuses on the overall effectiveness of the air travel system. The Department of Homeland Security concentrates on preventing hijackings, including the potential for using aircraft as weapons. The Department of State must look at international issues such as international trade agreements while the Department of Commerce needs to look at the impact of aviation on domestic business. No one office addresses these interrelated issues and understands how policies developed by different departments might affect each other. The result is a collection of department-specific policies that often act in cross-purpose. The extra time needed to clear security lines, for example, slows down passenger throughput at airline terminals, thus interfering with the efficient operations of the airport. Worse, the focus placed on high profile issues such as security potentially distracts policy makers from the long-term needs of the

³ Stove-piping is a metaphorical term which recalls a stovepipe's function as an isolated vertical conduit, and has been used, in the context of intelligence, to describe several ways in which raw intelligence information may be presented without proper context. The lack of context may be due to the specialized nature, or security requirements, of a particular intelligence collection technology. Alternatively, the lack of context may come from a particular group, in the national policy structure, selectively presenting only that information that supports certain conclusions. Accessed from <http://en.wikipedia.org/wiki/Stovepiping>, on May 6, 2009.

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nation's air traffic management system. This results in difficulty in obtaining the level of support from Congress sufficient to drive forward new programs designed to expand the capacity of the nation's airspace system, such as the Next Generation Air Transportation System (NextGen). Without these new programs, congestion will likely increase, as will delays, costing the country billions in lost commerce. The following sections examine some of the key issues facing policymakers.

Troubles in the Skies

As former Federal Aviation Administration Administrator (FAA) Marian Blakey stated in 2007⁴, “We’re watching a steady slide towards gridlock.” Congestion and delays have become commonplace at the nation’s busiest airports, causing costly delays both to commercial airlines and to the flying public. On-time arrival rates⁵ at the nation’s airports are frequently under 75 percent. Departure delays are increasingly common, leading some states as well as Congress to consider “passenger rights” legislation requiring commercial airlines to provide basic services to passengers forced to sit in delayed aircraft for more than three hours.⁶ Delays at the nation’s busiest airports are especially significant. At the New York City metropolitan area’s three major airports, Newark Liberty International Airport, John F. Kennedy International Airport, and LaGuardia Airport, congestion-based delays are so severe that the FAA imposed scheduled flight caps. In an attempt to respond to public outcries about congestion and delayed flights, the FAA even proposed in 2008 to conduct auctions for the most valuable time slots at the three New

⁴ "Tomorrow is Today", Marion C. Blakey, speech given at Joint Planning and Development Office-sponsored “JPDO Day on the Hill” in Washington, D.C., June 13, 2007.

⁵ The FAA considers a flight to have arrived on time if it arrives at the terminal gate within 15 minutes of its scheduled arrival time. Similarly, a flight is considered to have departed on time if it pushes back from the gate within 15 minutes of its scheduled departure time. This potentially understates the true level of delays, since an aircraft might not actually take off for hours after pushing back from the gate.

⁶ <http://www.consumer.state.ny.us/pressreleases/2008/jan012008.htm> on August 6, 2008.

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York metropolitan area airports.⁷ Not only did the Port Authority of New York and New Jersey oppose this action, but the Government Accountability Office also weighed in against it. The Port Authority argued that the auctions would have seriously affected the free flow of air commerce at the airport, and the GAO argued that the FAA did not have the legal authority to conduct the auctions.⁸

Security practices imposed after the terrorist attacks of September 11, 2001, have also stressed the air travel system. The shock of experiencing internationally based terrorism on United States mainland resulted in the creation of a new cabinet department, Homeland Security (DHS). To address transportation-specific issues, Congress created the Transportation Security Administration (TSA). Within weeks of the terrorist attacks, the TSA implemented new rules for boarding aircraft. What was once a process that focused primarily on whether or not a passenger might be bringing explosive material onboard an airplane is now a rigorous procedure that attempts to detect potential suicidal hijackers. New procedures now add many minutes to the passenger terminal process, and at the busier airports, airlines advise passengers to add an extra hour to their travel plans to allow for the time needed to clear all security lines. The new delays exacerbate the delays caused by bad weather and scarcity of airport resources and make the ability to travel to and from non-commercial airports more attractive, especially to business travelers for whom the time cost in money may be significantly higher than non-business travel.

Both the public and private sectors are responding to the difficulties faced by air travelers. Through a project named “Next Generation Air Transportation System” (NextGen), the FAA is coordinating a private and public sector plan designed to employ advanced technologies that will increase the capacity of the system to meet the growing demand for air travel. At the

⁷ http://www.faa.gov/about/office_org/headquarters_offices/aep/ny_auctions/

⁸ <http://www.gao.gov/products/A84460>

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same time, innovations developed in the private sector as a response to increasing congestion at large commercial airports take advantage of the FAA-led projects by making smaller community and regional airports desirable for business travel. These innovations, in the form of technologically advanced aircraft (TAA) and very light jets (VLJs), make use not only of advanced manufacturing and avionics technology, but also the advanced navigation capabilities made possible by the NextGen project. The combined effect of expanding the capacity of the nation's airspace using new technology and the development of new aircraft technology could well be a more efficient use of the nation's regional and community airports. This is especially true for business people for whom the time saved realized by being able to travel from closer airports outweighs any potential higher airfares. The next advance in our nation's air transportation history could easily be the dramatically expanded use of smaller airports not currently served by the commercial airlines.

The ability of business travelers to realize the potential air travel benefits created by the technological advances now under development might be limited, however, by fragmented aviation policymaking. Examples include policy initiatives by the TSA to extend security requirements from commercial airlines to general aviation users in response to TSA concerns that terrorists, thwarted in their intentions by security practices implemented at commercial airports, might turn their attention to general aviation users. General aviation operators have not been required to implement such practices as checking passengers against a watch list, checking for banned items (including shoe bombs), or carrying federal air marshals aboard the aircraft, practices that the TSA proposed imposing on all operators of aircraft weighing in excess of 12,500 pounds. Industry advocates argue that the differences between commercial airline operations, in which passengers are generally not known to the pilots, and general aviation

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operations, in which they are, render the requirements unnecessary and that implementing these requirements will cause irreparable harm to the industry that contributes significantly to the nation's gross domestic product.

The Importance of Air Travel to the U.S. Economy, Firms, and Regional Economic Development

The evolution of air travel over the past century has been nothing less than world changing. Soon after the invention of powered flight, business processes changed and new theories of business location decisions needed modification. Firms could reach new customers and suppliers in ways that had been unimaginable only five or ten years before. This section provides an overview of the dramatic changes that have occurred since two brothers changed the world.

A World Transformed

On December 17, 1903, the meaning of space and time changed forever. On a wind-swept sand dune in Kitty Hawk, North Carolina, two bicycle makers from Dayton, Ohio, accomplished a feat that would eventually overshadow other transportation-affecting feats such as the completion of the trans-continental railroad or even the opening of the Panama and Suez canals. On that day, Orville Wright made the first successful manned flight in a powered airplane. No one recognized it at the time, but the Wright brothers' feat caused, as Star Trek aficionados might describe it, a rift in the time-space continuum. Within a few decades, the way that people perceived distances bore little resemblance to pre-1903 paradigms.

Early aircraft were not particularly conducive to business air travel. They were noisy and often perceived as unsafe. They were better suited to the daredevil barnstormers of the post World War I era than to the heads of firms seeking new customers and suppliers. The first real

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breakthrough in passenger travel came with the Douglass DC-3, introduced in 1935. Capable of flying over 1,000 miles, the DC-3 had an enclosed cabin and was large and powerful enough to carry fare-paying passengers. It reduced the per-seat-mile operational cost to the point where passenger service became somewhat affordable. Air travel was not yet a viable option for the average person, however. Trains were far less expensive and less vulnerable to delays due to inclement weather. It was only when firms began to consider the value of time as a transaction cost that air travel began to take hold. Heppenheimer (1995) noted that because of the relative value of their time, executives became an important source of air passengers for the budding airlines.



Douglas DC-3

Source: <http://www.aviation-history.com/douglas/dc3.html>

Around 1940, improvements in aircraft safety and comfort and larger capacity aircraft drove down the per-seat cost, and passenger traffic began to grow. By 1940, annual passenger traffic grew to three million (approximately 2.3 percent of the U.S. population⁹). By 1956, the count was 55 million people on commercial airlines, over 32 percent of the U.S. population.

⁹ Source: Population Estimates Program, Population Division, U.S. Census Bureau.

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The introduction of the first successful jet airliner, the Boeing 707¹⁰, in 1959 further reduced flying time. The trip from New York to London, for example, was reduced from 12 hours to 6. Contrast this to crossing the Atlantic Ocean by ship, which requires spending a full six days. By 1965, 95 percent of transatlantic travelers were crossing in the fast jets of Pan Am and European airlines such as British Overseas Air. Air traffic enplanements soared from 205 million in 1975 to 297 million in 1980, and to 638 million in 2000. By 2008, annual enplanements totaled over 800 million.¹¹

As aircraft technology improved, improved ground-based radio navigation systems made air travel safer. Navigation aids evolved from lighted signal beacons on hilltops to sophisticated satellite-based systems that allow commercial airliners to find their way to distant cities without ever seeing the ground; instrument landing systems allow them to land safely even when clouds completely obscure the ground. Larger aircraft drove down per-seat costs, lowering airfares and making air travel more accessible to more people. In many cases, carrying freight and U.S. mail helped substantially to foot the “air bill”.

Business travel grew with the growth of accessible air travel. By 2002, air travel captured 16 percent of the 405 million annual long distance business trips (National Household Travel Survey 2003). As trip lengths increased, so did the reliance upon air travel. Air travel accounted for 31 percent of all business trips between 250 and 499 miles. For trips between 500 and 749 miles, air travel captures 64 percent of trips. Of business trips between 750 and 1,500 miles, almost 85 percent of business travelers chose to travel by air, with that percentage increasing to 90 percent for trips over 1,500 miles. The profile of typical business travelers is particularly important to understanding the acceptance of travel innovations. Those who identified their

¹⁰ The DeHavilland Comet was actually the first commercial airliner powered by turbojet engines. Structural problems resulting from pressurization and depressurization, however, led to its withdrawal from service.

¹¹ Source: Bureau of Transportation Statistics T100 Market data.

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occupations as professional, managerial or technical accounted for over 53 percent of all business trips, a figure greater than their 40 percent representation in the general population. Sales or service workers were the next largest traveling cohort, accounting for 28 percent of business trips. Between them, these two groups account for over 81 percent of all business trips. A potential indicator of the value that these travelers might attach to their time is their income. While only 12 percent of households have incomes greater than \$100,000, the National Household Travel Survey found that in 2002 this group accounted for 27 percent of business trips during the study period. Households with incomes between \$75,000 and \$99,000 accounted for another 18 percent of business trips. Households with incomes greater than \$75,000, therefore, accounted for 45 percent of all business trips.

The introduction of commercial air travel dramatically reduced the cost in personal time associated with long distance travel. As the airlines grew, capital costs declined, and airplanes became more efficient per passenger seat-mile. By the late 1970s, the lowering costs of travel compared favorably to the potential benefits of being able to expand markets, reaching out to new customers and suppliers. Moss (2000, p. 3) cited airports and the Internet as “backbone systems...vital for the location of new information-based industries.” In a survey-based study of business locations (Schmenner, 1980), a good share of establishments listed the proximity of an airport sufficiently close for using corporate aircraft as an important locational consideration. More recently, Cohen and Paul (2007) noted that access to air transportation ranks high on the priority list for establishments selecting sites for headquarters locations. Checchio (2006) documented the importance of business air travel as a productivity aid for corporate executives and technical managers. In interviews with the heads of New Jersey corporate flight departments, Checchio notes that many establishments have no choice but to travel by air for important face-

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to-face meetings.¹² This was especially true in firms with multiple locations. In one interview, a manager noted that the value of time for not only high-level corporate executives but also technical managers far exceeded the cost of travel. In any case, air travel clearly plays an essential role in firms' business practices.

The Need for Face to Face

While airline travel has become better able to facilitate business travel, other technologies made long-distance communications possible. Audio and video teleconferencing made "virtual" face-to-face business meetings possible for the first time in 1964. By the 1990s, the advent of the personal computer and the Internet enabled world-wide web-conferencing. They also made desktop video conferences possible. In spite of evolving technology that makes it possible to communicate with virtually anyone in the world in near real time, people continue to travel to transact some business. Why is this? Since teleconferencing allows people separated by thousands of miles to see each other and even exchange documents, how can costly face-to-face contact possibly yield any advantage? Daft, Lengel, and Trevino (1987) merely suggest rather vaguely that face-to-face communications has a "special ability to communicate the types of decisions made by senior managers." Ota and Fujita's (1993) formal model of information exchange among corporate headquarters at a single information-rich location and between each headquarters at that location and its production plants at information-poor locations explained not only export-based businesses' decentralization tendencies but also the centralization tendencies of headquarters operations. The need for face-to-face contact appears to be a key factor in the financial industry's location decisions (ter Hart and Piersma, 1990).

Why is face-to-face communications important? Thrift (1994) suggests that in the

¹² More details on this are provided in Chapter 2.

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financial sector, it is the need for expertise that filters and interprets the information quickly and for the tacit information attached to the social contact that facilitates the explicit information exchanged. That is, such contact is important because it engenders trust, which helps in the information filtering process by reducing information uncertainty. Athanassiou and Nigh (2000) go a bit further by finding that top management team members need “to meet face-to-face to share the individual tacit knowledge stocks and create a shared team-level perspective of the multinational establishment’s overseas activities and environments.” Thus, they conclude that face-to-face communications is particularly necessary for problem-solving tasks involving ambiguity and uncertainty.

Terminal Fatigue¹³ – Life in an Airline Terminal

At the same time that the nation’s economy came to depend more and more on an effective system of air travel, the performance of the system started to seriously decline. In essence, it became a victim of its own success. Improvements in air safety and reductions in cost achieved over the past 100 years led to increased acceptance of air travel by the public, while new technology (combined with airline deregulation) led to the introduction of more efficient flight routing topologies and lower-cost carriers that made traveling by air affordable to millions of Americans. In 1954, commercial airlines flew 35.4 million passengers.¹⁴ By 1980, this figure had risen to 296.9 million, an increase of 738 percent, in large part because of the deregulation of the airlines in 1978, which led to the introduction of numerous new low cost carriers, and the introduction of wide body jets that dramatically increased the efficiency with which airlines can

¹³ While I would like to credit Rutgers Professor Joseph Seneca for coining this term during the initial presentation of this research’s proposal, the initial use of this term goes back at least to June 21, 1971, where it was used in a Time Magazine article.

¹⁴ Source: Bureau of Transportation Statistics

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operate.¹⁵ In 2008, 806.8 million passengers flew on commercial airlines.

According to the Bureau of Transportation Statistics, the FAA expects annual passenger enplanements in the United States to rise to over one billion by 2020 (Chart 1). Accompanying this increased demand for air travel, however, were problems such as congestion, which led to delayed and canceled flights and to diminished levels of service at outlying airports. The following sections highlight some of the issues in the U.S. air travel system making business air travel increasingly problematic. First, I look at the problems that exist in the nation's air travel system today, focusing on delays and declining airline service. Next, I look at some of the causes of those problems. The costs of delays and declining airline service are examined next, and I finish with an overview of the responses being developed in the public and private sectors.

The Decline of Commercial Air Travel

The issues faced by business people traveling by air fall into two general categories: flight delays and cancellations. Both are largely due to poor weather conditions at major airports and airport capacity shortfalls. Recent increases in fuel costs led airlines to reduce service to less profitable routes, which led to a decline in the number of cities served by commercial airlines (e.g., “you can’t get there from here, regardless of how long you want to wait.”).

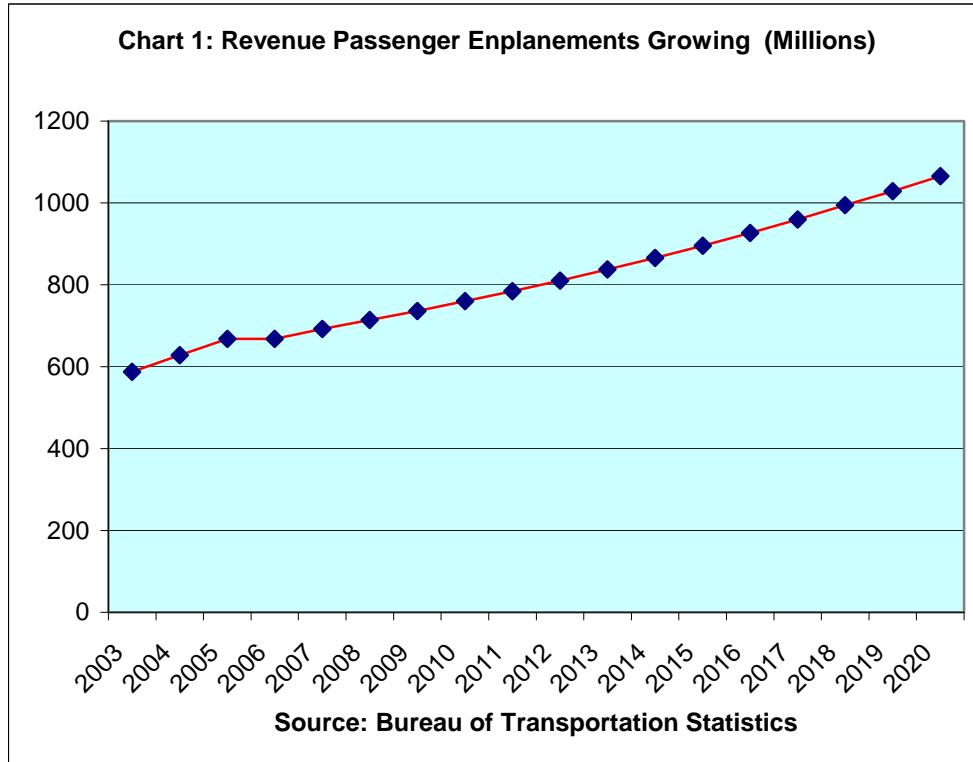
Flight Delays and Canceled Flights

The dramatically increased demand for air travel noted earlier has led to increased demand for flights. While the number of accessible gates at a given airport might be increased, the air travel system as a whole has a relatively fixed arrival and departure capacity based on the number of usable runways at airports as well as the need to separate aircraft in flight to minimize

¹⁵ In comparison, United States Gross Domestic Product increased from \$380.4 billion to \$2,789 billion during this same period, an increase of 633 percent

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the risks of mid-air collisions and wake turbulence.¹⁶ The result is that increased congestion at



the nation's busiest airports has become so severe that some states have passed "air traveler rights" legislation, forcing airlines to provide water and other necessary support to passengers sitting in aircraft waiting to depart. In some well-publicized cases, passengers have been forced to sit in aircraft for over four hours.

On-time arrival statistics are bleak, according to Bureau of Transportation Statistics. At New Jersey's Newark Liberty International Airport, for example, less than 60 percent of arriving flights are on time. The New York metropolitan region's other two major airports, John F. Kennedy International Airport and LaGuardia Airport fare little better, with on-time arrival rates at both airports under 65 percent.¹⁷ Delays are not a localized problem. As noted in Chart 2,

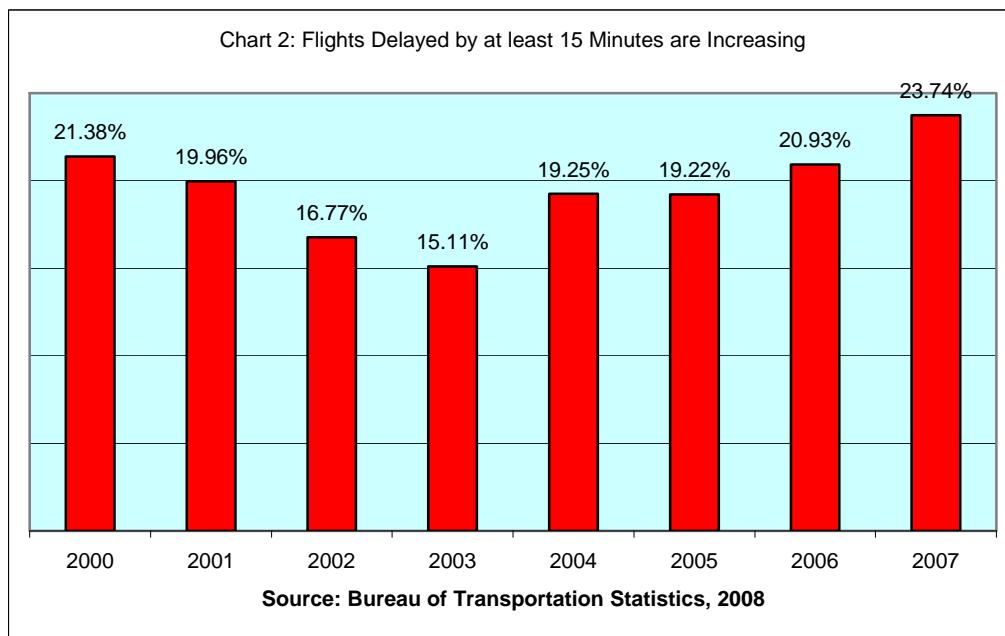
¹⁶ Wake turbulence is the result of wing-tip vortices created by aircraft wings creating lift. They can cause severe bumps to aircraft flying through them. These vortices descend slowly and can affect aircraft for miles behind the aircraft that created them.

¹⁷ Source: Bureau of Transportation Statistics.

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arrival delays nationwide have increased steadily since 2003 as flying passengers regained confidence in the national air travel system after the events of September 11, 2001.

Business travelers flying to and from airports in the United States experience a tremendous level of uncertainty in the commercial air travel environment. In the 12 months ending December 2008, only 76 percent of all airline flights arrived on time.¹⁸ According to the 2008 Air Travel Quality study, passenger complaints about air service are increasing rapidly. The Air Travel Consumers Reports, issued by the U.S. Department of Transportation, show similar upward trends in delayed flights.



Declining Airline Service

Even if the system functions as planned by the commercial airlines, the spatial expanse of passenger service is declining. Perez and Trottman (2006) noted that airlines have sought to maximize their load factors (the percentage of seats on an aircraft filled with passengers) in order

¹⁸ Bureau of Transportation Statistics, On-Time Arrival Performance National (January-December, 2008)

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to increase profitability. These efforts lead to another disturbing trend affecting air travelers, cutting back scheduled airline service on the least profitable routes, leaving many cities with far fewer scheduled flights. In some cases, airlines have even eliminated service on the least profitable routes. The authors proffer as evidence a 21 percent decrease in the combined fleet size of the major airlines. American, Continental, Delta, Northwest, United, and US Airways, which had a total of 3,469 aircraft in 2000, had 21 percent fewer aircraft (2,747) in 2005. Further, while some airlines created in the wake of airline deregulation in 1978 (Continental, Southwest) continue to fly, 130 airlines have gone out of business.¹⁹ Thus while higher load factors have yielded improved profitability for these establishments, passengers now have fewer options for and less flexibility in their travel plans.

The U.S. Government Accounting Office (2002) found that at 200 commercial airports the total number of scheduled daily departures declined by 19 percent during the 12 months ending October 2001. A 2007 U.S. Government Accounting Office study found that, according to a key industry association, flights to small communities are the first flights to be eliminated due to their limited profitability and that in July 2006 scheduled flights for small communities were 26 percent below the number of scheduled flights in July 2000 (GAO 2007).

Why is Airline Travel a Hassle?

What is responsible for the delays at our nation's airports? While poor weather is a significant cause of delayed and canceled flights, over-scheduling has also been named a culprit. The need to turn aircraft around quickly to minimize down time also introduces the potential for delay. Other potential causes have been identified, such as dependence on an air traffic control system that had its genesis in the 1950s, and a shortage of pilots and understaffed control towers.

¹⁹ Minneapolis Star Tribune, August 28, 2005.

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Whatever the causes, delays are now endemic at major commercial airports, making it often impossible for business travelers to accurately predict whether or not they will arrive at their destination airport at the scheduled time – a real problem for the time-sensitive crowd.

Making matters even worse for air travelers, major airlines have increasingly employed a “hub and spoke” strategy to maximize seat load factors. While it is understandable to maximize revenue and therefore profits, the change is not good for travelers. Under this strategy, passengers from smaller airports (located off of one hub) traveling to other smaller airports (off of another hub) must fly at least three flight legs and suffer two layovers. Worse, the traveler’s nightmare, they might be forced to disembark from a late-arriving aircraft and run to another boarding gate at the airport hoping to make the scheduled flight to their final destination while hoping that their luggage joins them.

Exhibit 1 shows a single hub. In order to travel from Birmingham, Alabama, to Indianapolis, Indiana, a passenger must first fly to Atlanta, Georgia, along with other Birmingham area residents who want to travel to other destinations. Once at Atlanta, the passenger then boards another aircraft bound for Indianapolis, accompanied by passengers from other originating cities. Prior to airline deregulation in 1978, point-to-point flights were more common and few airports had dominating airlines.

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Exhibit 1

Adding to the problems faced by air travelers, security procedures implemented after the terrorist attacks of September 11, 2001, have increased the time needed by air travelers once they arrive at the airport. From having to submit to full body scans to removing their shoes, the “hassle” factor associated with air travel has reached the point where more and more people are actively seeking alternative travel solutions. In a study of Lakeland, Florida, business people noted the “hassle” factor as one important reason to turn to alternatives to commercial line service such as air taxi service offered at a local airport.²⁰

The Cost of Delay

Delays impose costs both on the airlines and on the flying public. For the traveling public, personal and business travelers face different types of costs. The following sections review those costs.

²⁰ The Executive Summary of the report is provided in Chapter 2. The complete report is included in Appendix One.

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The Cost of Delays to Airlines

For the airlines, delays result in increased fuel costs and additional personnel costs. In adverse cases, delays can also mean lost revenue when they result in flight cancellations.

According to an Air Transport Association study, the cost of delays to airlines in the 12 months ending September 2008 exceeded \$9.9 billion. Total delay minutes reached 138 million in this period. Table 1 categorizes the direct operating costs.²¹

These costs do not include the loss of good will that occurs when flights are chronically late or when passengers are compensated passengers for being bumped from overbooked flights.

Table 3: Direct Aircraft Operating Costs - 12 Months Ending September 2008

Cost Category	\$ Per Block Minute	Annual Delay Costs (\$ millions)
Fuel	\$39.35	\$5,431
Crew - Pilots/Flight Attendants	\$13.08	\$1,805
Maintenance	\$10.09	\$1,398
Aircraft Ownership	\$7.72	\$1,066
Other	\$1.88	\$259
Total Direct Operating Costs	\$72.13	\$9,954

Source: Airline Transport Association

The Cost of Delays to the Traveling Public

Air travel delays impose enormous costs to the traveling public. One cost is the value of lost time. According to Air Transport Association, the value of lost time to passengers in the 12 months ending September 2008 exceeded \$4.9 billion.²² The Joint Economic Committee of the

²¹ Costs based on year-end 3Q 2008 U.S. DOT Form 41 data as reported by U.S. scheduled passenger airlines with annual revenues of at least \$100 million. Arrival delay minutes reflect operations at 77 U.S. airports and are taken from the FAA Aviation System Performance Metrics (ASPM) database.

²² This figure is based on total system delay minutes of 138 million, based on FAA Aviation System Performance Metrics and FAA-recommended values adjusted for BLS employment costs.

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U.S. Senate and House of Representatives (JEC 2008) reported that passengers lost an estimated \$12 billion worth of time in 2007 due to flight delays.²³

These costs, substantial as they might be, hide the indirect costs of delays and canceled flights. Personal travelers whose flights have been canceled often must pay for overnight stays in hotels and extra meals waiting for an available flight. Trips taken for vacations can be time sensitive, especially when pre-paid reservations are made. Further, the social costs in the form of stress created by flight delays and outright cancellations are difficult to measure, but they certainly exist. The prospect of spending hours in a crowded airline terminal, not knowing if the flight will depart at all, can be chilling, especially to a family with small children.

What impact does uncertainty in the air transportation system cause for business people? Needing to be at a critical meeting at a specified time and day might result in a business person traveling the night before, thus incurring lodging and meal expenses that might have been avoided if direct reliable air travel had been available. The value of lost time due to flight delays is particularly serious for business travelers. In the limited Lakeland, Florida, study mentioned earlier, business people placed an average value of over \$100 per hour on their time. It is therefore not unreasonable to suggest that firms might forego personal contact with markets that require significant amounts of air travel to service new customers effectively. Alternatively, firms might employ other modes of travel.

The Effect of the Shrinking Airline Network

What does a decline in service levels - fewer flights to small market cities, fewer cities actually served by commercial airlines, and fewer airlines - mean to air travelers? For personal

²³ Delayed travelers, their employers, and others lose productivity, business opportunities and leisure activities when air travel takes extra time. Costs cascade when delayed flights resulted in other late flights. These costs to passengers could be even higher than JEC estimates, as a result of missed connections, cancelled flights, disrupted ground travel plans, forgone pre-paid hotel accommodations, and missed vacation times.

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travelers, a smaller airline network might be mostly an inconvenience. After all, if it takes an additional hour or two to get to Disneyland, not much is lost. Being able to fly on a low-cost carrier might result in air fares low enough to compensate for the inconvenience of having to drive a longer distance to the closest commercial service airport.

Business travelers, however, face a different calculus. Longer drives to airports, longer waits in check-in lines, and longer waits to be scrutinized at security checkpoints all add up to large amounts of non-productive time, and since the various waits are unpredictable, greater uncertainty in the minimum total time needed for air travel. Add to that the time that airliners sit on taxiways waiting to take off, and business people are faced with hard choices. Should they depend upon airline schedules when making travel plans, or do they factor delays into their itineraries? This latter option means possibly traveling a day in advance of an important meeting to be sure of not being late, further adding to both travel cost and non-productive time. Even when the system functions without significant delays, the need to either drive to an airport with scheduled commercial service, or just having to wait for one of the few flights that serves the area, increases the lost productivity associated with flying.

Technology as an Answer

Both the public and the private sector are responding to the challenges described in the previous section. The federal government is leading an effort to expand the capacity of the national airspace system (NAS). Aircraft manufacturers are producing new aircraft tailored to smaller airports. As business people become more interested in the ability to save travel time, entrepreneurs are responding by introducing new flexible air travel options such as air taxi services that offer business travel to regional and community airports not served by the commercial airlines. This section examines each of those responses.

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Government Response

Even before the most recent series of flight delays, the federal government recognized the need to overhaul its air traffic management processes. In December 2003, Congress enacted Public Law 108-176, “Vision 100 - Century of Aviation Reauthorization Act”, to begin work on the planning and implementation of the Next Generation Air Transportation System (JPDO 2007). Included in the legislation was the establishment of the Joint Project Development Office (JPDO). Congress charged this office with the responsibility of coordinating the efforts of multiple government departments and many civilian contractors. Key participants from the federal government in JPDO leadership roles include the FAA, National Aeronautics and Space Administration (NASA), the Departments of Transportation, Defense, Commerce and Homeland Security, and the White House Office of Science and Technology Policy. Private sector participants in leadership positions include Boeing, Lockheed-Martin, Computer Sciences Corporation, Carter and Burgess and the National Business Aviation Association.²⁴

The mission of the JPDO is to coordinate the development of ground- and space-based technologies that can combine to create an air traffic management system capable of supporting the volume of airline traffic forecast by the FAA in 2020, which is expected to exceed 2 billion annual enplanements. Consisting of many sub-systems that address particular components of the air travel system, the effort is known collectively as the Next Generation Air Travel System (NextGen). The backbone of this effort is the transition from a network of radar systems monitored by a spatial hierarchy of ground controllers to a satellite-based system. The bulk of the intelligence required to maintain safe separation of airliners will subsequently reside with the aircraft themselves, and the role of ground personnel will primarily be to monitor the effective

²⁴ Source: NextGen Who's Who, accessed from <http://www.jpdo.gov/whoswho.asp>, May 11, 2009

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operations of the system. Other systems will address delays caused by weather (the most significant cause of delays in the airline system), wide area navigation and national security.

NextGen, expected to cost over \$44 billion over ten years²⁵, is a complex project developed by a consortium of public agencies and private firms working together to implement a number of technologies that will allow commercial carriers to operate both more efficiently and more safely. While the specific tools and processes to be combined into the NextGen architecture have yet to be fully defined, the broad goals of NextGen have been established. Attachment 1-1, taken from the latest Joint Planning and Development Office planning document, “Next Generation Air Transportation System Integrated Work Plan: A Functional Outline”, Version 1.0, September 30, 2008, describes those goals.

Technologically Advanced Aircraft

At the same time that the federal government is working hard to increase the capacity of the nation’s airports and air traffic management system, aircraft manufacturers are introducing a new generation of aircraft generically known as technologically advanced aircraft (TAA) and light turbine-powered aircraft known as very light jets (VLJs).

Technologically Advanced Aircraft

TAAAs employ the latest aviation electronics, or avionics, to better manage the aircraft’s navigation and control systems. The aircraft uses computers to monitor the engine systems and to provide appropriate information to the pilot. Navigation systems based on satellites have largely supplanted older generation processes that depend on ground based radio systems and, when coupled to autopilots, allow the pilot to spend less time manipulating the controls and more time

²⁵ This figure includes both the cost to transform the FAA’s air traffic management (ATM) system from one that depends on ground-based radar systems to one based on satellite technology. It also includes the cost to equip the nation’s air fleet with the avionics required to utilize the new ATM system.

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monitoring the aircraft's overall situation. Large flat panel displays have replaced the older instrument displays, quaintly referred to as "steam gauges."

An excellent example of a technologically advanced aircraft is the Cirrus SR-22. The advanced avionics in the SR-22 greatly reduce the pilot's workload, especially in poor weather



Pictures used with permission, Cirrus Aircraft, 2009

conditions, and make it possible for safe flight operations in instrument meteorological conditions (IMC) with a single pilot. This greatly increases the utility of the aircraft, making its operation much more reliable. It, therefore, has enormous implications when choosing an aircraft for a mission-oriented application such as air taxi or charter service.

These advances come at a price, however. The complexity of the TAA's systems requires pilots to undergo new training regimens designed to teach them the new idiosyncrasies.

Very Light Jets

VLJs represent a continuation of the trend in the business jet industry to take advantage of emerging technologies. What qualifies an aircraft as a VLJ? VLJs are distinguished from other aircraft on three primary dimensions: initial and on-going cost, avionics technology, and performance. While VLJs have differing characteristics and performance profiles, they are generally similar in the following ways according to Mahon (2007):

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- Weigh less than 10,000 pounds or less at maximum certificated takeoff weight
- Single pilot operations
- Four to seven passengers
- Range of up to roughly 1,000 nautical miles
- Employ the latest technology to reduce pilot workload. These technologies include:
 - Advanced flight deck automation such as global positioning system (GPS) systems for navigation
 - Multi-function displays eliminating multiple separate flight instruments and engine monitoring gauges
 - Automated engine and aircraft systems management
 - Integrated flight planning and autopilot equipment
- Operate from runways as short as 3,000 feet, far shorter than those used by the current generation of business aircraft.²⁶
- High reliability and maintainability
- Under \$3 million acquisition cost.

Some aircraft, especially at the high end of the performance scale, blur the distinction between VLJs and the existing business jet fleet. For example, the Embraer Phenom 100, has been classified by the Business Aviation Subcommittee of the Transportation Research Board in the category one step higher than a VLJ because its performance and cost exceeds that of most other VLJs. It is designed, however, for the same market targeted by other VLJ manufacturers.

²⁶ While a VLJ operated by an owner/pilot in accordance with CFR Part 91 (private, non-commercial use) can use 3,000 feet, an air taxi or charter operator must comply with CFR Part 135 which requires that the aircraft must be able to stop within 60 percent of the total runway length unless certain conditions are met. Even when those conditions are satisfied, the air taxi operators cannot land on a runway that just fits the aircraft's landing performance. In essence, the runway must exceed the minimum stopping distance of the aircraft by as much as 67 percent.

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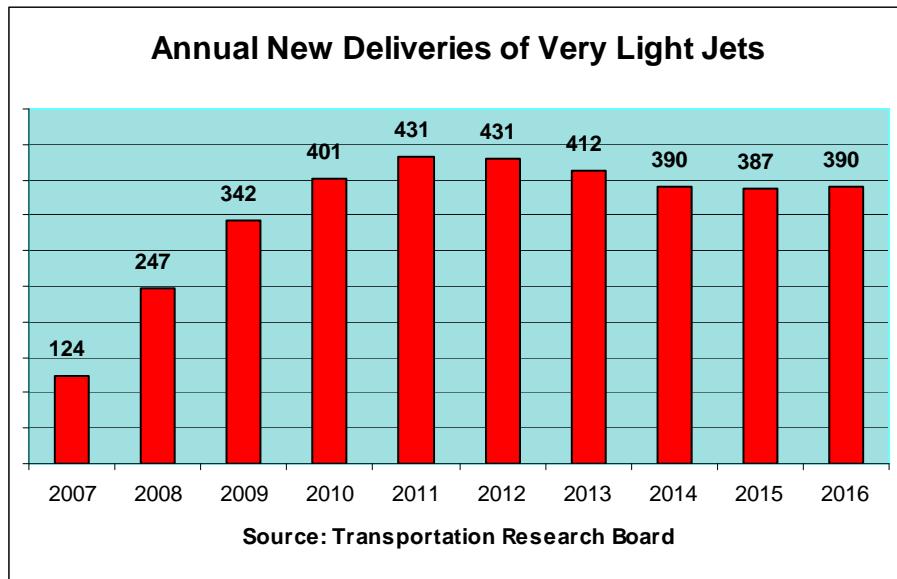


Cessna Mustang Cockpit



Cessna Mustang in Flight

Pictures used with permission, Cessna Aircraft Company, 2009



A comparison chart listing the characteristics of the very light jets currently being operated or planned is included in Appendix 1-2.

Expanding the System

Why are TAAs and VLJs important new additions to the business aviation fleet? The ability to operate from small runways opens up thousands of small airports to business air travel.

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According to the FAA, only 560 airports (of 5,199 public use airports²⁷) in the United States have been granted Part 139 certification, a requirement for scheduled commercial operations. If VLJs do not provide scheduled service, they may operate from airports that fall under different parts of the federal regulations, CFR Part 91 and CFR Part 135. According to the Aircraft Owners and Pilots Association, in the United States and adjacent countries (mostly Canada and the Caribbean) there are over 2,000 airports with runways at least 3,500 feet long and also with a precision landing approach.²⁸ Thus, VLJs dramatically expand the number of locales that may become more attractive to businesses that have integrated air travel into their business processes.

Air Taxi Service

New short haul travel firms commonly referred to as air taxis²⁹ have recently entered the competition for business travelers. A number of factors, documented earlier, have led to the introduction of these services. Foremost among them is the increasing congestion at the nation's busiest airports, which creates uncertainty about the reliability of commercial airline schedules. Air taxis capitalize on the growing demand for point-to-point travel that commercial airlines no longer offer to many locales. Second, the recent spate of mergers and acquisitions lead to the creation of more multi-establishment firms, which require upper level managers to travel between business locations. As managers, time spent traveling is generally less productive time. That new, short-haul air travel firms will help to minimize. Third, this enables air taxis to fill the gap left by commercial airlines, especially at smaller cities.

²⁷ Source: Federal Aviation Administration, Airport Facility Data, accessed June 19, 2009.

²⁸ A precision landing approach today requires a ground-based radio system. Only about 25 percent of airports in the U.S. have precision landing approaches.

²⁹ The term air taxi does not accurately apply to all of the short haul air travel firms. Some of the firms plan to employ very light jets much in the same way that propeller driven aircraft are used today in the air charter business, but plan to employ VLJs because of the lower initial cost, higher speed, and the appeal that a jet aircraft may have to potential clients.

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VLJs add to the viability of the short haul travel industry by offering turbine-powered aircraft that can operate from small community and regional airports. Firms will be able to locate in new areas with less concern about the time required to drive to and from commercial airports. Cities with community airports, which do not have commercial service but that can accommodate VLJs, are ripe for experiencing economic growth as they become more desirable as business locations. Chapter 3 examines the effect of noncommercial airports on regional economic development in 30 metropolitan statistical areas.

Transportation Innovation Diffusion and Technology Adoption

Innovations in any industry are rarely adopted immediately after their introduction. Instead, firms must first become aware of the innovations. They then must determine that the innovation might somehow benefit their business. Ettie and Vellenga (1979) describe this process using a six-stage innovation model, consisting of awareness, interest, evaluation, trial, adoption and implementation. Innovation adopters will typically progress through each phase sequentially.

The key issues addressed by Ettlie and Vellenga are how much time do firms require to make the transition form one stage to the next, what characteristics of a firm and of individual decision makers influence that time, and how do the characteristics of the innovation itself effect the interstage time periods.. Time can be critical for new firms entering a market, especially when the industry is capital intensive (such as needing to purchase multi-million dollar jet aircraft). Unless a sufficient market can be developed to allow the firm to become profitable in a reasonable timeframe (as determined primarily by the investors), the firm might fail.

Hence, the factors that influence the inter-stage time periods are vital to the success of failure of new air taxi firms. First, Ettlie and Vellenga find that the risk-taking climate that exists

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in a firm is a primary determinant of the inter-stage times, and therefore affects the overall elapsed tie between awareness and implementation. Firms perceived as risk takers shared key attributes:

- The relative advantage of an innovation (the advantage of adopting an innovation compared to remaining with existing technologies and processes) is lower. A risk taking firm seems willing to adopt innovations without a large expected benefit offsetting the risk that the innovation may fail to be effective.
- Risk taking firms spend more on research and development than do firms that are more conservative.
- Risk taking firms adopt innovations with less need for demonstrable performance criteria.
- Innovations are likely to be viewed by risk taking firms as less complex than by conservative firms.

Interestingly, Ettlie and Vellenga find that the presence of risk-taking individuals in a firm is not enough to change the risk-taking climate of an organization. They also find that individuals are more successful at stimulating the innovation process immediately after an organizational restructuring has taken place, especially when it involves the introduction of a key organizational member to the group. Perhaps the disintegration of past patterns of behavior that accompany a restructuring facilitates risk taking.

In addition to a firm's characteristics, those of the innovation itself might play a role in determining the innovation timeline. The first is ***cost***, the financial commitment to the use of the innovation. The second is ***relative advantage***, or how much the innovation is perceived as being better than previous ideas. The consistency of an innovation with the values, experiences and

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needs of the adopting unit defines its 3. The *complexity* of an innovation is determined by how difficult it is to understand and use the innovation. The *trialability* of an innovation is determined by how easy it is to experiment with the innovation or to test it without making an irrevocable commitment to its use. Finally, *observability* is the ability to see the benefits accruing from the use of the innovation as well as how easily those benefits are communicated to others. Ettlie and Vellenga posit that cost and complexity vary directly with interstate time lags, while relative advantage, compatibility, trialability, and observability are expected to show an inverse relationship.

The introduction of TAA/VLJ-based air taxi service might depend on the ability of policy makers to implement a new aviation policy as well as governance structures that can adapt to the new technologies. Policies governing economic development need to reflect new knowledge about spatial development patterns and how technological changes in the aviation industry affect those patterns. The economic contributions of large commercial airports to regional economies have been the subject of study, but those of smaller airports that support corporate travel, air freight, air charter services, agricultural aviation, and other general aviation industry users, have not. Instead of concentrating infrastructure development in large commercial airports (as important as that might be), investment might need to be made in the regional and community airports that can also serve as engines of regional economic growth. As will be seen in greater detail in Part 3, a study of 113 metropolitan statistical areas (MSA) finds a positive relationship between the runway capacity of MSAs and job growth, even when controlling for population and other key explanatory factors such as tax rates and college graduation rates. This is especially important in those MSAs containing the most congested commercial airports, where expansion to accommodate increased demand is fast becoming impossible due to both land-side constraints

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(the inability to add runways or extend existing runways due to the unavailability of land) and air-side constraints (limitations in the air traffic control system that determine how many aircraft may depart and arrive in a given amount of time).

Further, public policy must reflect the regional nature of the benefits of air travel. The regulation of land use around smaller airports is often been left to local authorities. Larger airports traditionally associated with economic growth typically have the governance structures (and the political backing) needed to sustain technological advancements. In the case of the commercial airports in the New York City metropolitan area, John F. Kennedy International Airport, LaGuardia Airport, and Newark Liberty International Airport are managed by the Port Authority of New York and New Jersey, a quasi-governmental metropolitan planning organization that is effectively beyond the control of the host municipalities' governing structures. Other airports in the region, however, are subject to local municipalities' development requirements, especially in the area of zoning. This is especially problematic for airport managers who might want to expand their airports to make them more compatible with the operating requirements of 21st century aircraft.

Small airports are a classic example of the mismatch between benefits and externalities: while the benefits of airports extend to broad regions, the negative externalities, primarily noise, are felt only locally. The loss of the potential benefits to the greater region is frequently ignored. Hence, airport host communities' governing bodies often are, unsurprisingly, pressured by their constituents to oppose any airport improvements for fear that they will lead to more and larger aircraft, creating greater levels of noise and air pollution.

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Research Objectives and Importance

The purpose of this research is to create a framework for understanding how the federal government should formulate national aviation policy. Without a comprehensive national aviation policy, various government departments risk developing policies that not only act at cross-purposes, but can harm the nation's economy. Of course, many factors go into any policy formation process. Besides the air travel security issue, the effect of air travel on the environment, funding requirements, domestic and international trade, foreign policy, labor policy, regulation, and costs of technology must also be included as important components of any comprehensive national policy. This dissertation will not address all of these issues, focusing instead on the interplay between the effect of aviation, especially general aviation, on the nation's economy and the changing views towards air travel security.

Approach

In order to place the importance of general aviation policy into context, I first study the economic importance of general aviation airports. Research by Irwin and Karsarda (1991), Brueckner (2003) and Green (2007) document the relationships between large commercial airports and regional economic growth. With few exceptions, however, the impact of smaller regional and community airports on regional economic growth has been largely ignored. When these airports are studied, the focus tends to be on aviation-related industries such as those that provide fuel and maintenance services, rental cars and other business activities driven by users of an airport. Usually uncaptured is the value that accrues from having convenient access to the air travel system.

Part 2 illustrate the impact of regional and community airports by probing the association between general aviation airport capacity (e.g., how much airport infrastructure capable of

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supporting business air travel) and economic growth of metropolitan statistical areas (MSAs). I then present the results of interviews of the heads of business aviation departments within New Jersey-based pharmaceutical firms.³⁰ I discover common themes that link different corporations' use of business aircraft as alternatives to commercial air travel. Next, I conclude the chapter with the results of a study of potential business people's use of air taxi service, operating from a local airport, as an alternative to commercial airline service.

In Part 3, I illustrate the U.S. government's policy formation process by examining the federal government's responses to the changing needs of air travel security, focusing primarily on the activities of the TSA since its creation in 2001. Part 3 looks at two policy initiatives resulting from the September 11, 2001, terrorist attacks. The first is the successful federalization of airport security workers. This action had in fact been urged by some members of Congress prior to 2001, but there was no sense of urgency attached to the recommendation. The second is the unsuccessful attempt to implement a computerized passenger screening process, CAPPS-II. An earlier system, Computerized Passenger Profiling System (CAPPS) had been deployed by at least one airline in the 1990s. CAPPS-II greatly expanded the range of information that would be searched for each passenger. Privacy advocates strongly opposed many of CAPPS-II's provisions (which included a personal credit check) and only one airline agreed to implement the system before it was eventually scrapped.

Importance of the Study

How is national policy formed? As we have seen over the last nine years, frequently it is developed piecemeal in response to a crisis. We see this not only in aviation policy, but also in

³⁰ Pharmaceutical firms were picked for two reasons. First, the industry plays a key role in the New Jersey economy. Second, the heads of the respective flight departments were recommended by an industry expert whom I consulted when beginning this research.

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national economic policy. The financial crisis of 2008-2009 led to new policies of government assistance to banks and other large institutions that previously might have been unthinkable. Yet the severity of the crisis led Congress to approve bailouts in amounts that stagger the imagination.

So it has been with aviation policy. A crisis in the form of terrorist attacks on American soil led to the implementation of new policies designed to prevent a recurrence of the attacks. The TSA now proposes to extend those policies to more of the aviation industry. But are those policies sensible in the context of their overall impact on the U.S. economy? Certainly another successful attack could have dramatic financial ramifications. According to the Center for Contemporary Conflict (2002), the total cost of the 9/11/2001 attacks to the U.S. economy exceeded half a trillion dollars. Security precautions enacted since the attacks, however, have hopefully greatly reduced the likelihood of another successful attack, thus lowering the expected cost in any one year. With increased security, however, comes a reduction in the effectiveness and efficiency of the nation's air travel system imposing both direct and indirect ongoing costs. If firms cannot conduct business effectively and efficiently, the economy is harmed. Thus far, however, the TSA has not been forced to justify its proposals with the same benefit/cost analysis required for other agencies, and in some cases, has been allowed to issues rules without following the normal rule-making procedures required for other agencies..

Can effective policy be formed in response to the latest crisis of the day? Following this paradigm runs the risk of ignoring the impact of a new policy on the other important factors listed above. How can this be avoided? It is the goal of this dissertation to inform the judgment of policy makers regarding the importance of forming a national aviation policy by presenting a model aviation policy and the impacts to the nation of not having a comprehensive national

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aviation policy. Going forward, this dissertation creates an initial context for forming future national aviation policy.

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Attachment 1-1

Overview of Next Generation Air Transportation System Goals

Source: “Next Generation Air Transportation System Integrated Work Plan: A Functional Outline”, Version 1.0, September 30, 2008.

1. Provide Collaborative Capacity Management: The ability to dynamically balance forecasted airspace and airport demand and utilization in collaboration with enterprise stakeholders through proactive strategic planning and automation (e.g. decision support systems), using airspace and airport design requirements, standards and configuration conditions, and with consideration of other air transportation system resources.
2. Provide Collaborative Flow Contingency Management: The ability to provide optimal, synchronized, and safe strategic flow initiatives and minimized operational impacts in collaboration with enterprise stakeholders, through real or near real time resolutions informed by probabilistic decision making that address large demand/capacity imbalances within capacity management plans.
3. Provide Efficient Trajectory Management: The ability to provide trajectories that minimize the frequency and complexity of aircraft conflicts within the flow through trajectory negotiation and adjusting individual aircraft trajectory and/or sequence when resource contention requires.
4. Provide Flexible Separation Management: The ability to establish and maintain safe separation minima from other aircraft, vehicles, protected airspace, terrain, weather, etc., predict conflicts, and identify resolutions (e.g., course, speed, altitude, etc.) in real time to accommodate increasing capacity demands and traffic levels using automation (e.g. decision support systems) while applying reduced separation standards.
5. Provide Effective Information Sharing Environment: The ability to improve information required by aviation regulation, situational awareness and enhance decision making by managing, integrating, and flexibly delivering, relevant and reliable data and information (e.g., advisories, signals, and alerts) on demand in a format that is accessible, secure, and available to authorized users in a unified and coordinated environment.
 - a. Provide Integrated/Actionable NextGen Information: The ability for authorized stakeholders to provide, discover, and consume timely and accurate NextGen information (e.g. weather, surveillance (PNT), aeronautical, and geospatial) in a decentralized, distributed, and coordinated environment through trusted aviation stakeholder partnerships and aligned data policies and standards.
 - b. Provide Quality Net-centric Infrastructure: The ability to store, transport, and retrieve NextGen information between providers and consumers on a reliable, scalable, and secure net-centric infrastructure by managing and reconfiguring resources and existing infrastructure capabilities to sustain normal operations and service level agreements.

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6. **Provide Integrated Regulatory & Risk Management:** The ability to provide appropriate, effective and scalable solutions to mitigate environmental impacts, and safety and security risks in the air transportation system based on proactive risk identification and analysis through improved automation, policies, procedures, and processes using established standards, requirements, and responsibilities.
 - a. **Provide Secure Air Transportation System:** The ability to provide a secure air transportation system using a layered, adaptive, and collaborative approach to identify, prioritize, and assess security situations and appropriately defeat an evolving threat using appropriate tactics, techniques, and procedures.
 - b. **Provide Improved Environmental Performance:** The ability to provide improved flexibility in the identification of environmental impacts and the optimized management of resources necessary to meet increasing capacity demands through collaboration and improved environmental operational policies, procedures, and practices.
 - c. **Provide Safe Air Transportation System:** The ability to ensure a safe air transportation system through prognostic safety risk assessments of systems, organizations, or operations using collaboration, automation (e.g. decision support systems), and enhanced safety assurance techniques, using safety standards, requirements, and responsibilities.
7. **Provide Flexible Airport Facility and Surface Operations:** The ability to reallocate or reconfigure the airport facility and surface assets to maintain an acceptable level of service that will accommodate increasing passenger and cargo demand levels, or changes in operational requirements, through infrastructure development, predictive analyses, automation (e.g. decision support systems), and improvements to technology and procedures.
 - a. **Provide Flexible Airside Operations:** The ability to allocate and utilize the airport assets and infrastructure to conduct safe, secure, and efficient operations on the airport surface through predictive analyses, automation (e.g., decision support systems), and improvements to technology and procedures within an acceptable level of service that accommodates demand levels.
 - b. **Provide Flexible Landside Operations:** The ability to allocate and utilize the airport landside assets and infrastructure to conduct safe and efficient operations, through predictive analyses, automation (e.g., decision support systems), and improvements to technology and procedures within an acceptable level of service that will accommodate demand levels.
8. **Provide Collaborative Airport Management and Infrastructure Development:** The ability to maintain acceptable levels of service that will accommodate increasing demand levels or changes in operational requirements through collaboration with airport planning and management organizations, predictive analyses, and infrastructure development.

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Attachment 1-2 **Very Light Jet Comparison Chart**

Aircraft	Construction	Pax	Cruise *	Range **	Ceiling	Price	Delivery
A700 - AAI Acquisition, Inc.	Carbon Fiber	7	340 kt	1100 nm	41 K ft	\$2.25 M	3/08
D-Jet - Diamond Aircraft	Carbon Fiber	5	315 kt	1350 nm	25 K ft	\$1.38 M	2009
Elite - Epic Aircraft	Carbon Fiber	6-8	412 kt	1650 nm	41 K ft	TBD	2009
HondaJet - Honda	Comp./Aluminum	6	420 kt	1180 nm	43 K ft	\$3.65 M	2010
Independence - Spectrum	Carbon Fiber	6-9	415 kt	2000 nm	45 K ft	\$3.65 M	2009
Mustang - Cessna Aircraft	Aluminum	6	340 kt	1150 nm	41 K ft	\$2.53 M	10/2007
Phenom 100 - Embraer	Aluminum	4	360 kt	1160 nm	41 K ft	\$2.85 M	2008
PiperJet - Piper Aircraft	Aluminum	6-7	360 kt	1300 nm	35 K ft	\$2.19 M	2010
SmartJet - Maverick Jets	Comp./Aluminum	5	290 kt	1250 nm	22 K ft	\$899 K	TBD
SoloJet - Maverick Jets	Comp./Aluminum	5	350 kt	1200 nm	31 K ft	\$1.25 M	TBD
SPn - Grob Aerospace	Carbon Fiber	6	TBD	1800 nm	41 K ft	TBD	10/2007
Sport-Jet - Excel-Jet	Comp./Aluminum	4-5	375 kt	1000 nm	25 K ft	\$1 M	TBD
Stratos Aircraft -714	Comp./Aluminum	4	414 kt	1585 nm	41 K ft	TBD	TBD
The-Jet - Cirrus Design	Carbon Fiber	5	300kt	TBD	25 K ft	TBD	TBD
Victory - Epic Aircraft	Carbon Fiber	4-5	320 kt	1200 nm	28 K ft	\$1 M	TBD
* High Speed Cruise							
** IFR Range							
Average Cost Per Hour are based on Variable Cost plus Fixed Cost Per Hour as published							
Source: very-light-jet.com, January 5, 2009							

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The Need for the Debate

In Part 1, I examined the importance of air travel to the United States economy as a whole. In this chapter, I conduct a somewhat more discrete analysis, looking at the effects of aviation on state and regional economies. First, I present details on the importance of air travel to the United States economy. I then ask how airport infrastructure affects job growth? Do regions that provide more access to air transportation fare better than those that provide less access? Further, do airports that provide access to non-commercial air travel play a role in job development? I find that airports classified as among the top 100 airports by the Federal Aviation Administration are strongly associated with job growth. Other researchers have found the same connection, so this result is not surprising. I also find, however, that all other airport infrastructure, including general aviation airports with runways as short as 3,000 feet – long enough to support business aircraft operations but too short to accommodate commercial airliners – are also positively associated with job growth.

Next, I develop some potential explanations for the economic benefit of smaller, non-commercial airports. General aviation flying accounted for over 22 million flight hours in 2007.³¹ Why do firms choose to fly on non-commercial aircraft? In particular, can the need for business people to travel from smaller airports help to explain any economic effects of smaller airports that we might find? I find that there are a number of reasons why multi-location firms derive significant benefits from non-commercial air travel.

Lastly, I look at a new form of air travel that might boost the importance of smaller non-commercial airports. The development of technologically advanced aircraft and very lights jets,

³¹ Source: FAA General Aviation and Part 135 Activity Survey CY 2007,
http://www.faa.gov/data_research/aviation_data_statistics/general_aviation/CY2007/

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combined with growing unpredictability of the commercial air travel system, has spurred the introduction new air taxi services in areas of the country where the population density is large enough to provide demand for short haul air travel services yet are not served effectively by commercial airlines. Will these developments lead to greater use of regional and community airports? The research finds that on-demand air travel might fill a void in that nation's air travel system.

Why do these questions matter? While the regulation of the nation's airspace and aircraft operations are the responsibility of the Federal Aviation Administration, important policy issues such as airport funding mechanisms are left to states (and occasionally to regional authorities) and land use guidelines are most often left to local governments. Without a formal national aviation policy, state and local governments lack direction and guidance that such a policy framework would certainly provide. Local politics might easily thwart the national interest as municipal leaders, concerned about constituents' issues, make decisions that reflect only very local interests. Because of such interests, even the operators of large commercial airports with seemingly powerful backers find it difficult, if not impossible to expand existing runways, let alone build new ones.

One of the most important policy question facing Congress may be how should the air traffic control system (ATC) be funded? The current ATC system consisting of control towers, terminal and en-route radar services and weather forecasting service is funded primarily using a combination of airline passenger fees and fuel taxes. Some have suggested that the government assess user fees on all aircraft operators obtaining ATC services as a way to tie the use of the system more directly to the users.

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In Part 2 of this report, I hope to accomplish two goals. First, by creating a broader view of the economic implications of air travel than has been developed previously, it builds a foundation for a broad aviation policy debate at the national level. By demonstrating the importance of a robust air travel system, it creates an imperative for elevating the aviation policy to executive department level. The Federal Aviation Administration, which recognizes the existence of a “system” of airports in the United States through the publication of the National Plan of Integrated Airport Systems, which identifies more than 3,400 existing and proposed airports that are significant to the national air transportation system and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). The NPIAS also includes estimates of the amount of AIP money needed to fund infrastructure development projects that will bring these airports up to current design standards and add capacity to congested airports. The FAA is required to provide Congress with a five-year estimate of AIP eligible development every two years.³² The protection of individual airports, however, is left to the states. While the FAA requires that an airport owner who has accepted federal funds maintain the airport for a minimum period (typically 20 years), it accepts no role in the decision to close an airport after that period has concluded, other than to ensure that airport owners meet proper notification requirements. While the FAA regularly conducts studies determining where additional airport capacity is needed, it has little role in implementing plans to fulfill those needs, save to provide funding to airport sponsors. So while the federal government generates data on the need to improve the nation’s airport infrastructure, it has not followed up with any formal policy formation that could guide policymakers at state and local levels.

³² Source: Federal Aviation Administration, accessed from http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/.

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Second, this chapter addresses a key information gap that exists at local policymaking levels. In general, national policy, which local policymakers might look to for direction, has ignored the economic impact of commercial, regional and community airports. Even with a national aviation policy in place, without mechanisms for translating national policy into local action, local decisions are still likely made based primarily upon local considerations. Being able to make better informed decisions could well result in municipal leaders adopting policies that reflect the regional impacts of their decisions; at the very least local policymakers will be faced with the economic ramifications of their decisions.

Why is this study important? If the economic activity generated as a result of airports is perceived as substantial, then policy makers are more likely to take the need for a adequate national system of airports into account when forming public policy, else they run the risk of developing public policies that result in statutes and regulations that have unintended harmful effects. For example, if regional and community airports are not considered by state legislators as important to states' economies, and if public policy permits local municipalities to solely determine the valid use of land around airports, the building of business and residential structures that create unsafe conditions might force an airport to restrict operations (which might eventually lead to the airport closing), causing the loss of access to the nation's air transportation system. Given the reliance upon corporate aviation documented in this chapter, such a loss might cause firms to relocate to the detriment of the region's economy.

A national aviation policy that takes all of these considerations into account might provide the guidance needed for effective local policy formation. The remainder of this chapter is devoted to creating the economic imperative to define such a policy.

Direct and Indirect Economic Impacts of Aviation

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The importance of air travel to the U.S. economy has never been more important, with dramatic impacts both financially and culturally. By reducing the time needed to travel over long distances, firms expand market areas, reaching out to both potential customers and suppliers in ways impossible without air travel. While once business people took days to reach buyers and sellers, it now takes hours. The introduction of air travel has thus permanently changed the geography of business development. In this section, I provide a broad picture of the importance of air travel to national and state economies, followed by a look at the impact of aviation at the regional levels.

National Effects

The air travel industry accounts for a substantial portion of the U.S. gross domestic product. In 2000, Wilbur Smith Associates released a report prepared for the Federal Aviation Administration (Wilbur Smith 2000) that measured the impact of aviation on the U. S. economy. Using the RIMS-II model of the U.S. Department of Commerce, Bureau of Economic Analysis and U.S. Department of Transportation databases, researchers found that aviation and related economic activity in 1998 in the United States totaled \$976 billion, greater than the gross national product of all of the countries in the world except the United States, Japan, Germany, France, the United Kingdom, Italy and China. This industry employed 10.9 million people, earning \$278 billion in wages and salaries.

Not surprisingly, commercial aviation accounted for the bulk of the economic activity, over \$911 billion of the total impact. General aviation, defined as all aviation except scheduled commercial airlines and military aviation, contributed almost \$65 billion. Jobs followed the same pattern, with commercial aviation providing over 10 million jobs and general aviation contributing over 637 thousand. Comparing these impacts to the total United States economy, the

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researchers found that aviation and related activity accounted for over four percent of the total U.S. GDP. A report published only a few years cast further light on the importance of air travel. Researchers at DRI-WEFA (2002) found that the total impact of aviation had actually reached 9.2 percent of U.S. GDP over \$903 billion out of a total U.S. GDP in 2000 of \$9,873 billion, and over 11 million jobs were created through civil aviation.

As impressive as these data might be, they do not take into account the full impact of increased economic activity made possible through the use of air travel. This likelihood is underscored by comments made by Wilbur Smith Associates in their 1999 report on the economic value of California's Van Nuys Airport (Wilbur Smith 1999). Commenting on the conformance of the study with approved FAA methodology, the researchers note that the economic impact results do not indicate an airports full benefit to the community, since current methodology "does not attempt to measure the transportation benefits of an airport that arise from increased efficiency in shipping products, attracting customers and transporting employees." It is not a stretch, therefore, to conclude that the full impact of aviation on the U.S. economy might easily be substantially more than current data would seem to indicate.

Impact to State Economies

Aviation's contributions to individual state economies are similarly impressive. According to a 2003 report by the Campbell-Hillman Aviation Group of Arlington, Virginia, for the Coalition for Economic Strength Through Aviation, over 11 percent of the Texas gross domestic product depends on aviation (CESTA 2003a). The report noted that aviation drives five percent, or over \$17.5 billion, of total state earnings and eight percent of total state employment, over 800,000 jobs. These impacts put Texas at third in the nation in aviation impact behind California, where aviation contributes \$128.5 billion of gross domestic product, and New York

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where the impact was \$67.2 billion. The relative impact of aviation on Louisiana was even greater, accounting for over 12 percent to the state's gross domestic product, \$12.5 billion out of the total state GDP. According to CESTA, one hundred and sixty three thousand jobs and \$2.8 billion in personal earnings depended on the aviation industry (CESTA 2003b).

Only a few years later, a subsequent report produced by the Campbell-Hillman Aviation Group of Arlington, Virginia, for the Air Transport Association of America indicated that the aviation industry has enormous impacts on many states' economies (Campbell-Hill 2006). Using the same methodology used by the DRI-WEFA³³, the researchers found that in 2005 commercial aviation in California accounted for over \$202 billion of the state's gross output, 6.4 percent of state earnings, and 11.5 percent of state jobs. The total impact of civil aviation on Texas now measured \$126.9 billion.

The impact on jobs was greatest in Washington, where aviation-related activity accounted for 10.2 percent of state earnings but 15.2 percent of all jobs in the state. Commercial aviation accounted for over 10 percent of all state jobs in Texas, Florida, Georgia, and Arizona. Not surprisingly after looking at the jobs and earnings data, aviation has an impact at the personal level. Researchers in California found that with aviation-related activity, real personal per capita income in 2001 reached over \$38,800. Without aviation, that figure would have been less than \$36,500 (California 2003).

The 1996 broad evaluation of the economic impact of New Jersey's publicly and privately owned airports commissioned by the New Jersey Department of Transportation found a total economic impact of over \$1.9 billion. The researchers also surveyed state firms in an attempt to quantify the impact on the New Jersey economy that would result if the state's smaller

³³ According to the report, the study used the most recent RIMS-II multipliers available from the U.S. Department of Commerce, Bureau of Economic Analysis for aggregate level industries. The multipliers are based on 2003 annual input-output accounts for the United States and 2003 regional accounts data.

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airports were not available to firms. Based on firms' responses, the loss of New Jersey's non-commercial airports would result in a loss of 54,700 full-time positions with a payroll in excess of \$1.95 billion. When indirect and induced effects are considered, the total impact on the New Jersey economy of the loss of the state's general aviation airports exceeds \$3.28 billion.

Even in relatively small states such as Vermont, aviation has significant economic impacts. According to a 2003 report prepared for the Vermont Department of Transportation, Vermont's public use airports contributed over \$611 million and 9,531 jobs to the state's economy in 2001 (SH&E 2003), a contribution of greater than 3 percent of the state's GDP of \$18.8 billion in that year and 2 percent of the state's job.

The above data support the view that civil aviation is an important component of both the national economy and state economies. As noted above, however, even the significant impacts to the federal and state economies are most likely understated because of the difficulty in measuring the full impact of aviation. Commercial air travel facilitates business travel, making it possible for firms to succeed that might easily fail without the access to markets that air travel provides. Hence, the economic impact contributed by suppliers accessed by customers via air travel, but who do not employ air travel themselves, is easily overlooked by conventional economic studies. How, then, can policy makers understand the importance of air travel when economic data collected by current methodologies omit the full impact of air travel? Planners and public policy researchers must ask this crucial question, especially as dramatic changes occur in the air travel industry.

Regional Economic Studies

Considering the impact that air travel has on current day business processes as described in the previous section, it is somewhat surprising that there has been very little formal research

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into the effect of air travel on regional economies. The study conducted by the Port Authority of New York and New Jersey on the regional economic impact of Teterboro Airport in New Jersey is a notable exception. That report considered not just the aviation-related activity at the airport, but also the effects on jobs, wages and sales in the surrounding area. The authors found that the aviation activity at the airport, combined with results of corporate decisions to locate in the area because of the access to the air travel system provided by the close proximity of the airport resulted in 15,554 jobs, \$670 million in wages, and \$1.8 billion in annual sales (Port Authority 2005). The importance of the airport to the region's economic vitality was noted by the authors (page 3):

“Placed into the context of the Bergen County economy, Teterboro Airport counts as approximately four percent of all personal income received by residents of Bergen County – a significant amount of activity from a single source for an economy as diverse as Bergen County’s. In terms of other sources of economic activity in a region of similar size, Teterboro’s impact exceeds Buffalo Niagara International and Long Island MacArthur airports, both of which are significant contributors to the regional economy and the envy of city administrators everywhere as sources of jobs and community benefits.”

Considering the results of the Teterboro study, it is surprising that the regional economic impact of air travel has, by and large, escaped the notice of formal researchers. Irwin and Kasarda (1991, p. 525) echo this surprise, noting:

“...despite the exponential growth in the national airline network and its pervasive utilization by business organizations, in over 30 years no sociological work has examined its role in reorganizing the spatial economy. This sociological lacunae is particularly puzzling given the theoretical importance of transportation systems to human ecology.”

Green (2007, p 91) drew the same conclusion, noting:

“The popular press and local economic development boosters often cite hub airports as mechanisms for helping metropolitan areas grow. We will present a number of examples of such boosterism below. Moreover, there are a variety of literatures that touch on the importance of infrastructure in general, and airports in particular, to economic development and also on the financing of

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such infrastructure. Yet, so far as I can tell, there have been a limited number of studies that have looked at the impact of airports on regional growth (Brueckner 2003 being the key exception). In light of the many claims that have been made about the importance of airports to economic activity, this may seem surprising.”

A search of the literature results in only a handful of articles describing the relationship between air travel infrastructure and regional economic growth. Irwin and Kasarda, noted above, were among the first to study the connection between air travel and regional economic growth. They found that the centrality of an airport, that is, the relative position of the airport compared to other airports in terms of overall passenger activity, was positively associated with employment growth.

Brueckner (2003) was among the first to study the linkage between airline passenger enplanements and regional economic activity. Starting with the premise that Chicago’s O’Hare Airport is constrained in the number of passengers it can handle due to airspace and ground space limitations, and that this constraint limits the amount of economic activity that can take place, he determines how economic activity would increase if those limitations were removed. Brueckner uses a two-stage least squares method to address the obvious causality issue: does increased passenger traffic lead to greater economic development, or does greater economic development lead to more airline passengers? Controlling for variables such as age, energy costs (using heating degree days as a proxy), and education, he finds that a ten percent increase in passenger enplanements is associated with a one percent increase in service-related employment, but not in manufacturing and other goods-related businesses, mirroring the findings of Irwin and Kasarda. By applying his results to current employment levels in the Chicago metropolitan area, Brueckner suggests that expanding O’Hare Airport’s capacity by 50 percent will increase service related employment by 185,000 jobs. This, of course, assumes that the elasticity between

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passenger enplanements and employment remains constant and that an equilibrium is not reached before the new airport capacity limit is reached. This concern is problematic for Brueckner's results, since so many other factors may limit job expansion – available office space, ground traffic capacity, and the overall economic environment to name just a few – and an equilibrium point might be reached well before the forecasted number of jobs is added.

Green (2007) took a slightly more comprehensive approach, looking at passenger enplanements and population at airports in 83 Metropolitan Statistical Areas.³⁴ He uses commercial boardings per capita as an explanatory variable instead of simply total enplanements. This might be problematic, since it seems to downplay the importance of airports within the largest metropolitan areas (simply by virtue of their having so many people living in them, making the denominator in the metric so large). Using both two-stage least squares and OLS methods, he finds that a one standard deviation increase in boardings per capita is associated with eight percent growth in employment during the period 1990-2000. Green was perhaps the first to recognize explicitly the potential contributions of smaller airports. In his initial regressions, he includes measures for airports that can support smaller commercial airliners.

The methods used by Irwin and Kasarda, Brueckner, and Green provide reasonable results, given the fact that they focus their attention on large commercial airports. Irwin and Kasarda explicitly incorporate this focus by presuming that commercial airport centrality is vital to the conduct of business travel. While this may be true if one considers only commercial airlines, the assumption breaks down as one considers the growth of corporate aviation over the past 20 years. While business travelers once depended upon commercial airlines for fast travel between cities, such is no longer true. More and more firms, especially those in the Fortune 500

³⁴ Green describes in his paper how he took into account the fact that an MSA might have more than one airport in a metropolitan area.

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category, have access to non-commercial aircraft. Some firms, finding the need to travel without depending upon commercial schedules and route structures, even have their own flight departments employing aircraft that are capable of operating at non-commercial airports.

Brueckner and Green do not account for the air travel as provided by other than commercial airlines by using passenger enplanements as explaining regional economic development. Green went so far as to limit his research to the largest 100 airports in the country based on passenger enplanement data available from the Federal Aviation Administration. He explicitly discounts the possibility that non-commercial airports might make significant contributions to regional economic development, saying, “I stop at the arbitrary ranking of 100 because at that point there are airports that are *small enough that likely have little economic impact* and because the airports are in locations where there would almost certainly never be a major airport” (emphasis added).

Certainly, the contributions to regional economies made by the large commercial jetports (often referred to as “primary” airports by the Federal Aviation Administration) are important. This approach ignores, however, the contributions made to regional economies made by those airports that do not have scheduled commercial service. Smaller airports have few (if any) commercial enplanements, and thus fall under Brueckner’s and Green’s radars (figuratively speaking). Nonetheless, they often support significant levels of corporate aviation activity, and therefore may be significant contributors to regional economies. Teterboro Airport, as noted above, plays a key role in the New Jersey economy, yet it does not have scheduled commercial airline service. This creates potential problems with the models previously described. An increase in economic activity generated by firms using Teterboro Airport, for example, is attributed to passenger enplanements at the nearby commercial airports (Newark Liberty

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International Airport in New Jersey, and JFK International and LaGuardia Airport's in New York City), thereby inflating the effects of those enplanements. The same scenario plays out in other metropolitan areas. Boston's Logan Airport, for example, is the area's commercial jetport, but nearby Hanscom Field is a major destination for corporate travelers. Relying on commercial enplanements to explain economic growth also ignores the impact of large freight operations. Firms such as Federal Express and United Parcel Service might well serve as significant contributors to the economies of the regions surrounding their major hub airports (such as Memphis, Tennessee), yet the effect of this activity on those regions' economies might be lost.

A Different Perspective on Airports

Clearly, an alternative model is needed, one that takes to account the potential effects of non-commercial airports. Admittedly, no one has developed an accepted method for measuring all of the regional economic impacts of airports. The authors of the Van Nuys Airport economic study explicitly recognized this difficulty, saying "the fact that the airport is an important factor in some firm's location decision is agreed to by many, but no universally accepted methodology has been established for accurate and statistically sound measurement of these additional and important off-site impacts" (Wilbur Smith 1998). The authors respond to this difficulty by deciding to ignore the potential impact altogether in their study. In the following section, I describe an approach to the issue that incorporates the effects of smaller non-commercial community airports on regional economies. I generate and test an alternative hypothesis to those used by previous researchers: the total amount of airport operating capacity, as measured by the total length of runways at all airports capable of supporting business aircraft, not just airports with scheduled commercial service, is associated with two typical measures of economic activity: income per capita and employment growth.

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Objective of the Research

The purpose of this research is to understand the contributions made to regional economies by all airports – not only those that support commercial airlines, but also those that do not support scheduled commercial service. These latter airports, commonly referred to as general aviation airports, provide businesses with the ability to operate aircraft such as corporate and charter aircraft. Their users are thus able to avoid having to operate from the larger commercial airports that are commonly associated with congestion and delays. Firms located near these airports potentially gain an advantage over those firms who choose to use only commercial airlines. These firms are able to travel with fewer delays and at times that are more convenient. This research seeks to find empirical evidence that regional economies do indeed benefit from the existence of all airports, commercial and general aviation airports alike. With this evidence, public policy is better informed and transportation planners are better able to make decisions that reflect those benefits.

Theoretical Framework

The theoretical framework for this research is central place theory. In economic location theory, transportation cost is the common thread. Walter Christaller's Central Place Theory first explained the phenomena observed in Germany in which population centers grew based on the distances to market centers. August Lösch expanded the explanation of the geography of population growth by explaining how comparative advantages could give rise to a more polycentric topology (e.g., a city located on the water might have more firms engaged in international trade). Generally, these theories assume that all costs of production are spatially non-variant, and that transportation costs are the sole determining factor in business location decisions. Firms locate where they can minimize the transportation costs associated with their

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market transactions (e.g., bringing goods to market).

As transportation costs grow lower, however, the costs of labor and local services may play a greater role than other factors in a firm's location decision. If the cost of time for key business travelers is high, travel dependent firms will tend to locate close to airports that provide air service. If this is true for firms that are generally associated with strong economic growth, then these types of firms will tend to agglomerate near airports. In other words, we should see a correlation between a region having an airport that provides air service and higher levels of economic activity. Schmenner's (1980) work on business location decisions in which he cited a link between the availability of an airport suitable for use by corporate aircraft and business location decisions made by firms supports this hypothesis.

Research Plan

This project examines the effect of convenient access to air travel on regional economic growth. The unit of analysis is Metropolitan Statistical Areas (MSAs).³⁵ To capture regional differences I begin with all of the MSAs along the east coast of the United States (see Table 5 at the end of this section for complete list of MSAs). I used the statistics and data analysis software product Intercooled STATA 10 to perform correlation and regression analyses on the model. The model is briefly outlined in Table 1, and explained more fully in the following sections.

Dependent Variable

To measure the relative economic vitality of a region, I use the measure typically associated with a healthy economy: new job creation. The dependent variable NEW JOBS is defined as the difference between the total employment in 2000 and 2007. The source of the

³⁵ Using MSAs is, of course, somewhat problematic; it is possible that an airport located close to the physical boundary of one MSA will have spillover effects by helping to generate jobs and income in an adjacent MSA. Future research may develop an approach to this issue.

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data, as well as the employment data used in the independent variables below, is the Regional Economic Information System 1969-2007, version 4.1.4, issued 2009 by the Bureau of Economic Analysis.

Table 1 – Initial Regression Model

Dependent Variable	JOBS	Net jobs added between 2001 and 2007
Independent Variables	AIRPORT-MAJOR	Total runway infrastructure, top 100 airports
	AIRPORT-MINOR	Total runway infrastructure, non-top 100 airports
	PERCENT EMPLOYED	The percentage of the total population that is employed
	UNION	Right to work state status
	FIRE	Percentage of jobs in Finance, Insurance and Real Estate sectors
	MANUFACTURE	Percentage of jobs in Manufacturing sector
	SERVICES	Percentage of jobs in Services sector
	INFORMATION	Percentage of jobs in the Information Services sector
	ENERGY	Sum of Heating and Cooling Energy Days
	COLLEGE	Percentage of the population that has attained a college degree
	EDUCATION	Per-Student Primary and Secondary Spending
	DRIVING	Driving time from primary city in an MSA to the primary market city
	FUEL	Average cost of diesel fuel
	ELECTRICITY	Average cost of commercial electricity
	CORP-TAX	Top corporate tax rate
	POPULATION	MSA Population in 2001

Independent Variables

The independent variables used in the research model are listed below, along with the reason for including each variable.

Major Airport Infrastructure Index

To capture the effect of having a large airport in the region, I calculate the total amount of runway length at airports determined by the Federal Aviation Administration to be one of the top

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100 airports in the nation. The source of the data is FAA Form 5010 data.³⁶ Identifying the top 100 airports was accomplished by studying the Passenger (enplanement) and cargo data from the Air Carrier Activity Information System (AC AIS).³⁷

To avoid endogeneity, I only select airports that were in existence in 2000. I then divide the total runway length by 1,000. Using a commercial database to correlate the zip code of the airport manager to the MSA, I obtain the primary MSA where the airport is located. The variable MAJOR is the total amount of runway infrastructure contained within each MSA.

Major Hub Dummy

This variable is introduced as an alternative way to evaluate the impact of the presence of a major hub airport in an MSA.

Minor Airport Infrastructure Index

As noted earlier, Green only considered in his model commercial airports having a number of passenger enplanements ranking in the top 100 in the nation, concluding that airports with fewer enplanements would not have significant effects on regional economies. As I pointed out, however, not only do some airports with no commercial service affect regional economies (e.g., Teterboro Airport in New Jersey), but declining airline service at many cities is stimulating demand for other forms of air travel, such as charter, air taxi, and corporate air travel. This variable reflects this effect.

To capture the effect of having a business-capable airport in the region, I calculate the total amount of runway length at airports, as long as the runway is at least 3,000 feet long, and determined by the Federal Aviation Administration as not one of the top 100 airports in the

³⁶ Accessed at http://www.faa.gov/airports/airport_safety/airportdata_5010/menu/index.cfm#datadownloads.

³⁷ Accessed at http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/index.cfm?year=2001.

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nation. The source of the airport and runway data is FAA Form 5010 data.³⁸ Identifying the top 100 airports was accomplished by studying the Passenger (enplanement) and cargo data from the Air Carrier Activity Information System (AC AIS).³⁹

Right-To-Work

Both Brueckner and Green postulated a link between right-to-work laws in state and employment growth, so I include this variable. Brueckner and Green theorize that states with right-to-work laws, in which unions cannot force workers to join the union in order to work at a given firm, are associated with lower wages rates. This makes the state potentially more attractive to firms that depend on low cost labor. I obtained right-to-work data from the United States Department of Labor. The dummy variable UNION is used to represent whether or not in state in the study area is a right to work state.

Energy

Green and Brueckner posited a possible association between heating energy costs and employment. I find this analysis incomplete, since cooling costs might also play a role in business location decisions (although admittedly not as much as before the widespread introduction of air conditioning). Using heating degree days alone might not capture the effects of extremes in temperature on establishment location decisions. I create a variable called ENERGY that is simply the sum of the heating degree-days and the cooling degree-days. The source of the data is Historical Climatology Series Report issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service. The heating degree-days report covers the period July

³⁸ Accessed at http://www.faa.gov/airports/airport_safety/airportdata_5010/menu/index.cfm#datadownloads.

³⁹ Accessed at http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/index.cfm?year=2001.

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2001 through June 2003, and the cooling degree-days report covers the period January 2000 through December 2001.

Percentage of FIRE Jobs

Jobs in the finance, insurance, and real estate (FIRE) sectors are associated with high levels of economic activity. The variable FIRE represents the percentage of jobs within the MSA found in the finance, insurance, and real estate sectors. The source of the data is the Regional Economic Information System 1969-2007, issued by the Bureau of Economic Analysis.

Percentage of Manufacturing Jobs

Manufacturing jobs have traditionally been associated with well-paying jobs. The variable MANUFACTURE represents the percentage of jobs found in the manufacturing sector. The source of the data is the Regional Economic Information System 1969-2007, issued by the Bureau of Economic Analysis.

Percentage of Services Jobs

Jobs in the service sector are associated with high levels of economic activity. The variable SERVICE represents the percentage of jobs within the MSA found in the finance, insurance, and real estate sectors. The source of the data is the Regional Economic Information System 1969-2007, issued by the Bureau of Economic Analysis.

Percentage of Information Sector Jobs

The growing dependence of business processes computer-based processes potentially make information sector jobs increasingly important. The variable INFORMATION represents the percentage of jobs found in this sector. The source of the data is the Regional Economic Information System 1969-2007, issued by the Bureau of Economic Analysis.

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Human Capital

To capture the effect of human capital on job development, I include the variable COLLEGE, the percentage of the MSA population that graduated from college. The source of the data is the SOURCE: U.S. Department of Commerce, Census Bureau, Census 2000 Brief, "Educational Attainment: 2000" and "Educational Attainment in the United States: 2004."⁴⁰

Local Educational Investment

As a surrogate for the level of municipal services provided, I include per capita spending on public schools. The variable EDUCATION represents the per capita amount of educational spending, expressed in thousands of dollars.⁴¹

Driving Distance to Primary Market

The ability of a region to grow economically might depend on access to markets. A longer distance to the primary market increases the delivery costs both because of labor costs and because of transportation costs. I chose four primary markets: Boston, New York City, Washington, D.C., and Atlanta Georgia. I used maps.google.com to determine the driving distance from the primary city of the MSA to the closest primary market. When Google provided two different driving times because of potential traffic congestion, the longer time was chosen.

Gasoline Cost

Higher fuel prices increase the cost of delivering goods to the primary market. This should have a depressing effect on profits and thus make it harder for firms to expand. The

⁴⁰ Sources: http://www.census.gov/population/www_socdemo/education/cps2004.html; and Census 2000 Summary File 3, retrieved on March 23, 2005.

⁴¹ Source: "Pubic education Finances 2004", issued March 2006 by the Governments Division of the U.S. Census Bureau.

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source of the information is the U.S. Department of Energy's Energy Information Administration data for 2009.⁴²

Average Price per Kilowatt-Hour

Business costs might affect the ability of firms to expand. High energy costs result in lower profits, everything else being equal. The source of the information is the “State Electricity Profiles 2001”, issued October 2003 by the U.S. Department of Energy’s Energy Information Administration.

Corporate Tax Rates

Tax rates might affect where firms locate by increasing firms’ costs. High tax rates might also be used as a surrogate for the state’s overall attitude towards business. The tax rate data was obtained from the Tax Foundation, www.taxfoundation.org.

Employment Rate

This variable captures the percentage of the total population that is employed.

Population 2000

U.S. Census data provides the year 2000 population for each MSA. This variable accounts for any agglomeration effects that might have impacts on job growth.

Regression Results

Descriptive Statistics

The descriptive statistics for the independent variables are shown in Table 2. Values range widely, as might be expected due to the inclusion of not only MSAs that are comprised of large metropolitan areas but also those that consist of relatively small regions.

⁴² While the data are from outside the study period, they do reflect relative differences in fuel prices.

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Table 2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Major Hubs	111	8.306306	17.63096	0	107
Major Hub Dummy	111	0.297297	0.459141	0	1
Minor and GA	111	22.94598	22.76256	0	138.973
Employed Rate	112	58.46604	7.485237	32.87836	76.11639
FIRE	108	7.070406	2.154176	3.355191	13.41776
Manufacturing	109	11.36981	6.594583	1.833074	36.79132
Services	99	5.135455	2.060486	1.76	14.24
Information	105	1.908571	0.741116	0.7	4.6
Right to Work	112	0.571429	0.497096	0	1
Energy	112	5234.964	1090.928	4066	8082.5
College	112	25.08482	3.686919	20.4	33.2
Education	112	77.07929	16.16716	60.2	109.22
Corp Tax	112	71.08482	16.2447	50	99.9
Driving Time	112	3.9375	2.145614	0	10.03333
Electricity	112	7.994196	1.922411	5.77	11.63
Fuel	112	19.20223	0.761966	17.84	20.59
Population	112	800.7632	1967.921	50.553	18353.35

Correlation Analysis

The initial correlation analysis, producing the Pearson's R coefficients, showed evidence of strong relationships between some of the independent variables. As a result, ENERGY and RIGHT TO WORK were removed from the model. The final is provided in Table 3.

Regression Results

The regression results are shown in Table 4. Not surprisingly, the amount of major airport infrastructure (MAJOR HUBS) was strongly associated with job creation, predicting over 2,000 jobs created for each 1,000 feet of major airport runways. Runway infrastructure at smaller

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airports was also found to be associated with job creation. While the coefficient is smaller (811 compared to 2307), the effect is nonetheless significant. These results confirm not only the earlier studies that reported that major airports were significant contributors to job growth, but also the suggestion that smaller airports also play a key role in regional economic development.

Table 3: Correlation Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Major Hubs (1)		1												
Minor and GA (2)	0.78	1.00												
Employed Rate (3)	0.19	0.03	1.00											
FIRE (4)	0.43	0.41	0.06	1.00										
Manufacturing (5)	0.50	0.44	0.48	0.48	1.00									
Services (6)	0.49	0.45	0.22	0.36	0.54	1.00								
Information (7)	-0.23	-0.31	0.02	-0.48	-0.27	-0.25	1.00							
College (8)	0.04	-0.01	0.25	0.13	0.37	0.24	-0.10	1.00						
Education (9)	0.05	-0.03	0.06	-0.07	0.21	0.22	0.04	0.66	1.00					
Corp Tax (10)	-0.07	-0.05	0.15	-0.15	0.15	0.12	0.15	0.34	0.54	1.00				
Driving Time (11)	-0.01	0.02	-0.29	0.10	-0.19	-0.26	-0.33	-0.57	-0.42	-0.33	1.00			
Electricity (12)	0.13	0.09	0.01	0.08	0.33	0.31	-0.18	0.60	0.80	0.40	-0.17	1.00		
Fuel (13)	0.09	0.10	-0.07	0.15	0.28	0.17	-0.23	0.18	0.35	0.55	0.22	0.62	1.00	
Population (14)	0.82	0.78	0.06	0.35	0.45	0.43	-0.16	0.10	0.16	0.04	-0.19	0.18	0.11	1.00

Adjusted R-Squared = .8807

Prob > F = 0

Of the other variables in the model, only the 2000 population showed a statistically significant association with job creation, perhaps substantiating the agglomeration hypothesis

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that a high concentration of jobs attracts newcomers, many of whom are then hired.

Table 4: Regression Results

job_growth	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Major Hubs	2307.569	432.377	5.34	0	1445.843	3169.295
Minor and GA	811.935	291.107	2.79	0.007	231.7596	1392.11
Employed Rate	185.9793	728.2975	0.26	0.799	-1265.52	1637.474
FIRE	-1430.64	2286.469	-0.63	0.533	-5987.56	3126.291
Manufacturing	-1295.69	3254.227	-0.4	0.692	-7781.35	5189.977
Services	-984.806	770.8517	-1.28	0.205	-2521.11	551.499
Information	7699.061	6608.855	1.16	0.248	-5472.37	20870.49
College	-449.652	1797.273	-0.25	0.803	-4031.61	3132.308
Education	198.5344	512.4082	0.39	0.7	-822.694	1219.762
Corp Tax	-534.236	414.1572	-1.29	0.201	-1359.65	291.1781
Driving Time	-716.355	3072.728	-0.23	0.816	-6840.29	5407.583
Electricity	-8744.98	5016.029	-1.74	0.085	-18741.9	1251.955
Fuel	3331	11174.27	0.3	0.766	-18939.3	25601.29
Population	16.95985	3.912159	4.34	0	9.162929	24.75677
_cons	38394.98	194721.5	0.2	0.844	-349685	426474.5

Discussion

I hypothesized that regional economies are affected not only by the presence of large commercial airports such as New Jersey's Newark Liberty International and Chicago's O'Hare Airport, but also by airports that do not provide scheduled commercial service such as Teterboro Airport in New Jersey and Van Nuys Airport in California. I constructed an airport infrastructure index by determining the amount of runway capacity existing at airports that can support business air travel. I then built a model that examined the effect of this index on job growth, controlling for a number of other potentially influencing variables. The regression results show that the amount of airport runway infrastructure is positively associated with both increased income per capita and job growth during the study period 2001-2007.

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What does this mean for policy-makers? Having shown the positive effect of airport infrastructure on employment growth, this does not mean that, as Green noted, that every community should immediately build an airport. It does suggest, however, that policy makers might need to address the potential role of non-commercial airports in adding to economic growth, especially as the larger airports experience more and more congestion.

For example, the impending introduction of air taxi service⁴³ using very light jets makes any region with an airport having a runway of least 3,000 feet reachable by business people from hundreds of miles away. Conversely, firms located in regions served by these airports have the ability to expand their market areas by being able to reach customers and suppliers previously out of reach. Economic development planners in these regions now have an additional tool to make their areas more attractive to firms. A recent pilot study (Checchio 2007) included in this report suggests that the value that business people place on their time may be greater than any fare premium associated with air taxi service. Policy makers may now have to balance the increased economic impact of smaller airports, which will likely increase as air taxi service areas expand, against the potential externalities.

Changes in aviation technology have the potential to make more areas of the country attractive to firms seeking to locate or expand their establishments. This spatial dispersion of establishment locations and the resulting growth in regional economic development in these new regions, however, might well depend upon the local support given to community and regional airport owners and managers as they plan to add to ground-side infrastructure needed to support additional flight operations. All too often, unfortunately, local decision makers do not recognize the benefits of general aviation airports, and they see airports only as creating negative local externalities (and thus problems with constituents if they support the airport)..

⁴³ The DayJet Corporation launched its on-demand air taxi service in Florida in October 2007

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The results of this project should help inform the judgment of policy makers as they develop transportation policy. The regional economic impact of airports that I see militates for a regional approach to transportation planning. The closing of an airport or the imposition of operating restrictions on it has implications that transcend municipality boundaries, just as the closing of one portion of an interstate highway would affect ground traffic not just locally, but possibly in an entire region. Certainly, there is always a tension between local and regional planning, but a policy of allowing host municipalities alone govern the operations of smaller airports is, in effect, allowing those municipalities to determine not only regional transportation policy, but regional economic policy. This work, and the subsequent research built upon it, hopefully will result in a regional approach to transportation planning.

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Table 5: Metropolitan Statistical Areas included in the study

Albany, GA
Albany-Schenectady-Troy, NY
Allentown-Bethlehem-Easton, PA-NJ
Altoona, PA
Anderson, SC
Asheville, NC
Athens-Clarke County, GA
Atlanta-Sandy Springs-Marietta, GA
Atlantic City-Hammonton, NJ
Augusta-Richmond County, GA-SC
Baltimore-Towson, MD
Bangor, ME
Barnstable Town, MA
Binghamton, NY
Blacksburg-Christiansburg-Radford, VA
Boston-Cambridge-Quincy, MA-NH
Bradenton-Sarasota-Venice, FL
Bridgeport-Stamford-Norwalk, CT
Brunswick, GA
Buffalo-Niagara Falls, NY
Burlington, NC
Cape Coral-Fort Myers, FL
Charleston-North Charleston-Summerville, SC
Charlotte-Gastonia-Concord, NC-SC
Charlottesville, VA
Chattanooga, TN-GA
Columbia, SC
Columbus, GA-AL
Cumberland, MD-WV
Dalton, GA
Danville, VA
Deltona-Daytona Beach-Ormond Beach, FL
Dover, DE
Durham, NC
Elmira, NY
Erie, PA
Fayetteville, NC
Florence, SC
Fort Walton Beach-Crestview-Destin, FL
Gainesville, FL
Gainesville, GA
Glens Falls, NY
Goldsboro, NC

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Greensboro-High Point, NC
Greenville, NC
Greenville-Mauldin-Easley, SC
Hagerstown-Martinsburg, MD-WV
Harrisburg-Carlisle, PA
Harrisonburg, VA
Hartford-West Hartford-East Hartford, CT
Hickory-Lenoir-Morganton, NC
Ithaca, NY
Jacksonville, FL
Jacksonville, NC
Johnstown, PA
Kingsport-Bristol-Bristol, TN-VA
Kingston, NY
Lakeland-Winter Haven, FL
Lancaster, PA
Lebanon, PA
Lewiston-Auburn, ME
Lynchburg, VA
Macon, GA
Manchester-Nashua, NH
Miami-Fort Lauderdale-Pompano Beach, FL
Myrtle Beach-North Myrtle Beach-Conway, SC
Naples-Marco Island, FL
New Haven-Milford, CT
New York-Northern NJ-Long Island, NY-NJ-PA
Norwich-New London, CT
Ocala, FL
Ocean City, NJ
Orlando-Kissimmee, FL
Palm Bay-Melbourne-Titusville, FL
Palm Coast, FL
Panama City-Lynn Haven, FL
Pensacola-Ferry Pass-Brent, FL
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
Pittsburgh, PA
Pittsfield, MA
Portland-South Portland-Biddeford, ME
Port St. Lucie, FL
Poughkeepsie-Newburgh-Middletown, NY
Providence-New Bedford-Fall River, RI-MA
Punta Gorda, FL
Raleigh-Cary, NC
Reading, PA
Richmond, VA
Roanoke, VA

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Rochester, NY
Rocky Mount, NC
Rome, GA
Salisbury, MD
Savannah, GA
Scranton--Wilkes-Barre, PA
Sebastian-Vero Beach, FL
Spartanburg, SC
Springfield, MA
State College, PA
Sumter, SC
Syracuse, NY
Tallahassee, FL
Tampa-St. Petersburg-Clearwater, FL
Trenton-Ewing, NJ
Utica-Rome, NY
Vineland-Millville-Bridgeton, NJ
Virginia Beach-Norfolk-Newport News, VA-NC
Washington-Arlington-Alexandria, DC-VA-MD-WV
Williamsport, PA
Wilmington, NC
Winchester, VA-WV
Winston-Salem, NC
York-Hanover, PA
Youngstown-Warren-Boardman, OH-PA

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Why Firms Use General Aviation

According to futurists in the 1970s, advances in telecommunications technology would eventually result in fundamental changes in business processes. Business managers would not need to travel to meetings with colleagues or clients – they would use audio teleconferencing or videoconferencing to replace expensive and time-consuming air travel. In spite of these predictions that technological advances would render business travel obsolete, the use of business air travel to conduct face-to-face meetings is growing at a double-digit rate (Blank 2005). As business globalizes and the need to interact with different colleagues and clients from different cultures increases, the need for face-to-face communications seems to be growing in importance, not diminishing.

General Research Questions

The primary purpose of this section is to explore the reasons behind the continued use of travel for face-to-face meetings and to discover the underlying factors responsible for the dramatic rise in business air travel that has occurred over the past two decades. The secondary purpose of this section is to explore the underlying factors explaining the increased use of corporate aircraft, both owned and operated by the firm or owned through a fractional ownership arrangement⁴⁴ as opposed to traveling on commercial airlines, especially when travel costs on airlines has become very competitive for many city pairs. I first review the literature for already discovered general themes and concepts, then I conduct interviews with managers of two New Jersey firms determine if those existing themes persist and if any new themes emerge. The first firm is a member of the pharmaceutical industry. The second is a member of the medical device

⁴⁴ A fractional ownership program, such as one operated by the firm Net-Jets, allows companies to pay for a certain number of flight-hours per year and be guaranteed access to corporate jet aircraft within a contracted time

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industry. Both are representative of Fortune 500 firms that have multiple locations not only in the United States, but also around the world.

Limitations

This section gathers qualitative data on two major firms located in New Jersey. As is the case with most qualitative research, the results of this research are not immediately generalizable to all business firms, even to firms in the same general category (i.e., Fortune 100, 500, and so on). It is even more certain that the results cannot be extended to firms much smaller than the firms studied here. The results from this section, however, help us understand the importance of business air travel, and can guide future research efforts conducted as part of much larger investigation into the effects of changes in aviation technology, their effects on business location decisions, the resulting impacts on regional and state economies, and ultimately, the need for federal public policy to reflect the importance of air travel.

The Communications Challenge

The increased globalization of businesses creates new challenges for firms as they endeavor to find ways to balance the need to inter- and intra-firm communications to conduct business with the need to control overall communications costs. Multinational firms, in particular, face challenges created by the need for communications between people in different time zones and in different cultures. The ability to meet with colleagues and clients has changed from when firms located establishments in a single building, and clients were usually found in the same general area, to today's environment in which a firm may have branches in dozens of countries.

The communications challenge is not limited to strictly multinational firms. Increased globalization of business has led to complex networks of inter-related supply chains. A firm

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might be dependent on an effective working relationship with a firm in another continent for intermediate products necessary for final production.

Finally, the need to interact with customers that are simply too far away for convenient meetings to occur presents challenges to all types of firms. As a result, more firms have turned to technology as the answer. Technologies such as audio-teleconferencing, video-teleconferencing, computer-conferencing, and electronic mail have all been used as ways to bridge the time and space gaps between meeting participants as the world shrinks both because of increased integration of world economies (Kreuger 2004) and because of improvements in communications technology.

The Virtual Meeting

Firms employ virtual meetings in a number of environments. The three broadest categories in which virtual meetings occur are:

1. Meetings between groups within a single non-multi-establishment firm
2. Meetings between groups within multi-establishment firms
3. Meetings between members of a firm and individuals (e.g., clients, professional colleagues) outside the firm

Each environment is associated with conditions where conducting technology-assisted virtual meetings maximizes the effectiveness of the firm. Weisband et al. (1995, p. 1125) point to research that indicates that “participation in group discussion and influence over final decisions have generally been found to be more equal in electronic groups than in traditional face-to-face groups.” Studies from as far back as McLeod (1992) conclude that the applications of computer technology mitigate some of the social inhibitions that can occur in face-to-face meetings, thus reducing some of the social barriers to communications that can occur. Clapper, McLean, and

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Watson (1991) conclude that the electronic framework of the computer-based communications mitigates social differences between participants and results in lowered self-awareness, giving participants of different social status (e.g., executive, technical manager, sales manager) a greater degree of freedom in meeting participation. Weisband (p. 1127) argues further that part of the equalization effect is due to the ability of members of computer-supported groups to participate uninterrupted in the decision-making process.

Recognizing the relative richness⁴⁵ of face-to-face communications, researchers have studied the behavioral and technical issues affecting virtual meetings (Rice and Associates, 1984) and have argued that electronic meeting systems supporting groups with a suite of computer-based communications tools will allow companies to reduce the growing costs of executive travel and shrink the effects of geographic distances (Chidambaram 1993, p. 465-491).

Meetings between groups of a single establishment firm, where cultural and temporal differences are less likely to be present, may find the fewest problems associated with virtual meetings. This is especial true when the purpose of the meeting is to reduce uncertainty about a specific issue (Daft and Lengel 1986) or to collect additional data about a problem. In cases such as these, there is less a need for a rich, personal medium. Since meeting participants are, by definition, members of the same firm, trust between the participants is already likely to be at a relatively high level. Participants need the non-verbal cues that face-to-face meetings provide less, and the emphasis is on the data, not the messenger.

⁴⁵ Richness is described as the degree to which communications media provide an immediate exchange of a wide range of communications cues (Chidambaram 1993, p.466); a rich communication medium is one which has the broadest range of sensory inputs – body language as well of verbal language; a lean communications medium is one in which information is passed using only method (e.g., email)

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Multi-establishment Challenges and Solutions

The rise of multi-establishment firms has created multiple management problems. One of those is how to bridge effectively spatial, temporal and cultural gaps. Here, as with the preceding section, firms see technology as a solution. Videoconferencing is a technology that permits visual and aural communications over long distances. The advantages to business people are clear: firms can conduct meetings without the need to travel, saving both time and travel costs. Since the divestiture by AT&T of its local operating companies in 1984, long distance telecommunications costs have decreased dramatically. Not only have long-distance telephone call costs dropped, but the costs for the higher bandwidth needed for effective video-teleconferencing has fallen sharply. Hewlett-Packard implemented a communications program (Snyder 2003) connecting a 16-country, multilingual team that operates on both sides of the International Date Line. The program required careful attention and sensitivity to cultural differences and temporally displaced workdays, but the result was reduced compliance costs for customers in Argentina and faster cycle times in Korea. Research done by Martha Neale, the John G. McCoy-Banc One Corporation Professor of Organizations and Dispute Resolution at the Stanford Graduate School of Business indicates that the virtual team model, despite limitations, can be used by a variety of businesses.

One travel analyst, Christopher Elliott, argues that inconveniences, which have been imposed on travelers (primarily air travelers) since September 11, 2001, have induced business people to more aggressively investigate technology as an alternative to traveling (Elliott 2002). He claims that “business travel is obsolete” due to the combination of higher airline prices (especially in the business and first-class sections of most airlines), the long wait times at airports, the concerns about safety and security, and the growing availability of technology-based alternatives.

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Communications and the Need for Face-to-Face Contact

Communications between different firms or offices within a firm can be problematic because of the need to establish first a trusting relationship. Once firms establish that relationship, however, technology presents a viable alternative to face-to-face meetings, especially when the purpose of the meeting is information exchange. Why, then, in the face of obstacles (both physical and financial) to face-to-face meetings, do firms continue to spend an increasing amount of time traveling to meetings? The differences between face-to-face meetings and the use of computer-based technology for information exchange have been the subject of studies for over 20 years. Daft, Lengel, and Trevino (1987) found that face-to-face communications has a “special ability to communicate the types of decisions made by senior managers.” Roger Schmenner explored the reasons behind business location decisions in his book “Making Business Location Decisions” (1980). He noted that some firms he studied listed proximity to an airport close enough to be able to use their corporate aircraft as an important consideration in the location decision. Futurists of the 1980s, while predicting a move away from the centralized office environment, cautioned against assuming too much change due to technology. In a chapter forecasting the current shift to home offices in his book “The Third Wave”, Alvin Toffler (1981) said "...it would be a mistake to underestimate the need for direct face-to-face contact in business, and all the subliminal and non-verbal communication that accompanies that contact." In 1998, Sobczak noted:

Videoconferencing, perhaps the application most sensitive to service quality, is a case in point. Though it has been commercially available in one form or another for almost 20 years, it hasn't caught on. While most major corporations use videoconferencing for specific applications, it has not achieved any mass appeal. Even in companies where these specific uses have been very successful, the use of video rarely proliferated—perhaps the most telling indication that videoconferencing will never have widespread appeal. Any suggestion that video will become commonplace reflects wishful thinking rather than discernible market forces.

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Snyder (2003) further noted that [during an audio conference] “... Unable to see each other, people inadvertently interrupt and miss significant visual cues.”

Multi-establishment firms, in particular, face greater challenges, especially when the communications involves groups in different countries. The existence of different cultural standards complicate the need for inter-group understanding, increasing the likelihood that the same words or idioms have different meanings in the differing cultures. Snyder (2003) noted that a simple email exchange might result in frazzled nerves because of cultural misunderstandings. As noted by John Alexander, Director of Human Resources of Check Point Systems, a firm with offices in the U.S. and in Israel, employees in Israel were upset by emails from their counterparts in the U.S., asserting that the emails were “wishy-washy”. In contrast, the U.S. employees felt that the emails from the Israelis were direct and blunt to the point of being rude.

Athanassiu and Nigh (2000, p. 471-487) examined the need by top management teams of multinational corporations (MNCs) to interact on a face-to-face basis with their counterparts in other countries by studying 39 multinational corporations. They concluded that top management team members need “to meet face-to-face to share the individual tacit knowledge stocks and create a shared team-level perspective of the multinational firm’s overseas activities and environments.” The authors argued that firms develop rich, multidimensional, robust relationships “only through face-to-face interaction because it allows all senses into the process and it is the only way to capture the entire bandwidth of human interaction.” They also noted that face-to-face communications is particularly necessary for problem-solving tasks involving ambiguity and uncertainty. A key finding is that MNCs that have world-wide activities that are highly interdependent across international markets have the greatest need for face-to-face communications. The increased globalization of business in which supply chains cross national

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boundaries (thus creating “virtual” MNCs) results in even non-MNCs potentially having the same need for face-to-face communications as do the true MNCs.

Rise in Corporate Aviation

Before the 1980s, most business people traveled on commercial airlines, and corporate aviation represented (in many peoples’ minds) an expensive frill. Today’s firms, however, are integrating corporate aviation into their business processes, driving up demand for corporate aircraft. Rolls Royce has forecast that business aircraft manufacturers will deliver almost 14,000 aircraft between 2003 and 2022. The number of firms employing “fractional ownership” (essentially a form of shared ownership in which share owners are guaranteed a certain number of flight hours) is growing rapidly, according to Frost & Sullivan, an industry research firm. From its modest beginning in 1986, with three shares, fractional ownership has come a long way. The total number of shares has increased from 548 shares in 1996, to more than 7,000 shares by 2004. Although this growth appears to be phenomenal, Frost & Sullivan estimates that the majority of the fractional ownership market is yet to be tapped. There are 15,000 flight departments run by companies in the United States alone, and several more thousands of aircraft privately run by wealthy individuals. In addition, there are thousands of people that fly first class everyday on commercial airlines that represent potential customers for fractional ownership.

Theoretical Framework

The thoughts of Daft, Lengel, and Trevino (1987) form the framework for this study. I start by asking: why do organizations communicate, i.e., why do they engage in information processing. According to Daft et al. (1987), the two main drivers of business communications are the need to reduce uncertainty (e.g., the need to collect data needed for business decision-making), and the need to reduce ambiguity (what they term “equivocality”) - the existence of

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conflicting interpretations about organizational situations. Equivocality is equated with confusion, disagreement, and a lack of understanding, not because all parties to the interaction lack specific knowledge about a situation, but because people from different cultures⁴⁶ view the same events using different frames of reference. In relationships where equivocality is high and trust is low, the building of trusts and relationships is of key importance.

It is important to understand how uncertainty and equivocality result in different managerial responses. Uncertainty drives managers to collect more data, whereas equivocality leads to “the exchange of subjective views among managers to define the problem and resolve disagreements” (Daft et al. 1987, p. 357). It can be argued that reducing ambiguity about a problem is a necessary precursor to developing a plan to solve it.⁴⁷ The environment of the communications need, therefore, serves as a driver for the communications model choice. If a problem is data-oriented, e.g., if there is a common understanding of the problem’s context and significance, then a lean communication method – passing information using electronic mail, for example – might be an appropriate response. If the need for communications results from equivocality, however, then lean communications media that do not allow for social support might not be appropriate. Daft et al. (1986) define a hierarchy of media richness, which associates a level of media richness with four basic forms of communications (Figure 1). Each form differs in the amount and quality of feedback (the ability to provide instant feedback where questions are asked and corrections made), multiple cues (the ability to physical presence, body gestures, and voice inflection to add to the words actually spoken), language variety (the ability

⁴⁶ I do not mean to limit the term “culture” as resulting from different national or ethnic backgrounds; culture includes the particular frame of reference used by an individual. Even within a single firm, different cultures exist because of the presence of different organizations (R&D, marketing, sales, etc.), all of which tend to view events differently

⁴⁷ My own experiences as a systems analyst for a large telecommunications firms support the argument the more time that is spent in defining the problem and in communicating the problem in an unambiguous format, the time needed to develop a solution to the problem is reduced and the likelihood of developmental errors is greatly reduced

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to provide data in different formats), and personal focus (the ability to convey a message infused with personal feelings and emotions) (Daft et al. 1987, p 358). Face-to-face communications, the richest form, brings the greatest level of these qualities.

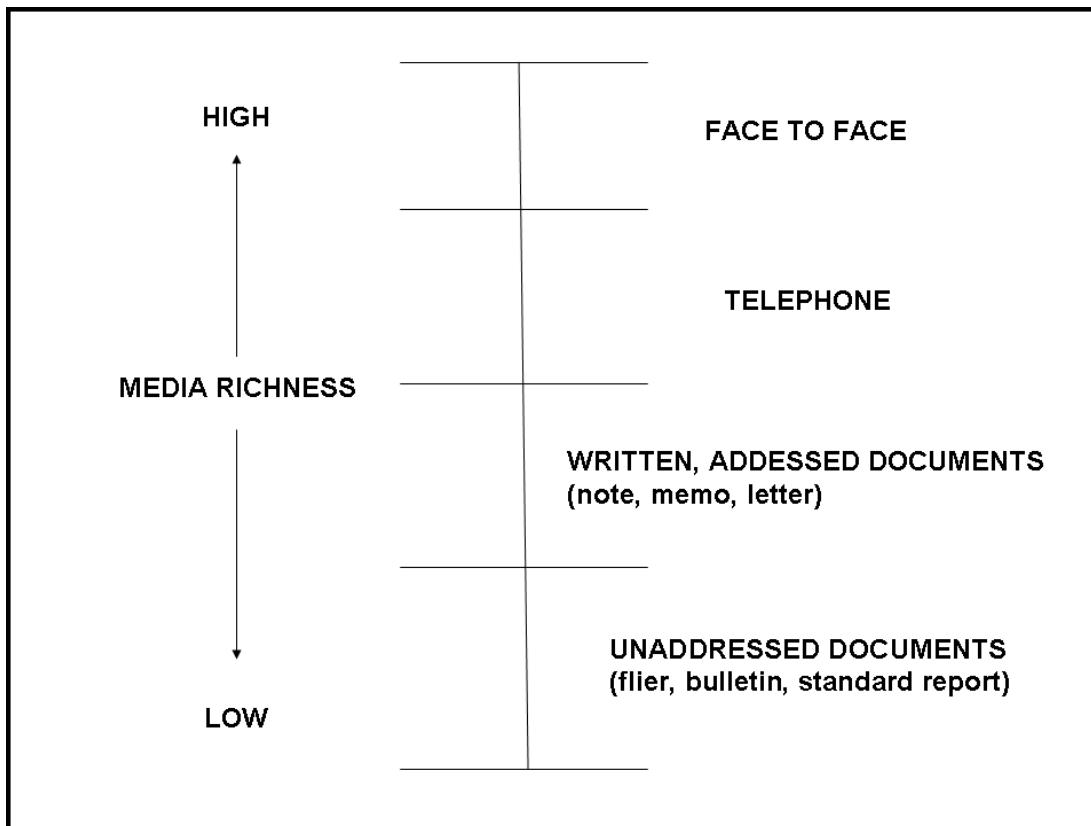


Figure 1 – Media Hierarchy

Source: MIS Quarterly, September 1987, p. 358

Daft et al (1986) then consider a set of 60 different communications scenarios ranging from one in which a manager needs to give a subordinate a set of cost figures to one in which a manager needs an explanation from a peer in another department regarding a complicated technical matter (one in which the manager has little formal training or experience). A panel of 30 judges rated each of the 60 scenarios for equivocality of each of them on a scale of 1 to 5, with 1 representing low equivocality (e.g., low ambiguity) and 5 representing high equivocality. Next, the researchers asked 95 managers to associate each of the communications scenarios with

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a preferred form of communications. Table 1 summarizes the results. As the equivocality of the scenario increases, the preference for face-to-face communications increases dramatically from less than 14 percent for the least ambiguous scenario to over 84 percent for the most ambiguous.

Table 1. Relationship Between Message Equivocality and Media Richness.

Communication Medium	Message Equivocality				
	Low 1	2	3	4	High 5
	% (N)	% (N)	% (N)	% (N)	
Face-to-Face	13.5 (148)	40.5 (598)	60.6 (1342)	84.1 (546)	
Telephone	18.6 (203)	18.3 (271)	9.4 (208)	4.6 (30)	
Addressed Documents	62.4 (683)	40.5 (598)	28.4 (628)	10.8 (70)	
Unaddressed Documents	5.5 (60)	0.7 (11)	1.7 (37)	0.5 (3)	
	100 (1098)	100 (1478)	100 (2215)	100 (649)	

Source: MIS Quarterly, September 1987, p. 362

Daft et al. (1986) further discover that the managers who are more sensitive to the choice of communications media tend to be higher performing than those who are less media-sensitive (Table 2).

Table 2. Relationships Between Media Selection and Performance Ratings for 30 Managers.

Performance	Media Insensitive Managers		Media Sensitive Managers	
	%	No.	%	No.
High Performing	47	(7)	87	(13)
Low Performing	53	(8)	13	(2)
Total	100	(15)	100	(15)

Source: MIS Quarterly, September 1987, p. 363

I conclude that in cases where ambiguity is highest, face-to-face communications are the preferred medium. Based on the initial review of the literature, I form the following hypothesis:

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H1: When the communications scenario with colleagues and clients is ambiguous, business managers prefer to meet face to face

Corporate Aviation as a Replacement for Commercial Aviation

There is little extant formal literature to explain the move in the past 20 years or so away from the use of commercial aviation and towards corporate aviation. Much that exists is in the form of anecdotal reports published by stakeholders in the general aviation industry. These reports, however, support the hypothesis that more and more firms recognize the advantages of corporate air travel over the use of commercial airlines. As noted previously, the growth in the ownership of fractional shares of corporate aircraft has been dramatic, and the reports published by the National Business Aviation Association indicate a clear preference for corporate aviation over the use of commercial airlines. While I use the data above and the anecdotal reports mentioned to help inform my research, I cannot use them as a basis for theory. When studied as a body of literature, however, they reveal certain patterns that recur. These patterns help form a second hypothesis:

H2: Corporate air travel provide firms with productivity advantages compared to other forms of air travel

To confirm my hypotheses, and to build a theory explaining the business behavior as it applies to business travel, I use a grounded theory approach as described in the next section.

Methodology

The grounded theory approach described by Ryan and Russell (2003) forms the basis for my research methodology. In this methodology, theory is generated from the data while it is being collected, or the researcher elaborates upon existing theory as new data is collected. The methodology uses constant comparisons whereby the researcher systematically analyzes each

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new datum and compares it to previously collected data. Key to the process is the systematic asking of generative and concept-relating questions, systematic coding procedures, and conceptual integration. This allows the researcher to “connect the dots” as the picture is being developed, rather than wait until all of the data are collected, then attempting to figure out which relationships are primary, which are secondary, and which data are outliers.

The method is essentially the same as the constant comparative analysis described by Thorne (2000, p. 68-70), taking one piece of data (one interview, one statement, one theme) and comparing it with all others that may be similar or different in order to develop conceptualizations of the possible relations between various pieces of data. This method is particularly useful when there is little literature on the subject that can be used to inform the researcher’s judgment as to the type of data collection method to use or what type of questions to ask. As coding categories emerge, the researcher links them together in theoretical models (Ryan, p. 279).

The use of grounded theory is useful because of its ability both to expand upon existing theory (such as the work done by Daft et al. (1987) regarding face-to-face meetings) and to generate new theory. I have found no formal theoretical research into the reasons for the use of corporate aircraft; hence, I intend to build theory using the grounded approach, comparing the data obtained with previously collected data, looking for patterns and themes.

Grounded Theory Application

My study began with an analysis of nine existing (anecdotal) reports documenting the advantages of face-to-face meetings and the advantages of using corporate aviation in place of commercial airlines. I collected this data from the National Business Aviation Association web site, www.nbaa.org. I used the reports as if they were individual interviews, coding them using

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an open coding method. The results helped me develop the interview guide that I used in the remainder of this study. After coding each report, I referred to my original hypotheses to see if the report supported either of the hypotheses, or if they suggested new themes.

I then described the study to the former president of a national aviation organization, the National Business Aircraft Association. Employing the snowball sampling approach, I asked him to provide references to heads of corporate flight departments in the state who might be willing to participate in this study. He provided me with the names of three heads of corporate flight departments. Due to time constraints, I conducted only two interviews. For confidentiality purposes, I refer to the first interviewee as “AB”, and the second as “CD”, and the first firm as Company A and the second as Company B. I conducted these elite interviews in a semi-structured manner, using the interview guide that I developed. The guide contained the questions that I wanted answered, but I allowed the interviewees latitude in the areas of both flight operations and business processes, allowing them to expand on areas about which they felt strongly. This approach was instrumental in the discovery of a third important theme affecting the use of corporate aviation.

I conducted the interviews at the flight departments’ headquarters and audio taped them with both AB’s and CD’s permission. In both cases, I promised complete confidentiality – the names of the firms and the interviewees, as well as any identifying characteristics of the firms are given code names to prevent any breach of confidentiality. In addition, I offered both AB and CD copies of the transcribed interviews (both offers were accepted and the transcribed interviews were sent to the interviewees about a week after each interview). The interviews began with discussions of operational issues, such as the types of aircraft employed, the general characteristics of the flights in terms of destinations and length, believing that they would be the

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most comfortable with this line of inquiry. Interestingly, both AB and CD volunteered their opinions as to the value of corporate air travel to their firms even before I asked many of the questions. When I mentioned this, AB said that it was logical that I would want that information.

I coded the interviews using the open coding method, identifying key concepts and relationships using word, phrase and sentence analysis. Recurring themes were noted and general concepts developed, referring back to the literature. Following the grounded theory methodology, after each interview I looked for commonalities with prior data that were consistent with the literature (in the case of my first hypothesis), and for common threads that I could use to build new theory (in the case of my second hypothesis). In particular, I looked for references by the interviewees to the need for face-to-face meetings, and for the factors driving the decision by their firm's managers to use their own aircraft instead of commercial airlines. I use the results from the first interview to help guide the second one, consistent with the grounded theory approach.

Interview Results

General Firm Characteristics

The two New Jersey firms selected for this study share many common characteristics. They are both multinational, Fortune 500 firms with multiple locations both in the United States and around the world. The firms have their own flight departments which includes the ownership of multiple aircraft, both fixed wing corporate jet aircraft and helicopters. In one case, the corporate headquarters of the firm is located very close to the airport base of the flight department, while in the other the corporate headquarters is located in New York City. Company A sold manufacturing equipment and that used their corporate aircraft primarily for transporting technical managers, although AB indicated that a larger cross-section of company employees

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employed the aircraft after the terrorist attacks of September 11, 2001, while Company B had a two-tiered structure used for corporate flying. Company B limited the use of the 6-10 passenger corporate aircraft to the top 14 executives in the firm, but also employed two higher seat capacity aircraft for lower-level employees, operating what was described during the interview as an “in-company airline” serving cities that were not well-served by commercial airlines. In both cases, managers traveled year round, with 50 percent or more of the travel to international destinations.

Three key themes emerged during the interviews with the two flight department managers:

1. Trust and Relationships
2. Productivity
3. Safety and Security

I highlighted references the key themes in the following exchanges.

Trust and Relationships

The theme of relationship building was primary in the discussion of why key business managers travel for face-to-face meetings. This was not surprising, considering Daft's et al. (1986 and 1987) research. When asked about the potential use of telecommunications-based methods such as video teleconferencing, AB responded

Face-to-face meetings are still vital to the company... Our executives still need to shake hands and see people. When they go to conferences, when they go to sales meetings, our executives need to be there physically to make a statement on behalf of the company.... If you need to either reach out to someone personally or see a machine, or see a product that you really need to touch and feel, then videoconferencing may not be the answer.

CD's response to the same question stressed the trust and relationship building of face-to-face contact.

There is a certain percentage of business that requires person-to-person interaction. You've got to be able to convince somebody and we all know, just from interaction, that the content of the voice alone⁴⁸ only delivers part of the message and you have to be

⁴⁸ Remember the previous discussion of the “richness” of various communications media

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able to form a relationship with a business partner, you have to gain their trust, so they want to do business with you and while that can be done with some business transactions, it cannot be done for other business transactions, especially when there are certain cultural requirements for a company to say “I will go with you”

The theme of trust and relationship building was not limited to interactions with other companies. Even within a firm, AB and CD both noted face-to-face contact as important contributors to success. CD stated, “It’s critical that senior leadership make periodic visits to the locations that they are in charge of.” He indicated that, as the head of the flight department, he felt that he did not make trips to that part of the corporate aviation department for which he had responsibility, he would begin to lose effectiveness:

A lot of times you have to retain the trust and confidence of the group that you are leading, and I think personal contact, when you show that you care enough to be there, it helps. Especially when you are going through a difficult event.

Productivity

The discussion of productivity centered on the decision to travel using corporate aircraft versus commercial airliners. Both AB and CD felt that business travel was an integral part of their firms’ business processes. This was consistent with the themes discovered while analyzing the NBAA reports. As a decentralized firm, Company A sold their equipment to many manufacturers located throughout the country and the world. AB pointed out that the engineers had no choice but to travel to repair machines and build new lines.

They must [travel]. I can tell you that we can do in one day what it takes them three days of travel to do. Now think about that. When you multiply that salary of one engineer times 8 or 6, however many are going out there, times three days versus one day. That gives you a sense of the productivity gained or lost as the case is.

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AB described benefits realized by executives within the firm, especially after the security measures implemented after September 11, 2001, increased travel time:

We had a sea change, from 9/11 forward in that at that point the aircraft started to be used a more of an executive tool, in addition to still maintaining our manufacturing connection with the engineers. But the executives started using it more for various reasons, including security, time efficiency became a very very important part due to the deterioration of the airline schedules

The benefits of corporate air travel were not lost on the executives. AB noted that the mix of passengers, which had been primarily all engineers in the beginning, has shifted to a 50 percent/50 percent mix of executives and engineers:

We're about at 50/50 level, and the main purpose of the executive travel, is, similar to that before, they need to reach out to their constituents, their colleagues, in other companies, their vendors, we do a lot of work with investors, we visit investors all over the country to tell our story. So those weren't exactly new missions but they became more, they became more frequent in terms of missions

CD noted that while the aviation department was traditionally treated as a cost center, it was also a productivity tool. When asked how he would position corporate aviation to a company he replied:

I would say that your aviation department, while is a cost center, it's a productivity tool. And what our charge is, is to provide as much improvement in their productive use of time. And we do that by simply saving them time getting to their required business locations and providing them a mobile office, a productive environment while they're enroute, so they've got to be capable. We have to save them time.

AB provided examples where executives made effective use of the time traveling on the corporate aircraft that would not have been on a commercial airliner

One division president told me that on a trip that we took him to that he actually used the time to do performance reviews, something that he would have to do, I would think that he would have to take the time presumably out of his day at home. We had a 4-5 hour trip, he brought his team with him, he did his performance reviews along the route, completed. So again, time saved, productivity efficiency. So it is changing in those ways. And I see it happening more and more as time goes by.

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Deteriorating commercial airline schedules were noted as contributing to the use of corporate aircraft, making that travel integral as a business tool. AB stated that in the past ten years, corporate aviation had become “integral to the company” versus a “nice to have” business tool. While air travel had always been important to the firm because of decentralized locations, because of the increasing disamenities associated with commercial travel, the time value of executives, and hub and spoke routing replacing point to point capabilities, the value of business aircraft has increased dramatically. The lack of convenient commercial airline service affected Company B so much that in order to maximize its employees’ productivity, it acquired two regional jet aircraft to transport staff between corporate locations in the Midwest and the East coast.

Safety and Security

Safety and security emerged as the third key theme during the interviews, with security playing a greater role in the post-9/11 environment. I had not expected the emphasis that both AB and CD placed upon this theme; in fact, it was a new finding for me. This theme was completely absent from the NBAA studies.

The board of directors of Company A mandated that the chairman of the corporation use the firm’s corporate aircraft whenever possible for security reasons, and that more key executives are using the firm’s aircraft. Company B requires its chairman to use the corporate aircraft for all of his travel, both business and personal. CD also noted safety and security as a motivating factor in not using charter aircraft unless no other option is available.

We rarely, rarely use charter. We have a company policy, signed by the Chairman, that we will not use charter unless we absolutely have to. And the reason we do that is we feel that our operations and maintenance that we totally control are of a higher quality. We have direct control of the safety and security, much more so than by contracting out.

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AB noted the importance of intellectual security in the decision to employ corporate air travel. When asked about the feasibility of discussing company business during a flight, AB noted

The confidentiality of the travel is critical, much more critical today than it was 10, 15, 20 years ago. People are much more concerned about what they open and who sees it than they were 10-15 years ago.

Discussion

In both interviews, we see that the theme of trust and relationship building is a primary motivating factor in deciding on face-to-face meetings, consistent with the literature. As noted in the discussions with Company A, the very practical issue of problem solving – needing to fix manufacturing equipment – also plays a key role in the travel decision. We can now revisit my initial hypothesis:

H1: When the communications scenario with colleagues and clients is ambiguous, business managers prefer to meet face to face

From the data, I see that when the purpose of the interaction is more than the simple exchange of information, a richer form of communications is appropriate. When the purpose of the interaction is to create trust between two groups or individuals, or when it is to build a new relationship with new potential clients or partners, or when it is to reinforce existing relationships, the richness of face-to-face communications, and the commitment to the other party that it signals, creates the best outcome.

Once the firm makes the decision to travel rather than use other communications technology, the choice becomes to use commercial airlines or corporate aviation. I now revisit my second hypothesis:

H2: Corporate air travel provide firms with productivity advantages compared to other forms of air travel

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We see that the more the firm values a person's time, the more likely it is to use corporate aviation as opposed to commercial airlines. Top-level executives, whose time is at a premium, see productivity gains associated with corporate travel where the time in the aircraft is put to productive use, which is not the case with airline travel. Engineers, many of whom have no choice but to travel, see productivity gains by not being bound to commercial airline schedules.

The results from the interview allow us to construct a third hypothesis, explaining the use of corporate air travel over commercial airlines:

H3: Corporate air travel provide firms with safety and security advantages compared to other forms of air travel

These advantages were not limited to physical safety. Corporate air travel provides a level of privacy unmatched by commercial airlines.

Constructing a Theory

The data collected support the initial hypotheses that, at least when the interaction requires a rich communications medium, firms prefer to employ face-to-face communications. Further, for those situations where productivity and security are factors, corporate aviation provides key advantages over airline travel. Finally, the data allow me to construct a third hypothesis addressing safety and security. This allows us to construct an explanatory theory of corporate air travel based on my three hypotheses:

- The need to create inter- or intra-firm trust and relationships increases the preference for face-to-face meetings, especially when the firms serve geographically dispersed customer and partner networks or when customer service-related functions require in-person interaction due to the ambiguity of the situation (i.e., problem solving is needed as opposed to information providing)
- The higher the value placed on a manager's time, the greater the likelihood that corporate aviation will be used in place of commercial air service.
- Corporate aviation provides advantages in safety and security that cannot be matched by commercial airlines.

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Conclusions

The existing literature serves to describe the cases where firms need the richness of face-to-face communications. My research shows that the need for this richness exists in the firms studied, and this allows us to develop an explanatory theory of corporate aviation. We find further that when firms place a high value on the productivity of their managers, or when safety and security considerations are important, corporate aviation is preferred over commercial airlines. Subsequent research will include interviewing business process managers – the people actually making the travel/not travel decision – to validate the data obtained in the course of this study.

This research contributes to the study of corporate communications and travel mode decision-making. Public policy makers, boards of directors, key executives, and shareholders all benefit from a better understanding of the benefits provided by corporate aviation.

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Innovation Adoption and the Air Taxi Industry

The final section of this chapter renews the focus on individual choice. Here, I present the results of research conducted in Lakeland, Florida, with a group of businessmen, some of whom were familiar with the concept of on-demand air travel. All of the participants had been recommended by the Lakeland Chamber of Commerce.⁴⁹

Objective

As with any transportation innovation, the path from awareness to implementation may be an arduous one. The objective of this report is to assess how business people in Lakeland, Florida, may adopt the very light jet-based air taxi service offered by the DayJet Corporation as an alternative to commercial airline service for short haul travel. It also assesses the acceptance of the service as an alternative to automobile travel. Key dimensions studied include price, reliability, value of time and service area.

Air taxi service employing very light jets has the potential to offer business and personal travelers who place a high value on their time with a viable alternative to both commercial airline and automobile travel. The ability to travel from an airport located close to one's home or business can be an important advantage, especially for frequent travelers. Increasing congestion at major commercial airports, combined with the increase use by airlines of hub and spoke routing plans, further enhances the attractiveness of being able to travel from a regional airport instead of a commercial jetport.

Findings

The business people interviewed as part of this study generally acknowledged the value

⁴⁹ Presented here is the Executive Overview of the report. The full report is included in Appendix A.

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proposition offered by air taxi service. The participants could not necessarily be characterized as frequent fliers, but even so, the value proposition offered by DayJet's air taxi service was well understood and generally accepted as a worthwhile alternative to commercial airlines and automobile travel (for certain distances). The participants agreed that time savings, convenient scheduling, convenient departure locations, and convenient arrival locations (airports closer to the eventual destination than the closest commercial service airport) were important factors in selecting a travel mode. These factors, of course, reflect the value proposition presented by air taxi service. Notable, however, was the price factor. All of the participants indicated that price was an important factor, yet they expressed a willingness to pay a substantial price premium in order to save time. This suggests that the participants are not as price conscious as their original answers might have suggested. This is supported by the expressed willingness to employ DayJet's air taxi service even when the fare was substantially higher than existing commercial airline coach fares.

Factors other than financial were also important. Trips that required traveling through a hub airport such as Atlanta were seen as very inconvenient, not only because of the additional time required for the total trip, but also because of the possibility of lost luggage and missed connections. The ability to fly nonstop to a destination was seen as a major benefit of air taxi service. It was noted, however, that Southwest Airlines, the commercial carrier most often mentioned by the participants, strongly positions its use of nonstop flights in its own marketing mix as opposed to an airline such as Delta Airlines which uses Atlanta's Hartsfield Atlanta International Airport as a major hub. According to Southwest Airlines, nearly 80 percent of their flights are non-stop.⁵⁰

⁵⁰ <http://www.blogsouthwest.com/2006/07/25/>

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The inconvenience of post-9/11 air travel was noted as a major disadvantage of air travel. Most participants indicated that the time needed to get through airport security lines was an important factor in deciding when to fly. Selecting flights that left very early in the day was seen as a way to mitigate the “hassle factor” mentioned by many participants. This suggests that being able to avoid the inconvenience of security checks might be a strong marketing factor.

The participants agreed that having convenient access to an airport was important to their firm’s business. Whether or not they would make a location decision based on the availability of a nearby airport is less clear. While there was general agreement that the introduction of DayJet’s air taxi service makes Lakeland a more attractive location in which to locate a business, other factors are probably more important. Research has shown that factors such as labor pool availability, stable tax rates, proximity to markets and customers, sources of inventory and materials, and sources of technical, managerial and financial assistance can rank very high in a firm’s location decision.

The overall attractiveness of air taxi service manifested itself in the participants stated willingness to employ the service for personal travel. Even at fares of up to 150 percent of normal coach rates, most of the participants expressed a preference for air taxi service over commercial airline service.

Some obstacles to the adoption of air taxi service, however, were identified. Concern was raised by one participant about DayJet’s ability to provide reliable positioning of aircraft, that is, being able to schedule a flight at the time requested by the customer. This concern will only be dispelled over time as DayJet demonstrates its ability to meet its demand as it introduces service in Florida.

Not all employment sectors are likely users of the service. Travel by public sector

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employees is frequently governed by policies that require the use of the lowest cost carrier. In most cases (although, interestingly, not all), commercial airline service will be less expensive than DayJet's service. While travel to and from Tallahassee by government workers can be time-consuming (especially for those workers in the southern portions of Florida), the gains in productivity made possible by air taxi service are precluded by bureaucratic requirements that, ironically, are designed to minimize public expenses. This issue might be avoided if DayJet works closely with public officials to demonstrate how the use of DayJet's air taxi service can lead to lower overall travel costs.⁵¹

Attorneys represent another sector where the use of air taxi service is problematic. At first glance, the value of even one hour of a typical attorney's time would justify the employment of an air taxi service. Looking more closely, however, there is actually a disincentive for an attorney to save time. Since travel expenses that are billed to clients include travel time, any travel time saved results in fewer billable hours. Hence only the client would benefit from an attorney's use of air taxi service. A client, however, would likely not be aware of the potential costs savings resulting from the use of air taxi.

Conclusions

Study participants see DayJet's air taxi service as an attractive alternative to commercial airline service for short to medium length trips, and for medium to long automobile trips. Price does not seem to be a significant obstacle as long as service reliability is maintained. Notwithstanding this perception, DayJet is left with many challenges based on the concerns noted above.

⁵¹ Subsequent to the research, the author learned that government workers have received authorization to employ DayJet's air taxi service

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The first challenge is identifying those potential customers most likely to use air taxi service. The participants in this pilot study were from a variety of industry sectors, and attitudes towards air taxi service were consistent across the sectors. No one sector, or group of sectors, seems more likely to adopt the service than other sectors. Subsequent research may be able to uncover some variation across industries, possibly by analyzing the characteristics of firms that express a willingness to adopt air taxi service. For now, however, DayJet is left with the challenge of projecting its marketing message as efficiently as possible.

A second, and possibly more significant challenge, is demonstrating the ability to position aircraft to customers' airports at the time promised in a reliable fashion. Any failure to provide service when promised could have a long lasting effect on customers' perceptions of the service. Here, a major advantage of the service is also a major disadvantage. Many innovations require a significant investment in time or money to adopt. An example is the use of robotics in factories. Air taxi service, however, requires no significant investment on the part of the customer. Customers may try and evaluate the service very easily. By the same token, a customer may elect to stop using the service just as easily.

Finally, since the major benefit of air taxi may be the time savings achieved through the use of regional and community airports, DayJet must find an effective way to stress the importance of time to prospective customers and must find a way to help those customers translate time savings into willingness to pay a premium price. In the end, the ability to represent the advantages of air taxi over alternatives such as driving will determine DayJet's long term success or failure. These advantages are not limited to time savings, but also include direct costs such as overnight stays and other travel related expenses.

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Final Thoughts on the Economic Imperative

In this chapter, I established a commerce-based framework for the development of a national aviation policy. The convenience that general aviation provides to business people compared to commercial aviation gives firms that employ general aviation aircraft to reach clients, suppliers, and coworkers significant advantages over firms that do not. In the second part of the chapter, I established that the benefits of general aviation are not limited to the firms themselves. Indeed, the economic benefits of general aviation are regional in nature, as seen by the associations between general aviation infrastructure and income per capita and job creation. Finally, I demonstrated the ongoing need to develop policies that facilitate the continued growth of general aviation airports by confirming the need for alternatives to commercial air travel for business people that do not have access to their own aircraft.

The importance of the above is significant. Policymakers in Congress who do not understand the importance of general aviation in constructing a national aviation policy risk creating a system that fails to meet the ongoing travel needs of the firms that contribute greatly to commerce in the United States. Further, failing to understand the characteristics of general operations might result in Congress failing to act when regulatory policies proposed by the administration (and here I am talking primarily about the Department of Homeland Security) serve to inhibit commerce and thus threaten the financial well-being of the country.

In the next chapter, I turn to just that problem – imposing new security requirements on the air travel system. The chapter addresses the difficulties in policy formation, especially when the process does not address issues critical to the group most affected by the new policy. First, I will discuss a successful policy change – the federalization of airport passenger screeners. Next, I will address a failure at policy change – the unsuccessful attempt to introduce an intrusive

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passenger pre-screening program named Computer Assisted Passenger Prescreening System II – CAPPs-II. Finally, I will address a new policy that the Transportation Security Administration is proposing – extending security practices that previously applied only to commercial air carriers to general aviation as well.

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APPENDIX A – Full DayJet Report

LAKELAND FLORIDA AIR TAXI FEASIBILITY:

A PRELIMINARY ASSESSMENT

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Lakeland Florida Air Taxi Feasibility – A Preliminary Assessment

Executive Overview

Objective

Air taxi service employing very light jets has the potential to offer business and personal travelers who place a high value on their time with a viable alternative to both commercial airline and automobile travel. The ability to travel from an airport located close to one's home or business can be an important advantage, especially for frequent travelers. Increasing congestion at major commercial airports, combined with the increase use by airlines of hub and spoke routing plans, further enhances the attractiveness of being able to travel from a regional airport instead of a commercial jetport.

As with any transportation innovation, however, the path from awareness from implementation may be an arduous one. The objective of this report is to assess how business people in Lakeland, Florida, may adopt the very light jet-based air taxi service offered by the DayJet Corporation as an alternative to commercial airline service for short haul travel. It also assesses the acceptance of the service as an alternative to automobile travel. Key dimensions studied include price, reliability, value of time and service area.

Findings

The business people interviewed as part of this study generally acknowledged the value proposition offered by air taxi service. The participants could not necessarily be characterized as frequent fliers, but even so, the value proposition offered by DayJet's air taxi service was well understood and generally accepted as a worthwhile alternative to commercial airlines and automobile travel (for certain distances). The participants agreed that time savings, convenient

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scheduling, convenient departure locations, and convenient arrival locations (airports closer to the eventual destination than the closest commercial service airport) were important factors in selecting a travel mode. These factors, of course, reflect the value proposition presented by air taxi service. Notable, however, was the price factor. All of the participants indicated that price was an important factor, yet they expressed a willingness to pay a substantial price premium in order to save time. This suggests that the participants were not as price conscious as their original answers might have suggested. This was supported by the expressed willingness to employ DayJet's air taxi service even when the fare was substantially higher than existing commercial airline coach fares.

Factors other than financial were also important. Trips that required traveling through a hub airport such as Atlanta were seen as very inconvenient, not only because of the additional time required for the total trip, but also because of the possibility of lost luggage and missed connections. The ability to fly nonstop to a destination was seen as a major benefit of air taxi service. It was noted, however, that Southwest Airlines, the commercial carrier most often mentioned by the participants, strongly positions its use of nonstop flights in its own marketing mix as opposed to an airline such as Delta Airlines which uses Atlanta's Hartsfield Atlanta International Airport as a major hub. According to Southwest Airlines, nearly 80 percent of their flights are non-stop.⁵²

The inconvenience of post-9/11 air travel was noted as a major disadvantage of air travel. Most participants indicated that the time needed to get through airport security lines was an important factor in deciding when to fly. Selecting flights that left very early in the day was seen

⁵² <http://www.blogsouthwest.com/2006/07/25/>

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as a way to mitigate the “hassle factor” mentioned by many participants. This suggests that being able to avoid the inconvenience of security checks might be a strong marketing factor.

The participants agreed that having convenient access to an airport was important to their firm’s business. Whether or not they would make a location decision based on the availability of a nearby airport is less clear. While there was general agreement that the introduction of DayJet’s air taxi service makes Lakeland a more attractive location in which to locate a business, other factors are probably more important. Research has shown that factors such as labor pool availability, stable tax rates, proximity to markets and customers, sources of inventory and materials, and sources of technical, managerial and financial assistance can rank very high in a firm’s location decision.

The overall attractiveness of air taxi service manifested itself in the participants stated willingness to employ the service for personal travel. Even at fares of up to 150 percent of normal coach rates, most of the participants expressed a preference for air taxi service over commercial airline service.

Some obstacles to the adoption of air taxi service, however, were identified. Concern was raised by one participant about DayJet’s ability to provide reliable positioning of aircraft, that is, being able to schedule a flight at the time requested by the customer. This concern will only be dispelled over time as DayJet demonstrates its ability to meet its demand as it introduces service in Florida.

Not all employment sectors are likely users of the service. Travel by public sector employees is frequently governed by policies that require the use of the lowest cost carrier. In most cases (although, interestingly, not all), commercial airline service will be less expensive

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than DayJet's service. While travel to and from Tallahassee by government workers can be time-consuming (especially for those workers in the southern portions of Florida), the gains in productivity made possible by air taxi service are precluded by bureaucratic requirements that, ironically, are designed to minimize public expenses. This issue might be avoided if DayJet works closely with public officials to demonstrate how the use of DayJet's air taxi service can lead to lower overall travel costs.⁵³

Attorneys represent another sector where the use of air taxi service is problematic. At first glance, the value of even one hour of a typical attorney's time would justify the employment of an air taxi service. Looking more closely, however, there is actually a disincentive for an attorney to save time. Since travel expenses that are billed to clients include travel time, any travel time saved results in fewer billable hours. Hence only the client would benefit from an attorney's use of air taxi service. A client, however, would likely not be aware of the potential costs savings resulting from the use of air taxi.

Conclusions

Study participants see DayJet's air taxi service as an attractive alternative to commercial airline service for short to medium length trips, and for medium to long automobile trips. Price does not seem to be a significant obstacle as long as service reliability is maintained. Notwithstanding this perception, DayJet is left with many challenges based on the concerns noted above.

⁵³ Subsequent to the research, the author learned that government workers have received authorization to employ DayJet's air taxi service

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The first challenge is identifying those potential customers most likely to use air taxi service. The participants in this pilot study were from a variety of industry sectors, and attitudes towards air taxi service were consistent across the sectors. No one sector, or group of sectors, seems more likely to adopt the service than other sectors. Subsequent research may be able to uncover some variation across industries, possibly by analyzing the characteristics of firms that express a willingness to adopt air taxi service. For now, however, DayJet is left with the challenge of projecting its marketing message as efficiently as possible.

A second, and possibly more significant challenge, is demonstrating the ability to position aircraft to customers' airports at the time promised in a reliable fashion. Any failure to provide service when promised could have a long lasting effect on customers' perceptions of the service. Here, a major advantage of the service is also a major disadvantage. Many innovations require a significant investment in time or money to adopt. An example is the use of robotics in factories. Air taxi service, however, requires no significant investment on the part of the customer. Customers may try and evaluate the service very easily. By the same token, a customer may elect to stop using the service just as easily.

Finally, since the major benefit of air taxi may be the time savings achieved through the use of regional and community airports, DayJet must find an effective way to stress the importance of time to prospective customers and must find a way to help those customers translate time savings into willingness to pay a premium price. In the end, the ability to represent the advantages of air taxi over alternatives such as driving will determine DayJet's long term success or failure. These advantages are not limited to time savings, but also include direct costs such as overnight stays and other travel related expenses.

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Background

The national commercial air travel system is increasingly characterized by congestion, delays, and canceled flights. In 2006, less than 74 percent of all nationwide flights arrived on time.⁵⁴ At the nation's 32 busiest airports, delays are an even more severe problem. Business travelers who frequently travel are especially affected by these delays for at least three reasons. First, being able to attend an important meeting may depend on flights arriving on time. A late arriving flight might well prevent a business person from transacting important business. The issue of late arriving flights is especially problematic given the commercial airlines' adoption of hub and spoke scheduling topology in which direct flights have been replaced by flights that fly first to a large hub airport. Passengers then typically must deplane and board other aircraft for the flight to their eventual destination. A late flight arriving at the hub airport can easily result in a missed connection.

Second, the value that many business people attach to their time is greater than that which the average personal traveler does. Especially for key executives, time spent driving to airports over congested roads, then arriving at airports in enough time to pass through security checkpoints, often amounts to hours of lost productivity. When airliners spend time on ramp areas waiting for takeoff clearances, this lost productivity mounts.

Finally, the need for business people to arrive at their destinations in time to transact important business combine with the increasing percentage of late flights to create a new travel calculus: the personal cost of air travel, expressed in terms of potential lost business

⁵⁴ Source: Bureau of Transportation Statistics, Year to Date through September, 2007. The Federal Aviation Administration considers a flight as having arrived on time if it reaches the gate within 15 minutes of the scheduled arrival time

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opportunities plus the value of lost productivity now outweigh the price of air fares. In response to this new calculus, firms are introducing a new travel mode referred to as air taxi. Air taxi differs from previous modes of air travel, such as charter, in two important ways. First, the new air taxi firms have developed business models that hope to maintain high seat-load factors, that is, to minimize empty seats on any flights. Second, the new air taxi firms will employ, for the most part, a new generation of light turbine powered aircraft referred to in the industry as Very Light Jets, or VLJs. Very light jets are designed to operate from small community and regional airports making it unnecessary for business people to first travel to larger commercial jetports to access the nation's air travel system. VLJs also offer lower purchase prices and operating costs than offered by the existing fleet of corporate jet aircraft.

Unclear at this time, however, is whether the advantages that air taxi service provide in terms of increased convenience and reduced unproductive time by being able to fly from closer and less congested airports will translate into a market share sufficient to maintain a viable air taxi industry. This report seeks to determine, in a small controlled setting, how attractive an air taxi service might be to business people in various industries as an alternative to commercial airline service or automobile travel.

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Objectives

The objective of this study is to gain insight into the decision processes used by business people when choosing an air travel mode. In particular, the study seeks to determine if air taxi service employing very light jets (VLJs) that can operate from regional and community airports represents a viable travel option.

VLJ-based air taxi service has certain advantages over commercial airline service. Air taxis can operate from regional and community airports with runways too short for commercial airliners. These airports are often located in suburban areas, providing travelers with the option of driving a relatively short distance compared to a drive to a commercial jetport. In the case of Lakeland, for example, Lakeland-Linder Regional Airport is about a ten-minute drive from the Lakeland central business district compared to a drive of an hour or more to Tampa-St. Petersburg or Orlando airports. Further, the time needed to board an air taxi is measured in minutes, compared to hours at primary commercial airports. Parking at regional and community airports is not the problem as it is often is at busy airports. For business people who place a premium on their time, this can represent an important choice factor.

Further, air taxi provides significant advantages over automobile travel. The 480 mile drive from Miami, Florida, to Tallahassee takes a minimum of seven hours,⁵⁵ precluding the possibility of a single day meeting. In contrast, the time required to travel by air taxi is just over an hour. The savings from being able to conduct business in a single day includes not only the regained productivity, but also the avoided hotel and other travel costs.

⁵⁵ Source: Mapquest

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Other important factors may lead business travelers to select an air taxi in place of a commercial airline. Air taxis, since they operate on-demand as opposed to a fixed schedule, can provide travel times that meet travelers' needs. This can further enhance their value to time-conscious travelers. In addition, air taxis offer point to point service without the need to fly first to hub airports. This eliminates possible plane changes that bring the risk of missed connections and misplaced baggage. Finally, regional and community airports might be closer to a business traveler's ultimate destination. This further reduces the time spent traveling. Whether or not air taxis will be successful, however, depends on a number of factors, discussed later in this report.

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Research Environment

Lakeland is a city in Polk County, Florida, located approximately 35 miles east of Tampa and 55 miles southwest of Orlando along Interstate I-4. Neighboring communities include Polk City, Winter Haven, Bartow, Mulberry, and Dover. The city is home to Florida Southern College and Polk Community College.⁵⁶ The city has a population of 100,502,⁵⁷ ranking as the 21st most populous city in Florida.⁵⁸ When accounting for the metropolitan area that includes Winter Haven, Lakeland ranked ninth. The mean household income is \$50,508, and the median household income is \$37,870. The per capita income is \$21,705.

Management, professional and related occupations account for over 33 percent of employment for workers 16 years of age and older. Sales and office occupations account for almost 29 percent of employment for that group. The largest industry sector is Education Service and HealthCare/Social Assistance, accounting for over 23 percent of employment, more than twice as much as any other sector. Government jobs account for about 12 percent of employment. Of persons 25 years of age and older, 83.2 percent have at least a high school diploma. Over 20% have a bachelor's degree or higher.

Area residents are served by Lakeland-Linder Airport (see Figure 1), a publicly-owned, public-use regional airport located approximately five miles from the Lakeland central business district. The airport has two runways: 9/27 that is 8,500 feet long and 5/23 that is 5,000 feet long. Runway 5 has a precision instrument landing approach (ILS). All runways have a GPS (Global Positioning Satellite) approach. The Lakeland-Linder Airport control tower is staffed 16 hours

⁵⁶ <http://www.citytowninfo.com/places/florida/lakeland>

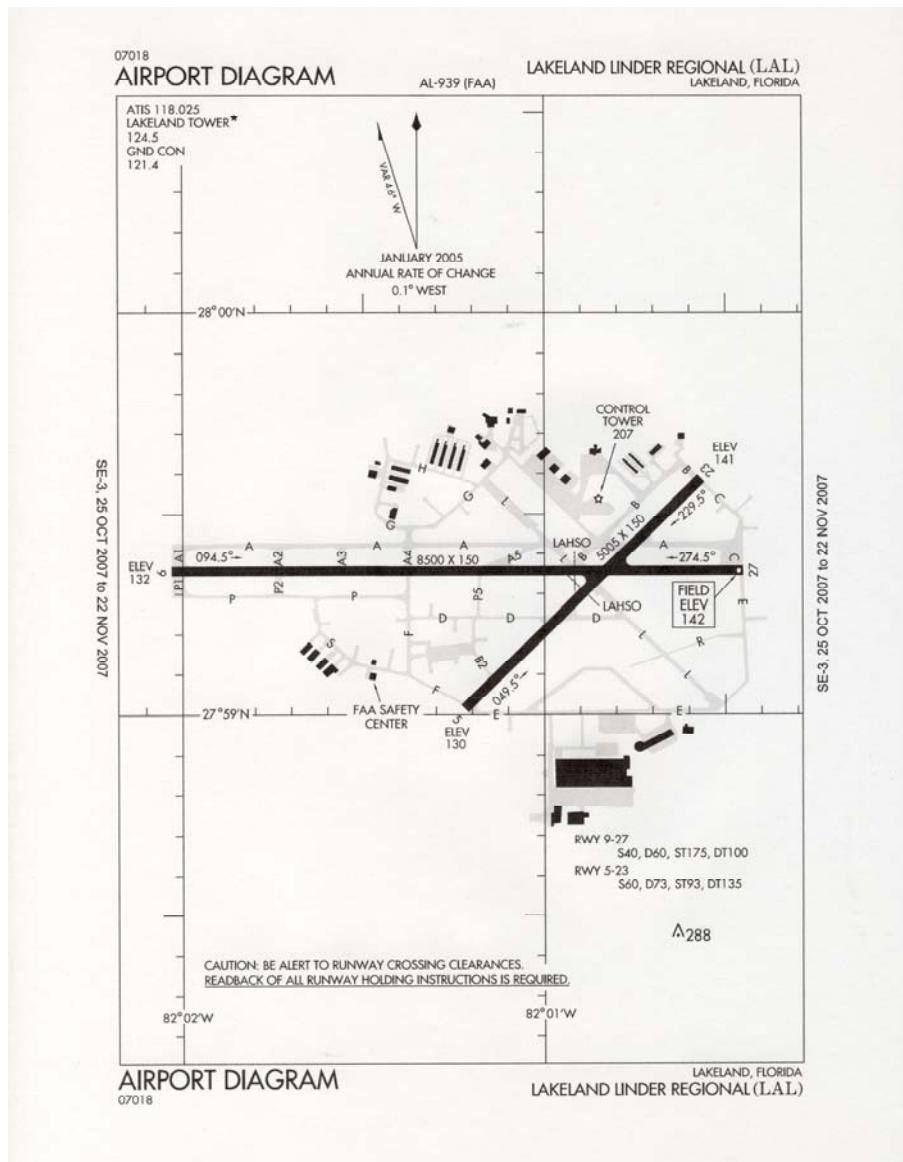
⁵⁷ U.S. Census Bureau, 2006

⁵⁸ <http://www.stateofflorida.com>

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per day. Aviation gas and jet fuel are both available. Lakeland-Linder does not have any scheduled commercial service – area residents who need to travel by air must first drive to Tampa International Airport or Orlando International Airport.

Figure 1: Lakeland-Linder Airport Diagram



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Lakeland hosts Florida's largest convention – the Sun'n Fun EAA Fly-In – which brings 300,000 visitors and contributes over \$25 million to the economy each year, while involving nearly 3,000 volunteers and 20 service organizations. Lakeland also offers a wealth of artistic and cultural attractions, some of which are listed here:

- Florida Southern College Frank Lloyd Wright Architecture & Visitors Center: Home to the largest single-site collection of Frank Lloyd Wright architecture, the College offers a wealth of information about the famous architect, including a permanent exhibition of his photos, drawings, and correspondence.
- Florida Air Museum at Sun 'n Fun: Among the exhibits are personal artifacts from legendary aviator Howard Hughes and "Sweetie Face", the famous aircraft of aerobatic legend Bob Hoover.
- Florida Dance Theatre: Polk County's only professional dance company and one of Central Florida's most innovative forces in contemporary dance.
- Polk Theatre: A restored facility originally built in 1927 as a vaudeville and movie house.
- Exploration's V Children's Museum: Three floors of hands-on exhibits for kids and families.
- Polk Museum of Art: Exhibitions include Contemporary American Art, European Decorative Art, Asian Art, and a permanent display of Pre-Columbian artifacts.
- Imperial Symphony Orchestra
- Pied Piper Players
- Lakeland's Community Theatre

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Methods

The President of the Lakeland Chamber of Commerce identified 16 business people from the Lakeland area as potential participants in the study. All 16 were contacted by telephone to determine first, if they were willing to participate in a series of in person interviews. One person declined to participate; the other 15 were willing to participate contingent upon their schedules allowing it. Two days for in person interviews were allocated, in a conference room provided by the Lakeland Chamber of Commerce at their offices on Lake Morton Drive.

In-person interviews were successfully completed with seven of the identified business people in Lakeland. Due to scheduling conflicts, interviews with two business people were conducted by telephone. Conflicts prevented the completion interviews with the remaining business people, although attempts to complete interviews with them are continuing.

Data was collected using a survey instrument (Attachment 1) that collected information about the respondents air travel preferences as well as their inclination to employ a air taxi service such as DayJet's as alternative to commercial air travel and/or automobile travel. The survey consisted of open-ended questions designed to collect qualitative information, and questions designed to collect quantitative information. The first type of questions were used to allow participants to provide greater depth in their answers and to allow for the development of new questions. The second type of questions was used to allow for statistical measurements of key data elements. These questions were generally constructed using a five point Likert Scale.

An extensive interview was also conducted with the manager of the Lakeland-Linder Airport and two members of his staff. This interview provided insight into the impact that a

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successful air taxi service might have both on the airport and on the region's economy. It also resulted in suggestions about how DayJet might better position its air taxi service

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Findings

The findings are grouped into four categories: current air and automobile travel behavior, air travel factors and needs, air taxi awareness, and the airport management perspective.

Current Air and Automobile Travel Behavior

Air Travel

The average number of airline trips taken by the participants was 24 per year. One participant reported making 52 airline trips in the past year. Another reported that as his business grew, the number of required trips could grow to dozens of flights per month. The typical distance for trips by air ranged from 300 to over 1,000. The average reported trip was 694 miles. All of the participants said they only used coach travel in order to minimize travel costs. The participants reported using commercial airlines the vast majority of the time, although some participants reported having used charter air travel on occasion

In general, participants traveled alone more often than not. The average number of people traveling together was 1.4. No one reported a travel group size larger than three. The number of days spent traveling range from one to four, with the average being just over two days. All of the participants reported a preference for taking early flights. When asked why, answers included “airports are a pain in the ass”, to avoid the backlog, and a desire to maximize the day. While no strong preference for flying on particular days of the week emerged, the tendency was to travel during the middle of the week when road and air congestion was likely to be less a factor. Of those participants that did specify a preferred day of the week to travel, Tuesday, Wednesday and Thursdays were mentioned most often.

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All of the participants reported using their own car for the drive to the airport. The time required for the drive to the airport averaged just less than one hour. The shortest drive (35 minutes) was reported by a participant who lived midway between Lakeland and Tampa. When asked whether road congestion was a factor in their travel plans, participants reported that the possibility of congestion resulted in their decision to take early flights. One participant stated that he only travels between 6:00 a.m. and 7:00 a.m. when there is little road traffic. The participants agreed that road congestion was a meaningful problem when making travel plans. Congestion at Tampa International Airport was not described as a significant problem. Only one participant was concerned about the possibility of delays at the airport; he reported that he planned to arrive at the airport two hours before the flight's scheduled departure time.

The most often reported airport used by the participants was Tampa International Airport. The most frequently reported destinations were Tallahassee and Washington, D.C. A complete list of all reported destination cities is included in Chart 1.

The participants were asked how close an airport needed to be in order for it to be considered convenient. Answers ranged from 30 minutes to two hours, with the average being 76 minutes. One participant noted that being able to take a charter flight from Lakeland-Linder Airport made even a 30 minute drive to Tampa Airport seem inconvenient.⁵⁹

Automobile Travel

Participants were asked what was the longest trip they would make by automobile before considering air travel. The average distance for automobile travel was 191 miles, or about four to

⁵⁹ This has important implications for how DayJet markets its service. It suggests that giving free “demo” flights on a “seat-available” basis might serve as an important tool in generating awareness and interest in the air taxi service.

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five hours depending on the route chose. The maximum car trip was 250 miles, and the minimum reported trip was 150 miles.

Travel Factors and Needs

Why business people travel and what factors cause them to choose one travel mode over another are important questions that any travel provider must answer. This area was probed with a number of questions about why they traveled, and what factors were important to them. The factors and the participants' responses are described here. The first question was open-ended, allowing the participants to answer in their own words. The next eight questions were developed using a Likert Scale where 1 indicated Very Unlikely or Not Important and 5 indicated Very Likely or Very Important. The score for a factor is simply computed as the arithmetic mean of the participants' scores. A summary of the results is shown in Chart 2. This section ends with eight additional open-ended questions

Why Travel?

The need for business people to travel has been well documented in prior research. The Lakeland responses, listed below, parallel those found in previous studies. The reasons given include:

- Need to shake hands
- \$75 million business needs to be “eyeball to eyeball”
- Establishes trust
- In-person carries more weight
- Need to see body language

Price Importance

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Participants were asked about the importance of air fares. The average score for price was 4.2. This is consistent with the participants' decision to purchase coach seats when traveling on commercial airlines.

Time Savings

The importance of time savings scored even higher than price, achieving a score of 4.7. The lowest score given by a participant was 4. The ability to save clients' time is likely to be an important factor in DayJet's marketing.

Scheduling

The importance of convenient flight scheduling scored 4.3, results very similar to the price importance question. The ability of DayJet to arrange for departure times is likely to be a competitive advantage over commercial airlines.

Convenient Departure Airports

Being able to fly from a convenient departure airport was very important to the participants, scoring 4.7 with very little deviation (0.5). This indicates that proximity to a regional or community airport might be a significant factor in DayJet's marketing process.

Convenient Arrival Airports

Having a convenient arrival airport, that is, an airport that is close to the eventual destination, was less important, scoring 4.3

Location Factor

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When asked if having close proximity was an important factor in choosing a location for their business, the participant's responses varied widely. The average score was 2.9, but responses also included "strongly agree" and "strongly disagree." This is consistent with other studies of location decisions that show that other factors, such as the availability of a qualified labor force, rank higher in a firm's location decision-making process.

Air Travel Affects Business

There was general agreement that without the use of air travel, their ability to conduct business would be adversely affected (average score = 3.9).

Air Travel Importance

The importance of air travel to their overall business was rated as important, scoring 4.2.

Factors Leading to More Air Travel

A list of factors possibly leading to greater use of air travel was read to the participants. Each participant was asked if the factor would make him more likely to employ air travel. The most frequently reported factor was direct flights. This is consistent with anecdotal evidence that suggests that needing to make connections at hub airports is a serious detriment to air travel. The number of times each factor was reported is presented in Chart 3.

Factors Leading to Less Air Travel

A list of factors possibly leading to lesser use of air travel was read to the participants. Each participant was asked if the factor would make him less likely to employ air travel. No one factor stood out more than any other did. Notably, some participants said that the need to travel

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outweighed factors such as air fares and delays. The number of times that each factor was reported is presented in Chart 4.

Air Travel Benefits

Participants were asked to list the major benefits of air travel. Every participant except one reported that saving time was the most important benefit. One participant reported that flying allowed him to have the face-to-face contact that was vital to him.

Air Travel Drawbacks

Participants were asked about the drawbacks of air travel. The most frequently mentioned drawback was missed connections, especially when using Atlanta as the connecting airport. Chart 4 shows the complete list of drawbacks reported. The complete list of drawbacks and their frequency is provided in Chart 5.

Value of Time

In order to gain a better perspective on the value of time to business people, the participants were asked what price premium they would pay in order to save travel time. The average premium they expressed a willingness to pay to save one hour of total travel time was just over \$107. For two hours of time savings, participants expressed willingness to pay an average of \$175. For three hours, the premium rose to \$214.

Two possible issues arose during this section. One participant who worked for a county government unit indicated that while he placed a high value on his time, he was bound by county procedures to employ the least cost means of travel, even if meant incurring overnight expenses at a hotel.

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Another participant, an attorney, reported that he billed the customer for his travel time, so there was no particular incentive on his part to save travel time. In this case the beneficiary of reduced travel time was not the travel decision maker.

Flying and Security

Participants were asked if airline security issues that arose in the wake of the 2001 terrorist attack had affected their travel decisions. In general, there was no material impact on their decisions to travel by air, although two participants indicated that they had looked into using automobile travel more.

Air Taxi Adoption

The participants were asked a series of questions about DayJet's air taxi service.

Awareness

Every participant was aware of DayJet's air taxi service. One participant had already become a member.

Interest

All but two participants indicated that they were very likely to use DayJet's service. One participant said that he would use the service if he lived in Lakeland; the other seemed neutral to the service.

When asked why they would or would not use DayJet's air taxi service, the following reasons were given:

- Frequent destinations (Miami, Jacksonville, and Fort Myers) were all within reasonable driving distance

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- Cost analysis needed
- Hard to compete with Airtran
- Does not fly to Florida locations today (but looks forward to expansion of the service into the southeast)

Amenities and Comfort

The participants indicated that the longest trip they would make in an air taxi was, on average, three hours. One participant (who reported that he enjoyed small planes) said that he was fine with a five hour trip. Only one participant indicated that having a restroom on the aircraft was an important consideration.⁶⁰ No one indicated that flying in a relatively small aircraft was a disincentive to using an air taxi service.

Regional Economic Value

When asked about how DayJet's air taxi service affected their perception of Lakeland as a place to do business, all of the participants agreed that having an air taxi service available made Lakeland a much more attractive place in which to do business. One participant said that having DayJet was a great attribute; another noted that their Tallahassee representative was difficult to reach. One participant, however, was still concerned about the price of the service. More than half of the participants reported that having an air taxi nearby made them more likely both to stay in Lakeland and to expand their market area. Three participants indicated that they were more likely to expand their business because of having DayJet nearby.

⁶⁰ All of the participants were men. Whether women would have this same perspective is open to conjecture and might be an area for further research

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Price Comparisons

To obtain more information on willingness to pay, the participants were asked how likely they were to use DayJet's service at prices relative to commercial coach fare. At a price equivalent to coach fare, all of the participants said they were very likely to use DayJet. At 125% of coach fare, the participants were still very likely to use DayJet. At 150% of coach fare, likelihood dropped off, but participants were still likely to use DayJet.

Personal Travel

The prospective use of DayJet was not included in the original set of survey questions, but a question on this issue was added after the participants' apparent distaste for commercial air travel became apparent. All but two of the participants expressed a willingness to employ DayJet for personal travel. The price requirements paralleled the requirement for business travel.

Airport Management Perspectives

The manager of Lakeland-Linder Airport and two key members of his staff were interviewed to obtain additional perspectives on DayJet's service. The key points resulting from the discussion are presented here, grouped in categories representing common themes.

Positive Effects of DayJet's Presence

1. People will eventually want to avoid large airports (especially those who can make choices).
2. Key issues include delays, crowding: stress with decision makers that VLJs are an answer to business travel.
3. High end business travelers may move to air taxi. Airlines become flying buses.
4. DayJet may make making flying easy again.

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5. Are behavioral changes needed? Will people have to try it multiple times? Will needed behavioral change occur quickly enough for DayJet to succeed?
6. DayJet will allow businesses to focus on the area around Lakeland for growth (Tampa and Orlando).
7. Florida Department of Transportation is pushing the use of underutilized airports. The presence of DayJet might stimulate terminal and other infrastructure development.
8. FAA implemented WAAS-LPV approaches for all runways sooner than planned because of DayJet (helped entire airport).
9. What will DayJet do for Lakeland-Linder? There will be little impact to the airport itself. But even if DayJet does not make financial contribution to airport, DayJet will bring other business to the airport. Example: one business person has opened a branch office made possible only by DayJet.

Concerns

1. DayJet's operating from main terminal building at Lakeland. At other airports, DayJet operates from GA FBOs. So the public does not have the mainstream public access to DayJet.
2. Dayjet's needs to show all advantages of using DayJet – time savings, avoidance of lost productivity, avoidance of overnight travel expenses.
3. DayJet needs to prove viability. DayJet needs to get many people to say "we're glad you're here" and to USE the service.

Recommendations for DayJet

1. DayJet needs to convince economic development organizations working with startup firms to include the availability of DayJet in the marketing mix.
2. DayJet should work with Chambers of Commerce to demonstrate the advantages of air taxis. Chambers and Economic Development Councils could be one venue for getting their word out.

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3. Lakeland officials should help DayJet by using DayJet for its official travel – DayJet will help city.
4. Dayjet needs to develop case studies showing how DayJet allows avoidance of overnight hotel, food, rental car/taxi. – actually reducing overall costs. These case studies should go to all government policy makers, especially government officials who make travel policy (e.g., trips to Tallahassee from far enough away to necessitate an overnight trip); these case studies should be on the DayJet website (use NBAA case studies as examples).
5. DayJet should find a large firm who sees the benefit and agrees to use DayJet a lot
6. DayJet should be giving decision makers demo (or at least reduced costs) flights to Tallahassee and back.

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Analysis

The business people interviewed during this project had strongly positive impressions of DayJet's air taxi service. Overall, the value of time savings was seen as more important than price. Indeed, the research participants expressed willingness to pay a significant premium above current airline coach airfares to achieve the gains in productivity made possible by air taxi service. Contributing to this willingness are the increasing disamenities associated with commercial air travel. The adoption by most of the major airlines of a hub and spoke route topology has resulted in a decrease in the number of direct flights available. When combined with the inconveniences associated with post 9/11 security requirements, the oft-mentioned "hassle factor" becomes an important issue for business travelers. Finally, the congestion-caused delays and hence lack of predictability of commercial airline travel become important considerations for business travelers, especially when the reason for the travel is to conduct important business.

There are two keys to DayJet's success. The first is achieving awareness and interest in target markets. This includes being able to influence the travel mode decision makers who might not travel themselves. The participants in this study were themselves responsible for their travel choices (with the one exception noted). In many cases, however, the people who might benefit, such as sales executives, engineers, and other senior manager, are not the travel mode decision makers. DayJet must be able to create awareness among corporate travel planners as well as with travelers themselves.

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As DayJet expands its service, more aircraft will be required, increasing its capital expense. It is important, therefore, to achieve not only awareness, but also actual adoption of the service by enough customers to achieve the cash flow from operations needed to cover both day to day operations as well as capital expenses.

The second key to DayJet's success is successfully demonstrating the ability to meet agreed upon departure and arrival times while maintaining a seat load factor that results in profitability. Some participants stated that they wanted to see how DayJet's service matched its promises. The complex positioning model developed by DayJet must meet the challenges created by expanding service into additional areas. The possible combinations of point to point routes increase as a function of the square of the airports served, placing demands not only on the business model, but also on pilots and maintenance staff.

A further challenge for DayJet concerns three aspects of its pricing model. The existing model for non-commercial air travel is the air charter in which a client pays for the entire airplane, and pricing is based on the total aircraft's operational costs. DayJet has selected a "per seat" model in which the aircraft is shared by 3-4 passengers. It is possible, therefore, that a flight might take place with only one revenue-paying passenger. While DayJet's business model has the potential to minimize this problem, it remains a concern, especially as service is expanded.

Second, since the pricing of the service depends essentially on a dynamic negotiation between the client and DayJet – involving required arrival times and acceptable departure times – no one price between two destinations can be predicted. This seems to preclude the advertising

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of prices on internet services such as Travelocity, Orbitz, and Expedia. This may place DayJet at a competitive disadvantage to other low cost carriers.

Lastly, the current flight planning process does not provide flight time information to a customer until the night before the flight. This could potentially deter some users from using the service.

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Conclusions

1. The time for an air taxi service seems to be right, with public outrage over commercial airline delays reaching the point where it has received presidential attention.
2. DayJet's air taxi service has a promising future, provided they successfully meet the challenges described in this report. The business model seems to provide a basis for financial success
3. While the value of time savings is an important factor in promoting air taxi service, other benefits might be even more important. These include the ability to offer direct flights (especially when they allow avoiding the Atlanta hub airport), avoiding security lines, and being able to depart from a much more convenient airport.
4. Challenges remain:
 - a. the ability of DayJet to maintain a high degree of service reliability as it expands its market area is an open question, considering the increases in complexity of its routing and aircraft positioning algorithms as the number of served airports increases
 - b. establishing awareness within the decision-making community is key to achieving the density of users needed to maintain a high seat load factor.

Some Personal Observations

Before meeting with the Lakeland-Linder Airport management team, I noticed a DayJet counter in the terminal building. It was unattended. If I had been a potential traveler wanting to obtain information on DayJet, I would have been disappointed. After I had lunch at the terminal restaurant, I visited the counter again. A young lady was seated behind the counter. When I asked about the airfare from Lakeland to Tallahassee, she was unable to provide me with the information, suggesting that I go onto the DayJet website. After my meeting with airport management, I revisited the DayJet counter, this time staffed by a gentleman who was able to provide me with price quotes for a flight from Lakeland to Tallahassee, although even he

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expressed some surprise that I didn't get pricing information from the web site.⁶¹ The advantage of having a counter in the terminal building should not underestimated, since it represents an obvious way to increase awareness among fliers who might be currently employing higher priced charter service. If this advantage is to be realized, however, all counters must be staffed with people who are capable of providing pricing information quickly and accurately.

⁶¹ When attempting to obtain pricing information after I arrived back home, I was initially unable to obtain pricing information. This difficulty was eventually traced to my use of my AOL browser. Supported browsers were not listed on the web site, and this might result in customer dissatisfaction.

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Recommendations

Based on the information collected during this project, it is possible to make the following recommendations.

1. Make available reduced cost flights to corporate decision makers to make the time-saving benefits of air taxi tangible. As one participant in the research noted, one flight from Lakeland made having to drive to Tampa seem extremely inconvenient.
2. Target marketing to those firms located in areas around regional airports without commercial airline service, increasing awareness among the potential users most likely benefit the most from air taxi service.
3. Contact local Chambers of Commerce in municipalities with airports directly, providing them with material on how the availability of air taxi service enhances the region as a place in which to locate a business.
4. Include on the DayJet web site case studies showing how businesses that have actually used the service have benefited. The total cost savings – overnight hotel costs, meal costs, and so on – need to be made explicit.

Examples include:

- a. <http://web.nbaa.org/public/news/stats/AndersenPart02.PDF>
- b. <http://web.nbaa.org/public/ops/adm/travelsense/reports/trip.HTM>

Lakeland Florida Air Taxi Feasibility – A Preliminary Assessment

Charts

Chart 1: Frequently Mentioned Destinations

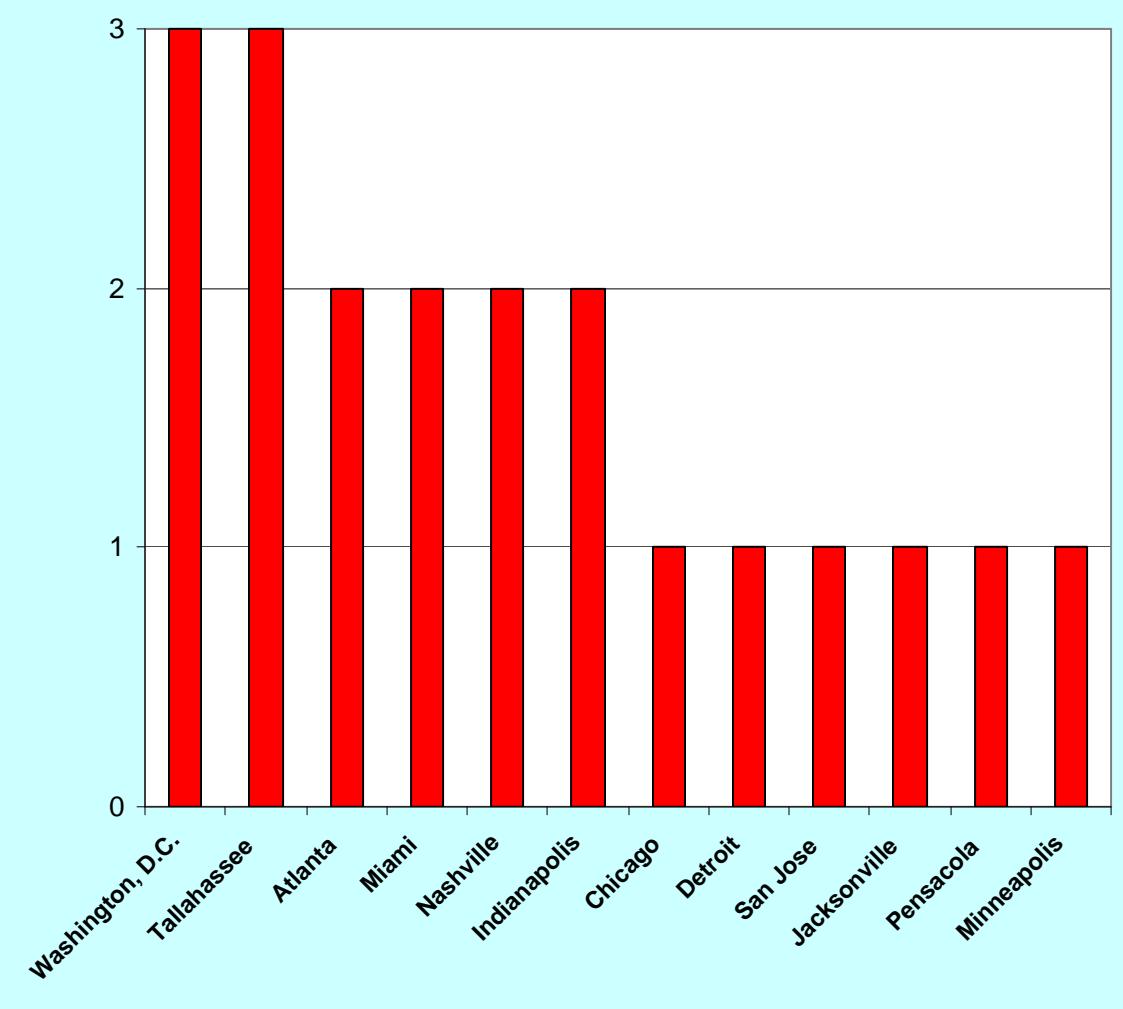
Chart 2: Relative Importance of Factors in Air Travel

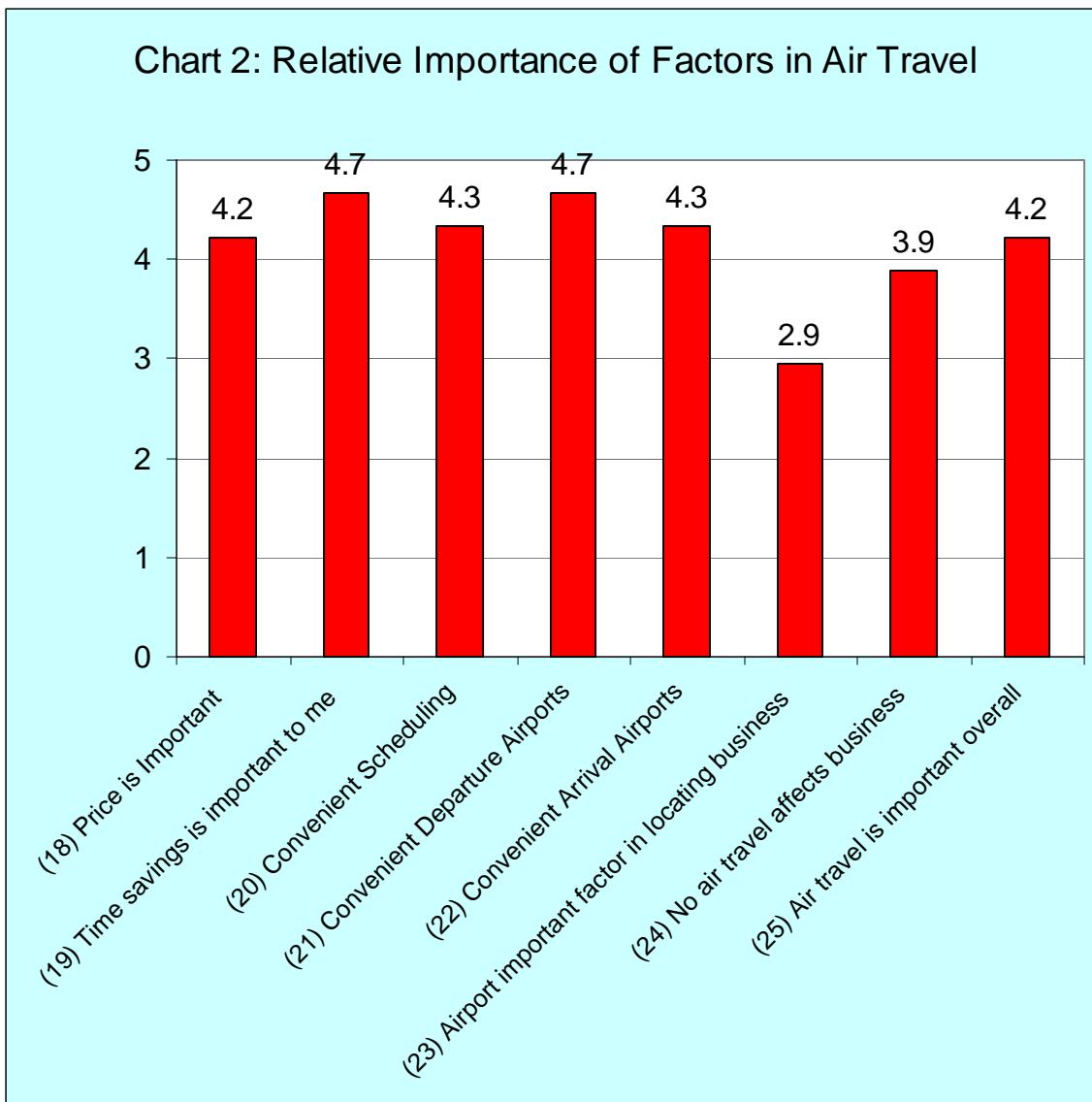
Chart 3: Factors Leading to Greater Use of Air Travel

Chart 4: Factors Leading to Less Air Travel

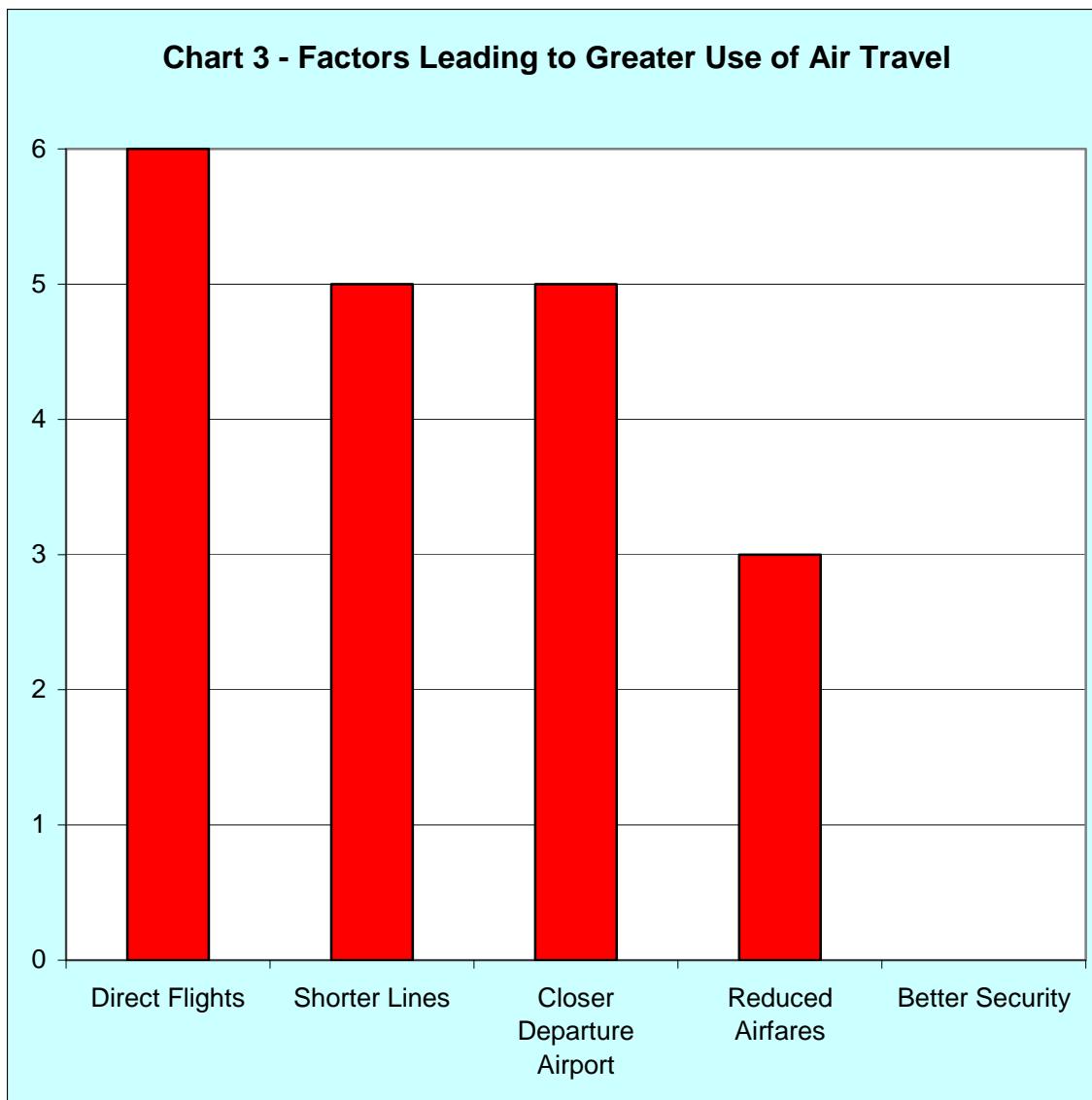
Chart 5: The Worst Aspects of Air Travel

Chart 1: Frequently Mentioned Destinations

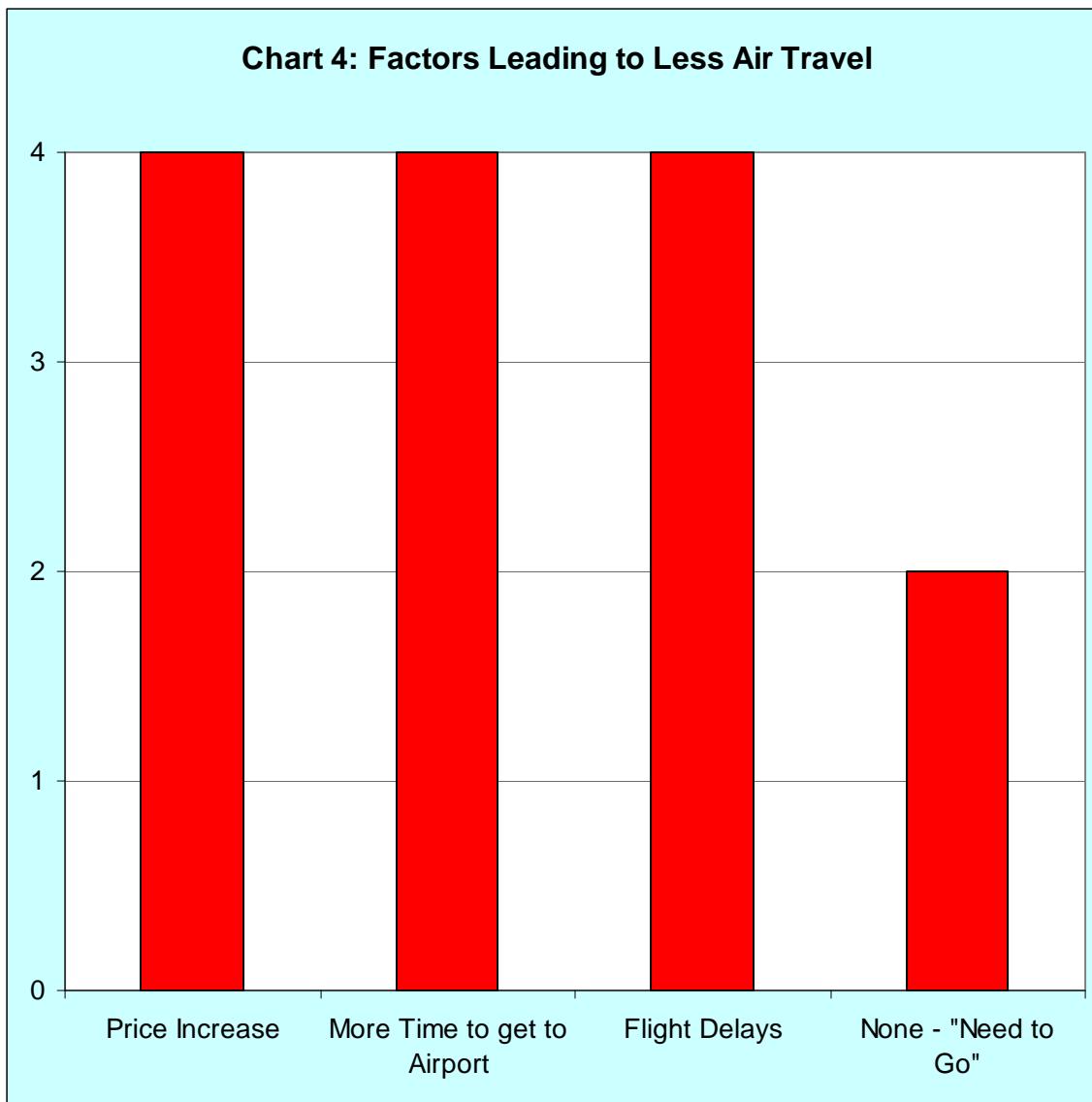


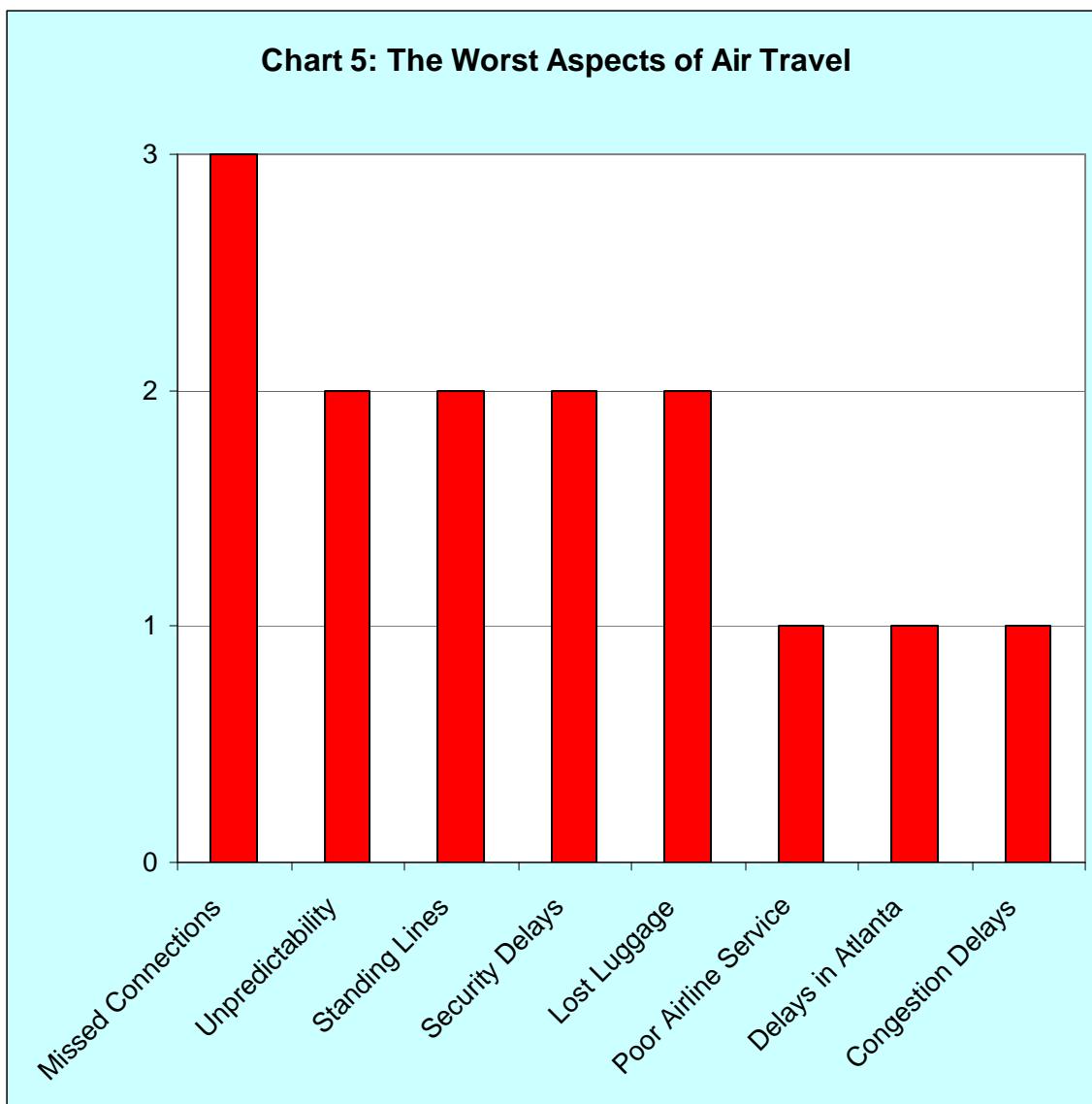


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Appendix 1 – Survey Instrument

The survey instrument used on this project begins next page.

DayJet Research Survey Instrument

Travel Patterns Today

1. How frequently do you and your firm's employees travel on business?
 times per day
 times per week
 times per month
 times per year

2. What is the average percentage of trips by travel mode?
 % Car
 % Rail
 % Bus
 % Air

3. What is the average percentage of trips by travel distance?
 % 0-100 miles
 % 101-250 miles
 % 251-500 miles
 % 501-1000 miles
 % 1001+ miles

4. When traveling on business, how many employees typically travel at the same time to the same destination?

5. How long are typical trips in days?

6. On what days is travel typically conducted?

 _____ No particular days

7. What is your preferred time to travel?

 Morning Afternoon Evening No Preference

8. What is the longest trip by automobile or other ground mode you would make before considering air travel?

 _____ hours / miles

DayJet Research Survey Instrument

AIR TRAVEL PREFERENCES

9. When you or your employees travel by air, what is the percentage of travel by type of air carrier?

- % Commercial airline
 % Charter
 % Corporate owned aircraft
 % Shared corporate aircraft
 % Other (specify)

10. When you travel by commercial airlines, what is your preferred seating class?

- Coach
 Business Class
 First Class

11. How do employees get to the airport?

- Own car
 Bus
 Taxi
 Limo
 Other (specify: _____)

12. How long do employees spend getting to a flight (leaving home/office to scheduled departure time)?

13. How important a problem is road congestion getting to the airport?

- Very Important
 Somewhat important
 Not Very Important

14. Which airports do you or your employees usually fly from?

15. Do you have any particular destinations that are flown to more frequently than others?

16. How close would an airport have to be to your home or office for you to consider it to be convenient?

DayJet Research Survey Instrument

17. What are your reasons for traveling on business instead of using other business meeting processes such as telephone, videoconferencing, web-conferencing?

Please let me know how much you agree with the following statements:

18. Price is important to me:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
----------------	-------	----------------------------	----------	-------------------

19. Time savings is important to me:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
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20. Convenient scheduling is important to me:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
----------------	-------	----------------------------	----------	-------------------

21. Convenient departure locations is important to me:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
----------------	-------	----------------------------	----------	-------------------

22. Convenient arrival locations is important to me:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
----------------	-------	----------------------------	----------	-------------------

23. Convenient access is an important factor in locating my business

Strongly	Agree	Neither Agree	Disagree	Strongly
----------	-------	---------------	----------	----------

DayJet Research Survey Instrument

Agree

Nor Disagree

Disagree

24. Not being able to travel by air affects my business

Strongly
Agree

Agree

Neither Agree
Nor Disagree

Disagree

Strongly
Disagree

25. Overall, air travel is very important to my firm

Strongly
Agree

Agree

Neither Agree
Nor Disagree

Disagree

Strongly
Disagree

26. What factors would make you use air travel more?

- _____ Price decrease
- _____ Ability to travel from closer airport
- _____ Shorter check-in and security lines
- _____ Better security
- _____ Direct flights
- _____ Closer airport
- _____ Other _____
- _____ Other _____

27. What factors would make you use air travel less?

- _____ Price increase
- _____ Increased time to get to the airport
- _____ Flight delays
- _____ Other _____
- _____ Other _____

28. What do you see as the benefits of air travel?

29. What are the worst things about air travel?

30. How much more would you pay for an air travel ticket to save one hour of total travel time?

\$_____

31. How much more would you pay for an air travel ticket to save two hours of total travel time?

\$_____

DayJet Research Survey Instrument

32. How much more would you pay for an air travel ticket to save three hours of total travel time?

\$ _____

33. Has your firm's air travel changed since 2001?

No Change Very Little A Great Deal

34. If your firm's air travel did change since 2001, what are the reasons?

Concern about safety Delays Inconvenience

Other:

35. Have you sought alternatives to air travel since 2001? YES
NO

If yes, what are they:

AIR TAXI SECTION

36. Would being able to travel from Lakeland Airport increase your use of air travel?

Very Likely Likely Possibly Unlikely Very Unlikely

If no, why not?

If no, explain: Air taxi service employs a newly developed type of turbine powered aircraft. They hold 4 to 6 people, and can take off and land at smaller airports than those used by commercial airlines. For example, they would be able to use Lakeland Airport instead of Tampa Airport or Orlando Airport, and they would be able to travel to airports up to 1,000 miles away. [show pictures]

38. If you were able to travel from Lakeland Airport instead of having to travel to Tampa Airport or Orlando Airport, would you consider using air taxi service?

DayJet Research Survey Instrument

Very Likely Likely Possible Unlikely Very Unlikely

If no, why not?

39. What is the longest trip you might consider making in an air taxi?

- 1 hour (about 300 miles)
- 2 hours (about 600 miles)
- 3 hours (about 900 miles)

40. How would being able to travel from an airport such as Lakeland Airport using an air taxi service affect your perception of Lakeland as a place to do business?

- It makes Lakeland much more attractive
- It makes Lakeland somewhat more attractive
- It does not make a difference

41. How would being able to travel from Lakeland Airport using an air taxi service affect your business operations? Please choose one or more from the following:

- More likely to stay in Lakeland
- More likely to expand business (hiring)
- More likely to expand market area
- Would not use air taxi service

42. If you were able to travel from Lakeland Airport instead of having to travel to Tampa Airport or Orlando Airport, how likely do you think you would be to use air taxi service? Please answer considering the following sample fares:

a. Same as Coach fare

Very Likely Likely Possible Unlikely Very Unlikely

b. 25 % more than Coach fare:

Very Likely Likely Possible Unlikely Very Unlikely

c. Same as Business Class fare:

Very Likely Likely Possible Unlikely Very Unlikely

DayJet Research Survey Instrument

d. 25 % more than Business Class:

Very Likely Likely Possible Unlikely Very Unlikely

e. Same as First Class fare:

Very Likely Likely Possible Unlikely Very Unlikely

f. 25 % more than First Class

Very Likely Likely Possible Unlikely Very Unlikely

DEMOGRAPHIC INFORMATION

43. How many people does your firm employ? _____

44. How many locations does your firms have? _____

45. What is your firm's total annual payroll? \$_____

46. Does your firm have a parent firm? Yes No

If yes, where is it located?

47. How long has your firm been established?

_____ year

Part 3: Paradigms for Aviation Policy Formation

PART 3 – Paradigms for Aviation Policy Formation

The Evolution of Aviation Policy

In this part, I turn to the problem of aviation policy formation. The chapter addresses the difficulties in policy formation, especially when the process employed by policymakers does not address issues critical to the group or groups most affected by the new policy. The term “aviation policy”, of course, is overly broad and it is difficult to draw conclusions when there are so many divergent areas, each of which has proponents that might claim that it is the most important issue needing attention. Just a few of the important policy areas include environmental policy, government regulation and finance. Security policy, however, is one that has gained significant importance over the past ten years and that provides some key examples of how national policy is made, or not made is the approach is wrong. In this chapter I examine three attempts to formulate and implement policy changes, using frameworks developed by political scientists to help explain the success or failure of each of the attempts.

First, I will discuss a successful policy change – the federalization of airport passenger screeners. Prior to 2001, airport passenger screening was a function delegated to the commercial airlines. Each airline hired its own workers and developed its own processes for training and evaluating the people who checked airline passengers for potential weapons. Subsequent to the terrorist attacks of 2001, Congress passed legislation making passenger screening the responsibility of the federal government.

Next, I will address a failure of policy change – the unsuccessful attempt to introduce an intrusive passenger pre-screening program named Computer Assisted Passenger Prescreening System II – CAPPSS-II. This program was an attempt to change the focus from objects that passengers might be carrying to the passengers themselves. CAPPSS-II was an attempt to create a

Part 3: Paradigms for Aviation Policy Formation

passenger profile of likely terrorists by using a broad array of personal information and comparing the information to the profiles of known terrorists.

Policy Success: The Federalization of Airline Security Workers

In response to the terrorist attacks of September 11th, 2001, Congress passed, and President George W. Bush signed, the Aviation and Transportation Security Act (P.L. 107-71). The Act dramatically changed the way that the nation administered security over air, land, and maritime transportation services. The most visible changes, and the ones that have most directly affected U.S. citizens, are in the area of airline security. For the first time in United States history, Congress transferred responsibility for airline security from the Federal Aviation Administration (FAA) to the newly-created Transportation Security Administration (TSA). The most controversial aspect of the Aviation and Transportation Security Act was federalizing airport security workers. At first glance, one might conclude that this last change was a hasty response to the catastrophic events of September 11, 2001, especially if one remembers the allegations of inept security work performed by the company in charge of airport security at the airports used by the September 11th hijackers. Closer examination of the record reveals instead that federalizing aviation security workers is a classic example of the agenda-setting process postulated by political scientist John Kingdon.

The Kingdon Framework

The framework for governmental agenda-setting posited by political scientist John W. Kingdon (1984) consists of the interaction between problems, politics, and the participants in the agenda-setting process, resulting in a stream of policy alternatives (Figure 1). Problems rise and fall in relative importance, often as a result of focusing events such as natural catastrophes, although sometimes issues can be placed on the agenda because of societal indicators (the

Part 3: Paradigms for Aviation Policy Formation

unemployment rate) or feedback from a growing number of constituents (input from senior citizens on the high cost of prescription drugs). Politics affects whether or not problems can reach the policy stream, especially when the likely solution to a particular problem runs contrary to the fundamental values of the party in power. Finally, the visible participants, such as members of Congress, affect the policy stream by the very nature of their positions in government – legislation must be explicitly sponsored by a member of Congress for it to be discussed, either in committee or on the Senate or House floor. The policy stream, therefore, is a result of very dynamic forces, often pulling in different directions.

Kingdon sees this policy stream as a mix of policy alternatives, floating around in suspension until conditions are right, i.e., a focusing event opens a window of opportunity in which policy entrepreneurs can gain consensus for placing a policy on the political agenda. In the case of federalizing airport security workers, we will see an evolving problem stream and set of political forces working together with the participants to create a policy stream that included components of the eventual Aviation and Transportation Security Act of 2001 (Figure 2). Yet even after the window of opportunity had been opened by the terrorist attacks of September 11, 2001, it still took weeks for policy entrepreneur Senator Ernest Hollings (D-SC), who had previously pushed for airport security worker federalization, to push through a compromise solution that achieved his goal.

Kingdon Framework in Action

The problem of airline terrorism (Kingdon's "problem stream") had grown steadily since the early 1970s. For example, aviation crime changed from being hijackings solely for the purpose of escaping from (or sometimes even fleeing towards) a particular regime to crimes involving violent hostage taking and sabotage. Responses (Kingdon's "policy stream") were

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developed well before 2001. Most of the changes involved technology such as bomb-sniffing devices. As early as 1990, however, Congress questioned the FAA's role in overseeing aviation security. Transferring the responsibility for airline security away from the individual airlines and airports first entered the political agenda. Airline executives and others, however, were able to thwart any Congressional effort to federalize airline security by appealing to politicians (part of Kingdon's "political stream") with strongly worded concerns about the cost of implementing the measures.⁶² Furthermore, concerns about the role and the size of the federal government kept the federalization of airline security off the top of the political agenda. Even though a 1996 commission chaired by Vice- President Al Gore recommended significant changes to airline security, airlines implemented only incremental changes to security protocols.

The terrorist attacks of September 11, 2001, (Kingdon's "focusing event") created a window of opportunity during which policy entrepreneurs Senator Ernest Hollings (D-SC) and John McCain (R-AZ) were able to use heightened public concerns about security to overwhelm any political objections, place the federalization of airline security workers not only into the policy stream, but on the top of the political agenda, and obtain quick (for Congress) Congressional acceptance.

The Evolution of Aviation Terrorism – The Problem Stream

The first recorded hijacking of an aircraft took place in 1931, when Peruvian revolutionaries hijacked an aircraft for the purpose of distributing propaganda leaflets. The second hijacking occurred two days later for the same purpose. The next recorded hijacking did not occur until 1948 when five men and women hijacked a Czechoslovakian commercial flight, diverted it to Munich, Germany, and sought asylum (Choi, 1994, 12). In spite of the rapid rise in

⁶² Note that prior to the passage of the Aviation and Transportation Security Act, the airlines were totally responsible for cost of providing security at airline terminals.

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air travel that occurred over the next decade, few aircraft hijackings took place, as illustrated in Table 1.

Motives for airliner hijackings changed in the 1960s. Political expression, political terrorism, and extortion emerged as the major reasons for hijackings. Hijackings to either escape from Cuba, or to return to Cuba, most of them successful, reached a peak in 1968. In 1969, members of the Popular Front for the Liberation of Palestine added political terrorism as a motive for hijacking when they hijacked an America airliner on its way to Syria. Extortion was added to the list of hijacking motives when a hijacker demanded and received over \$200,000 from an American airline company then escaped by parachuting out of the aircraft (Sweet 2002, 29)

In the 1970s, however, violence associated with hijackings increased. In 1972, for example, three wanted criminals hijacked a Southern Airways airliner and threatened to crash it into the Oak Ridge atomic facility if their demands were not met (Choi 1994, 25). Yet even with this increase in possible violence associated with hijackings, there were no hijackings in which the primary motive of the hijacker included causing the death of anyone else. As a result, the major strategy for dealing with most aircraft hijackers was one of negotiations, with safety of the crew and passengers being paramount.

The nature of hijackings continued to evolve in the mid-1970s and 1980s as airline bombings began to account for more of the terrorist incidents, and hijacking evolved into the weapon of persons acting for political reasons (Evans 1973, 644). Between 1975 and 1989 over 1,300 people died in 40 separate airline bombings (Choi 1994, 8).

Aviation Security Literature

Part 3: Paradigms for Aviation Policy Formation

The bulk of aviation security literature prior to 2001 focused on the risks posed by people who either sought to hijack a commercial aircraft for political, financial or other personal reasons, or to cause the destruction of the aircraft through the use of explosives, typically bombs hidden within checked luggage. Evans' (1973) study of airline hijacking is typical of the type of research conducted into aviation security in the decades prior to 2001. In it, she reports that from 1961 through 1968, 66 aircraft of United State or foreign registration were hijacked (p. 641). Hijackings escalated during the next three years, with the hijacking figure rising to 277. This was followed with a sharp decline in 1973, with no U.S. airliners hijacked and only nine aircraft of foreign registration.

Evans observes the difficulty is collecting valid statistics on hijacking. Is a hijacking considered successful if the aircraft is successfully diverted to an airport of the hijacker's choosing, but then the hijacker is apprehended upon landing? For purposes of her study, Evans creates five categories (p. 641-642):

- Successful international, where an aircraft is diverted to a foreign destination from its intended domestic or international destination;
- Successful domestic, where an aircraft is diverted to a different airport within the same country;
- Unsuccessful international, where an attempt to divert an aircraft to a foreign destination was thwarted by air crew or passengers;
- Unsuccessful domestic; where an attempt to divert an aircraft to a different destination within the same country was thwarted by air crew or passengers; and
- Attempts to seize control of an aircraft before it has departed.

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Evans discovers that the United States has been the primary victim of hijackers, with 157 successful hijackings between 1961 and 1972 out of a worldwide total of 343 successful hijackings. The proximity of Cuba to the United States explains virtually all of the U.S. hijackings, with the island nation being the ultimate destination for 149 hijacked flights (p. 643). In fact, the offense was treated by the international community as a largely U.S. problem resulting from the strained relations between the U.S. and Cuba. It was not until 1969 that the number of hijackings committed abroad exceeded those committed in the U.S.

Evans notes that during this period, both the nature of the offense, and the international response to hijacking, evolved. Hijacking had been committed primarily for what Evans describes as “personal” or “private” reasons, by a fugitive from justice, a military deserter, a disgruntled spouse, a homesick refugee, and so on. Starting around 1968, the motives behind hijacking shifted to “public” and “political” ones. Evans provides numerous examples in which a political group such as the Popular Front for the Liberation of Palestine hijacked an aircraft to achieve political ends, such as the release of terrorists⁶³ from jail in exchange for the safe release of passengers. From 1968 to 1972, the PFLP was responsible for 16 successful and unsuccessful hijackings.

Another example of the evolution of hijacking motives is hijacking for extortion of money. In the three year period 1970-1972, 22 hijackings appeared to have no connection to political considerations, but instead to financial gain by the hijackers. Demands for ransom ranged from \$50,000 to \$2,000,000. This strategy for financial gain was less than successful, however. Eight of the hijackers asked for parachutes to make their escape. Of these, seven were

⁶³ The term terrorist was not commonly used during this period. Members of groups such as Fatah were more often referred to as “guerrillas.”

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captured with their booty. In 18 of the 22 hijackings, authorities captured or killed the hijacker. In only two cases did the hijackers escape with their loot.

Evans notes that this early period in the research is marked by changes in governmental responses to hijacking. Under pressure from the International Federation of Airline Pilots Associations, the 1970 Convention for the Suppression of Unlawful Seizure of Aircraft (Hague Convention) was rapidly concluded and accepted. Some U.S. airlines instituted electronic surveillance, and the U.S. initiated the federal “sky marshall” program. Screening of all passengers and cabin luggage became mandatory, and the U.S. government ordered airports to provide armed guard at all boarding gates by early 1973.

Consistent throughout Evans’ study is the desire of the hijacker to survive the event. Whether the goal is to simply reach another country, escape with ransom, or force the release of prisoners, there is no evidence that hijackers had any wish to intentionally sacrifice their lives for their cause. In spite of the increasing violence associated with hijackings (largely due to governments’ responses to demands there were deemed too excessive, mostly in terms of the precedent they would set, especially when it came to the release of dangerous prisoners).

By 1988, researchers placed skyjackings into the same category as explicit terrorist incidents. Cauley and Im (1988) analyze the intervention policies enacted by governments and look at skyjacking within the overall context of international terrorism, considering skyjacking just one tactic that a terrorist might employ. They conclude that the deployment of metal detectors in 1973, accompanied by the electronic screening of passengers and carry-on luggage significantly reduced the number of skyjackings, but the total number of terrorist events increased. The authors suggest that as terrorists found airliners to be harder targets, they turned their sights (figuratively and literally) elsewhere. What is not clear is whether society is better off

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with fewer hijackings but more non-hijacking events. The authors conclude that in order to reduce terrorist activity overall, it is necessary to increase simultaneously the marginal cost of committing all modes of terrorism.

Just two years later, aviation security still had barely reached the attention of Congress. The General Accounting Office⁶⁴ convened a conference (GAO 1990) in November 1990 at which aviation security was one of many components. Organization and management issues, air traffic management capacity, and consumer protection were equally placed on the GAO's agenda. The authors note that while the government made significant improvements since the passage of the Aviation Security Improvement Act of 1990 (P.L. 101-604), weaknesses continued to exist. Specifically, better measures to detect explosives were required, and security over cargo and mail needed to be improved. The report notes plans to require the deployment of thermal-neutron analysis (TNA) machines at major airports to improve the explosives detection rate.

Security, however, seemed almost an afterthought to most conference participants. Even on the panel in which aviation security was discussed, attention was shared with airport capacity issues. Of the four speakers on the Airport Capacity and Security Panel, one speaker did not address security at all and a second only asked that money spent on security be spent wisely.

The primary concern of the two panelists who did address security continued to be bombs placed aboard airliners, not suicidal hijackers. For example, the bomb that exploded and destroyed Pan Am Flight 103 over Scotland continued to be a major driving force in determining aviation security policy.. Captain David Haase of the Air Line Pilots Association addressed security issues only after he had discussed flight safety and airport capacity issues (p. 73). His concerns centered on the ability of TNA machines to detect small amounts of explosives and

⁶⁴ The GAO was renamed the Government Accountability Office.

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matching passengers with bags. Admiral Clyde Robbins, Director, Office of Intelligence and Security, Department of Transportation, expressed concern about the level of attention that aviation security received, saying “As we all know, it is always easy to say in hindsight that security should receive a higher priority within FAA and DOT. But until somebody really cares about it, it is hard to move it up a level of attention” (p 75). His words would prove prophetic. Still, his focus, as was that of others, was on explosive devices placed in passenger luggage. He noted that overseas carriers improved their bag matching procedures on domestic flights, but the improvement was still needed (p. 76).

The GAO continued to study aviation security in the years that followed. In 1998, GAO reported on the implementation of 31 recommendations made by the White House Commission on Aviation Safety and Security⁶⁵ in part to counter the growing threat of terrorist activity within the United States (GAO 1998). Of the 31 recommendations made to address aviation security, progress was made in few of them. Of the three recommendations scheduled to be completed, only one had been by the end 1997 (Table 1).

Table 1 – Security Objectives

Security Initiative	Status
Give properly cleared air carrier and airport security personnel access to classified information they need to know	Complete
Establish procedures to identify passengers before boarding	Incomplete
Establish a volunteer partnership between airports and air carrier officials and law enforcement agencies	Incomplete

Of five other recommendations that were contained in the White House Commission and were similar to mandates contained in the Federal Aviation Reauthorization Act of 1996 (Table

⁶⁵ Chaired by Vice President Al Gore, the White House Commission on Aviation Safety and Security was established by Executive Order 13015 issued August 22, 1996, after the crash of TWA Flight 800 to look at the changing security threat and how the United States should react to it.

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2), little progress was made. This lack of progress seems to confirm the relatively low level of attention that aviation security received within DOT and FAA. No recent crisis had occurred, and there did not seem to be any urgency behind the recommendations, confirming Admiral Robbins' concerns about the need to raise the priority of aviation security within FAA and DOT. Noting that full implementation of the recommendations will take years, GAO confirms that aviation security remains a relatively low priority within those key agencies.

Two years later, in 2000, GAO released a report focusing on two aspects of aviation security, air traffic control computer systems and airport passenger screening checkpoints (GAO 2000). The GAO reported that “the FAA and the airline industry have made little progress in improving the effectiveness of airport checkpoint screeners. Screeners are not adequately detecting dangerous objects, and long-standing problems affecting screeners’ performance remain, such as the rapid screener turnover and the inattention to screener training” (p. 2). In one joint testing program conducted with another country, U.S. screeners detected half as many test objects as the screeners located overseas.

Table 2 – Security Initiatives

Security Initiative	Status
Initiate a computer-assisted passenger profiling system	Incomplete
Implement explosive detection equipment	Incomplete
Match bags with passengers identified by the profiling system	Incomplete
Implement joint threat and vulnerability assessments	Incomplete
Provide computer-based training for security personal who screen carry-on bags	Incomplete

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GAO reported that screener turnover in many airports exceeded 100 percent, with turnover between May 1998 and April 1999 at one airport reaching 416 percent (Lambert St. Louis International). Complicating efforts to retain experienced screeners was the low pay. At many of the nation's largest airport, screeners were paid the minimum wage. In many cases, wages paid by airport fast food establishments exceeded those paid to checkpoint screeners. GAO found additional factors to which FAA has paid too little attention:

- Individuals aptitude for effectively performing screening duties
- Sufficiency of the training provided to the screeners and how well they comprehend it
- The monotony of the job and the distractions that reduce the screeners' vigilance.

GAO found significant differences in the practices of five other countries – Belgium, France, Canada, the Netherlands and the United Kingdom. In these countries, screening operations, screeners' qualifications, screeners' pay and benefits, and institutional responsibility differed from United States' practices.

The lack of urgency noted in prior reports continues to be a serious problem resulting in delays in implementing procedures intended to improve aviation safety.

The Political Stream

The influence of the airlines, conservatism in Congress, and the attitude of the public towards increased federal responsibility all greatly affected the political stream.

The airline's response to airline terrorism was framed by a number of factors. First, the airlines wanted to avoid creating an environment in which the public felt it was unsafe to fly. Hijacks of American-owned airliners had dropped significantly since 1970 (see Table 2), so it was easy to fall into a trap of complacency. The Atlanta Journal and Constitution, in an editorial

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supporting the federalization of airline security workers, referred to “a national complacency about the danger that could come from hijacked commercial jetliners” (The Atlanta Journal and Constitution, 2001, 22A).

Second, airlines, which traditionally operated on thin profit margins, expressed concern about the additional costs they might have to pay if the salaries of security workers were brought to the level of, for example, U.S. Customs agents who were paid at higher rates than the airlines’ workers. Most of the airlines’ workers manning X-ray machines were paid between \$5.15 (minimum wage) and \$10 per hour (about \$10,000-\$20,000 per year), while U.S. Customs Agents, even at the entry level, were paid a GS-5 level that ranged from \$22,000 to \$28,500 per year (Atlanta Journal and Constitution, 2001, 22A). Thus, costs of security screeners would roughly double, costs that would presumably be recovered through ticket surcharges. The airlines, being extremely price-sensitive, were thus opposed to federalizing security workers.

The airlines also expressed concern about flight delays that might result from increased security. In 1973, Paul Ignatius, Executive Vice President of the Air Transport Association, wrote: “The airlines must be responsible for timely boarding and would lack the necessary control over it if the screening process were operated by government personnel” (“Emergency Antihiijacking Regulations” 1973).

The airlines exercised their political power by making heavy contributions to the Democrat Party in the closing weeks of the 1996 presidential election, and the White House Commission on Airline Security backed away from most of the more stringent security measures initially proposed (Robinson 2001, A1). Paul Hudson, executive director of the Aviation Consumer Action Project, a nonprofit watchdog group, reacted by stating in a subsequent interview, “There is a virtual interlock between the airline industry and the Transportation

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Department and the FAA. The aviation industry spends over \$20 million to get their way. I've never seen a serious instance in which they haven't" (Washington 2001, 16). The effectiveness of the airlines' efforts were also reflected in a statement made in letter sent by Vice President Al Gore to Carol B. Hallet, president of the industry's trade group, the Air Transport Association. "I want to make it very clear that it is not the intent of this administration or of the commission to create a hardship for the air transportation industry or to cause inconvenience to the traveling Public" (Washington, 2001, 16).

It is also important to note the political mindset that existed in the late 1980s and 1990s towards the role of the federal government. The administrations of Presidents Ronald Reagan and George G. W. Bush placed much attention on reducing the size of the federal government and transferring to the private sector as much responsibility as possible (Van Horn 2001, 32-33). The airlines' arguments to retain responsibility for airline security (and thus to control its cost) resonated strongly with conservatives in Congress and the White House. Even President Bill Clinton found it necessary to proceed very cautiously on the subject of expanding the role of the federal government. President Clinton's "Health Security" plan was defeated (at least in part) due to widespread concerns about the role that the federal government and attendant bureaucracy might play.

Further mitigating against increasing the federal government's role was the public attitude. Public trust of governmental institutions and public officials declined significantly during the prior few decades. The percentage of Americans that believed government will do "what's right" (always or most of the time) slid from 80 percent to about 30 percent between 1964 and 1980 (Van Horn 2001, 32).

The Major Participants

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The most prominent participants in the aviation security policy formulation process were found in Congress, in the Federal Aviation Administration, and in the airline industry. Sen. Hollings and Sen. McCain expressed concerns about aviation security well before September 11, 2001. While other members of Congress did speak out on the issue, it was typically only after some extraordinary event such as the Lockerbie Pan Am bombing.

The Federal Aviation Administration now faced the unusual challenge of both being responsible for creating the security regulations that the airline industry would implement and at the same time, being asked to evaluate its own performance. It should not have come as a surprise, therefore, that when asked (as it was in 1990) to determine if major changes were warranted, the FAA recommended no changes. After all, to recommend that aviation security did not meet national requirements would be tantamount to admitting that the FAA was not doing its job.

The airlines were also in a peculiar position. As long as the cost of providing airport security was seen as an airline responsibility, any major changes represented increased cost with no obvious enhancement in their primary objective – increasing revenue. Even when Sen. Hollings suggested federalizing airport security workers, there was no corresponding suggestion that the federal government provide the necessary funding. The airlines were placed into the unenviable position of facing dramatically increased costs for security workers in response to problems not of their own making.

United States Response to Airline Terrorism - The Policy Stream

Until 1950 there was no federal statutory law specifically applicable to crimes committed on board aircraft, and it was not until 1961 that aircraft hijacking was deemed serious enough to be labeled a criminal act (Lissitzyn 1973, p. 306-307). Legislation that amended the Federal

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Aviation Act of 1958 was a hasty response to a series of hijackings of American planes to Cuba. A subsequent increase in hijackings led to new measures enacted in 1968, when the Civil Aeronautics Board authorized carriers to deny transportation to any person who refused to permit a search of his person or luggage (Evans 1973, p648). When the number of sabotage bombings of aircraft peaked in 1970, the federal government recognized airline sabotage as an increasing threat, and the Federal Aviation Administration developed regulations requiring the screening of all persons and carry-on baggage before entering an airport's departure area (Sweet 2002, 101). Congress ordered additional measures in 1973, and airports provided armed guards at all boarding gates (Evans 1973, 649).

During the 1980s, responses to airline terrorism focused on terrorism. On April 26, 1984, President Ronald Reagan sent Congress four separate bills to counter terrorism. One of them, the Aircraft Sabotage Act [S. 2623/H.R. 5690], was in direct response to, as President Reagan put it, "the direct use of instruments of terror by foreign states" (Leich 1984, 915). The Aircraft Sabotage Act was an attempt to implement the provisions of the Montreal Convention for the Suppression of Unlawful Acts Against the Safety of Civil Aviation (which had been ratified by the United States in 1972) by expanding the definitions of acts that would result in penalties. The Aircraft Sabotage Act also expanded jurisdictions of the parties to the Convention. In April, 1989, Senator Robert Byrd (D-WV), speaking in Congress about a potential terrorist attack on the United States, addressed the need to reassess the assignment of responsibility for airline security: "The response to such a concerted attack on our Nation, then, should properly be the domain of the Federal Government. We should not expect the commercial airlines to alone carry the burden of protecting American citizens against essentially political-military attacks on the

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United States" (Byrd 1989, S3432). So as early as 12 years before the attacks of September 11, 2001, the issue of federalizing airline security had entered the policy stream.

It was not until the 1990s, however, that the federal government first seriously studied federalizing responsibility for airline security workers. In August 1990, partially in response to the loss of Pan Am Flight 103 over Lockerbie, Scotland, in 1988, President George Bush established the Commission on Aviation Security and Terrorism. This action resulted in the Aviation Security Improvement Act of 1990 (H.R. 5732) that created the position of Federal Security Manager at domestic high-risk airports. It also set new standards and procedures for the hiring of airport security personnel, but it left the responsibility for hiring airport security personnel to the airlines. The legislation was unanimously passed by Congress and signed by President George G. W. Bush on November 16, 1990 (P.L. 101-164). The Federal Aviation Administration conducted an unpublished study in 1991 evaluating shifting responsibility for airline security from the airlines themselves to airports (Federal Aviation Administration, 53). The report, however, did not recommend any significant organizational changes in how airlines maintained security. In spite of that, however, FAA officials, members of Congress, and the Bush Administration boasted in newspaper articles and on television that the U.S. government had successfully tackled and largely solved the problem of airport security (Felcher 2001, 31).

Concerns about aviation security, however, did not go away. The Aviation Security and Antiterrorism Act of 1996 (H.R. 3953) called for a review of the advisability of transferring responsibilities of air carriers to appropriate entities independent of air carriers. Sen. Hollings reopened the issue of federalizing airport security workers when he said in 1996: "Unless we change the way security is provided, we cannot upgrade it. I am considering whether the FAA should provide the screeners, thereby relieving the air carriers of this responsibility" (Aviation

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Security 1996). In July 1996, President Bill Clinton established a White House Commission on Aviation Safety and Security, charged with looking at airline security after a crash of TWA Flight 800. Although the omission, chaired by Vice President Al Gore, did not recommend any sweeping changes in how responsibilities for airline security were assigned, the final report noted that “The federal government should consider aviation a national security issue” (White House Commission 1997, 27).

The common theme running through the policy stream before September 11, 2001, is one of incrementalism and the maintenance (when politically feasible) of the status quo. This preference for slow change was underscored by the 1998 Study and Report to Congress on Civil Aviation Security Responsibility and Funding which noted, “the study recognizes the incremental increases [italics the author’s] that have taken place and predicts that such increases will continue, perhaps in the field of aviation security training” and “The FAA recommends that there be no change to the current system of shared responsibilities or funding at this time and therefore offers no legislative proposals” (FAA 1998, 4). Federal Aviation Administration officials took the official position that the “Air carriers bear the primary responsibility for applying security measures to passengers, service and flight crews, baggage and cargo” (FAA 1998, 14).

Legislators, however, became more and more uneasy about the nature of airline security. In April 2000, Senator John McCain (R-AZ) stated in regard to bill to improve aviation security “I cannot overemphasize the importance of adequate training and competency checks for the folks who check airline baggage for weapons and bombs. The turnover rate among this workforce is as high as 400 percent at one of the busiest airports in the country. The work is hard, and the pay is low” (McCain 2000, S2520).

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Clearly, as the problem stream became more and more dominated by aircraft terrorism with associated violence, the policy stream became a mix of reactions in the form of criminalizing the behavior and incrementally increasing the physical safeguards against hijacking.

The Window of Opportunity Opens – September 11, 2001

On September 11, 2001, the focus changed from explosives to terrorists. The weapons concerning policy makers changed from bombs to airliners. The urgency of aviation security resulted in the creation of a cabinet level department, the Department of Homeland Security, and the Transportation Security Administration.

More significant, however, is how views of the world change. Jervis (2002) examines some of the major shifts in policy analysis, focusing on the impacts that terrorism have on the world. The primacy of the nation-state in conducting wars (or, at least, military-style attacks) is diminished, and the response to acts of terror is less well defined. Jervis argues that not only are acts of terror easier to mount than full scale attacks, but modern societies are more vulnerable to them, especially psychologically. This might be especially true in the United States, which had been largely spared from international terrorism.⁶⁶ Ironically, civilian populations are more vulnerable than military targets, especially in a largely open society in which people travel freely.

Some of the ways that the United States changed after 9/11 are examined by Huddy, Khatib and Capelos (2002). Looking at the results of a series of polls taken after the attacks, the authors find that a large segment of the American public (59 percent) was willing to support the monitoring of telephone conversations and electronic mail. Perhaps not surprisingly, support for

⁶⁶ The 1993 bombing of the World Trade Center in New York City that killed six people was the significant exception.

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this type of surveillance dropped to the low 30s when the monitoring was targeted to ordinary Americans and dropped even further when it was their own conversations being monitored. Support for violations of civil rights was mixed. Using military tribunals to try suspected terrorists gained initial support, but this support waned if the government could withhold evidence or if verdicts could be other than unanimous. Poll respondents supported identity checks at work and at public buildings, but strongly opposed random checks of personal possessions.

Support for the government's ability to protect the homeland was strong, although respondents expressed ambiguity about the ability of the government to protect against future bioterrorism. Opinions were similarly mixed regarding protection for air travelers. Roughly half of poll respondents felt that the government had done enough to secure the air travel system. Most people, however, felt that airports themselves could do more to protect travelers.

The attention that the federal government has placed on aviation security is reflected in the number of reports issued by the GAO. During the period 1958 to 1989, the GAO issued only 31 reports on aviation security, an average of about one per year. Between 1990 and 1999, that number rose to 80. Since 2000, the GAO has issued 159 reports dealing with aviation security. Virtually all of them focus on the progress made by the Department of Homeland Security, the TSA and the FAA in meeting the air transportation security requirements defined by Congress.

Perhaps no single event in American history has caused such a radical restructuring of the United States government as the terrorist attacks of September 11, 2001. Even the attack on Pearl Harbor on December 7, 1941, did not result in the creation of a new cabinet level department, the creation of a massive bureaucracy, the reorganization of many existing government agencies and the massive redirection of public policy and funds. The effects of the 9/11 attacks are seen most

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clearly in the way that policy towards aviation security changed in the weeks and months following that fateful day in American history.

The terrorist attacks of September 11, 2001, changed forever the response of the United States to airline terrorism. For the first time in history, airliners had been hijacked, not for escape, political statement, or extortion, but for the expressed purpose of using the airliners as a terrorist weapon. The strategy of non-violent accommodation of the hijackers played into the hijackers' hands, as the belief that the hijackers intended to use the airliners as weapons had not entered into our collective consciousness, and passengers assumed that the airliners would be flown to some destination chosen by the hijackers for some unknown purpose, where they presumably stood a good chance of leaving the airliner unharmed.⁶⁷ Ironically, as late as November 2001 the official hijacking survival guidelines issued by the U.S. government advised passengers to stay calm and encourage others around you to do the same and not to challenge the hijackers physically or verbally (Department of Commerce 2004).

The attacks of 9/11 were the first hijackings that were part of a planned suicide attack. But that factor alone might not have brought around the sort of sweeping changes encompassed in the Aviation and Transportation Security Act had it not been for three factors. First, the attacks took place on American soil. Terrorist attacks involving suicide bombers had taken place before, but mostly in the Middle East with Palestinians executing most of the attacks. Second, the loss of life was immense, surpassing the loss of American service men and women during the attack on Pearl Harbor by the Japanese on December 7, 1941, opening up World War II. During that attack, 2,729 men and women lost their lives. Third, they struck two dominant symbols of American presence: the Pentagon, representing U.S. military might, and the World Trade Center,

⁶⁷ The notable exception was United Airlines Flight 93, the flight that crashed into a field in Pennsylvania. The accepted explanation is that passenger attempted to regain control of the airliner from hijackers after learning that other aircraft had been seized and used as weapons.

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representing dominance in the financial industry. These factors destroyed the complacency that had been building up for years, and Congress quickly developed a response with the introduction by Sen. Hollings of the Aviation and Transportation Security Act (S. 1447).

Congressional Response to 9/11 and the Aviation and Transportation Security Act

Both the Senate and the House of Representatives quickly agreed on most of the components of the Aviation and Transportation Security Act. Reflecting the growing concerns over the ability of the airlines to manage aviation security, a new organization, the Transportation Security Administration, would be responsible for developing a comprehensive plan for addressing the security needs of all modes of transportation. The major source of contention between the two bodies of Congress was an issue that reflected the respective views of the political leaders – federalizing airport security workers. The policy issue that was over twelve years old became the obstacle that delayed the passage of the Aviation and Transportation Security Act by eight weeks.

Senate Floor Action

Immediately, aviation security went to the top of the political agenda. Concerns about the FAA's ability to provide aviation security, concerns that had dated back to at least 1990, resulted in Senator Ernest Hollings (D-SC), Chairman of the Senate Commerce, Science and Transportation Committee, sponsoring the Aviation and Transportation Security Act (S. 1447). Senator Hollings, the primary policy entrepreneur in the entire process, took the opportunity to speak strongly in favor of federalizing airport screeners. In a statement made on September 20, 2001, Sen. Hollings said

The current system of aviation screeners is a hodgepodge of shared responsibilities among the air carriers, security subcontractors, the airports, and the Federal government.

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Make no mistake – lines of responsibility need to be made more clear. *I have said for years* [italics the author's] that we need to professionalize the nearly 18,000 screeners in our nation's airports who are employees of the airlines and private security companies. We need to make them Federal employees. (Hollings 2001)

Support in the Senate for a major changes in the airline security was widespread and bipartisan. Senator John McCain (R-AZ), who previously expressed concerns about the effectiveness of airline security, joined Sen. Hollings in sponsoring the bill. Most other Senators spoke strongly in favor of the federalization of airline security workers. Senator Paul Wellstone (D-MN) stated on October 9, “Senator Hollings is right that one of the best ways to get this industry back on its feet is to have people think they are safe. God knows the whole notion of federalizing the security forces is what the vast majority of people are for” (Wellstone 2001).

On October 11, 2001, the Senate unanimously passed the bill that called for the federalizing all aviation security workers.

House Floor Action

The House GOP leaders opposed the Senate approach, and introduced H.R. 3150, the Secure Transportation for America Act of 2001. H.R. 3150 did not call for federalizing airport security workers. House Majority Whip Tom DeLay and Majority Leader Dick Armey, both Republicans from Texas, argued that simply placing the work force on the federal payroll would not make flying safer. In keeping with their conservative roots, perhaps, they did not want to see the role of the federal government expanded. They noted that federalizing the airport screeners would increase the rolls of labor unions (which presumably would benefit the Democrat party). But Senator Peter DeFazio (D-OR) focused on the fact that many other law enforcement functions were already being performed by federal workers when he noted: “Mr. Speaker, when we come through Customs, those are Federal law enforcement agents. When we come through INS, they are Federal law enforcement agents. If we go to Hawaii, the agriculture agents are

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Federal law enforcement agents. Even the beagles that they use in the airport have been deemed to be Federal law enforcement agents” (DeFazio 2001, HR6786)). Rep. James Oberstar (D-Minn), ranking member of the House Transportation and Infrastructure committee, said at a news conference Thursday afternoon that while the President’s proposal was “commendable,” it was lacking because it did not require federalization of airport security personnel. Rep. Oberstar said federal security employees would “substantially improve the quality of the screening process,” adding that he was “troubled by reports of proposals to create a nonprofit organization” to handle the process instead (Government Executive Magazine, September 27, 2001).

With the support of President Bush, the House passed legislation (H.R. 3150) that did not guarantee the federalization of aviation security workers. Instead, federalization would be an option. It then took two weeks of arguments about negotiations between the House and the Senate for Congress to arrive at a compromise solution.

The Role of the President

President George W. Bush believed that the best way to address passenger and baggage screening was with a federal-industry partnership. Although Bush said the federal government will “take charge” of baggage and passenger screening, he indicated that government and industry would work together to tighten security standards at the 420 airports that serve civilian air travel. “The government and the private sector will make flying a way of life again in America,” Bush told a flag-waving crowd of airline employees at Chicago’s O’Hare International Airport (Government Executive Magazine, September 27, 2001). The President never did fully endorse the complete federalization of airport screeners, but there is no evidence that he was sufficiently invested in the issue to actively attempt to thwart federalization.

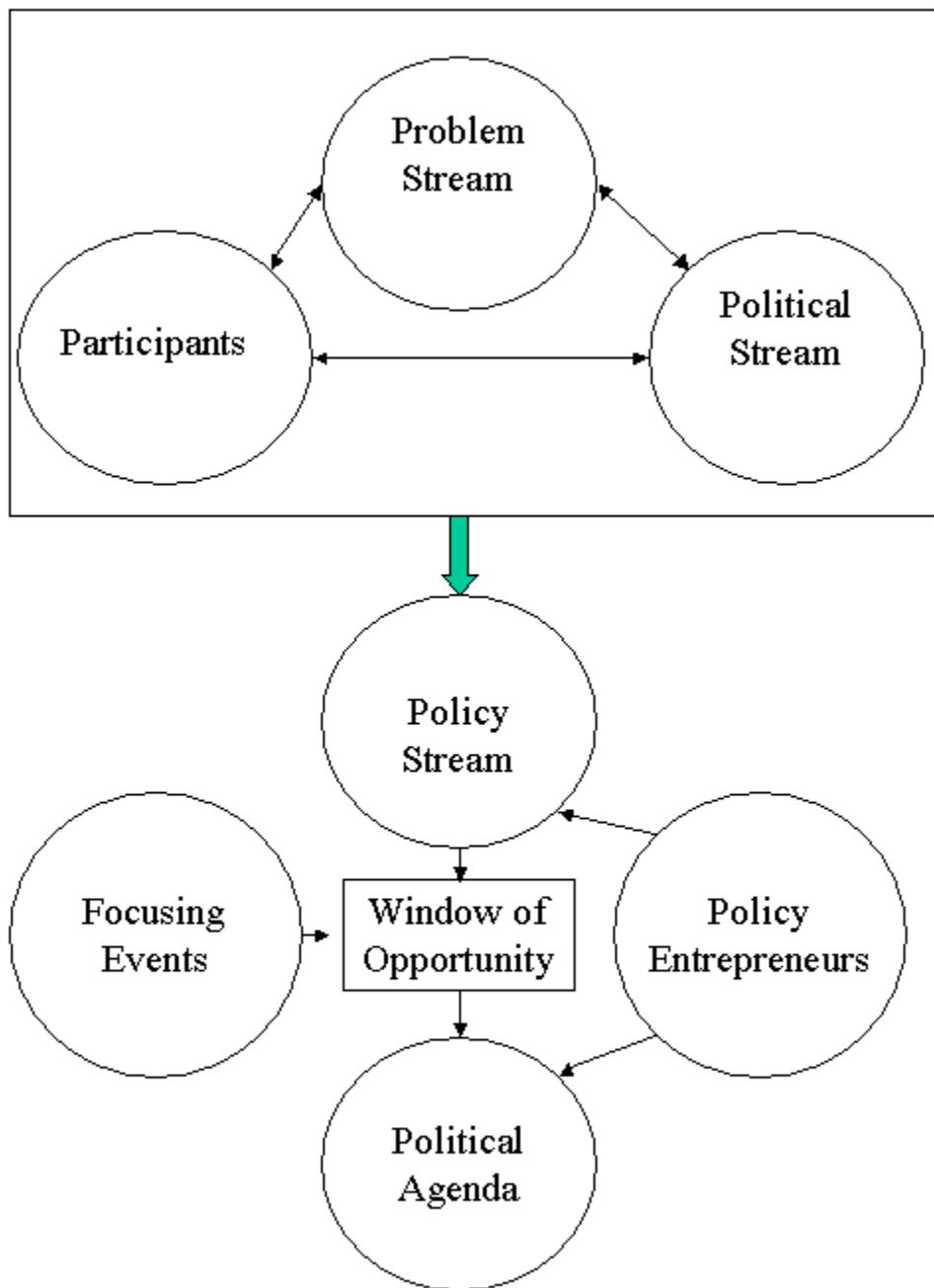
House and Senate Conference Results – the Final Bill

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As noted above, the major point of contention between the House and Senate bills was the federalization of airport screeners. With ideological arguments being made on both sides, and with the public (and many in Congress) becoming more and more impatient for a decisive response to the terrorist attacks and the threat of future terrorism, the opposing camps finally hammered out a compromise solution. It was agreed that federalizing airport security workers would be the rule for most U.S airports, with provisions for future privatization (see Appendix 1). Congresswoman Juanita Millender-McDonald (D-CA) spoke of the compromise as being “glorious” (Millender-McDonald 2001). On November 19, 2001, over two months after the terrorist attacks of September 11, 2001, President Bush finally signed the compromise bill, transferring responsibility for transportation security to the Transportation Security Administration, and federalizing the nation’s airport security workers.

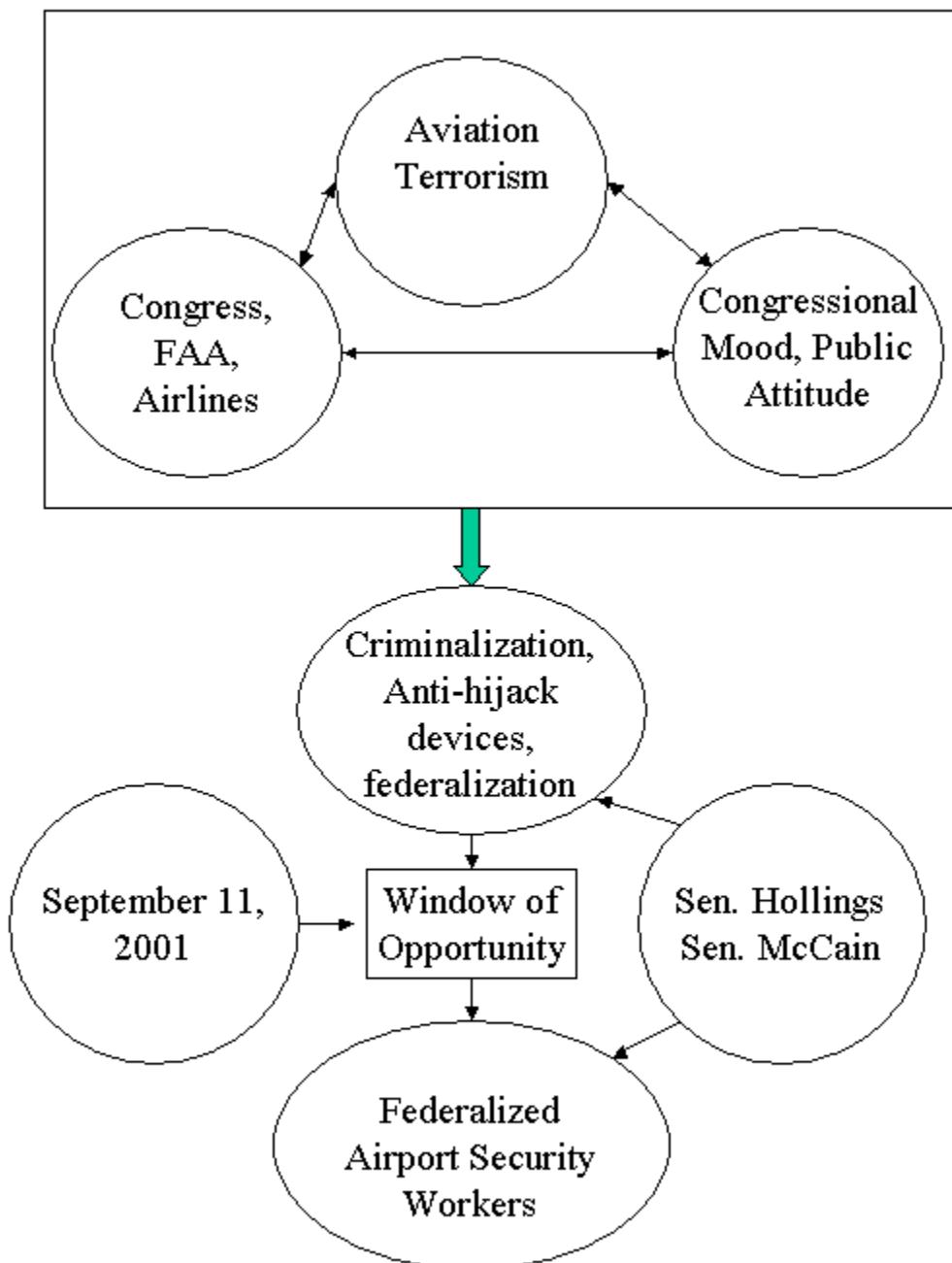
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FIGURE 1
THE KINGDON FRAMEWORK



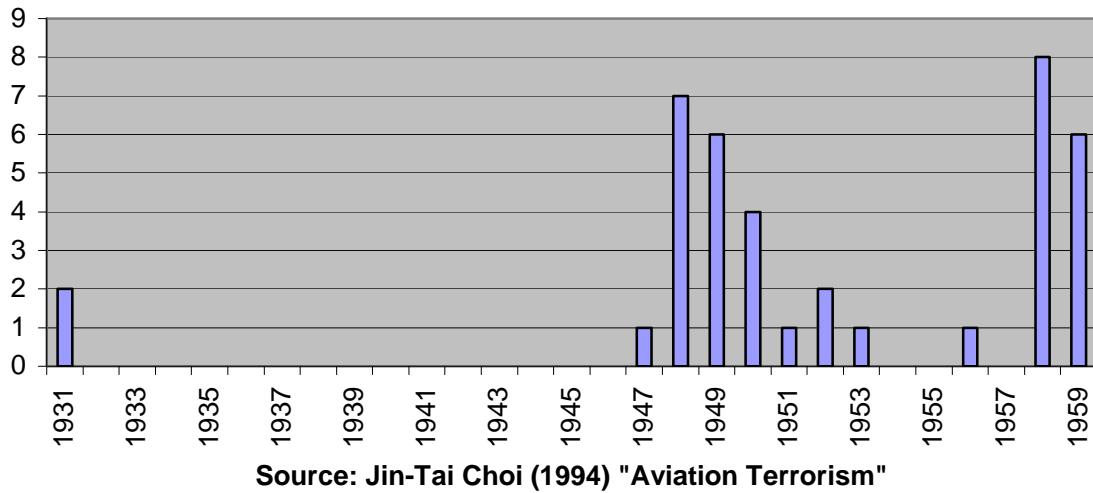
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FIGURE 2
FROM KINGDON TO FEDERALIZATION



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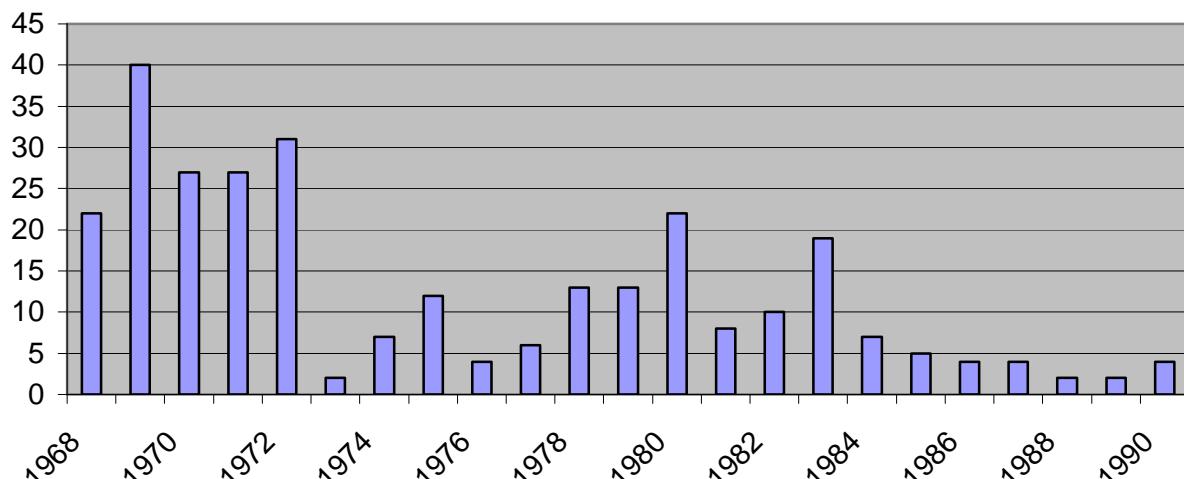
World-wide Aircraft Hijackings: 1931-1959



Source: Jin-Tai Choi (1994) "Aviation Terrorism"

Table 1

Hijackings of U.S.-owned Airlines 1968-1990



Source: Jin-Tai Choi (1994) "Aviation Terrorism"

Table 2

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Appendix 1

Provisions of the Aviation and Transportation Security Act (PL 107-71) Addressing the Federalization of the Airport Screener Workforce

- **Screener Workforce:** Under Secretary must hire, train and supervise security screeners at all airports (except for up to 5 airports that may participate in a Federal-private pilot program). Authority enables the TSA to hire and fire expeditiously, and prohibits strikes.
- **5-Airport Pilot Program:** Upon certification of full federalization, the Under Secretary may establish a two-year, voluntary pilot program to allow qualified private screening companies to conduct screening at no more than 5 airports (one from each security/size category). The airport must apply to be included in the pilot. The Under Secretary would contract with the private company for the services. Such private screeners must be supervised by federal personnel, must meet all federal standards and qualifications, and must receive pay and benefits not less than federal screeners. Private screening companies must be U.S.-owned and may be terminated at any time for significant failures. At the end of the two-year time period, the airport can opt in to participate in the Federal system or continue with its private contract relationship. The Under Secretary would pay for the contract services.
- **Airport Opt-Out Program:** Two years after certification of full federalization, an airport may apply to have screening carried out by a private company. Such application will be subject to the same conditions as the pilot program. Secretary before approving any opt out request must certify that the level of security to be provided under the private contract will be equal to or greater than security provided by federal personnel and that the firm is U.S.-owned.

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CAPPS-II and Privacy – A Policy Failure

The Aviation and Transportation Security Act (ATSA), signed into law by President George W. Bush on November 19, 2001 (P.L. 107-71), took the first halting step in establishing new national policy towards privacy and security. ATSA placed, for the first time, much of the responsibility for airline security into federal hands.

In the wake of the 9/11 attacks, Congress charged the Transportation Security Administration with developing an upgraded computerized passenger screening process intended to prevent potential terrorists from boarding commercial airliners. As the TSA began to implement these new requirements, the Administration encountered many obstacles. Interest groups such as the American Civil Liberties Union (ACLU) are concerned about privacy rights, and successfully press for the project's cancellation.

This section first briefly reviews the advocacy coalition model for policy evolution developed by political scientist Paul A. Sabatier (1986). I then briefly examine the events that led to the introduction of ATSA. I place ATSA into the Sabatier policy model and see the realization of the various components. After describing the security requirements established by ATSA, I examine the difficulties encountered during the policy implementation phase using the synthesized top-down/bottom-up framework suggested by Sabatier.

The Sabatier General Policy Model – A Preview

Sabatier (1986) constructed a general model for policy evolution that combines his previously developed “top-down approach” in which the central policy formulators play the key role in successful policy implementation with the “bottom-up” approach preferred by political scientist Benny Hjern in which the low-level actors play the primary role. The model is illustrated in Figure 1. The model consists of four key components:

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- A collection of relatively stable factors that exist throughout the policy evolution period;
- Some number of external events or socio-economic changes that lead the policy changes;
- Resources available to the policy sub-system actors and the constraints on their behavior; and
- A policy sub-system in which opposing coalitions work to formulate policy changes, those policies are implemented, outcomes occur, and impacts are felt.

The formation of the opposing coalitions formed by various interest groups, not all of which are natural allies, is a key characteristic of the policy sub-system. These coalitions tend to counter-balance each other during the policy formation stage and constantly receive information about the impacts caused by the policy shift resulting in a “policy-learning” process that can be a factor in later policy shifts. While at first glance the model might seem more appropriate for a discussion of policy formation, we see that the Sabatier’s framework provides insights as to why implementation efforts might fail, particularly by looking at the competing coalitions that develop during the initial policy formation stage.

At this point, we note a potential weakness of analyzing the implementation of the Aviation and Transportation Security Act using the Sabatier model. Sabatier points out that four to five years is a relatively short time-span for implementation studies. Congress enacted ATSA in November 2001, just over three years ago as of the original date of this study. As we point out later, the fundamental policy change goes far beyond the specific security requirements embodied in the legislation, but extends to the underlying belief systems that formed the context for both the policy that existed before September 11th and that which began to emerge afterwards. It is unlikely that these fundamental belief systems can change in so short a time. We still find the Sabatier model helpful in discussing implementation failures, however, because of the coalition framework that Sabatier creates.

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Policy Before September 11th

Before the September 11th terrorist attacks the nation's attitude regarding aviation security was ambivalent. Even though Congress expressed concerns about the precautions taken to protect airline travel as early as the 1990's, national policy placed the personal privacy, convenience of air travelers (expanded passenger and luggage screening notwithstanding) and the economic interests of airline companies above that of aviation security, even though few would openly admit it. As discussed by Checchio (2004) the airlines fought numerous measures that might have led to improved aviation security (for example, a bag-matching program whereby no bag of luggage is allowed on an aircraft unless it is confirmed that the associated passenger is also on board) because they were too expensive and would result in numerous delayed flights. The deep (normative) core belief system of the policy elites (Sabatier 1989, 308) continued to place privacy rights ahead of security. This resulted in a near (normative) core belief system that did not place the federal government in a key role in collecting personal information as a way of providing aviation security. The secondary aspects of the belief system included a near absence of government regulations defining standards of performance for passenger pre-screening.

To successfully implement a system in which the federal government collects personal information, even in the name of national security, therefore requires much more than a single event, regardless of how extreme. Instead, Sabatier effectively predicts that to create a major policy change about personal privacy and national security, the deep core beliefs regarding their relative priorities must first be changed. We see that the terrorist attacks of September 11th led to a initial shift in this belief system that failed to garner the needed widespread support in key interest groups and which was eventually reversed.

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The Policy Shift Begins

The bombing of the World Trade Center in 1993 might have served as a warning that Islamic fundamentalists saw the United States as an enemy. In a BBC report (Cuomo 1993), New York Governor Mario Cuomo told journalists: "We all have that feeling of being violated. No foreign people or force has ever done this to us. Until now we were invulnerable." The limited amount of damage, however, and the relatively small loss of life ("only" five people died in the attack) mitigated in favor of treating the event as an anomaly. We see that even this attack, the attack on the USS Cole in Yemen and the attacks on U.S. embassies in Africa, with much greater loss of life, did not result in any changes of American policy.

This changed on September 11, 2001, when 19 terrorists seized control of four U.S.-owned commercial airliners, intentionally crashing two of the aircraft into the World Trade Center in New York City, and one into the Pentagon in Washington, D.C. These attacks served as much more than a final, unavoidable wake-up call. The sheer magnitude of the loss of life demanded dramatic action. These events led to the introduction of the Aviation and Transportation Security Act (PL 107-71) by Senators Ernest Hollings (D-SC) and John McCain (R-AZ) and the subsequent passage of the Act by Congress. We now place ATSA into the Sabatier model and see how the various forces affected the implementation of the requirement to create watch lists and compare them to passenger lists.

ATSA and the Sabatier Model

Stable Parameters

Stable parameters listed by Sabatier include socio-cultural values as well as basic constitutional structure. The fundamental socio-cultural norm regarding public privacy and government access to personal information at the time of the terrorist attacks was one of strong

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concern. The American people have always had a dim view of the collection of information about people by the government without their consent. The actions of the Federal Bureau of Investigation (FBI) in performing surveillance of anti-war groups during the Vietnamese war served as a sobering reminder of what unconstrained government could do. As reported in the Los Angeles Times on March 22, 2004, the FBI (both agents and informants) followed (now Senator from Massachusetts) John Kerry, then a recently returned US Navy veteran. Kerry created the protest group Vietnam Veterans Against the War after his return from Vietnam. The FBI recorded the content of the speeches and dispatches were sent to FBI Director J. Edgar Hoover and President Nixon. According to documents that became known after Hoover's death in 1972, the FBI similarly harassed other activists and anti-war groups. Congress implemented reforms to prevent such abuses and restore the public's confidence.

The United States Constitution is a stable framework within which policy can be changed. The Fourth Amendment⁶⁸ of the Constitution provides (at least to most Americans) an overarching guideline for legislators and law enforcement officials concerning the individual's right to privacy,. Americans accept that their right under the Constitution to be free from searches without probable cause extends to having information about them collected by the government, and do not accept "well, you shouldn't worry if you don't have something to hide" as justification for unwarranted searches. As reported in an Associated Press article that appeared on April 28, 2004 ("ACLU battles FBI over ISP customer data"), the outcry over the Patriot Act's provisions that allows for secret searches further exhibits this strong belief in the right to privacy.

⁶⁸ "The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized."

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External Events

External events affecting policy shifts include changes in socio-economic conditions, changes in systemic governing coalitions, and policy decisions and impacts from other subsystems (Sabatier 1989). As we see, all three are present in the CAPPS-II policy shift process. The most important external event is, of course, the increase in terrorism throughout the world beginning on the 1980's culminating in the terrorist attacks of September 11th. The damage caused by the attacks went beyond the loss of lives and the economic impact. The attacks called into question the ability of the government to protect the homeland.

In 2000, George W. Bush won the race for President of the United States. While he ran for office as a moderate, many of his appointees demonstrated very conservative policies. Attorney General John Ashcroft, for example, called for the power for investigators to subpoena business records in terrorism investigations on their own rather than through a grand jury (Herald 2004). Another example of the new administration's attitude toward privacy rights in the development of a massive computer database named "Total Information Awareness" being developed by the Pentagon under the direction of retired Admiral John Poindexter (Billings 2002). Lee Tien, as senior staff attorney with the San-Francisco-based Electronic Frontier Foundation, called Total Information Awareness "an Orwellian vision, pure and simple."

Finally, while the 2001 terrorist attacks were the catalyst for action, calls for governmental pre-screening of airline passengers began much earlier. The White House Commission on Aviation Safety and Security (White House Commission 1997) concluded that the FAA should complement technology with automated passenger profiling as well as improving passenger manifests. The current, limited system, Computer Assisted Passenger Screening (CAPS) was first deployed in 1996 by Northwest Airlines. Other airlines began to use

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CAPS in 1998, as recommended by the White House Commission on Aviation Safety and Security (also known as the Gore Commission). In 1999, responding to public criticism, the FAA limited the use of CAPS: It would no longer be used to screen passengers and their carry-on luggage, but only to determine whether to subject their checked luggage to heightened scrutiny. So we see that at the same time that external events pushed the policy window in favor of reducing privacy rights, or at least initiating a dialogue in which the rights to privacy are balanced against the need to provide security, rumblings of concern were also felt.

Resources and Constraints of Sub-System Actors

The primary sub-system actors (Hjern's contribution to the model) consist of the sub-organizations within the Transportation Security Administration that are responsible for implementing any new policy and the airlines that are responsible for, at the very least, interacting with any system that is developed. The TSA certainly has the resources to create a large database, but it is not clear if it can overcome the concerns of rights advocates over its use. The airlines may feel compelled to cooperate with government directives concerning passenger data, but need to be concerned with the privacy rights of passengers as well as the economic impact of changing their information systems in order to comply with government requirements. As we see later on, the impact of the sub-system actors were less influential on the implementation of ATSA than other key factors.

The Policy Sub-System

Consistent with the Sabatier model, coalitions of unlikely allies favoring and opposing certain elements of the legislation quickly formed. Favoring the legislation was a "pro-

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security”⁶⁹ coalition consisting of the members of Congress, largely along bi-partisan lines, who favored increased government control of airline security, as well as former New Jersey Governor and head of the National Commission on Terrorist Attacks Upon the United States Thomas Kean. A key question raised by Senator Diane Feinstein (D-CA), for example, was how the terrorists were able to get aboard the aircraft at all. A report posted to the CNN web site on June 2, 2002, (“Senator has tough questions for FBI”) alleged that suspected hijackers Nawaf Alhazmi and Khalid Almihdhar were already on a Central Intelligence Agency (CIA) terrorist watch list, leading Senator Feinstein to question the effectiveness of the government’s ability to keep known or suspected terrorists off American airliners. A PBS News Hour (June 4, 2004) broadcast reported that Gov. Kean suggested that the attacks could have been prevented. Gov. Kean said

“The whole story might have been different if we had been able to put those people on the watch list of the airlines, the two who were in the country; again, if we’d stopped some of these people at the borders; if we had acted earlier on al-Qaida when al-Qaida was smaller and just getting started.” (PBS 2004)

This coalition was joined by conservative groups such as the Heritage Foundation (a conservative think-tank) that strongly favored an information-driven passenger pre-screening process. The Heritage Foundation argued (Heritage 2003) that “airport security was still using the same system to identify individual threats that did not work on September 11 and that a new computer-aided system would improve the TSA’s ability to assess the risk a passenger may pose to air safety.”

Leading the “Privacy”⁷⁰ coalition was the American Civil Liberties Union (ACLU) that had strong concerns about the impact of a computerized passenger prescreening program (a

⁶⁹ I use this term not to imply that other coalitions were not in favor of increased security, but to indicate the emphasis used by this coalition on using security as an overriding factor in their deliberations.

⁷⁰ The “Privacy” coalition carefully avoided the appearance of being opposed to improved security measures, and instead focused attention on the Constitutional and economic impacts of the legislation.

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system that, by definition, would need to collect great amounts of personal data on prospective travelers) on individual privacy rights. Anti-discrimination groups joined the privacy coalition. As reported in a September 21, 2001 meeting of the House Subcommittee on Aviation (House 2001), Sam Husseini, a spokesman for the American-Arab Anti-Discrimination Committee, was quoted in the January 2, 1998 New York Times as stating that profiling has been going on for 20 years, administered by individual airline employees, and that CAPS⁷¹ would merely eliminate the biases of an individual and substitute the biases of a computer. As reported in the same hearing, due to the concerns that had been raised about the potential for discrimination, DOT and the Gore Commission asked the Justice Department to review the CAPS profiling system. Justice issued its report on October 1, 1997. The Commission made the following recommendations:

- The FAA should periodically review the screening factors in CAPS to ensure that they are reasonable predictors of risk;
- Justice should undertake a post-implementation review within one year to ensure that passengers are not singled out on the basis of race, religion, or national origin;
- DOT and FAA should undertake efforts to inform the public about the profiling system;
- Airlines should be prohibited from altering CAPS without government approval; and
- FAA should require airlines to establish procedures for implementing CAPS to ensure that it is not done in a discriminatory or insensitive manner.

The strategies used by the two coalitions during House and Senate Committee hearings were simple yet predictable. The security coalition took advantage of the emotions created by the terrorist attacks and played the “national security card.” The privacy coalition could do little more than point to past governmental abuses.⁷² In the end, the policy elites in Congress⁷³

⁷¹ CAPS, or Computer Assisted Passenger Screening, was the name given to a computer-based system first used by Northwest Airlines in 1997, implemented as a way to avoid criticism that passenger profiling was being performed using subjective criteria.

⁷² Of course, the debate was somewhat more complex, but this paper’s purpose is to explore the post-enactment implementation problems.

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(primarily Sens. McCain and Hollings) ordered the Under Secretary of Transportation for Security to:

- Use information from government agencies to identify individuals on passenger lists who may be a threat to civil aviation or national security⁷⁴; and
- Consider requiring passenger air carriers to share passenger lists with appropriate Federal agencies for the purpose of identifying individuals who may pose a threat to civil aviation or national security

Congress also created a new organization, the Transportation Security Administration, headed by an Under Secretary of Transportation for Security, to be responsible for the implementation of the new requirements.⁷⁵ The TSA was given the budget and the authority to implement the §114 mandate. This set the stage for the implementation stage of the policy process.

Implementing Passenger Pre-Screening

Implementation of implementing §114 of ATSA by the Transportation Security Administration did not begin right away. The TSA initially focused in the recruiting and hiring of thousands of airport security screeners also mandated by ATSA.⁷⁶ It was not until February 28, 2003, that Under Secretary of Transportation for Security Admiral James M. Loy announced that the TSA had selected Lockheed Martin to develop the new passenger risk assessment and prescreening system. The TSA decided to call its new system Computer Assisted Passenger Prescreening II (CAPPS-II). The passenger risk assessment process used information from

⁷³ Title I – Aviation Security, §114, (h) “Management of Security Information.”

⁷⁴ This section was broadly interpreted by the TSA as meaning more than maintaining a “watch list” of potential terrorists; it was used as the basis for creating a “risk assessment” process in which passengers were assigned a color code (similar to the well known “threat level”) and then subject to increased questioning based on their individual color code, similar to the original CAPS system.

⁷⁵ On March 1, 2003, pursuant to the Homeland Security Act, Congress transferred the TSA to the newly created Department of Homeland Security (Berrick 2003, 3).

⁷⁶ The federalization of airport security screeners was very controversial, and in fact held up approval of the legislation for over 8 weeks.

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various sources to compute a “degree of risk” for the passenger (Kettl 2004, 38). That degree of risk is represented by a color (e.g., red, yellow, or green). Passengers with a yellow color codes are subject to more intensive screening at terminal checkpoints. Passengers with red codes will not be allowed to fly at all. The system also looks for potential terrorists by comparing the names of travelers (obtained from airlines passengers manifests) to names on a centrally-maintained watch list.

From a technological perspective, a system such as CAPPS-II is easy to conceptualize. Large database technology is now very advanced, and the ability to quickly cross-reference passenger names to names on a watch list is a simple process, at least at the system design level. As noted by the Washington Post, the plan for the new passenger-profiling network would piggyback on the data-collection revolution of the 1990s. Marketers and data services were able to take advantage of leaps in computer power and networking technology to compile demographic, public-record and consumer files about virtually every adult in the United States, documents showed (*Washington Post* 2004).

Problems with existing watch lists, however, proved a problem. Homeland Security officials said that the task of creating a single database was difficult because twelve lists from nine difference agencies were incompatible and contained overlapping but different information (Wodele 2004). Jerry Berman , president of the Center for Democracy and Technology, went on to say “Little information is publicly available about how U.S. watch lists are compiled and maintained, but numerous reports have suggested that current watch lists are deeply flawed.” The Washington Post (2004) reported that over 2,000 people had complained to the TSA because of being named on a watch list for apparently no reason. Even members of Congress including

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Senator Ted Kennedy (D-MA) and Representative John Lewis (D-GA) found themselves subjected to extra scrutiny because their names appeared on a watch list.

The biggest obstacle to effective implementation, however, was the privacy coalition that formed during the policy formation stage of ATSA. As reported in Air Safety Week (February 2, 2004) members of the European Union joined the American Civil Liberties Union, the National Association for the Advancement of Colored People, and Arab-American groups in expressing privacy concerns. This coalition asked questions that the TSA was unable, or unwilling to answer. The length of time that the TSA would keep passenger data obtained from passenger manifests was unclear. The TSA did not reveal how names were placed on a watch list. There was no process for a passenger to get his or her name off the watch list.

A GAO report issued in early 2004 documented all of these problems. The GAO found that the TSA had not fully addressed any of the issues noted by the privacy coalition, including:

- Accuracy of data,
- Abuse prevention and unauthorized access prevention,⁷⁷
- Privacy concerns, and
- Redress process

The GAO also expressed concern about the level of international cooperation needed to obtain passenger data, managing the possible expansion of the program's mission beyond its Congressionally-mandated purpose, and the ensuring that identity theft (in which a terrorist steals another person's identity) could not be used to circumvent the system. The TSA could not overcome the problems noted by the GAO, and on July 14, 2004, Homeland Security Secretary Tom Ridge announced that the CAPPS-II system would be scrapped in spite of the \$100 million

⁷⁷ Privacy groups had expressed concern that the data being collected by the TSA might be used by unauthorized persons resulting in identify theft.

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that the government spent on it. ACLU spokesman Barry Steinhardt noted its passing, saying “It was falling under its own weight – not just the privacy concerns, but the sheer impracticality of it. It was always a question of when they were going to pull the plug” (USA 2004).

Explanations

Why, in the aftermath of September 11th, with a country eager for protection from similar attacks, could the Transportation Security Administration not successfully implement the Computer Assisted Passenger Prescreening II system? For answer, we look to the top-down factors that Sabatier (1989, 290) argued as necessary for policy implementation to be effective:⁷⁸

- Clear and consistent objectives
- Changes in socio-economic conditions which do not substantially undermine political support or causal theory
- Committed and skillful implementing officials
- Implementing process legally structured to enhance compliance by implementing officials and target groups
- Adequate causal theory
- Support of interest groups and sovereigns

Certainly, the CAPPS-II implementation effort met first three conditions. The objectives of CAPPS-II were clear: keep dangerous passengers off commercial airliners. There were no significant changes in social or economic conditions whatever political support or causal theory existed (although we see later that causal theory is a major problem). There is no evidence to suggest that implementing officials were not committed to the success of CAPPS-II, or that the contractors chosen to implement the program lacked the necessary skills.

⁷⁸ The order of the conditions is changed from Sabatier’s original presentation.

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It is in the last three conditions that we find the answers. The ability of the TSA to obtain the data necessary to create a consolidated watch list was thwarted by the diversity of the lists.

While there is no explicit evidence to support this assertion, the historical tendency of government agencies such as the Federal Bureau of Investigation, the Defense Intelligence Agency, the National Security Agency, and the Central Intelligence Agency to protect their own “turf” probably contributed to the difficulties in creating a consolidated watch list.

Serious questions about the underlying causal theory also developed during the implementation phase. In response to a lawsuit filed by the American Civil Liberties Union on behalf of two peace activists whose names appeared on a no-fly list (Goo 2004), the TSA and the Federal Bureau of Investigation released documents that revealed early problems with the watch lists. The information showed that simply adding a middle initial to a reservation name would result in the name not being “matched” on the no-fly list. The contention that creating a consolidated watch list and using it to match against passenger manifests was feasible became highly questionable.

In the end, however, it was the privacy coalition that formed during the policy formation stage, led by the ACLU and joined by the NAACP, various privacy groups, members of the European Union and others, that demonstrated in a powerful way that the Aviation and Transportation Security Act lacked the necessary support from the affected interest groups. This lack of support, expressed via lawsuits, Freedom of Information requests, and other public expressions of concern, eventually led to the withdrawal of support from key government leaders (Sabatier’s “sovereigns”). Without that support, the death of CAPPs-II was inevitable.

Bottom Up Cures

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The issues addressed in the GAO report that led to the cancellation of the CAPPS-II program, especially accuracy of data, abuse prevention and unauthorized access prevention, privacy concerns, and provisions for a redress process must be addressed before any system such as CAPPS-II can succeed in the United States. Instead of treating these issues as an afterthought, as has been the case with the TSA to date, a project that begins with these issues in parallel with the security needs of the nation has a much greater chance of being implemented. Even the ACLU did not object to the need for increased security per se, but to the failure of the TSA to address the serious privacy concerns. A more fundamental issue that must be addressed, however, is the national belief system (Sabatier 1989, 308-309) that must be changed before the government can successfully implement any radical policy shifts. There are no signs that the country is ready to turn away from the Constitution. Unless and until the policy elites in the federal government can change the deep core values held by the American people, prospects for a system like CAPPS-II seem dim.

Conclusions

We see that the terrorist attacks of September 11, 2001, led to an initial policy shift away from the traditional core belief of holding personal privacy sacrosanct. As Congress considered responses, the coalitions predicted by Sabatier formed and used different strategies, some more successfully than others, to affect government leaders' decision making resulting in the passage of the Aviation Transportation and Security Act. During the implementation phase of the ATSA provisions that called for the creation of a passenger pre-screening process, however, we see that the government failed to account for the core beliefs of the country. The privacy coalition successfully focused attention on the ways that CAPPS-II might erode the rights to privacy that Americans have come to hold so dear, and the project was cancelled.

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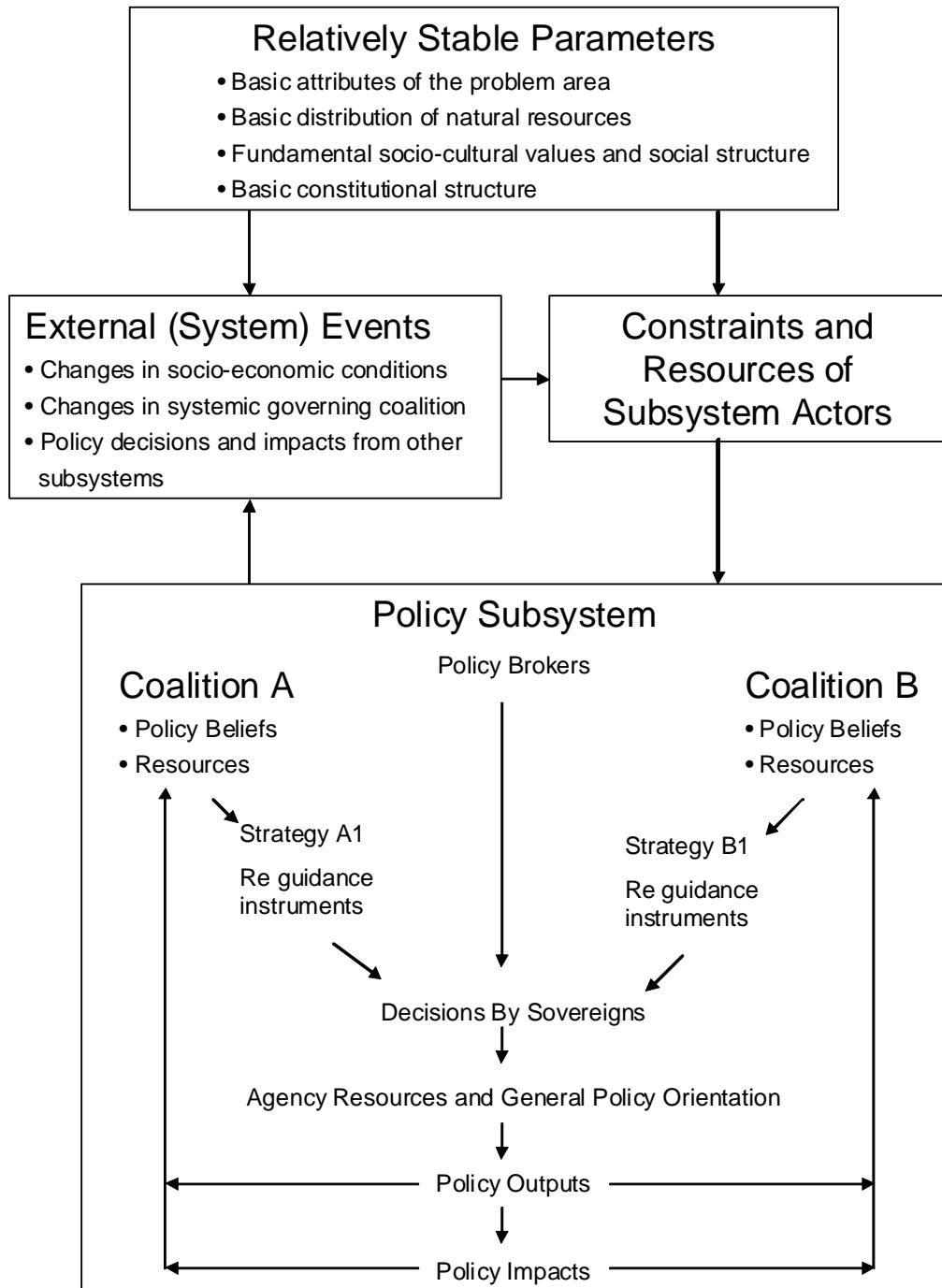


Figure 1: The Sabatier Model General Model of Policy Evolution Focusing on Competing Advocacy Coalitions With Policy Subsystems (Sabatier, *Implementation and Public Policy*, 1989)

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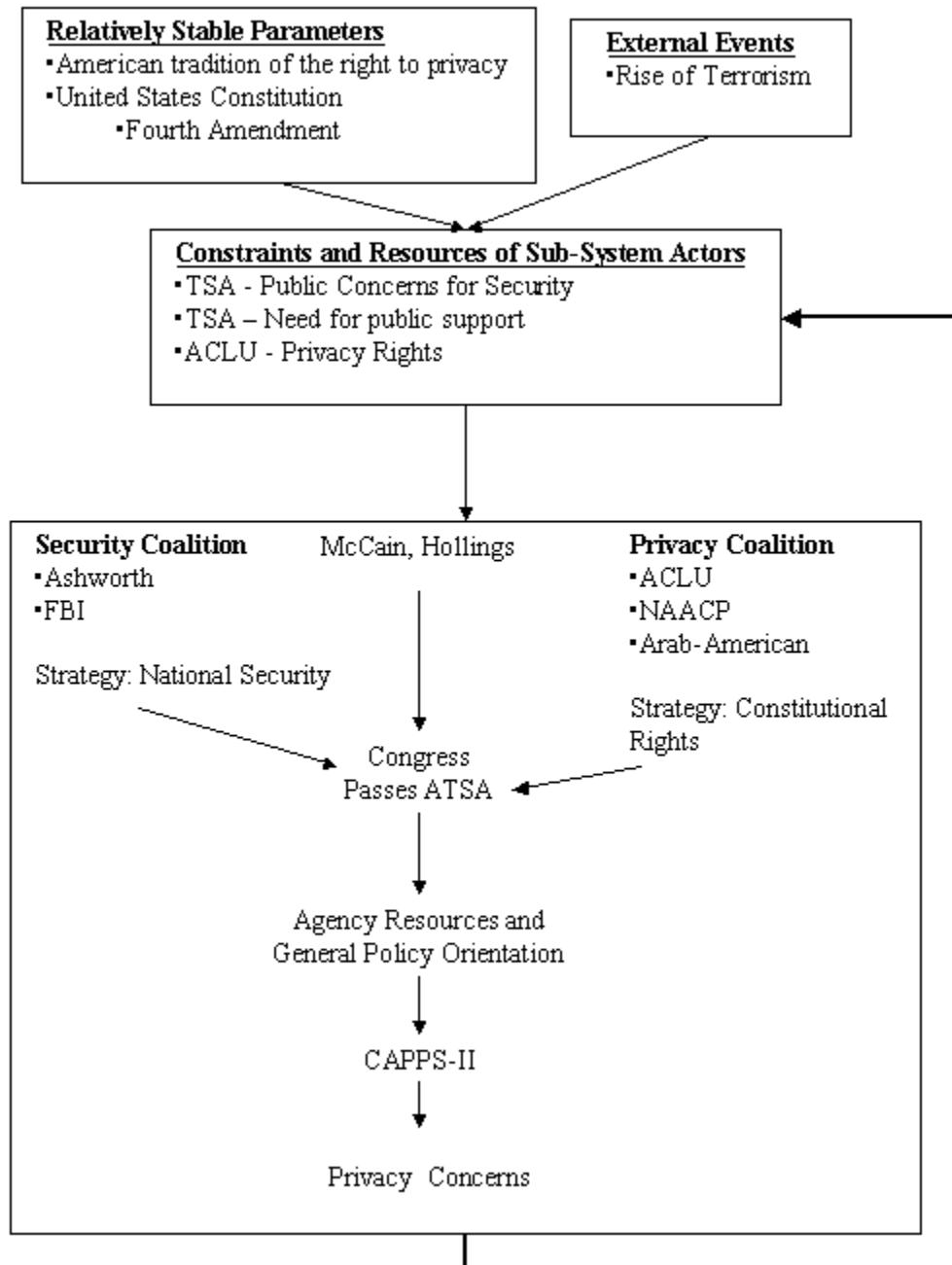


Figure 2: The Aviation and Transportation Security Act in the Sabatier Model

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Final Thoughts: Where Do We Go From Here?

As I have attempted to demonstrate in this report, there is a significant need for a national debate on U.S. national aviation policy. Arguably, much of the nation's economy depends on the free flow of people and goods made possible through air travel. Yet the focus of the national debate has focused on air travel security, with positive action being driven more by the latest crisis of the period than by reasoned debate of future needs. The inclusion of economic issues – the effect of air travel on the national economy, quality of life and overall consistency with the free flow of American life – is needed if the United States is to develop a comprehensive national aviation policy that meets the needs of all Americans. It is hoped that the information presented here will help to stimulate the debate that is so urgently needed.

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