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City University of New York

CUNY Aviation Institute at York College

Inaugural Conference:
*Strategies and Skills for
Revitalizing Aviation*

March 31, 2003

Conference Proceedings



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York College CUNY 94-20 Guy R. Brewer Blvd • Jamaica New York 11451
718-262-2353 (p) 718-262-2352 (f)
aviation@york.cuny.edu • www.york.cuny.edu/aviation

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*Strategies and Skills for
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Prepared by:

Eric Tyrer *CUNY Aviation Institute at York College*

Isabella Pierson *NYU Wagner Rudin Center for
Transportation Policy and Management*

Graphic design assistance:

Joseph LoPinto *York College - Publications*

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AVIATION SECURITY: PROMISE OR REALITY? by Dr. Joseph Szylowicz ©2003

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Foreword

We are honored to present the proceedings from The CUNY Aviation Institute's inaugural conference "Skills and Strategies for Revitalizing Aviation" held on March 31, 2003 at York College's Center for the Performing Arts.

This conference marked the dawn of a new era of in depth knowledge exchange between York College and its intellectual community on the subject of aviation -- an industry that impacts the college's community economically, socially and geographically.

The diversity, quality and thoughtfulness of the presentations and the distinction of our audience made for a remarkable event. The CUNY Aviation Institute is particularly grateful to Dr. Paul Stephen Dempsey, Dr. Joseph Szyliowicz, and Mr. A. Bradley Mims for taking the time out of their busy schedules to share their knowledge and experiences. We also want to thank Mr. Michael McKay of Congressman Gregory Meeks' office for his generous remarks about our program.

This event would not have been held without the generous support of our sponsors: The Port Authority of New York and New Jersey, Greater Jamaica Development Corporation, NYU Rudin Center for Transportation Management & Policy, Bombardier, CIUS, JetBlue Airways, and QCEDC.

Aviation is a key component to a future of economic health and prosperity in Queens. And, the Aviation Institute at York College is fertile ground for the growth of an industry with top-notch managers, skilled labor and sophisticated thinkers. Read inside to see all that the Institute can bring to York and its community.

Table of Contents

Foreword	vi
Introduction	
Cruz Russell Director, Office of Policy and Planning , The Port Authority of New York and New Jersey	
<i>CUNY's Aviation Institute: The Vision</i>	9
Session 1: Economic Challenges, Part 1	
Dr. Paul Stephen Dempsey Tomlinson Professor of Global Governance in Air and Space Law, Director, Institute of Air and Space Law, McGill University, and Vice-Chair, Frontier Airlines	
<i>The Cyclical Crisis in Commercial Aviation: Causes and Potential Cures</i>	11
Session 2: Today's Security Challenges	
Dr. Joseph Szyliowicz Founder - Intermodal Transportation Institute and Professor, Graduate School of International Studies, University of Denver	
<i>Aviation Security: Promise or Reality?</i>	19
Luncheon Address	
A. Bradley Mims Senior Associate, Booz/Allen/Hamilton, Former Deputy Assistant Secretary, USDOT	
<i>Global Competition and Security Issues in Developing Nations</i>	31
Session 3: Economic Challenges Part 2	
William DeCota Director, Aviation Department, The Port Authority of New York and New Jersey	
	35
Closing Remarks	
Dr. Anthony Perl Director, CUNY Aviation Institute at York College	
<i>Using Knowledge to Meet Aviation's Most Pressing Needs</i>	41
Papers	48
Speaker Biographies	80
Program of Events	84
Participants	86

Introduction

CUNY's Aviation Institute: The Vision

Cruz Russell

Director, Policy and Planning, The Port Authority of New York & New Jersey

Mr. Cruz Russell's presentation spoke to the vision that created the York College Aviation Institute. He began by emphasizing the importance of the aviation industry in the New York region as greater than a transportation function – in effect, the lifeblood of the regional economy, the urban workforce and the local business community. The activities at Kennedy International Airport are particularly important to this community since Kennedy serves as a national and international gateway. It is critical to have efficient and effective operations at air facilities and the Port Authority has achieved that during its tenure running the airports. Today, however, the environment has become much more challenging. The contemporary world is one of constant change that demands more of our human capital resources and more of our financial capital. The ability of our aviation industry to remain competitive will increasingly depend on the skills and ingenuity of its workers. The resources and services of an institute like the York College Aviation Institute will help them keep apace with this dynamic environment.

At the turn of the 20th Century, railroads were king. A huge amount of services and resources were dedicated to the railroad industry by way of investments in educational facilities, manufacturing resources, and additional elements in order to provide that industry with what it needed to flourish. Today aviation is America's railroad industry. America is dependent upon our aviation industry for domestic and international travel, as well as cargo shipment. America is dependent on aviation to a greater degree than many other nations which possess extensive rail services or alternate ways of conducting commerce. The most important industries within our region—producing companies like IBM and Pfizer—demand competitive transportation resources in order to survive. These companies are part of a world economy in which the technology and resources that are developed within this region are exported on planes to points across the globe. Inputs for high-end products are collected from around the world and are brought back to us by air—semiconductors manufactured in China, memory installed in Korea. An efficient air service industry is essential, not only to moving people – residents and tourists, but to the inter-regional and international movement of goods and business services that form the very basis of our economy.

Mr. Russell noted the crucial role that an Aviation Institute can play in shaping the future of the region's aviation industry. The primary mission of the Aviation Institute at York College is to provide for academic skills, specialized training, and work-study opportunities to prepare students for careers within aviation professions. The Institute can also act as a focal point for dialogue among aviation industry members on what the region requires to be competitive against other regions nationally and throughout the world. The attraction of the aviation industry to New York has long been based on the fact that New York City possesses the most affluent consumer market in the United States, the densest and most cosmopolitan population, and a business community with extensive travel and communication requirements. It is important to maintain this attraction.

The mission of the Aviation Institute will also include the provision of advanced study coursework and continuing education to support career development of those already part of the aviation industry workforce. Approximately 60,000 aviation workers are located within the Queens community. As the industry evolves, it will be necessary to have the resources to provide training they'll need to adapt to a changing industry. The Institute will be developing an aviation curriculum in concert with industry professionals who can foresee what the next steps will need to be. Furthermore, it will develop internships and work-study programs that allow undergraduate students to get critical exposure to hands-on practice. In addition, the continuing education program should allow executives, technical and support staff the opportunity to come back to retool and update those skills that are required to be effective.

Over the long-term, Mr. Russell suggested, the aviation industry can be a significant economic catalyst for New York City and the region. At one time, two major carriers — TWA and Pan Am — chose New York City as their headquarters location, along with a host of other airlines that called New York home. Over time, because of the way the industry began to redefine itself, these headquarters operations left New York for Texas, St. Louis, Chicago or Atlanta. Looking at a new generation and a new way of doing business, it is possible that new headquarters will return to our region. It is clear that for this to happen there will need to be academic support systems providing the trained workforce needed to propel their business interests. The York College Aviation Institute can be this training ground. It can reach out to the rest of the CUNY system and beyond, to promote the use of all the academic tools that we have in this region. In this way it will become a center of excellence and a capital for representing and promoting the aviation industry's interests. Meanwhile it will be doing wonderful things for the student body at York.

Mr. Russell reminded the participants in this inaugural event that the Aviation Institute has the great opportunity, open only to young institutions, to determine the agenda that will lead York to become a center of excellence in the transportation industry. He concluded by asking the audience to imagine the following scenario, which takes a more personal perspective on the founding vision of the Institute:

Students from the local community enter York College as freshman after having grown up with the airport as a neighbor. They have family, friends and relatives who have worked at the airport since they got out of high school. These students have the talent and motivation to aim for jobs in aviation management. They do well in their undergraduate studies, and they are intrigued by the special seminars given during their undergraduate years by aviation veterans. They write term papers about topics raised in these aviation seminars and they apply for short-term internships at the airport. Their supervisors find them to be valuable assistants, not only motivated and energetic, but knowledgeable about the industry and well prepared to handle their assignments. Upon graduation, when they are ready to seek permanent professional jobs in the industry, their experiences will distinguish them from other recent graduates. Some may leave the region for a while, only returning later in their careers to management positions at JFK or one of the other regional airports. They will be the ones standing at the podium of an Aviation Institute conference in the future, giving guest lectures at York College, and recruiting summer interns through the Aviation Institute.

Session 1: Economic Challenges, Part 1

The Cyclical Crisis in Commercial Aviation: Causes & Potential Cures

Dr. Paul Stephen Dempsey

Tomlinson Professor of Global Governance in Air and Space Law, Director Institute of Air and Space Law, McGill University, and Vice-Chair, Frontier Airlines

Addressing the cyclical crisis in commercial aviation, Dr. Paul Stephen Dempsey began by recalling a recent speech of Giovanni Bisignoni, President of the International Air Transport Association (IATA), in which Mr. Bisignoni characterized the North American airline industry as “in ruins.” However, Dr. Dempsey suggested that this is not a recent crisis; if one looks at the newspaper headlines from the early 1980s, 1990s, or 2000s, they identify similar issues—financial disintegration, economic crisis, bankruptcy, liquidation, layoffs, downsizing, and aircraft parked in the desert. Indeed, this is a phenomenon that occurs about every ten years in the industry, and the same questions are relevant each time:

- 1) What has caused it?
- 2) How bad is it?
- 3) How might the airlines extricate themselves from it?
- 4) What can the government do to help?

What Caused the Crisis?

According to Dr. Dempsey, 2001 was turning out to be a bad year even before September 11th. The dot-com, high-tech, over-capitalized bubble burst. Mainly people willing to pay exorbitant fares on demand vanished. Companies no longer had the same amount of capital available to them as in the 1990s. Recession drifted across the landscape and that caused business in all sectors to tighten their belts as well as their travel budgets. Consumer confidence began to wane as people were laid off and grew insecure about their personal livelihood. Vacation travel was also negatively affected. Predictions were being made as to the losses expected as a result of the downturn; they were estimated at several billion dollars.

The events of September 11, 2001, were an additional blow to the industry. On September the 11th, the Federal Aviation Administration (FAA) grounded the entire commercial aviation fleet in the United States for three days. The public was horrified watching repeated televised clips of aircraft crashing into the World Trade Center. The government responded by increasing security and creating the Transportation Security Administration (TSA). Suddenly, people who were flying were confronted with the hassle factor, which involved being frisked, forced to take off their shoes, and to wait in longer lines. Flying became much less convenient. TSA had, in some part, robbed the industry of its inherent advantage in comparison to other modes—its ability to save people time. Congress did respond quickly after the tragedy of September 11th, Dr. Dempsey explained, with a \$15 billion bail out for the industry comprised of \$5 billion in direct grants (i.e. taxpayer grants), and another \$10 billion in loans. In addition, the industry was given a package to reduce its liability for the events of September 11th and provide it with lower risk insurance.

How Bad is the Crisis?

Dr. Dempsey quantified the downward trend in the economic situation that had begun to unfold in 2001 prior to September 11th. Air traffic, that had been growing at 4% a year, reached a plateau in 2001 and did not improve in 2002. To give a dramatic image of the situation Dr. Dempsey pointed out that Chairman of the Federal Reserve, Allen Greenspan, described the economy as having hit a soft spot, and if that were the case, Dr. Dempsey would consider the airline industry to have fallen into an abyss. All the major airlines except Southwest, were collectively burning through \$24 million a day, thereby creating a liquidity problem. The industry lost \$13 billion in 2001, \$9.5 billion in 2002, and what was originally planned to be a \$7 billion loss for 2003, could be increased to an \$11 to \$13 billion loss if the war were prolonged in the Middle East. Over three years, the losses could total more than \$30 billion.

Historical Context

To provide some context to the current crisis, Dr. Dempsey presented the historical earnings of the airline industry. (He noted that the numbers were not adjusted for inflation and so were slightly overstated.) Since the time of the Wright Brothers the industry has lost all its cumulative profit due to the cyclical crisis. However, the contemporary problem is worse than any of the prior recessionary periods of recession. For example, in the early 1970s the industry was confronted with similar problems. There was a huge influx of capacity with the new 747, L1011 and DC10 aircraft entering the industry. Overly optimistic traffic projections by the FAA, just prior to a recession in which traffic began to flatten, left the industry faced with acres of empty seats. In the upper lounge of the 747, piano bars were installed simply because there were not enough passengers to fill the number of seats offered.

Dr. Dempsey recalled the Yom Kippur War of 1973 as a tough period for the industry. The Arab oil embargo tripled fuel prices and the airline industry decided to ask the Civil Aeronautics Board (CAB) for assistance. At that time the airlines were regulated and the CAB provided several types of aid. First, cost-based pricing was used to respond to increased costs as fuel prices had tripled. Second, there was a route moratorium in which no more routes would be issued for a set period. Third, capacity limitation agreements were instated between carriers. Finally, there was route swapping between Pan Am and TWA. The result was a one-year loss in 1970 of \$200 million, after which profits were made though not reaching the levels of the 1960's.

In the 1980s, fuel prices shot up again leading to the largest industry losses in history up until that point, totaling \$1.4 billion. The early 1990s, with the Gulf War, and the explosion of Pan Am 103 over Lockabie, Scotland, ushered in an era of fear of terrorism in which people were afraid to fly. The country experienced another recession, and again fuel prices shot up. Dr. Dempsey pointed out that these are all of the ingredients of the contemporary crisis except they differ in magnitude. In the 1990s \$13 billion in losses was unprecedented while today's crisis could lose the industry, over the course of a three-year period, more than \$30 billion. The magnitude of losses has grown progressively worse since deregulation.

Dr. Dempsey explained that those regulatory tools designed to save the industry from economic collapse in the 1970's, were the political catalyst for regulatory reform that turned into the industry deregulation of 1978. Prior to deregulation, no major airlines went bankrupt; only several supplemental airline and charter carriers were liquidated. Airline industry regulators managed economic downturns by encouraging stronger companies to acquire weaker companies and assume their assets and employees. Thus, when Delta Air Lines acquired Northeast Airlines, United Airlines acquired Capital Airlines, and

Allegheny acquired Mohawk, bankruptcy was avoided. In contrast, in the early 1980's, two major airlines went bankrupt—Braniff and Continental. The Braniff bankruptcy was the result of mismanagement and imprudence. After deregulation it grew its route structure by 50% and could not sustain that growth.

Dr. Dempsey pointed to five additional major bankruptcies of the early 1990's—America West, Continental, TWA, Pan Am and Eastern. Pan Am and Eastern were liquidated. Eastern had raucous labor relations, particularly after it was acquired by Texas Air Corporation. Pan Am was ruined by deregulation because it did not have a domestic network and instead relied on other carriers to feed its international network in New York, Miami, and San Francisco. With deregulation, non-stop flight rights were issued, for example, to London from Atlanta, Chicago, St. Louis, Houston, or Dallas thus over-flying Pan Am at international gateways such as Kennedy International Airport.

Today, Dr. Dempsey explained, three major airlines are in bankruptcy—US Airways, United, and Hawaiian Airlines—and more are likely. The root of the problem is that major airlines have an unsustainable cost structure. United, for example, was a company in which employees owned 55%. Management signed an agreement providing that senior pilots (those who flew 12 to 14 days a month) would have salaries of \$300,000 a year. That created an unrealistic and unsustainable paradigm of ever higher salary expectations. In addition, wage contracts were signed in the 90's when the industry was making profits that would be unsustainable during a period of economic downturn. Labor costs account for 38%-40% of average industry costs, and fuel costs have doubled in the past year to 11% due to conflict in the Middle East. Security costs have gone up to an estimated \$2-4 billion.

The hub-and-spoke system, the dominant trend of deregulation, exacerbates costs. All major airlines but one (i.e., Southwest Airlines) adopted a hub-and-spoke system, and Southwest is the only one that is profitable. Instead, Southwest runs a linear route structure that operates on the basis of efficiency as opposed to connectivity. There are advantages to creating a hub-and-spoke system. For one, it creates a geometric growth in the number of marketable city pairs, a monopoly on pricing opportunities for origin and destination traffic to and from the hub, and it allows carriers to take advantage of the S-curve relationship between frequency and revenue. This means that the carrier with the largest number of frequencies will likely generate more business traffic because business people prefer a carrier that flies several times a day between important points. However, the hub-and-spoke system also drives costs up. It erodes productive efficiency by reducing aircraft utilization, reducing labor utilization, and increasing fuel consumption. The failure of costs to fall at the pre-deregulation pace may explain the fact that real inflation-adjusted yields have fallen much more slowly in the post-deregulation period than in the pre-deregulation period. In other words, adopting a hub-and-spoke system has not allowed the cost reductions associated with a linear system to be passed on to consumers. The hub-and-spoke system has, however, created convenience for people who do not mind connecting at a hub to get to their destination.

New entrants and linear route carriers enjoy a significant advantage over the major airlines. United has labor costs exceeding 40% of its total costs, and is in bankruptcy along with US Airways. American is very close to Chapter 11 as well. On the other hand, Southwest has significantly lower ASM costs, as well as labor costs, as a percentage of its total costs. JetBlue, emerging as a new airline out of Kennedy and Long Beach, is also doing well as a linear route carrier.

Because capacity exceeds demand by a significant margin, Dr. Dempsey explained that value pricing makes sense. Demand is very cyclical in this industry—based on the time of day, day of week, and month of year—and it is responsive to the inflation and recession, prosperity and poverty that pervades

the economy as a whole. All carriers want to offer high frequency in all their important markets, and because of the S-curve, the result is the “tragedy of the commons,” or “overgrazing” the market. Excess capacity is also caused by the fact that average costs fall with growth and they increase with constriction. Meanwhile, it is difficult for an airline to reduce its costs on the basis of reducing capacity due to the high fixed cost structure. The least expensive employees are the first to be laid-off.

Interestingly, the bankruptcy process itself, which gives special protection to airline lessors, may also increase excess capacity by keeping companies alive longer than they might otherwise survive. Under section 1110 of the bankruptcy code, an aircraft owner can recover assets in 60 days if lease payments are not made, therefore creating an incentive to provide capacity to weaker carriers. The bankruptcy process also prolongs the process of liquidation, while the capacity stays in the air. When the capacity is on the ground, the product itself is easily fungible; airplanes are \$35- to \$175-million factories, and it is relatively inexpensive to repaint the fuselage, alter the interiors slightly, and fly the aircraft in another fleet. Because of the interchangeable nature of the capacity, even when you have a liquidation, the capacity does not necessarily disappear. Only exacerbating the situation, demand for airline service is highly cycled and fickle. It is subject to the psychological effects of a catastrophic event, such as a crash in the Everglades, or a crash of an aircraft into the World Trade Center.

How might the Industry Extricate Itself from the Current Crisis?

Dr. Dempsey considered how the airlines might survive the crisis. The first solution he offered is through bankruptcy reorganization. Bankruptcy allows an airline to hold all of its creditors, except its airline lessors, at arms length while it reorganizes itself. The shareholders lose their stock to the creditors who become shareholders of the emerging company. The debt on the balance sheet is wiped clean as debt is exchanged for equity. While a company is in Chapter 11, reorganization it does not pay its full cost of operation, but instead operates on an artificially deflated cost basis. It can price on that basis, forcing its competitors to match those prices or alternatively, they will lose customers. A downward spiral emerges and can lead to a cascade of bankruptcies as other carriers find that their balance sheets need to be cleaned up too, and that they cannot sustain below fully-allocated cost pricing for an appreciable amount of time.

Second, carriers should rethink the structure of the over-hubbed system. There are about 15 interior hubs in the United States in which excess capacity is in competition. Long distance air transportation service connecting coast-to-coast tends to be competitively priced. Carriers are looking to fill seats that otherwise might fly empty and price on a variable cost basis. The problem is that variable costs in this industry are relatively small. They amount to about one-fifth of fully allocated costs. Pricing based on variable costs for a sustained period of time results in severe economic problems, exactly what the industry suffers whenever there is a recession. Some airlines face the problem head on. American Airlines, for example, is trying an innovative solution involving a rolling hub system. Instead of scheduling on the basis of connectivity, it is scheduling on the basis of aircraft and labor efficiency. If consumers can connect, they will. That is the way that Southwest schedules. If people will accept a bit more inconvenience (and hub connectivity is not particularly convenient to begin with) then they can take advantage of a company with a lower cost structure and perhaps a lower price structure as well.

The third solution is fleet standardization. A number of carriers are informing their lessors that they cannot pay the leases on their aircraft and that the lessors will have to take them back for renegotiation. Fewer types of aircraft will be flown. Unfortunately there is a down-gauging of aircraft fleet such that

smaller aircraft are being substituted for larger aircraft. The advantage of smaller aircraft is that it affords the frequency and convenience that consumers want and provides non-stop service in thin markets. Cost per available seat mile (CASM) for smaller jets is significantly higher than CASM for large jets, likewise for turbo planes. Thus, to the extent that the industry down-gauges, its cost structure will rise. The only advantage is that block hour costs will decrease, and if the carrier can match the right size aircraft to the market demand, its load factors will improve. In some markets the net result may make it worthwhile. The real question is whether the traveling public is willing to pay more.

What Can the Government Do To Help?

Dr. Dempsey outlined several options for government involvement. The first is to do nothing and let the industry sort itself out according to Darwinian principles. Aviation has profound externalities on the rest of the economy, as seen in the ramifications when the entire nation's fleet was shut down for three days. An alternative mode of intra-city transportation does not exist. Amtrak is a skeletal system that exists only in the North East corridor with some regularity, but is virtually non-existent in much of the rest of the country. As our economy is based on service, not industry, conducting business requires the ability to move its brainpower around the country and around the world. A collapse of a large proportion of the airline industry would create economic disruption that might be intolerable to a government that wants to return its economy to normalcy. Moreover, if every market cycle continues to be worse than the previous, at some point it may be appropriate for the government to intervene.

The second, and most radical option, is to nationalize the aviation industry. The Airline Transit Association (ATA) believes the situation to be so dire that there may be a forced nationalization. Dr. Dempsey characterized this option as unfavorable yet it is, in effect, the road that the government is taking. The government put \$5 billion into the industry and provided \$10 billion in loans. The loans are an exchange for company stock. Essentially, the Federal Government ends up owning a portion of the means of production, and that is the definition of socialism. Socialism, Dr. Dempsey claimed, not regulation, is the antithesis to competition, and that is the path we are on.

The third option Dr. Dempsey provided was for government to reform the tax laws. Aviation is a grossly overtaxed industry. It is claimed that \$42 of every \$100 ticket goes to governmental use, specifically the airports. Even while the airports insist that is an overstated figure, it remains a significant percent. The industry is expected to pay for the infrastructure that it uses, but it is not clear to the industry that it should bear the security costs. Security is thought to be a governmental cost as part of national defense. In most countries, because there is a police function involved, security is not paid by the industry but by the government. To provide a similar example, the airlines do not pay for immigration cost even though the government incurs immigration costs while processing the passengers that come into the United States. Given the overall importance of the industry to the national economy it may be appropriate for government to pick up a part of the cost of security.

The fourth option is reformation of labor laws. Currently, the Railway Labor Act dominates despite that it is a sluggish and frustrating process for both labor and management in which there is potential for a lot of industrial sabotage. Labor employees are largely unsupervised and aviation is a service industry, so if labor is disgruntled it has the ability to drive away the high-revenue business traveler and employees are not reticent to do so if they feel there has been injustice. Management believes the law needs to change to use binding arbitration because the current process takes too long and drives up costs. Aviation cannot afford a strike or even a labor downturn because it is comprised of thin profit margin companies.

Dr. Dempsey's fifth option would be to eliminate foreign ownership and cabotage restrictions. In other words, if the national airline industry collapsed the service component could be picked up by Mexicana Airlines and Air Malaysia such that they provide the domestic service in the US. The Star Alliance partners, Lufthansa and Singapore Airlines, could then put capital into United Airlines to keep it alive. (Although Dr. Dempsey questioned why they would put capital into a company that has that kind of cost structure, he suggested they might see the loss of feed into the network as potentially profitable.) The problems with both of these scenarios are the national defense and security concerns raised after September 11, 2001. Would it be sensible to have a craft fleet upon which the military relies for foreign military expeditions in the hands of foreign citizens? In 1974 the Shah of Iran proposed to bail out Pan American World Airways. If that had happened, the Ayatollah Khomeini would have ended up owning Pan American World Airways.

Finally, Dr. Dempsey described the final alternative, that of re-regulating the aviation industry. He explained that the prevailing wisdom of the past two decades has been that the market can do no wrong and the government can do no good. Regulation is thought to have stifled the industry, created an inflated cost structure, as well as prices higher than a competitive market would have. He suggested that if one were to look at any comparable period before and after deregulation and compare real yields (i.e., inflation adjusted yields), one would find that real yields were falling faster in the pre-deregulation decades than in the post-deregulation decades. The explanation lies in cost-based pricing where costs fall due to technological improvements and efficiencies. Before deregulation, wages were increasing, but not at the rate of productivity improvements. Dr. Dempsey expressed hesitancy that there is the political will today to re-regulate the industry. However, he pointed out that if the other alternatives are unsatisfactory, and if Congress does not want to nationalize the industry or continue to infuse it with capital, regulation would compress the market swings and the market cycle. Regulation would offer a cushion and floor when times were rough as well as equity and a ceiling when times were good. This is what regulation provided the industry in 1938 when it lost half of the capital it had ever earned and came to Congress for help. The industry was clear that it did not want to be nationalized, it wanted to remain privately owned as it believed in capitalism, but it needed something to shield from the vicissitudes of the market cycle and destructive competition. Congress was willing to work with the industry, with the quid-pro-quo being just, reasonable and nondiscriminatory rates overseen by a regulatory body. This was the structure of the industry for 40 years, and its performance has suffered since.

Concluding Statement

Dr. Dempsey concluded with commentary on the following anonymous quote: "Since the invention of the wheel, and in the long term, no one has ever made money moving people." This has been true for steamships, true for transit, and true for intercity passenger railroads. He expressed hope that it will not be true for commercial aviation.

Question and Answer

Matthew Coogan

Q - If you believe as I do that the cost of an airline ticket is too low for our own good and in the long run, and you are intellectually open to re-regulation to raise ticket prices, what would JetBlue and Southwest do with all the extra profits from more costly tickets?

A - It would not be as easy to re-regulate today because the airline industry no longer has a homogeneous cost structure; rather it is heterogeneous. If the government were to contemplate re-regulation, it would need to force the industry to get its costs in order. If government were to abruptly raise prices to cover these costs, it would be so politically unpopular that it would not last. The people would not tolerate it. What I see unfolding is that things need to get a lot worse before they get better—labor agreements need to be renegotiated, carriers need to think about revisiting the hub-and-spoke phenomenon and perhaps reschedule themselves on a cost basis as opposed to a revenue basis. When the high-revenue customers go away, as they have, the advantages of enhanced frequency are more than offset by the increased cost of all that frequency.

Mayer Horn

Q – What is your opinion of partial regulation to control prices?

A - Many of the practices in the airline industry are dishonorable and would not be allowed in other industries; for example, using predatory pricing and practices as well as below-cost activity to drive out competition. Locking in prices through regulation would only increase a hemorrhage. However a consumer protection law, and a consumer bill of rights would be useful in protecting consumers from the unsavory practices of the industry.

Eric Lovecchio

Q – What do you think about airline pension funds to avoid a bad situation for the pilots?

A - The airlines do not have the financial resources to adequately fund pensions for any of their employees due to chronic under funding by billions of dollars.

Joseph Berechman

Q – What do you think of airport charges?

A - Airport charges have enabled some capacity expansion, wherein they begin to build infrastructure in good times and complete it in bad times. Airline cost structures have become so problematic that it is possible the airports should collect the fee externally instead of within the ticket price.

Session 2: Today's Security Challenges

Aviation Security: Promise or Reality?

Dr. Joseph Szyliowicz

Founder - Intermodal Transportation Institute and Professor, Graduate School of International Studies, University of Denver

Dr. Szyliowicz opened by expressing his gratitude for participating in an event of such overriding importance to the welfare of the United States and the globe. He said that while what happened on September 11, 2001 has been referred to as a wake-up call, and has had a profound impact on every aspect of our lives, it was not the first wake-up call. The list of terrorist attacks involving aviation is a long one; September 11 was the first that yielded such dramatic results. Aviation has always represented an appealing target and terrorists have not hesitated to strike at planes and airports of many countries.

Aviation has been a particularly tempting target to terrorists, according to Dr. Szyliowicz. Its facilities are of symbolic significance and it is critical to the national economies of every country in the world. Its role in international trade and tourism, as well as the opportunities for terrorists provided by crowded airports, make it a good target. In the 1980s many people were killed by terrorist attacks on aviation; one of the most disturbing developments in the history of recent terrorism has been the shift to inflicting more and more casualties. The existence of a major threat to aviation has been obvious for years and was especially so after the 1983 Pan Am 103 disaster over Lockerbie, Scotland. At that time it was the worst security related disaster in the history of US civil aviation. In short, steps designed to enhance the security of our system were adopted but these measures unfortunately did not prevent the tragedy of September 11th. A proliferation of cries for action followed. Indeed, September 11 illustrated the ways in which aircraft can be used as weapons not just targets as a horrified nation watched planes crash into the Pentagon and destroy the World Trade Center.

Dr. Szyliowicz advanced three major theses in his presentation. First, the complex character of modern aviation systems makes security a serious challenge and highly difficult to attain. Second, important steps have been taken since September 11; nevertheless major weaknesses remain that must be faced. And third, a point often neglected in discussions of aviation security, while an emphasis on prevention is essential, when dealing with a terrorist threat to aviation specifically, and transportation generally, it is essential to take into account the dimension of foreign policy.

The Complex Aviation System

Dr. Szyliowicz explained that the modern aviation system is vast and complex. It has three main branches: commercial, air cargo and general aviation. Each branch is a complex subsystem unto itself. The system is further complicated by the infrastructure—airports, aircraft and the national airspace system reliant upon very complex command, control and communications technology. A report published last month by the Presidential Commission of Critical Infrastructure identified the following weaknesses of the system. First, the volume of the system is problematic. Approximately 97 US carriers transport over 650 million passengers annually to 506 major airports with 1,000 screening points that handle more than 2.5 billion hand-held and checked baggage. Second, there is limited capacity and space. The quantity, capability and ease in using existing detection technologies is inadequate. Third, economic

sensitivity is a problem. The shift to “just-in-time” delivery has the US economy extremely vulnerable to delays in cargo shipments. Fourth, security versus convenience and cost must be weighed. The necessity of minimizing congestion and delays while maintaining security has very significant financial implications. Finally, accessibility presents a problem. Airports are public spaces accessible by highways, and hence vulnerable. These vulnerabilities pertain to the commercial segment of the aviation industry.

Three trends further complicate the issue of security. First, aviation is increasingly integrated with other modes of transportation, especially light and heavy rail, as the landside capacity of airports has become increasingly strained. Airport rail links are being undertaken in a number of cities including New York and by 2010, 20 of the top 30 airports will be served by rail. Adding rail to an airport complicates the security dimension through the design of the link. Ensuring effective communications between the people who run the rail, the transit, the FAA, and other personnel is critical so that each of these parties understands the role they must play in the security program and can manage it effectively.

Secondly, increased linkages with telecommunications further complicates security. The disruption of telecommunication networks can have profound consequences for aviation systems nationally, regionally, and globally such that you can not address aviation security independent of telecommunications. Of particular concern is the rapidly modernizing national aerospace system which, to accommodate expanding traffic, is replacing once isolated subsystems with open system architecture which will permit extensive change, and is thus highly vulnerable to cyber attacks. Enhanced security must take into account the cyber threat presented by hacking into computer databases. US data systems have pervasive weaknesses and attacks on them from across the globe continue to rise. The publicly known number of cases involving computer security rose from approximately 10,000 in 1999 to 52,000 in 2001, and reached 73,000 in the first few months of 2002—an estimated 80% of all incidence are not reported.

Thirdly, aviation security is more than a national issue—it is an international system. Dealing with aviation security requires consideration of the international dimension. US air carriers are very heavily involved with international travel and are becoming increasingly intertwined with code-sharing and other deals with international airlines. It is instructive to understand that the bomb on the American carrier Pan Am 103 was placed in Frankfurt Airport, thrown into modal movement from a foreign airline originating in another country by yet a fourth country’s intelligence service, and the tragedy itself occurred over Scotland—a causal chain that spread over five separate countries. The deficiency is the non-existence of an international authority which can enforce international regulations and mandates. While 185 member states agreed to the International Civil Aviation Organization’s (ICAO) Annex 17 in an attempt to establish overall security standards and practices, its implementation is subject to state decisions and, at best, it represents a minimum rather than stringent standard. Furthermore, Annex 17 is enforceable by the host government responsible for providing security in its own territory, and over time it has become obvious that most host governments, with the exception of Israel, were incapable or unwilling to provide the necessary level of security.

In 1984, and again in 1990 following the Pan Am 103 disaster, legislation was enacted to provide additional security through various measures including assessments at foreign airports. Yet problems remain. Since September 11th, there have been further attempts to try to strengthen aviation security throughout the globe. ICAO recently adopted an aviation security plan of action which called for “regular, mandatory, systematic and harmonized audits” in order to identify and correct inefficiencies in the implementation of ICAO security related standards. However, the estimated cost of implementation is \$17 million, \$15 million of which must be contributed as ICAO only has \$2 million available. The International Air Transport Association (IATA) and other international groups are also considering more

rigorous enforcement, including a mandate that effective baggage screening procedures be implemented by 2005 for the latest. To what extent the goals to correct the complex and unique challenges of global aviation security will be met remains to be seen.

State of Aviation Prior to September 11, 2001

Dr. Szyliowicz explained that prior to September 11, 2001 aviation received almost exclusive attention as the major threat in transportation security, while little attention was paid to ports, containers, transit, and other modes. Nevertheless, the strategy of the Federal Aviation Administration (FAA) was reactive, sporadic and directed at avoiding repetition of the specific kinds of attacks successfully carried out in the past. The problem was that the pattern of terrorist attack began to change. In the early 1960s, the lone hijacker was deterred with individual screening devices and the number of hijackings dropped. The net result, however, was that terrorists switched to bombs using sophisticated technologies which can easily be molded to disguise shape. By 1990, following the Pan Am disaster, it was obvious that something had to be done. The Aviation Security Improvement Act brought about some changes within the FAA including the creation of the new high-level position of Assistant Administrator, establishment of the Office of Intelligence and Security within the US DOT, and an attempt to coordinate security across all modes. However, the basic problem remained because the airline industry was not prepared to impose strict security measures out of fear that air travel would become unpleasant and costly, driving away the American customer who had become so accustomed to cheap, frequent, and convenient travel.

As the FAA continued to be charged with conflicting objectives of representing passengers and overall security interests while simultaneously overseeing the economic well being of the airlines, little substantive change occurred within the agency. The FAA was responsible for creating rules, taking into account economic impacts on the industry, while the airlines and municipalities were responsible for executing those rules. For the most part the airlines remained responsible for passenger and baggage screening and usually contracted out to private security companies. It was generally perceived that the airlines focused on attracting and retaining passengers while giving security a low priority as additional security measures were considered inconveniences. It was estimated, for example, that in the 1990s the airlines were spending almost \$0.65 per passenger for security and \$6.50 on food. The former Inspector General Schiavo of the US DOT commented at the time of a particular safety crisis that, "It was difficult for me to reassure the public when I knew about the FAA's sloppy safety and security record."

The highly-interdependent nature of the airline industry contributed to giving security low priority. The interdependent structure produces an environment in which people or organizations make perfectly rational decisions on the basis of their own self interest and, as each follows that rational course of action, destroy the common good. The airlines lobbied against new procedures and adopted them only reluctantly and after a crisis. The FAA would react to crisis as it always had. An illustration of this inertia was the famous crash near Roselawn, Indiana in October 1994. According to an investigation by the New York Times, "the FAA had for years brushed aside repeated warnings from pilots and experts, and from the behavior of the plane itself, that something was wrong. The failure to heed these warnings raises troubling questions that go beyond the Roselawn crash, questions about the procedures and safeguards of the agency itself." Another case was the Value Jet crash in May 1996 prior to which the head of the FAA, David Hinson, said "The Airline is safe to fly. I would fly it," and Frederico Peña, Secretary of Transportation, said "Value Jet is a safe airline." A week later Value Jet was grounded and eventually went out of business.

The FAA tended to not only have a panglossian attitude towards safety and security, but to look for

solutions with a technological fix without giving adequate consideration to costs, efficacy, or utility. Dr. Szyliowicz provided multiple examples as evidence. In 1989, FAA issued a rule to require new access control systems yet the cost of those systems far exceeded FAA estimates, and flight crews were subject to screening procedures and harassment. In response to the Pan AM 103 disaster, FAA required installation of new TNA machines expected to detect plastic explosives, but the machines did not work. Audits in four major airports in 1993 found that unauthorized personnel had succeeded in gaining access to secure areas 15 out of 20 times. In 1995, 40% of a group of investigators managed to smuggle plastic explosives through airport security systems. In 1996, when TWA 800 crashed over Long Island, the White House established the Commission on Aviation Safety and Security, known as the Gore Commission, which made a large number of recommendations. Unfortunately, by September 11, few of the 31 recommendations had been implemented. The recommendations included more sophisticated profiling, passenger bag matching, improved screening, and company performance. The FAA claimed that 25 of its suggestions had been “completed,” while in actuality, “most were still in development, and some remained entangled in interagency squabbles and bureaucratic delays.” The Gore Commission staff Director said after September 11, “It is a governmental failure. We specifically said the FAA had to change, and they have proved resistant to change.” While numerous warnings, reports and studies identified the problems, the structure and culture of key players, the policy context, and the nature of the aviation sector itself created an environment wherein a disaster was bound to happen.

State of Aviation Security Post-September 11, 2001

Dr. Szyliowicz presented the three major security improvement measures implemented since September 11, 2001. The most dramatic has been the structural reorganization including creation of the Homeland Security Department (HSD) incorporating 22 agencies and 170,000 employees, and within that, the Transportation Security Organization (TSO). The first major steps focused on preventing hijacking through well-known measures and, after much controversy, placing federal air marshals on various flights and reinforcing cockpit doors. The most dramatic change has been the federalization of screeners. Within a year the TSO succeeded in improving screening procedures by replacing a system of poorly paid, badly trained, and inefficient personnel with a force of thousands of federal workers. Today, screeners behave professionally, are courteous, and often go out of their way to help passengers—screeners at international airports have started a kid-friendly program.

More importantly regulations are being implemented effectively. Almost 5 million items have been confiscated including 1.4 million knives, 1,000 guns, 16,000 clubs, 40,000 box cutters, a trailer hitch, kitchen sink pipe, and circular saw. The TSO proudly claims this reflects enhanced security. However, many of these items were never intended for terrorist purposes, rather just forgotten in luggage. The question as to how many items were not intercepted is valid as well. As of last July, it was estimated by the GAO that guns, bombs, and dynamite eluded screeners 25% of the time at 32 major airports. The porous nature of the system was vividly illustrated recently by an investigative reporter at an international airport who smeared chemical traces of explosive on his coat and luggage and made it through checkpoints with the assistance of a security guard who pointed out that his coat was dirty and helped him brush it off. A TSO spokesman called these finding “unrealistic and alarmist,” and noted that, “Screeners perform their jobs exactly as trained and proper screening procedures were followed.” Dr. Szyliowicz said that he was not reassured by the TSO statement.

Furthermore, there is the financial cost of this kind of security enhancement. The TSO contract has risen from \$107 million contract to over \$700 million. The US DOT’s Inspector General is concerned

with the way the money is being spent and noted “We have \$8.5 billion worth of contracts and a limited infrastructure in place for overseeing them.” When the lack of infrastructure contributed to gaps in contract oversight it, in turn, led to tremendous growth in subcontract costs. The TSO total budget is about \$5 billion, the screeners cost \$1.8 billion dollars. The question is how long can this be sustained. TSO has announced plans to cut back on the number of screeners, but if it does how will that effect moral and efficiency?

The second approach to security improvement includes anti-explosive measures. Congress mandated screening of all baggage by the end of 2002, but airport managers objected for several reasons. First, on the basis of cost—each screening machine costs over \$1 million, plus maintenance. Second, the location of the machines—in most cases they have been located in the lobbies of terminal areas. Third, throughput and accuracy was of concern—many argued that new, more effective, machines which would yield fewer false positives were becoming available. All of these objections, however, were brushed aside. Baggage screening is claimed to be at 100%, although whether or not that is in fact accomplished is controversial. The proposal to move the very large screening machines from the lobby to the inline baggage system is estimated to cost \$5 billion, only 10% of which is available. The source of the remaining funds is unclear. Nor is it clear that this is the best use of the money. An anonymous expert is quoted as having said of the pictures produced from baggage screening, that they “cannot distinguish a block of plastic explosive from a wedge of cheese.” While this may be somewhat of an exaggeration, there are many experts who have serious questions about the technologies involved. A new technology, an EDTS machine, is being field tested at DIA and people are very hopeful of its improved abilities.

The third security major dimension now being implemented is the profiling of passengers. Any attempt to deal with aviation security must include profiling. An evolution of the previous computerized assisted passenger screening system (CAPS) is being tested. The new system will include comprehensive information on all passengers including where and when a ticket was purchased, how it was paid for, and the destination. This information can be interfaced with information about the ticket holder producing a range of information about each passenger in order to grade whether or not he/she will require further investigation. Obviously this raises a host of privacy issues that will require careful vigilance. The TSO is sensitive to the issue of civil liberties and has established an ombudsman to deal with complaints. However, it is important to monitor how the system works. In addition, the issue of profiling airport workers and staff needs consideration. As this personnel is involved in a wide variety of activities they can provide terrorists with numerous opportunities. Now the FAA requires checks of previous employment records and the wearing of badges, however the background checks do not appear to be effective. The FBI raided an international airport last September in which 110 people who had used fake social security cards to obtain security clearance positions were caught. Most turned out to be illegal aliens; 33 pled guilty to a misdemeanor and 67 have yet to be located. Forging badges is possible as well. While forging computerized badges is a difficult task, it can be done with insider collaboration or access to databases and badging processes. Terrorists can also take a riskier path and threaten the family members of employees, or even bribe employees to gain access. Considering the amount of drug smuggling through the aviation system, such measures are not as far fetched as one might think.

Cargo security must be considered as well. Cargo planes carry large quantities of fuel and can also be used as powerful weapons, yet cargo pilots are not permitted to carry guns, federal marshals are not on cargo flights, cockpit doors are weak (if they exist at all), and cargo ramps are insecure in comparison to passenger ramps. Thousands of people, few with background checks, work loading and unloading air cargo. A terrorist attack aimed at blowing up several cargo planes simultaneously would have very

damaging consequences for the U.S. economy and global trade in general.

These security risks have been recognized for some time, and during the past decade various measures were implemented by FAA and the air cargo companies. However, the primary concern remains passenger aviation; to date, the TSA has done little to minimize the threat to a passenger plane from the cargo that it carries or to ensure that the plane cannot be hijacked. A recent GAO report noted that explosive detection and cargo profiling are ongoing but no comprehensive cargo-security plan has been developed by the FAA or the TSA. The same report stated that each improvement measure must be weighed against costs and effects on the flow of cargo, but “without a comprehensive plan that incorporates a risk management approach and sets deadlines and performance targets, TSA and other federal decision makers cannot know whether resources are being deployed as effectively and efficiently as possible.”

Another critical element of the aviation system that has received scant attention in terms of security is general aviation. This is an enormous enterprise involving 550,000 pilots, 200,000 private planes and over 5,000 airports. Safeguarding these facilities would require billions of dollars and while some modest steps have been taken, access to these airports and planes remains relatively open. The Aircraft Owners and Pilots Association (AOPA) argues that general aviation does not present a major threat, and the government has concurred. This sector has voluntarily taken steps to enhance its own security. Furthermore, small general aviation airports are inherently secure because strangers would be noticed immediately, and the generally small planes are neither easily stolen nor able to cause significant damage. General aviation has therefore opposed measures proposed by the TSA regarding the denial, suspension or revocation of pilot certificates to individuals considered potential security risks.

The optimistic view of AOPA, however, is not shared by most experts. A simulated attack on the U.S., “Silent Vector,” revealed what its planners called a “gaping hole” in aviation security—the charter services that operate small and medium jets. It is simple to charter or steal a plane with intercontinental range and sophisticated navigation equipment and to include a large bomb in the luggage, thus transforming the plane into the equivalent of a cruise missile. Neither would it be difficult for a terrorist to purchase or steal a commercial sprayer or crop duster, load it with dangerous chemicals and release them as a terrorist attack. It is not even necessary to steal a plane for all that is required to rent a plane is a government issued photo ID, a license and a credit card. In short, the use of general aviation for terrorist purposes is certainly possible and requires the consideration of additional security measures. At a minimum, general aviation should require enhanced background checks into those who rent planes and the use of sophisticated ignition systems with embedded biometric data to deter theft.

Given the complexity presented by safeguarding aviation, it is necessary to mount a sophisticated and nuanced response. Any integrated, innovative approach to aviation security depends on the development and implementation of a careful and comprehensive strategy that recognizes the weakness of each element and develops well thought out systematic measures based on careful assessments. It has been suggested that this be the mandate of the TSA—a strategic systems oriented research and planning role with strong evaluative capability in key areas, especially technology, and that its activities be closely linked to relevant national and international actors.

Successfully implementing this approach and these recommendations will not be easy given the massive bureaucratic reorganization underway, the need to change organizational cultures, and the many traditional obstacles to overcome. A former staff director for the White House Commission on Aviation

Safety and Security, wrote “...the strategic role ... proposed for the TSA cannot be accomplished by the current organization with the current staff and under the existing legislation” because lobbyists influence departmental programs and policy makers override the conclusions of researchers. Nor will the new Department of Homeland Security be able to carry out the analytical tasks suggested above given the immediate needs that it must deal with. Accordingly, the task should be assigned to academia and the private sector.

The Future

Obviously much remains to be done to safeguard the aviation system from terrorist threats. The remaining vulnerability of the system has been documented above, along with the need for a new approach to planning, operations and enforcement. Until now the focus has been upon safeguarding assets—airplanes and airports—but there are simply too many facilities to safeguard and too many potential attack scenarios ranging from cyber to physical to biological, chemical or nuclear. The cost and damage wrought by a “successful” attack will vary greatly depending upon the event—the loss of an airplane is tragic and, more broadly, the disruption to the U.S. economy could be catastrophic. Accordingly, many experts have suggested that the focus should shift to the consequences of a successful attack not only at the system level but at the national as well.

Our national security is dependent upon complex interconnected systems and, the more complex the system (as is the case for international aviation), the greater the vulnerability. Contributing to this complexity is the large number of actors, many of whom are in the private sector, and whose cooperation is essential if appropriate levels of security are to be achieved. As noted earlier, the airlines and other private sector firms have historically not been interested in investing in security measures, apart from theft prevention, and have in fact resisted such efforts. In order to change this pattern and motivate the private sector to adopt different policies, incentives which achieve economic efficiency while enhancing security must be devised.

While every effort must obviously be made to safeguard existing systems by reducing vulnerabilities, it is also necessary to begin to think creatively about designing systems that are less vulnerable from the start. Such systems would be loosely coupled, resilient, flexible, possess redundant capacity, and not be based upon resources whose flow can be easily disrupted. Widespread changes in all aspects of aviation—planning, design, implementation and operation—are required if such a system is to emerge. New concepts like robustness, flexibility, and redundancy will have to be operationalized and integrated into the planning process. Accepted ideas will have to be re-examined. For example: Is remote check in at transit stations desirable? Should we reverse the trend towards intermodal terminals? Should people and baggage be handled separately? The goal should be to incorporate security into every element of the system to the extent possible.

Research is underway to determine whether it is feasible to move passengers and luggage through different modes. Air travelers would drop off their check-in baggage a few days prior to departure at any of a number of locally authorized outlets or even have them picked up at home. The bags would be shuttled to a local transfer station for re-sorting to intercity transport. Bags would be dispatched by truck when possible to arrive in time to meet passengers at their destinations, airport, hotel, or home. The elements for such a system are already in place but would be integrated into a more effective and efficient system. The result would benefit all the participants. It would allow the airlines to save the money spent to handle and screen baggage and enable them to carry additional high value cargo, minimize

the hassle that air travelers now undergo, and greatly enhance security by focusing only on people and their carry on luggage. Perhaps most importantly, the proposed system fits easily into the “layered approach” to security recommended by the TRB. Nor can one overlook the long-term advantages of enhancing the capacity of airports and facilitating travel for an aging population. Whether such a scheme is commercially viable remains to be seen but it represents the kind of innovative thinking that is required to reduce the vulnerability of the aviation system. Such a scheme would also illustrate how it is possible to gain the cooperation of private firms and enhance security by creating a win-win situation.

At the core of such a reappraisal would be a decision process based on clearly defined goals; which, at present, are not apparent. Is the goal of all the security measures enacted by the TSA to decrease the overall risk to passengers? If so then more stringent measures should be enacted. Is it to enhance the wellbeing of the airlines? If so, they should not be expected to bear the high costs. Is it to protect the national economy? If so, air cargo requires more attention. Is it to prevent the release of chemical or biological agents? If so, general aviation requires more attention. Is it to increase consumer confidence? If so, the least invasive procedures are probably desirable. Since some of these goals are contradictory, attempting to achieve them all leads to conflicting policies.

Once goals and objectives are specified, risk assessment methodologies that relate actions to potential threats and to costs can be utilized. These should be based on a realistic appraisal of the potential threat which evaluates such basic factors as the terrorists’ training, skill levels, resources, attack methods and weapons, including chemical, biological, radiological and nuclear as well as more traditional ones. As part of such an analysis, Dr. Szyliowicz posed the following questions:

1. What are the consequences of both the proposed action and the failure to act?
2. What adverse security effects would be avoided if the proposal is enacted and which ones are unavoidable?
3. What are the alternatives to the proposed action, the expected criteria for decision making, and why is the proposed action is the preferred choice?
4. What are the costs of the proposed action as compared to an attack?
5. What are the estimated costs of the proposed action and what is the estimated net present value of the investment required to take the proposed action?

Science and technology will inevitably comprise important elements in such a strategy. Technology can reduce the vulnerability of aviation in important ways; great hopes are placed upon research and development to identify new methods of safeguarding telecommunications systems, of detecting biological, chemical, and nuclear agents, of checking baggage for explosives, and of tracking and protecting containers. Ideally the new technologies will increase efficiency at the same time that they enhance security, but the Department of Homeland Security is composed of agencies that are not known for their experience in research and development and the budget devoted to it is quite small. Only \$0.5 billion of \$37.5 billion was allocated to research and development in the HSD’s FY 2003 budget, and \$75 million out of the \$5 billion budget from TSA’s in FY 2004. A national science and technology strategy for homeland security is required, but it is believed that in the meantime private resources and initiative will be relied upon.

Even if technology development is appropriately funded, it is not a panacea able to “fix” the problem of terrorism. For some threats, such as biological, chemical, or radiological weapons of mass destruction, breakthrough technologies are not available. Long lead times and high costs are often involved in

bringing technologies to market, and at times they do not meet their high expectations. A calculation of the social and economic risks and benefits is essential before making a decision to deploy a particular technology. The use of biometric technology to screen people at airports and other entry points is being discussed. These technologies can tie individuals accurately to travel documents thereby greatly reducing, if not eliminating, problems of identity theft and forgery. However, their implementation has significant implications for increased processing times and, thus, the flow of tourists and business travelers, especially, though not exclusively to border communities. Furthermore, Americans traveling abroad may be required to provide biometric samples to foreign governments. Care must be taken to consider all of the potential implications, for in the past, federal agencies such as the FAA have rushed to deploy technologies whose efficacy was limited by many false positives and whose financial and other costs were high.

Consequence management must become part of aviation security planning, and science and technology can play an important role in enhancing this element. Steps have been taken in this regard but, given the financial limitations, problems coordinating the many actors involved, and frequent lack of interoperability, much remains to be done. For example, a DIA emergency evacuation plan in the case of a major power failure called for sending people to nearby hotels. The same plan called for closing the highway leading from the airport to the hotels. Of particular concern is preparing for effective communication with the public to avert panic.

As technology ultimately depends upon people, better education and training is required. Human beings operate the technologies and interpret the results that technological tools provide. Ample evidence exists as to the ease with which weapons could be smuggled past screeners at multiple airports. Hence, the issue of training and education is as important as the development of the technologies themselves. The creation of a safe and secure transportation system will require a change not only in the application of technology, but also in the ways that human resources apply knowledge and make decisions. Every aspect of transportation—planning, design, operation and maintenance will undergo organizational and technological changes and will require professionals with appropriate skills and perspectives if they are to be implemented successfully. Until recently, transportation security was not accorded a high priority, and education for transportation security received little attention. As a result, there are few transportation professionals in either the public or the private sector who possess an appropriate understanding of security issues or the relevant skills required to function effectively in the new environment. Security in transportation organizations will improve when various levels of the organization assume ownership of security. However, this will take time and be dependent upon improving the technical and conceptual skills of all members of the transportation sector, from truck drivers responsible for transporting hazardous materials, and clerical staff opening the mail and entering data, to corporate level executives and government officials planning and implementing policy. Developing a coherent strategy to tackle such educational and training needs is no simple matter but it is an issue of great urgency.

Efforts to achieve a comprehensive aviation security strategy must go beyond vulnerability management and crisis management to include measures designed to prevent or deter terrorist action. These measures inevitably require the cooperation of foreign states if they are to be effective. Achieving such cooperation is seldom easy, for international politics is characterized by a system of autonomous states, each pursuing its own interests. It is further complicated by widespread hypocrisy and the application of double standards. The U.S. has not been immune from such practices, especially when strategic interests such as the flow of oil are concerned. Furthermore, the administration is unwilling to participate in international treaties and has forsaken the multilateral approach of its predecessors in favor of unilateralism. The

U.S. security policy that emphasizes the right of preemption raises further concerns about American leadership abroad. The decision to topple Saddam Hussein's regime in Iraq has resulted in the deepest rift between the U.S. and many of its traditional European allies, perhaps in history. The greater the growth of negative attitudes towards the U.S.—and these seem to have reached extraordinarily high levels throughout the globe—the more difficult it is to find allies who will cooperate fully and wholeheartedly in the struggle against terrorism.

To reduce the terrorist threat posed by Al Qaeda and similar organizations, it is necessary to deny these groups the ability to establish themselves in secure bases from which they can plan attacks, obtain the necessary weapons and intelligence, and recruit followers with the appropriate training to carry them out. A preventative strategy would be aimed at identifying the members of terrorist organizations, discouraging states from supporting them covertly, denying terrorists access to skills and resources, especially weapons of mass destruction, limiting their appeal and ability to recruit new members. Of fundamental importance in such a strategy is recognizing and attempting to deal with the root factors that drive individuals and groups to violence.

Terrorism, in all its forms, is a criminal activity that warrants vigorous law-enforcement efforts. The enhanced security measures discussed above, including a robust intelligence capability that provides officials with the kind of information necessary to impede or foil terrorist or other criminal designs are all important elements in any coherent strategy. Apprehension, prosecution, conviction, and imprisonment of responsible parties eliminates the possibility of repeat performances and may temporarily disrupt their organizations. Such actions do make terrorist operations more difficult, but they pose a challenge more than a deterrent to determined terrorists. Reliance on law enforcement and enhanced security measures alone is, at best, a partial remedy that only addresses the symptoms (or effects) of the underlying social and social-psychological causes. No amount of law enforcement or enhanced security measures can fortify or protect every carrier or terminal, much less every passenger. Furthermore, a trade off must often be made between enhanced security and civil liberties as the controversy over the Bush administration's Terrorism Information and Prevention System (TIPS) program demonstrated. Grievances—real or imagined, just or unjust, legitimate or illegitimate—are still grievances and terrorism provides the weak or frustrated with a means for gaining attention, if not for achieving ultimate ends. To identify these motivations, of course, is not to sanction or apologize for what is still illegal, organized violence. It is only to recognize that a comprehensive approach to the aviation-security challenge has to go beyond law enforcement and enhanced security measures to grapple with the more difficult social causes. Addressing social causes requires great patience, which is often lacking in policy makers who habitually focus on short-term measures with more immediate, hopefully positive effects.

Longer-term attention to social causes, however, can yield much greater payoffs than either law enforcement or security enhancement alone. Terrorism, especially when its roots lie overseas, is less likely when inter-communal conflicts, if not resolved, are at least managed towards reducing tensions and building a foundation of confidence upon which resolution or reconciliation eventually might be based. This has been as true in Ireland, with its various anti-British, Irish Republican Army (IRA) factions, as in the Middle East, where Palestinian-Israeli differences continue to be the source of organized violence that threatens transportation systems and carriers.

Dealing with such conflicts is, at best, a slow, difficult, aggravating process. Often the best that policy makers and diplomats can achieve in the short term is to manage such conflicts. Progress must be measured in modest terms but building the bases for accommodation, lowering conflict tensions, and

reducing the likelihood that an aggrieved party will resort to terrorism are outcomes that contribute directly to the real security of transportation systems and intermodal networks.

Even modest improvements in conflict relations can have substantial impact on the propensity to resort to organized violence as a response to unattended or unresolved grievances. The same may also apply to terrorism promoted or supported by the “Axis of Evil” and other so-called rogue states. Foreign policies that isolate and further alienate such countries and their governments more likely will result in continuance, not curtailment, of state-sponsored terrorism. Turning rogue states into pariahs or denouncing them with vivid rhetoric does not serve the interests of the acting state and can only worsen the transportation-security problem. It is an extraordinarily difficult problem, of course, to integrate disaffected groups and their “rogue”-state sponsors into the global mainstream. Careful and patient diplomacy will balance condemnation of the actions of states which sponsor terrorism or engage in destructive activities that have significant implications for terrorism (such as North Korea’s renewed commitment to becoming a nuclear power) with constructive efforts to bring such states into the global mainstream where adherence to global norms of acceptable state conduct is more routine.

Such an approach should be guided by the following principles which emerge from a recent study by a former senior CIA official, aided by many experts:

- Inject the counterterrorist perspective into foreign policy decision-making
- Pay attention to the full range of terrorist threats
- Disrupt terrorist infrastructure worldwide
- Use all available methods to counter terrorism, while not relying heavily on any one of them
- Tailor different policies to meet different terrorist challenges
- Give peace a chance
- Legislate sparingly
- Keep terrorist lists honest
- Encourage state sponsors to reform even more by engaging them, not just punishing them
- Help other governments to help with counter-terrorism
- Work with, not against, allies
- Use public diplomacy to elucidate Terrorism without glamorizing terrorists
- Level with the American people
- Remember that more is not necessarily better

Well before September 11, the precarious state of aviation security was apparent. Dr. Szyliowicz expressed hope that the reforms initiated since then and forthcoming measures will greatly improve the situation. However, it is clear that much remains to be done.

Prior to the destruction of the World Trade Center, Dr. Szyliowicz and a co-author wrote: designing an effective strategy to meet the problems posed by transportation security is no simple matter. It requires fresh thinking and new, integrated approaches.... While (terrorist) threats can never be eliminated completely, they are likely to increase over time unless they are addressed adequately (Szyliowicz and Viotti, 1997, 393-394).

He concluded by stating that the words are as true today as they were in 1997.

Luncheon Address

Global Competition and Security Issues in Developing Nations

A. Bradley Mims

Senior Associate, Booz/Allen/Hamilton, Former Deputy Ass. Secretary, USDOT

Mr. A. Bradley Mims began his presentation by explaining that it was a privilege to be invited to speak about issues of importance to the international aviation industry. He was impressed by the meeting, as it was the first for the Aviation Institute at York College, and commended Anthony Perl for organizing it. He acknowledged Congressman Meeks and his legislative assistant Mike McKay, as well as Congressman Floyd Flake for their efforts in supporting the aviation industry.

Mr. Mims' presentation addressed global competition and security issues in developing states around the world through the lens of U.S. policy. Specifically, he touched upon the situations in aviation in Africa, and the Caribbean, as well as Central and South America.

The Structure of Aviation Regimes

Governments organize their aviation regimes and relations with other nations using bi-lateral, regional, and multi-lateral approaches. While it has not always been the chosen structure, liberalized air transport is important to the economies of all countries throughout the world. Currently, the United States undertakes bi-lateral and multi-lateral discussions with our trading partners. The US shares important political, cultural and economic goals with African and Caribbean nations; the three regions share history and a strong future. Increasing trade and services between these regions is of great importance and an environment that fosters the development of efficient and safe transportation is essential to this goal.

The aftermath of September 11, 2001, and the war in Iraq, offer grim evidence of the degree to which air travel and tourism are vital to the economic well-being of nations. The World Travel and Tourism Council released findings that the effects of September 11 caused a 7.4 % decline in world travel and tourism in 2001-2002. This is a total worldwide loss in employment of 10 million jobs; an incredible and disheartening statistic. It is said that because of the war in Iraq, air travel decreased 40% domestically, and another 40% internationally.

Open Markets

Open aviation markets provide air carriers operational flexibility to adjust to changing market conditions and provide a range of services and prices to passengers and shippers. They facilitate commercial and business exchanges, lower air transport costs and promote investment, exports and tourism.

The two former administrations, starting with George Bush Sr., have promoted Open Skies agreements. In the early 90s there was only one and now the United States has 53; ten of which are with African nations and two with Caribbean states. Unfortunately, few US administrations have paid attention to the aviation industry in Africa and when the Clinton Administration extended a hand to African nations, it found appalling conditions. On the continent of Africa only three countries—South Africa, Ethiopia and Ghana—fell into International Civil Aviation Organization (ICAO) category 1 for safety and security. That is unacceptable as more and more people and investments travel to Africa. Aviation services across

the continent should be safe and secure such that they meet ICAO category 1.

In 1998, U.S. Secretary of Transportation, Rodney Slater, along with other departments, created Safe Skies Over Africa with the goal of improving aviation safety and security. Mr. Mims brought attention to Secretary Mineta and Administrator Blakeley who have continued to be supportive of the effort. The intent of the program is to assist as many countries as would like to meet the ICAO category 1 in reaching that goal. Safe Skies focuses on nine countries: Angola, Cameroon, Cape Verde, Cote D'Ivoire, Kenya, Mali, Namibia, Tanzania, and Zimbabwe. Regional activity in Uganda and other developing countries, including Nigeria, the largest African nation with 110 million inhabitants and a young democracy, is also underway.

Safe Skies is an interagency effort within the US government, including the US Department of Transportation, Department of State, US Customs, Immigration and Naturalization Services, the DEA, the Department of Commerce, and the Department of Defense. Initially, a survey of safety, security and air navigation systems is conducted in the participating countries. Then, follow-up visits are made and management training at the FAA Academy in Oklahoma City is provided. Additionally, the FAA Academy specialists have been visiting Africa to conduct needs assessments and with funding from IAD much needed equipment was procured. Furthermore, Safe Skies assists with the creation of sustainable management systems within air transport organizations enabling self-improvement over time.

Open Market Structures:

1. Bi-lateral Approach

Mr. Mims pointed out that as governments work to establish the foundation of safety and security for air services, they must also work towards opening air transportation markets to their territories. Out of the several available methods, Mr. Mims described the three most prominent. The first is the bi-lateral approach. The bi-lateral air transport agreement has existed for almost 60 years since the end of WWII when it was noted by President Roosevelt and Winston Churchill that a change was needed in the burgeoning international aviation industry so that it would sufficiently serve the changing international climate. The United States wanted to create an open, multi-lateral approach while Churchill did not. (The antagonistic relationship between the US and the UK in the realm of aviation has remained and needs to be dealt with.)

Looking at the globalization of air services by alliance partners and network carriers, and the emerging trend of multi-national or regional airlines, it can be argued that bi-lateralism has outlived its usefulness and ought to be replaced by more encompassing approaches. Bi-lateralism limits important evolutionary changes in air transportation.

2. Regional Approach

The second approach is regional. In this case, countries form a regional group that then negotiates with another group or single country, as occurs with the European Union. This approach is a work in progress and the wave of the future. Recent examples of regional approaches to aviation in Africa include the East African Conglomerate of Countries (ECWAS), COMESA, and the Southern African Group of Countries (SADIC). In the Yamoussoukro (Cote D'Ivoire) Agreement several African states came up with an approach to build a common economic structure that includes a common market for aviation in

Africa. Eliminating barriers in a common area allows aviation to develop, and so despite the economic downturn, there is hope in the region. The hope is that the regional philosophy will take hold in more countries throughout the world. In the Caribbean, CARICOM established a pact liberalizing air service rights between member states. CARICOM was urged to look beyond its region and efforts to enter into an Open Skies pact with the United States are currently underway.

As not every nation is financially capable of supporting a national carrier, the development of regional or multi-national airlines is increasing. Bi-lateral agreements do not accommodate the development of regional airlines, as nearly all bi-lateral agreements contain ownership provisions that limit service to national airlines. The US nonetheless recognizes the trend and US DOT has moved to license multi-national airlines. For example, Caribbean carriers such as LIOT have an ownership structure outside of a single country and have been licensed to serve the US. The United States DOT has also approved extra-national services, such as Air Jamaica, operating solely between the New York and Grenada, Barbados and St. Lucia. West Africa's Air Afrique, before it developed its troubles, was a regional airline owned by many countries. While for the most part, the US grants licenses on a discretionary basis, if the joint owners of a multi-national come from nations that have Open Skies agreements with the US, it is almost certain that the US DOT would look favorably upon the ownership agreements.

3. Multi-lateral Approach

The third, and newest, approach to organizing aviation relationships offered by Mr. Mims is multi-lateral. Its promise is illustrated by the first multi-lateral air transport agreement between the United States and several countries belonging to the Asia Pacific Economic Cooperation Group based on Open Skies principals. Secretary Slater and Mr. Mims were the lead entities negotiating this agreement. Multi-national agreements expand the benefits of a bi-lateral agreement from a two-dimensional relationship between two partners to a three-dimensional matrix between several partners. The access of air carriers to capital markets is improved by easing the ownership requirements traditionally found in bi-lateral agreements, thus facilitating the development of a multi-national airline and locating needed capital for upgrade improvements. By establishing a mechanism for the expanded exchange of rights and a uniform standard for commercial aviation relations, the multi-lateral agreement offers a vehicle for establishing Open Skies relations worldwide. The five original signatories to this agreement were Brunei, Chile, New Zealand, Singapore, and the United States. Peru opted to join last year. The United States DOT invites all nations to explore this new way of doing business and to consider its strengths for developing strong aviation services and economic ties with signatory partners.

Conclusion

Mr. Mims concluded by stating that the primary goal of US policy is the provision of safe, affordable, convenient and efficient air service. It intends to expand the overall international aviation market, further increase airline opportunities and expand international service to as many communities as possible. The United States DOT believes that its goals, achieved through Open Skies relationships, will result in increased travel, trade volume, productivity, high quality job opportunities and economic growth. A comprehensive multi-lateral approach is ideal but will take time to accomplish. The US will continue to be innovative in how it works with international partners and intends to reach out to a wider range of nations.

Mr. Mims thanked all of the conference participants and made an appeal to the students in the audience

that they make a start in the aviation business, no matter what the position level. Mr. Mims called the aviation community fabulous and fun, whether up or down, and more importantly, the bridge to our future.

Question and Answer

Mayer Horn

Q - I remember a time when the United States had two airlines that offered overseas flights, Pam Am and TWA. In 2003, how relevant or helpful do you think it is to worldwide aviation to have foreign airlines associated with one country?

A - I think it is helpful. The US carriers are usually the anchor carriers in that situation. If a particular US air carrier is identified as being able to serve a region or multiple regions through a code share relationship with the carriers that are from those areas, it makes the US more visible and capable, and it gives the American public greater ability to travel outside of Europe and Asia. We are initiating the same kind of Safe Skies agreements with the nations of South America as we are doing with Africa. American Airlines has most of South America tied up, and if AA were to develop a code share and alliance relationships with entities in Latin America it would only serve to enhance US presence and the US flag in those areas.

Session 3: Economic Challenges, Part 2

William DeCota

Director Aviation Department, The Port Authority of New York and New Jersey

Mr. William DeCota began by acknowledging that there were a number of partners who played an important role in organizing the inaugural event, specifically mentioning Robert Paaswell, Director of the University Transportation Research Center (UTRC) at CUNY, Elliot Sander, Director of the Rudin Center for Transportation Policy & Management, JetBlue and Bombardier. He expressed that The Port Authority of New York and New Jersey was pleased to play a pivotal role in creating the Aviation Institute and called it an extraordinary program.

Mr. DeCota's presentation addressed two subjects: 1) the local perspective of an airport operator; and, 2) things that can be done to revitalize aviation. He began by providing a description of the current situation in aviation. When the partners first began discussing the conference, the airline industry was not in as dire straits as it is currently. It had suffered since September 11, 2001, and its major business partners were in duress, but on the whole the industry was beginning to bounce back. The future now is much more uncertain. The industry is in terrible condition—traffic has been affected by hostilities in the Middle East, and advanced bookings since March 19, 2003 are down about 20%. As the health of the industry is so vital to the entire region—its trade, travel, commerce, tourism and economic activity—whatever happens here not only resonates through the borough of Queens, but through this city and this entire country. Thus, it is incumbent upon those who are in a position to make a difference to work towards improving the health of the industry.

Mr. DeCota emphasized the reciprocal importance of the Queens community and the aviation industry to each other. He referred to the relationship as “co-dependent” and “symbiotic.” The airports need the community and the community needs the airports. The local airports rely upon the community for work force and the community relies on the airports for employment. The community relies on the airport for goods and services that are traded here in the local region, and the community gets jobs, travel, and additional benefits. It is a win-win situation for both. Mr. DeCota provided the following example as a metaphor for the relationship between the community and the airports. The Nile crocodile exists with an Egyptian plover standing in its mouth. The crocodile does not eat the bird and the bird does not do anything to gorge on the crocodile. Instead when the bird enters the mouth of the crocodile, it feeds off of food that has fallen between the reptile's teeth and through the process of eating removes harmful parasites that might otherwise injure the crocodile. The bird gets fed and the crocodile gets relieved of this harmful parasite. It is a mutually beneficial relationship.

Mr. DeCota considered the recent words of Queens Borough President, Helen Marshall, which called Kennedy and LaGuardia airports the economic engines of this community, to not be hyperbole, but instead fact. He explained that there are huge economic benefits from the airports. Together they employ 41,500 people; that is 9% of the total employment in Queens. Many manufacturing, cargo processing, and subsidiary jobs are also created by the industry. The Queens Economic Development Corporation did an analysis and determined that for every two jobs that created at an airport another is created in the local community. Crain's called

American Airlines the 16th largest employer in New York City. That places aviation companies among the ranks of the biggest employers in New York City such as financial intermediaries like Goldman Sachs, the Bank of New York, as well as Insurance Companies like AIG and others. In this context it becomes clear how important this industry is and the degree to which the fates and fortunes of Queens and this city are tied to aviation.

Airports and aviation, Mr. DeCota pointed out, are the second largest employers in Queens, and larger in this borough than any other place in New York City. Wages are \$47,900 annually on average; that is 37% higher than the borough of Queens' average. This figure does not take into account well salaried employees like those in the Transportation Security Administration (TSA), which has added many jobs to the airport workforce, and filled them with workers from this borough. The Port Authority supports the Council for Airport Opportunity (CAO), which works to link jobs and airport tenants with skilled people through job referral. Thus far thousands of people have gotten jobs as a result of the Council's efforts.

Mr. DeCota explained that the Port Authority actively works to keep the community and these airports together in what he calls the "cradle to grave" program. The Port Authority gets involved early on by running local programs for school children to make them aware of aviation as a career and then works with the aviation high school and provides them with classroom space out of the airports. Mr. DeCota, as president of the Queens Council of the Boy Scouts, involves the Boy Scouts through explorer posts at LaGuardia and Kennedy Airports. The Port Authority serves on the board and faculty of the College of Aeronautics, as well as on the CUNY Aviation Institute Advisory Board. The Port Authority also formed the Air Services Development Office that intends to put 4,000 local businesses together with opportunities at the airports. Last year alone, the office assisted with 427 different contracts at \$56 million to Queens-based businesses. Some of the businesses that benefit include Kings Pest Control, Cherry Office Products, Five Boro Banner and Sign, and Jamaica Blueprint.

The airports, Mr. DeCota explained, spur development. Two examples are air cargo centers, and JFK Corporate Square. The economic development potential around rail stations is increasingly obvious and the AirTrain station is a perfect candidate. The Port Authority has spent \$1.8 billion on the 8.4 mile system that will connect JFK to mass transit in just 8 minutes. Jamaica is another major hub only 8 minutes away and a perfect place for mixed-use development like hotels, conference centers and more. The Port Authority has been involved in these projects as well as ancillary design projects to better integrate these elements into the community.

Furthermore, noted Mr. DeCota, The Port Authority works with Congressman Meeks who has been a tremendous supporter of Airports in Queens. Congressman Meeks recently launched a trade mission to Ghana in which the Port Authority participated, and it resulted in two construction/telecommunications contracts with Queens' businesses. More importantly the agreements laid the foundation for other businesses to visit Queens and establish good businesses relationships. Congressman Meeks is also looking at the potential of harnessing an additional foreign trade zone to that which exists at Kennedy Airport already. Aside from simply providing physical infrastructure, and working to assure that people and cargo get from land vehicles to air vehicles by way of terminals and cargo buildings, the Port Authority is trying to fuel the industry and ensure that it focused on and targeted towards the local community.

The nemesis of the successful recovery of this business and is a weak economy. The Federal Reserve reports that the economy is strong and should be able to sustain growth. The aviation economy is expected to lag the recovery in the national economy by 6 to 8 months. A concerted effort to boost the industry, like that shown at Jim Larson's cargo symposium with the JFK Cargo Association, needs to be made. The fragility of the airline industry is real; it is expected to have a \$9.5 billion deficit, a figure greater than the gross national product of 90 countries.

Mr. DeCota acknowledged that there are multiple factors impacting the aviation situation as well as a variety of positions on how the industry might survive. One solution worth review is how heavily the industry is taxed. The Airlines pay over 9.3 billion in taxes. Mr. DeCota recalled that the Chairman of Delta, Leo Mullin, made the comparison that if airline companies were taxed at the same level as companies selling distilled spirits and handguns, i.e. those subjected to "sin taxes," the taxes on airlines would in fact be cut in half. Such a level of taxation is worth congressional review. A number of federal relief bills exist and the issue is being debated in Congress. The Port Authority is educating Representative Jim Oberstar and Senator John McCain in what needs to be done. Additionally, Congressman Meeks recently introduced a bill that would provide airline relief. The industry has had to adapt with regard to market entry and pricing since the 1978 deregulation and the Port Authority is helping the airlines to evaluate their post-deregulation behavior and structure. Deregulation provided the freedom to enter and exit markets, price products, and fail, as happened to the four biggest carriers in the region, Pan Am, TWA, Eastern, and People Express. Despite the losses, traffic has grown because the industry is important, strong and resilient, and will continue to fuel the economy.

Security is another one of the chief issues that Mr. DeCota presented as a challenge to the cargo and passenger business. So that security concerns do not discourage people from traveling, it is essential to provide a sense of well-being and make sure their needs are protected. In the case of cargo, the issue of the time value is unavoidable. The Port Authority has been working with the Transportation Security Administration (TSA) to make sure that the region's airports are the safest and most secure. However, cost and who will cover those costs is a key issue. Deploying explosive detection systems at airports requires resources; they cost a fortune, weigh a lot, and require terminal modification to accommodate them. The Port Authority is lobbying the Federal Government to cover the costs, as it is widely agreed that security is a national business. However, funding ought not stand in the way of moving forward and due to the leadership of the Governors of New York and New Jersey, the Port Authority has been able to add \$200 million to its fund security projects in its capital plan for LaGuardia, Kennedy, Newark, Down Town Manhattan Heliport, and Teterboro Airport.

Mr. DeCota pointed out what a sense of insecurity can do to the aviation industry by pointing to the recent war with Iraq. Traffic decreased by 20% in a two-week period which Marion Blakey, the current administrator of the FAA, said resulted in a loss to the airlines of the past four years of growth. The rebound in traffic is expected to take two years more. All of the airlines have been placed on credit risk as some are in bankruptcy and others are believed to be joining them. As New York remains under the highest levels of alert and there is fear of retaliation, the Air Transport Association (ATA) announced that the industry losses are expected to be the biggest yet. Given this scenario, the Port Authority has pledged to provide the safest

airports anywhere, and the best level of customer service such that the system is a fortress-like safe haven environment for airline travelers.

Mr. DeCota concluded by stating that there are multiple challenges facing the industry but he believes it will emerge in a healthier position. The industry has seen difficult periods before, yet the industry prevailed. In the early part of the last century Queens was a notable manufacturing location for pasta, cut stone, and ice cream. There was more freight on the Newtown Creek than on the Mississippi River with the movement of raw materials in and out, as well as manufactured goods shipped out. Now most of those businesses are gone and big box stores and condominiums are in there place; it is reused and becomes vibrant again. Mr. DeCota pointed to adaptability as the hallmark of the borough. Likewise for the industry, despite that it is facing turbulent skies and some carriers may not be able to weather the storm, the fact remains that airports and air travel are going to remain big business. The big investments being made in the airports are not a waste because air travel will remain viable for many years to come; investments are part of equipping the industry for the needs of the future. The bottom line is that when there is a common problem, the Port Authority and the community is drawn together and produces harmony. The industry and the community are partners in a three-legged race where success and failure is mutually felt. At times the Port Authority will carry the community and at times it will carry the Port Authority. The most important part is that they are going to cross the finish line together and be victorious.

Question and Answer

Mayer Horn.

Q - You made reference to Federal Relief Bills. Eventually the industry will rebound and there is a question as to whether or not federal legislation will inhibit the ability of the Port Authority to manage its airports using congestion pricing? Do you think that congestion pricing would be beneficial and is this the time to act on it?

A - You will remember the congestion at LaGuardia and we took decisive action with the FAA. First we declared a moratorium on additional flights and then the FAA implemented an option to reduce the number of flights entering the airport. As the local airport operator, the Port Authority began an aggressive approach to control demand. Everything changed as a result and capacity was back in check. Then September 11, 2001 took its toll and now we are at a level where there is no need to specifically implement congestion pricing. Currently, we are looking at administrative measures to control demand, in other words, limiting the numbers of flights and regulating the size of aircraft. We are also looking at market measures because the market price usually results in an optimal allocation of resources. Yet we recognize that one cannot make all flight decisions on the basis of economics because there are some reasons, inexplicable in market terms, for why people need to be in a certain place at a certain time. We are still progressing analysis on how to approach congestion pricing when demand returns but now, given the nature of LaGuardia, we are blessed to have the number of flights that are coming in. We expect to be ready to manage traffic when high volumes returns, but now is not the time for congestion pricing.

Carol Lee Whiting

Q - I represent an organization in Queens called SAFE (Safe Aviation for Everyone). I would like to add to the potpourri of issues raised today the issue of health and environment. There have been ideas coming up in various communities around asthma, hearing loss due to noise pollution, passengers getting swollen limbs after reaching a certain altitude, and various other health problems. From the environmental standpoint, the fuel from the planes affects Jamaica Bay and other elements of the ecosystem. Is there any money available to communities to do research or educate around these health problems so they can be combated?

A - It is important to recognize that we operate airports to benefit the quality of life for people in this region and not detract from it. That is fundamental to the Port Authority. Whatever activities are related to our operations, the whole intent is to make sure we benefit quality of life. There are a number of programs that looking at the issues you raise. Congressman Crowley is using congressional money with the help of NYU to do a study of these issues. The Port Authority has an aggressive program of sound proofing homes. There are programs out there and we can most likely give you a direct connection to some of the things underway.

Closing remarks

Using Knowledge to Meet Aviation's Most Pressing Needs

Dr. Anthony Perl

Director, CUNY Aviation Institute at York College

At the CUNY Aviation Institute, we have taken skills development to be an important part of our mandate. There is great opportunity and promise in developing skills. All that I have heard today leads me to think that skills are going to become even more important to aviation's success in the future. Indeed, whether it is to turn around companies that are currently restructuring, to roll out or advance the fortunes of new carriers and new operations that will be joining the aviation sector, whether it is to meet some of the threats and challenges in our security areas, or to meet the very real challenges that are presented by the environmental impacts of aviation, all of these areas and more will benefit from a better skilled workforce. Raising the level of skills and expanding the scope in which those skills are imparted and developed are key parts in the solution to many of the problems and issues that have come up today. The Aviation Institute hopes to contribute to that. Whether it is a more productive workforce on the commercial side or a more secure airport environment, skills will help to meet those needs. It takes skill to be able to look over a scene at an airport, the travelers, the meters and greeters, those just passing through and determine who needs attention, what type of threats could be represented there, and how to deal with it in a way that is more effective over the long-term and more sustainable than our immediate post 9/11 efforts. Dr. [Mr.] Syzliowicz pointed out that a large amount of resources have been thrown at the problem since 9/11 but sorting that out over the long term will require a greater effectiveness, focus and ability that will come from continual upgrading of the skills of the security workforce. The same can apply to the competitive fortunes of commercial carriers to give people more for less—a pressure that the airlines always face, and again the skill set will be a key ingredient in meeting that challenge.

Skill Development

There are three points to consider: determining the right level of skills for new or existing programs; prioritizing the skills most immediately needed; suggesting or identifying how we will develop those skills most effectively. These are the considerations at the forefront of my mind as well as my colleagues, the faculty, the advisory board. Starting from a clean slate, although it is a daunting challenge, offers the maximum opportunity to meet tomorrow's challenges and not be bogged down with having to backtrack or justify some of the things that have been developed, that may be well done elsewhere which we will not seek to duplicate. We have the chance to address these questions at a crucial time in the industry.

What is the right level of skill?

I will use an aviation example, a New York air service example of a 1931 trans-Atlantic passenger dirigible docking at the top of the Empire State Building which was almost brand new back then. What does this have to do with the right skill level? It will become apparent in a moment because it connects to some of the threats that are involved with aviation of all types. The people who were involved in that particular aviation sub-sector thought that they had accomplished quite a lot by being able to provide downtown arrival service with trans-Atlantic travel—something that since the helicopters from JFK to the Manhattan heliport stopped, has not yet arrived again. But at the same time the people who were involved in that particular service, at least on this end of the Atlantic, had a breadth of skill. They could

understand a bit about physics and chemistry. They knew what was inside the dirigible. They also had a bit of knowledge about international relations, the global tensions, and economic turbulence. As that original dirigible, the Graff Zeppelin, was replaced by its much more infamous successor the Hindenburg, they thought it might be better to move the location of arrival from the tallest building in Manhattan, and the world at that time, to a slightly less populated area—Lakehurst, New Jersey. The net result was that, unfortunately when tragedy struck in 1937 and the Hindenburg was lost in a fiery catastrophe with some loss of life, the consequences were much more minimal than if that had happened in Midtown Manhattan right next to a skyscraper.

So I think that a breadth of skill that allows people to make connections, perhaps see things ahead of the curve, good opportunities as well as risks, and act upon them is important and goes beyond some of the technical and focused training that perhaps has been typical of the aviation sector, or indeed many areas of the transportation sector. We want a breadth of skills to complement specialized knowledge and capacities. The greater the degree of uncertainty in the world, the more important a breadth of skills may be to the future contributions of aviation.

Skills should also be deep. There are times when people in an organization have to make autonomous decisions in unexpected circumstances, whether it has to do with stranded passengers, problems with equipment, or an inability to follow the schedules and procedures built into aviation. Those people need a depth of experience and ability to take matters into their own hands, to be able to solve problems that arise. So the combination of breadth and depth are important. Breadth far enough to anticipate, hopefully prevent, or at least minimize risks and maximize opportunities and depth enough to solve problems. We have all been in situations where something unexpected happens when traveling and we know the difference between an organization that has staff with the depth of experience to improvise and solve problems that arise unexpectedly and those that do not.

How do we develop the most needed skills?

Strategic thinking is the generic approach or paradigm to curriculum and skill development that allows people to relate and understand how their tasks, whether it is in routine matters or when the unexpected arises, connect to, support and advance the goals of the organization. Whether it is a new low cost carrier that is trying to break into markets and find a new way of doing business or whether it is an established carrier that is in the midst of restructuring or about to come out of chapter 11, the more that the staff and the people involved in that enterprise understand that what they do fits into the whole and advances the organization through strategic thinking, the more effective they will be in whatever technical or non-technical duties they perform. Problem solving, being able to adapt the techniques that we will impart, is the application of that strategy. No matter how successful we are in the classroom, there will be all sorts of exercises that seem far removed from what one does in the day-to-day work world, but I would submit that some of that training and education does prepare students to handle problems and situations that are very different from those explicitly or specifically identified in the classroom. The more successful we are in our curriculum, the more it will manifest itself, not in the ability of the graduates to go out and follow the exact same scenarios and apply exactly the same tools as in the classroom, but rather in their ability to pick up new tools, or to use existing tools and innovative ways to solve the inevitably unique problems that everyday brings in every transportation system.

It is somewhat different for a brand new program like ours, yet our colleagues represented here as well as others in continuous improvement efforts, are grappling with engagement. One of the things that

thrills me about today's event and gives me the most encouragement is engagement with such a broad cross-section of the aviation community. I see people here from many different backgrounds—some have day-to-day operational responsibility in aviation, others are neighbors of the airports, we have public representatives, we have industry, and the next generation represented in the students. Indeed, there is a place for all of you, whether it is in our program or another, to engage and help the university sector as a whole to develop the next set of training and educational opportunities that are going to meet these needs. We will take as much advantage of your experiences and expertise as you will let us through the website, the proceedings, questionnaires, occasional focus groups and meetings, to make sure that we have as much of your feedback, input and advance testing of the concepts in our curriculum.

In addition to the engagement, resources are required to make that happen. The Aviation Institute at York College, through the Port Authority, is well on the way to making the connection between technology and the quality of experience taking place in our classrooms. We will start our first classes in September for our undergraduates at York College and our goal is to develop a full-fledged Bachelor of Science in Aviation Studies. It will be interdisciplinary, bringing the non-technical disciplines and perhaps some of the sciences and environmental studies as well into a degree that allows our students to look at management opportunities, public sector and security responsibilities as well. We are going to have the resources to bring in the technology and talent, some of which is in this room and some of which will be recruited from the vibrant and wealthy aviation community here in New York City. We are well situated in New York because we have a wealth of talent concentrated in the region to draw from.

We use the metaphor of the “Hub of Expertise” as part of our guidance and objective for the Institute. Today is the first hubbing of our operation here at York College and we may find other locations to hub at in the region. I am glad so many of you were able to join us here today. Again the idea is that for a city of its size and importance, for the importance of the aviation sector to this city, there is the potential for a critical mass to bring expertise and knowledge together locally and from around the world. We have taken the first step towards internationalization by bringing in Canadian perspectives, and it will not be the last. New York will benefit from an ongoing set of engagements and opportunities to tap into the wealth knowledge that passes through this global crossroads on a daily basis.

We are also going to do customized training. I am sorry that some of our colleagues from JetBlue that are involved in this training were not able to make it today. They were called away to San Diego to nail down the start-up of one of its newest destinations, which I understand is to begin very soon. We have been meeting with JetBlue regularly and they have encouraged us by supporting this event as well. One of their priorities is to build skills for productive and customer-focused conflict resolution within the workforce and for those that sometimes emerge between a company and its customers. We are heading in that direction and I hope that by the next time we meet we will have developed a valuable, state-of-the-art, day or two day training course that will serve as a springboard for similar efforts with other carriers and other businesses involved in the aviation sector. To have very focused and applied courses with one or more organization will be a complement to and a way to nurture our academic program. The two will enrich each other—the academic breadth will hopefully add perspective and strategic thinking to the coursework in these short courses, while the practicality and experience of actual problem solving will cycle back into the full-time student's classroom experience, hopefully to the benefit of both.

On the security front there is no shortage of needs, only a shortage of resources to meet those needs which skill development will address by hopefully preparing professionals to do more with less. We are working with John Jay College, the criminal justice focused college within the CUNY umbrella and one

of the leading such institutions in the US and globally, I would argue. Although John Jay has extensive resources and assets in security, protection management, forensic psychology—all things that are of critical value to aviation security—they have not applied them to the aviation sector in an organized way. That is changing now since we established a project team with our colleagues from John Jay. We are hoping to get support and momentum for a pilot program we call Supplemental Security Skills that would go beyond the Transportation Security Administration's (TSA) basic training. It would allow any range of workforce, from TSA to others, to develop security skills that will hopefully, without increasing the cost burdens, increase the effectiveness of the workforce, whether fulltime security or those who work in the car rental, the concession stands, parking lots, the activities that are not traditionally focused on in terms of security. The opportunity to build security skills throughout the aviation workforce will be one way to meet some of these threats without increasing costs to carriers or airport operators.

I do not want to pretend for a moment that we have all the answers here. We are a small institute and it is a small beginning, but from what I have seen and heard today and from your engagement and participation, I would like to think that we are off to a good start. Although the perspective from the front is never perfect, I am thrilled and pleased by what I have seen and heard from people interacting with one another and engaging with our speakers. I would like to emphasize that we would like to partner with other institutes of higher learning so as not to reinvent the wheel. Our working mission statement, "Advancing Aviation through Academic Achievement," is a very open and inclusive one that our board will wrestle with and maybe improve before too long. I think there is a lot of opportunity to do that here in the New York area through our own efforts and working with our colleagues at the other institutions.

Questions and Answers:

Mayer Horn

Q: I have two comments. One is that about 40 miles east of here, with federal earmark status, there was established the National Aviation and Transportation Center. There might be both lessons learned and material there that might be valuable, for example sophisticated computer systems. Secondly, 15 miles from here in the same general direction is a facility called Cradle of Aviation and it might be an opportunity for your students.

A: Thank you. I am familiar with the NAT Center and Dowling College's efforts. I know Clifford Bragdon, who was in many ways the architect behind that, and Gail Butler who continues to be on the faculty. Although her schedule did not allow her to be here today, we have been in touch already and I definitely want to make sure that we do not miss any opportunities based on what they have done and continue to do in their program. I am not familiar with the Cradle of Aviation and will look into it immediately after the conference today. Thank you for mentioning it.

I think these are exactly the kind of points we can benefit from whether it is in person today, by email, or any other form of feedback that you want to offer. You might as well take advantage of having been here at the inaugural and you might as well give us your thoughts based on what you have heard today, and how we might be able to serve some needs.

Tuomo U.S. Pihlava

Q: When we are talking about the academic side of aviation, I regret that I have to mention the Columbia accident but I feel it is a very good example of how the academic side made the decisions that reflected on the technical side. My question is how are you going to get your students out at 4 in the morning in a hanger where the very important decisions are made? You can come here at 8am and study all day long but today's aviation world is so complicated. It is not difficult, it is very complicated. I think academic people should take a good look at the technical side because the academic people are the ones making the decisions.

A: There are a couple of points that deserve to be underlined about our ambitions and our objectives for our program. The first is to make sure that our students have as much hands on experience with the industry outside of the classroom as possible. Our program objective is to get our Bachelor of Science aviation degree certified, and it will be the only certified program in New York City. Any program certified by the Council on Aviation accreditation is required to have an internship or work-study component. That is something that we want for each of our students. Starting in the fall we are going to have students available for internships, paid or unpaid, depending on the structure of the internship. We want to make sure that our students have the chance, whether it is at 4 am or other times that work for them and the potential employer, to get out there and see what goes on in the field and connect it to their studies as much as possible.

As far as the relationship between complexity, technology, skills and learning in our program, I do not know that we are in a position yet to turn out technical experts. We have at City College the transportation, engineering, and aerospace technology program which is much stronger than at York. Given that we have the CUNY umbrella over us, there is no reason why over time we cannot bring in high-tech training to our program or bring our program to those high-tech activities.

What we are going to try to do is provide our students with the best understanding possible and appreciation of the skills needed to make decisions, whether management, policy, or financial, while making the best use of and understanding the limitations of technology and the output of technical processes and practices that they themselves may not be experts in. I believe that any industry that expects all of its staff to be technical experts will always be falling a bit short of its potential or opportunity because technical expertise is a scarce resource and is not something that everyone can understand to the same degree. However, understanding how to work with technology, how to manage it, how to use it effectively and understand its limitations, and the ability to make use of the input of technical experts, are all components we hope to build into our students' tool-kit.

Submitted Papers



THE CYCLICAL CRISIS IN COMMERCIAL AVIATION: CAUSES & POTENTIAL CURES*

by

Paul Stephen Dempsey

INTRODUCTION

Giovanni Bisignani, Director General of the International Air Transport Association, recently observed that “the North American airline industry is in ruins.”¹ Unfortunately, the financial crisis in which the airline industry presently finds itself differs only in terms of its magnitude from those which preceded it.

If one pulls newspaper clippings describing the condition of the airline industry from the early 1980s, the early 1990s, and the early 2000s, the headlines are remarkably similar. They speak of the economic disintegration of the airline industry, massive financial hemorrhaging, tens of thousands of employee layoffs, hundreds of grounded aircraft, numerous bankruptcies, and major liquidations.

This essay offers observations on the following issues:

- What is the magnitude of the contemporary financial crisis?
- How does the contemporary crisis compare with past economic downturns?
- What are the causes of the airline industry’s unsatisfactory financial performance?
- How will the airlines extricate themselves from this morass?
- How might the government assist the industry in extricating itself from this morass?
- Should foreign governments follow the U.S. lead?

WHAT IS THE MAGNITUDE OF THE CONTEMPORARY FINANCIAL CRISIS?

In 2001, the U.S. airline industry lost \$13 billion, of which the taxpayer paid \$5 billion as part of an unprecedented \$15 billion federal bail-out package of grants and loans. 2001 was not turning out to be a pretty year even before the tragedy of September 11th. Demand, which grew at 4% per year throughout much of the 1990s, plateaued in 2001, well before the tragic events of September 11th. Let us examine its causes:

- The overcapitalized high-tech, tele-com, dot-com bubble burst, depriving the airline industry of large quantities of executives willing to pay exorbitant walk-up Y fares; and
- Recession swept across the landscape, causing business to tighten its belt and its travel budget, and consumer confidence to wane.

THE CYCLICAL CRISIS IN COMMERCIAL AVIATION: CAUSES & POTENTIAL CURES

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Then came September 11th.

- The FAA grounded the airline industry for three days;
- The traveling public was horrified by the repeatedly televised film clips of jets crashing into the World Trade Center;
- As enhanced security procedures were implemented by the nascent Transportation Security Administration, the “hassle factor” grew, increasing carrier costs and further depressing traffic; and
- The United States led a war in the Mideast.

As a consequence, demand plummeted. Another terrorist event will further depress traffic.

2002 was little better. Recession continued, layoffs and bankruptcies seemed abundant throughout the U.S. economy, and consumer confidence waned. Federal Reserve Chairman Alan Greenspan described the U.S. economy as having hit a “soft spot” in the road. But for the airline industry, it was far worse than stumbling into a soft spot; it was falling into an abyss. The major airlines (except Southwest) were burning through \$24 million a day, creating an enormous liquidity problem. The industry’s debt/equity ratio jumped to 90/10, 80,000 employees were laid off, and 577 aircraft were parked in the desert. By year’s end, USAirways² and United Airlines were in bankruptcy.³ The industry lost \$9.5 billion, or a cumulative \$22.5 billion in just two years. This cumulative loss exceeded all the profit the industry had earned since Orville and Wilbur Wright took flight nearly a century earlier.

2003 promises to be even worse. The U.S. economy is in recession, President George the Younger has led the country into the second U.S. war against Saddam Hussein, and fuel prices more than doubled⁴ – all the ingredients for an exceptionally bad year, financially, with no end in sight. Hawaiian Airlines declared bankruptcy, and by some accounts, American Airlines – the world’s largest airline – may not be far behind. What was originally projected to be a \$7 billion loss for the year could, according to some sources, turn into an \$11-\$13 billion loss if the war is prolonged.⁵ That could produce a total loss for the three years of between \$34-36 billion.⁶ With \$100 billion of debt, \$18 billion in unfunded pension liability,⁷ and only \$2 billion in equity, the airline industry’s access to private capital markets is virtually nonexistent.⁸

This financial crisis is worse than any the industry has ever suffered. But then, every downturn in the economy has led to progressively worse financial results for the U.S. airline industry since it was deregulated in 1978.

HOW DOES THE CONTEMPORARY CRISIS COMPARE WITH PAST ECONOMIC DOWNTURNS?

The problems faced by the airline industry today are different in magnitude, certainly, from those it suffered in earlier periods since deregulation. But they are not new.

Let us provide some historical perspective, in reverse chronological order. During the recession of 1990-94, the industry lost \$13 billion, the worst losses in history up until that time.⁹ Terrorism had earlier depressed demand with the explosion of Pan Am 103 over Lockerbie, Scotland. President George the Elder had led the country in its first war against Saddam Hussein, and fuel prices had spiked. The

industry lost all the profit it had earned since the dawn of commercial aviation. During this period, five major airlines (Pan Am, Eastern, TWA, Continental and America West) fell into bankruptcy, and two of them (Pan Am and Eastern) were liquidated, while a third (TWA) stumbled on without profits for nearly a decade until it was acquired by American Airlines.

During the recession and fuel spike of 1981-83, the U.S. airline industry lost \$1.4 billion. Two major airlines (Braniff and Continental) fell into bankruptcy, and one (Braniff) was liquidated.

Before deregulation in 1978, there were no major airline bankruptcies or liquidations. None. When a carrier was suffering financially, the Civil Aeronautics Board injected it with lucrative routes, or encouraged a healthier airline to acquire it (as Delta acquired Northeast, and United acquired Capitol, for example), much the same way the banking regulators handle the problem.¹⁰

But there were several crises in the industry that caused it much financial pain. In the early 1970s, industry reeled from the onslaught of massive capacity increases inspired by overly optimistic traffic projections coinciding with dampened demand fueled by recession, and a tripling of fuel prices triggered by the Yom Kippur War and the resultant Arab Oil Embargo. The regulators responded by approving cost-based tariffs, authorizing capacity limitation and route-swapping agreements, and imposing a moratorium on new route certification. The result was reduced profitability, and a one year (1970) loss of only \$200 million - again, the worst losses in history up until that time, though they pail in insignificance compared with the \$1.4 billion losses of the early 1980s, the \$13 billion in losses of the early 1990s, or the \$34-36 billion losses of the early 2000s. But consumerists viewed the use of these financially bolstering regulatory tools as anticompetitive, and it sewed the seeds for regulatory reform, the momentum for which evolved into wholesale deregulation.¹¹

Going back a bit further in time, in 1938, the airline industry successfully lobbied Congress for regulation to protect it from the vicissitudes of the market cycle. Before regulation, the U.S. airline industry had lost half of the capital that had been invested in it. The unregulated airline industry (before 1938 and after 1978) appears to have the characteristics of destructive competition whenever the economy softens.¹²

WHAT ARE THE CAUSES OF THE AIRLINE INDUSTRY'S UNSATISFACTORY FINANCIAL PERFORMANCE?

What has caused contemporary crisis – the worst financial result since deregulation? The fundamental problem is excess capacity relative to demand, and excess cost relative to price. At this moment in history, there are an insufficient number of passengers willing to pay a price sufficient to cover the industry's costs.

THE COST/PRICE DISCONNECT

Costs have risen significantly. September 11th not only dampened travel demand, it increased security and insurance costs. By some estimates, increased security alone imposed \$2.5 billion of additional costs on the industry.

Then, there were the labor agreements signed during the “bubble” years of the 1990s. In baseball, the Texas Rangers signed a contract with free agent shortstop Alex Rodriguez for a salary of \$24 million a year. In commercial aviation, United Airlines signed a contract with its pilots union paying senior pilots \$300,000 a year. Both created a new paradigm of unrealistic and unsustainable expectations by other

employee groups.

The threat or inauguration of war in the Mideast always causes fuel costs to spiral upward. The confluence of these events led airline management to focus on liquidity and CASM,¹³ and government assistance in the form of subsidies, insurance, and tax relief.

Costs have also been driven by the megatrends of deregulation. Since deregulation, all major airlines but one (Southwest) have adopted the hub-and-spoke method of distribution. On the revenue side of the equation, hubs:

- Produce a geometric growth in the number of city-pairs that can be marketed;
- Create monopoly and duopoly pricing opportunities for O&D traffic to and from the hub, as well as certain connecting markets fed only by it;
- Allow carriers to take advantage of the S-Curve relationship between revenue, along one axis, and frequency, along the other.

However, hubbing creates variable-cost-based pricing for long-distance city-pairs with multiple hubbing opportunities. But in an industry dominated by fixed costs, a variable cost focus can impair the ability of carriers to cover fully allocated costs. Moreover, in a recessionary economy in which large numbers of traditionally high-yield passengers decline to fly (and thereby cross-subsidize the fully allocated costs of leisure travel), and many more prefer the convenience of nonstop service wherever available at reasonable cost (as for example, by low cost carriers),¹⁴ the cost burden of frequency and hub connectivity can outweigh its revenue generation.

Hubbing drives costs up. It erodes productive efficiency by lowering equipment utilization, lowering labor utilization, and increasing fuel consumption. Because of market fragmentation, hubbing deprives the industry of its ability to use higher capacity/lower CASM aircraft.¹⁵

The failure of costs to fall at the pre-deregulation pace may explain the fact that post-deregulation real (inflation adjusted) yields have fallen at a slower pace than pre-deregulation real yields.¹⁶

THE DEMAND/CAPACITY DISCONNECT

The excess capacity which plagues the industry is a product of the desire of airlines to offer the frequency levels that attract high-yield business traffic. It is a Tragedy of the Commons phenomenon.¹⁷ Individually rational behavior becomes collectively irrational. The S-Curve relationship between frequency and revenue causes carriers to offer high frequency on all their important routes in order to capture the business traveler. The 15 interior hubs, create wasteful network duplication driving competitive pricing down to variable costs in order to derive some revenue from seats that otherwise would fly empty. The internet's contribution in terms higher load factors and reduced distribution costs is offset by its ability to drive prices down to collectively nonremunerative levels.

Excess capacity is also caused by the fact that average unit costs decline with growth, and increase with constriction. This is true, not only because of the high ratio of fixed to variable costs in the industry, but also because the least expensive employee is the most recently hired, who, because of labor seniority rules, will be the first out the door if the company lays off employees.

The bankruptcy laws also play a role in producing excess capacity, by giving special protected status to aircraft lessors, and stringing out the process of capacity reduction via liquidation. The aircraft themselves are relatively fungible, and the fuselage can be readily repainted in a surviving carrier's livery, thereby bringing grounded aircraft back to life.

Moreover, the airline industry has always, will always, and probably should always provide capacity in excess of demand. Demand for airline services is highly cyclical and fickle, depending on time of day, day of week, month of year, and broader macroeconomic trends of inflation and recession, as well as the psychological impact of catastrophic events (such as a crash into the Everglades or the World Trade Center). Excess capacity encourages all carriers to sell empty seats at a price that will cover variable costs and make some contribution to fixed cost overhead, and new internet distribution engines facilitate this ability. The problem is that widespread discount pricing consumes demand at an entry point lower than consumers may be willing to pay absent draconian sale behavior, sponging up demand that might fly at a higher price later on. Since airline costs are disproportionately fixed, variable cost-based pricing is a prescription for bankruptcy if embraced too generously, for too long a time.

These problems are profoundly exacerbated during economic downturns and waning consumer confidence, as well as the threat or fear of war or a terrorist event. As the war in Iraq began, United Airlines' international bookings fell 40%.¹⁸ Should a shoulder-fire missile or other terrorist event take down a commercial aircraft, the economic effect may be an additional loss in excess of \$2 billion.¹⁹

HOW WILL THE AIRLINES EXTRICATE THEMSELVES FROM THIS MORASS?

Bankruptcy. Airline deregulation has been criticized as a bankrupt policy.²⁰ In this latest cycle, major airlines like USAirways, United Airlines, and Hawaiian Airlines, and smaller carriers like Vanguard, National and Midway, have fallen into bankruptcy. In the short term, creditors are held at bay while the company tries to restructure under the benevolent oversight of a Chapter 11 bankruptcy judge. The carriers in bankruptcy offer lower fares based on artificially lower costs, thereby causing competitive injury to carriers paying all their bills, creating the potential for cascading bankruptcies. Some sources predict that all of the major U.S. network airlines are heading for bankruptcy.²¹ TWA managed to go to bankruptcy court three separate times to shore up a balance sheet ravaged by the fact that the company failed to make a profit for 13 consecutive years. Some industry observers decried the Chapter 11 process as creating a race of the un-dead.²²

Bankruptcy offers an opportunity, though, for companies to restructure themselves into viable enterprises, and some actually do. As noted earlier, airlines began to focus on costs, particularly after September 11th exacerbated the financial hemorrhaging.

Route Restructuring. To reduce the high cost of hub-and-spoking, American Airlines is experimenting with the concept of the rolling hub, whereby efficient equipment scheduling trumps convenient passenger connectivity, hoping that cost reductions will outpace revenue losses. Clearly, the overall number of hubs needs to be reduced. America West abandoned Columbus, Ohio, as a hub, and in earlier periods, American Airlines abandoned the hubs of Nashville, Raleigh/Durham and San Jose. Look for the number of Midwestern hubs to fall.

Fleet Standardization. Airlines are renegotiating leases, and standardizing fleet types. In downsizing gauge, they are trading higher CASMs for lower block hour costs, attempting to pair the capacity offered

with demand, keeping frequency high with regional jets. But it is unclear whether the high frequency model is sustainable in a soft economy, or whether the traveling public is collectively willing to absorb a higher CASM product.

Capacity Reduction. Airlines are grounding older and larger aircraft, parking hundreds in the desert. Liquidations may also ground aircraft, at least temporarily. Of course, they may well find themselves in the fleets of other airlines, as have their predecessors, as a new generation of entrepreneurs takes to the skies. There are three industries everyone thinks they can run – restaurants, sports franchises, and airlines. Despite their miserable economic performance, airlines are still perceived by some investors as a glamorous industry.

Labor Cost Reduction. Mike Dubinsky of the Air Line Pilots Association said of labor-owned United Airlines, “We don’t want to kill the golden goose. We just want to choke it by the neck until it gives us every last egg.”²³ Unfortunately, United was choked so severely it now languishes in bankruptcy. With labor accounting for nearly 40% of major airline costs, management will attempt to persuade or coerce wage and work rule reductions, amending collective bargaining agreements to eliminate scope clause restrictions on feeder operations. Pension contributions and liability will be deferred. This may well cause a deterioration in labor/management relations.²⁴ Further, the airlines must reduce billions of dollars in unfunded pension liability, though this too, will be unpopular with employees.

Higher revenue demand, of course, will not be restored until there is national economic recovery. And for the moment, at least, that appears not to be on the horizon. Moreover, one wonders whether, if all airlines were able to achieve the cost structure of a jetBlue or Southwest Airlines, they would nevertheless eventually compete away their profit.

HOW MIGHT GOVERNMENT HELP THE AIRLINES EXTRICATE THEMSELVES FROM THIS MORASS?

The market is not an end in itself. It is one mechanism that may, or may not, produce ideal efficiency or desirable social results, depending on a number of variables. Government -- the institution created by the people to order their affairs -- is always free to amend the rules of competition to achieve a more desirable economic or social result. The relationship between the government and the market is a complex one, and sometimes the government gets it wrong.

Nonetheless, prudent government involvement is inevitable in a complex economy if it is to achieve desirable results. Nations that have tried to do without it (contemporary Russia or Nigeria) achieve suboptimal results. Of course, nations that overdo the heavy hand of government (the U.S.S.R.) also achieve suboptimal result. Like the Laffer curve, the trick is to have the right mix of government and private enterprise to inspire innovation and efficiency on the one hand, and yet produce a set of economic and social outcomes that are perceived fair by the people -- who indeed, control the government -- on the other.

To avert industry-wide collapse, the U.S. government responded quickly after September 11th, providing \$5 billion in direct grants, \$10 billion in loans, war risk insurance, and relief from tort liability. As the quid-pro-quo for loans, the government demanded sizeable warrants for the purchase of stock. The net result is that the federal government becomes a stockholder in several airlines. Governmental ownership of the means of production is the definition of socialism, an anathema to a capitalist economy.²⁵ Now

who would have imagined that a concept such as deregulation -- designed to inject free market capitalism into an industry whose pricing and entry had been regulated for 40 years -- would instead produce socialism? Regulation is not the antithesis of competition; socialism is.

But let us succinctly list the federal government's alternatives at this point:

- Do Nothing. Allow the market to pursue its Darwinian imperative of ridding the market of excessive capacity via liquidation. If constrained to one, or two, or perhaps three major airlines, this restructuring may be transitionally painful, but acceptable. It will be more painful if the nation's very largest airlines are liquidated. As the veins and arteries of commerce, communications and national defense, transportation corridors have profound externalities upon a nation. A widespread collapse may be unacceptable because of the economic pain it may wreak on the rest of the U.S. economy. This is particularly true with respect to an atypical nation like the United States which is obsessively reliant on a single mode of transport – aviation – for the intercity movement of people,²⁶ and a service economy, reliant more on the movement of its brain power rather than its manufactured goods. Moreover, if each downward turn of the economic cycle produces such onerous financial results on the airline industry, it may be appropriate to “do something.”

- Nationalize the Industry. As we have seen, the U.S. government has already committed to a \$15 billion bail out. For a fraction of that, it could have purchased the stock of most of the major airlines. Of course, it would have inherited \$100 billion in debt. An Amtrak in the air is not a result Congress would likely prefer. Nonetheless, as a holder of warrants to purchase stock in the airlines to which it has given loans, the U.S. government is on the road to partial nationalization. State ownership is already the rule in the intercity rail and urban transit industries, both of which were originally privately owned. The Air Transport Association has conceded that, “a forced nationalization of the industry is not unrealistic.”²⁷

- Reform the tax laws. The tax burden upon airlines has grown sharply in recent years, on an industry that can ill afford it. Principal among the increases are taxes and fees designed to attend to infrastructure and security needs. Airlines claim that the government takes \$42 of a \$100 ticket, though that figure is disputed. The airlines will ask for relief, and for the government to assure reasonably priced war risk insurance. Given the importance of transportation to the overall economy, it may be appropriate to cover at least a portion of these needs from the general fund.

- Reform the labor laws. The Railway Labor Act generates a sluggish dispute resolution process during which frustration can build and service, and concomitantly, revenue, can decline. The industry has urged binding arbitration as an alternative.

- Accord the airlines antitrust immunity. Before the bottom fell out, the United/ USAirways merger proposal, and, more recently, the Northwest/Continental/Delta domestic alliance was opposed by the Justice Department. Both raised serious consumer concerns. Nonetheless, both would have enabled a rationalization of duplicative capacity, as would antitrust immunity to eliminate, or share (such as providing pooled blocked space) presently competitive routes.

- Eliminate foreign ownership and cabotage restrictions. The elimination of foreign ownership restrictions would enable foreign investors, and airline alliance partners, to “bail out” distressed airlines. If successful, this would alleviate market disruption, but not fully shed the industry of excess capacity. Certainly, Star Alliance partners Lufthansa and Singapore Airlines would suffer serious traffic losses if United

Airlines were to be liquidated. Whether they would have the temerity to invest their capital in an airline with United's cost structure is another question. The elimination of cabotage restrictions would allow foreign airlines to provide domestic service. Given the events of September 11th, and the reliance of the U.S. military upon the Civil Reserve Air Fleet, the elimination of either foreign ownership or cabotage restrictions raises significant foreign policy and national security concerns.

- Re-regulate the industry. Since the prevailing wisdom over the last quarter of the 20th Century has been the market can do no wrong and the government can do no good, there appears to be little political enthusiasm for re-regulation. Nevertheless, let us succinctly discuss its principal strengths and weaknesses. Re-regulation would relieve Congress of having to deal with the industry's financial concerns, and shore it up at every downward turn of the economic cycle. Indeed, regulation is able to compress the impact of market cycle swings on this industry so prone to chronic overcapacity and high fixed costs. Congress established regulation in 1938, at the industry's request, in order to shield it from destructive competition. The quid-pro-quo was that rates would be just, reasonable and nondiscriminatory; indeed, real yields fell faster during the period of economic regulation than it has subsequent to it. With modern computer software, the regulatory tools of price regulation could be performed more efficiently and expeditiously than they could before 1978. But, the difficulty in regulating today is the absence of a relatively homogeneous cost structure among new entrant vis-à-vis incumbent airlines, and the prevailing political correctness that insists that deregulation is not the (or even a) cause of the industry's financial collapse.²⁸

SHOULD FOREIGN GOVERNMENTS FOLLOW THE U.S. LEAD?

Nations large and small are faced with a vigorous momentum for "open skies" liberalization of bilateral air transport agreements, and conclusion of multinational "open skies" agreements, led by the United States, and the elimination of the airline nationality clauses²⁹ led by the European Union.³⁰ The response will be different depending upon the economic, political and social perspectives of each nation. Those which endorse neo-classical economic ideology will embrace "open skies" without hesitation. Moreover, all but the most poorly managed airlines in those parts of the world with double digit traffic growth will likely profit from liberalization.

But, as the foregoing review of the United States' experience with deregulation (the domestic sibling of international liberalization) reveals, the industry – its investors and employees – may suffer severe financial upheaval as a consequence of the restructuring, and perhaps bankruptcy, that liberalization may produce.

Certainly, there are national airlines that are poorly managed – some even governmentally owned – that would benefit from enhanced competitive pressure, so as to encourage them to become more efficient and productive, and more responsive to consumer needs. But not all nations will welcome the potential disintegration of their national airline. On certain thin routes, the loss of a national airline may result in the creation of a monopoly. Yields earned by certain European Airlines on routes to some of the poorest nations in Africa are some of the highest in the world, leading to serious equity concerns. In certain nations, the national airline has domestic service obligations on routes, though nonremunerative, important nonetheless for social, economic and political reasons. The loss of such airlines will require public subsidization if such service is not to be lost.

CONCLUSION

In summary, the severity of the financial problems faced by the U.S. airline industry is breathtaking. Every

market cycle since deregulation has been profoundly worse than the one that preceded it:

§ Pre-deregulation – \$100 million losses in one year; no airline bankruptcies;
§ 1981-82 – \$1.4 billion losses in two years; two major airline bankruptcies; one liquidation;
§ 1990-94 – \$13 billion losses in five years; five major airline bankruptcies; two liquidations; and
§ 2000-03 – up to \$36 billion losses in three years; three major airline bankruptcies, so far, but more likely.

There is an ominous and anonymous quotation that has long circulated in transportation circles: “Since the invention of the wheel, in the long term no one has made money moving people.”³¹ This was true with steamships, with intercity railroads, and urban transit. Let us hope it is not also true in commercial aviation.

(Footnotes)

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Tomlinson Professor of Global Governance in Air & Space Law, and Director, Institute of Air & Space Law, McGill University. From 1979-2002, the author was Professor of Law and Director of the Transportation Law Program, University of Denver College of Law. A.B.J. 1972, University of Georgia; Hague Academy of International Law, 1974; J.D. 1975, University of Georgia; L.L.M. 1978, George Washington University; D.C.L. 1986, McGill University. Member of the Bars of the States of Colorado and Georgia, and the District of Columbia. Dr. Dempsey is the author of more than 10 books and 70 scholarly articles on issues of law, economics and public policy in transportation.

¹ Address before the Seminar on “Aviation in Transition: Challenges & Opportunities of Liberalization (Montreal, Canada, March 22, 2003).

² It is no coincidence that TWA, without a profit for 13 consecutive years, and USAirways stumbled into bankruptcy. Neither carrier was a member of the four large international code-sharing alliances, and thus were deprived of the connecting traffic to which they would otherwise be eligible.

³ There is some irony here, inasmuch as United Airlines was the only major airline to have supported, indeed lobbied hard for, deregulation in the mid-1970s.

⁴ Fuel prices increased 107% over 2002. Credit Could Suffer If War With Iraq Lingers, Bond Buyer, Mar. 17, 2003, at 5.

⁵ Grounded By War, N.Y. Times, Mar. 23, 2002, at 4.

⁶ These figures do not include the \$5 billion federal taxpayer contribution.

⁷ Caroline Daniel, Politicians Wary of Boy Who Cried Wolf, Financial Times, Feb. 13, 2003, at 18.

⁸ James May, Cost of Survival Too High, USA Today, Mar. 24, 2003, at 18A.

⁹ The laissez-faire period which followed the 1981-83 recession led to a roller coaster of industry consolidations in the 1980s, creating modest profitability for a short while. Then recession, the Gulf War, and a spike in fuel caused economic collapse from 1990-94, during which the industry lost \$13 billion. The President and Congress responded by creating the Baliles Commission, most of whose members had little enthusiasm for any governmental remedy beyond such indirect subsidies as releasing crude from the Strategic Petroleum Reserve and rolling back taxes. Direct subsidies were provided to one Minneapolis-based airline. Five major carriers collapsed into bankruptcy; two were liquidated.

¹⁰ Competition oversight and financial stabilization was performed during the Air Mail contract period, and during the period of economic regulation (1938-1978). Economic growth and technological developments, coupled with benign governmental oversight, kept the industry profitable, and importantly, lowered consumer prices significantly until the recession of 1969-71.

¹¹ Potential economic collapse caused by excessive capacity, recession, and a sharp spike in fuel prices triggered by the Yom Kippur War and the Arab Oil Embargo was avoided in the early 1970s by the application of regulatory tools -- a route moratorium, capacity limitation agreements, pass through of fuel in the rates, and route swapping. All that was viewed as anticompetitive and anti-consumer, and the industry was deregulated in 1978.

¹² The existence of destructive competition has long been accepted as a rationale for economic regulation of an industry. Only a few years before becoming Chairman of the Civil Aeronautics Board, Alfred Kahn wrote:

The major prerequisites [of destructive competition] are fixed or sunk costs that bulk large as a percentage of total cost; and long-sustained and recurrent periods of excess capacity. These two circumstances describe a condition in which marginal costs may for long periods of time be far below average costs. If in these circumstances the structure of the industry is unconcentrated -- that is, its sellers are too small in relation to the total size of the market to perceive and to act on the basis of their joint interest in avoiding competition that drives price down to marginal cost -- the possibility arises that the industry as a whole, or at least the majority of its firms, may find themselves operating at a loss for extended periods of time.

Alfred Kahn, *Economics of Regulation* (2nd ed. MIT 1988). Kahn described the post-deregulation airline industry almost perfectly. Fixed costs outweigh variable costs, by a margin of about four to one. The airline industry suffers from relentless excess capacity. On a national basis the industry is unconcentrated, leading to tremendous network competition for connecting traffic, often driving prices down to variable costs. Under deregulation, the airline industry has operated at a loss for extended periods of time.

Before Congress in 1977, Kahn testified, "the assumption that you are going to get really intense, severe, cut throat competition just seems to be unrealistic when you are talking about a relatively small number of carriers who meet one another in one market after another." Kahn said, "I just do not see any reason to believe that an industry which is potentially rapidly growing, for which there is an ever-growing market, cannot prosper and attract capital." Speaking before the New York Security Analysts in 1978, he discounted, "The most general fear about [airline deregulation,] that when the CAB withdraws its protective hand from the doorknob, the door will open to destructive competition -- to wasteful entry and cut-throat pricing -- that will depress profits, render the industry unable to raise capital, and so cause a deterioration in the service it provides -- on the whole, it must be admitted good service."

That was before deregulation. A decade after deregulation, Kahn confessed, "There is no denying that the profit record since 1978 has been dismal, that deregulation bears substantial responsibility, and that the proponents of deregulation did not anticipate such financial distress -- either so intense or so long-continued." That was said before the \$13 billion losses of airline industry losses of 1990-94, or the \$21 billion of losses in 2001-02.

Kahn also appears to have changed his mind on the issue of whether the airline industry is subject to bouts of destructive competition. When asked about whether his vision of deregulation in the late 1970s included the steep financial nose dive that resulted from it, Kahn replied, "No. I talked about the possibility that there might be really destructive competition, but I tended to dismiss it. And that certainly has been one of the unpleasant surprises of deregulation."

¹³ CASM = cost per available seat mile, the essential unit of production in passenger air transportation. The down-gauging of aircraft (substitution of relatively smaller for larger aircraft) increases CASM, but usually reduces block-hour operational costs and results in higher load factors. Higher CASM, however, requires higher RASM (revenue per available seat mile) to break even.

¹⁴ Hubs are highly inconvenient for the majority of passengers who flow through them. Certainly, O&D (origin-and-destination) passengers who begin or end their trips at hubs enjoy frequent, and convenient,

nonstop service on every spoke radiating from a hub, though they pay a premium (some would say, a monopoly) charge for that privilege. But most passengers at hub airports are on their way to some other place. The opportunity to fly circuitously to their intended destination, spend an hour or more on the ground, then continue on, is hardly a paradigm of convenience, particularly in an industry that counts among its greatest inherent attributes its inherent ability to save time -- man's most important commodity. Surely too, many passengers trade off the inconvenience of a hub connection for a lower price, though that too makes the point that hubs are inconvenient, but competitively priced for some (but not all) who must there connect there. If frequency is synonymous with convenience, it must be because a frequent schedule saves consumers time; but if time is lost due to the connection, the savings are mutilated. The privilege of departing earlier is lost if one is forced to arrive later. Certainly too, some city-pairs are too thin to warrant nonstop service; connecting is, for example, the only way to get from Boise to Savannah. So, hub connections are convenient in some long-haul thin markets that cannot support a nonstop aircraft (though the RJs are beginning to serve many of those markets). Nevertheless, for passengers traveling in city-pair markets that can support nonstop service (such as Birmingham-Los Angeles, pre-deregulation), nonstop service is far more convenient than a hub connection. Price may indeed be a different issue, but much of airline pricing has been based largely on competitive considerations, rather than cost, and as a general rule, connectivity costs more to produce than does nonstop service.

¹⁵ The fleet decisions inspired by the dominant post-deregulation hub-and-spoke paradigm account for the industry-wide plateau and decline in average aircraft size since 1978. Brenner, Leet and Schott have written:

There is ... an economy of scale in aircraft size. But the market fragmentation of deregulation has made it more difficult to obtain the benefits of that scale. In this sense, deregulation has converted what would normally have been less efficient planes, into seemingly more efficient ones, simply because the smaller planes fit better into the new market subdivisions and uncertainties. . . . The trend toward smaller planes has been only an illusory cost efficiency, and in fact has actually resulted in higher seat-mile cost than would be possible without it. Mel Brenner, James Leet & Elihu Schott, "Airline Deregulation" (Eno Foundation 1985).

¹⁶ Declining costs in the pre-deregulation period correlate reasonably well with the productivity improvements of aircraft technology. It is inaccurate, however, to suggest that deregulation correlates well with the end of technological improvements, and that that explains why post-deregulation costs and yields have fallen at a slower rate. In fact, hubbing – the dominant megatrend on the deregulation landscape – has eroded airline efficiency and productivity in terms of aircraft and labor utilization and fuel burn. (inflation adjusted fares, or yields) fell faster in virtually period pre-deregulation than it did in the same number of years post-deregulation. See Paul Dempsey & Andrew Goetz, "Airline Deregulation & Laissez Faire Mythology" (Chapter 21 - Pricing, and Chapter 23 - The Economic Effects of Deregulation: The \$6 Billion Myth) (Quorum Books 1992); Paul Dempsey & Laurence Gesell, "Airline Management: Strategies for the 21st Century" (Chapter 5 - The Price: Revenue and Inventory Management, and Chapter 10 - Public Policy in Aviation) (Coast Aire 1997).

¹⁷ Garrett Hardin, in his powerful essay, "The Tragedy of the Commons," provides insight as to the economic forces leading a rational wealth maximizer to advance his own economic interests by externalizing his costs, and how individually rational behavior can degenerate into collectively irrational behavior:

Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day or reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At

this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.

(1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

(2) The negative component is a function of the additional over-grazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of 1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another. . .

. . . But that is the conclusion reached by each and every rational herdsman sharing a commons. Therein lies the tragedy. Each man is locked into a system that compels him to increase his herd without limit -- in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedoms of the commons. Freedom in a commons brings ruin to all.

Garrett Hardin, *The Tragedy of the Commons*, SCIENCE (Dec. 13, 1968), at 1243. In an environment of deregulation, airports and airways are the commons, the airlines are herdsmen, and passengers, so to speak, are cattle. Certainly, many passengers feel they are treated as cattle herded aboard aircraft.

¹⁸ *The Darkest Hour*, Economist (Mar. 22, 2003), at 53. For U.S. airlines, domestic bookings fell 5-10%, Latin American bookings fell 3-19%, trans-Pacific bookings fell 10-20%, and trans-Atlantic bookings fell 20-30%. Caroline Daniel, *American Airlines Pilots Agree to Cuts*, Financial Times, Mar. 31, 2003, at 17.

¹⁹ *The Darkest Hour*, Economist (Mar. 22, 2003), at 53.

²⁰ Hobart Rowen, *Airline Deregulation: A Bankrupt Policy*, Washington Post, Sept. 29, 1983, at A21. ALPA President Randy Babbitt wrote:

The corporate body count in the airline industry continues to rise, but the policymakers in the White House are satisfied because "this is the free market at work." This policy of "economics by bankruptcy, is literally a bankrupt policy, and it can no longer be tolerated. It's time we stopped worshipping at the altar of laissez faire and realized that the victims we are sacrificing to this ideological demon are real human beings, whose lives and livelihoods are being destroyed for the sake of an ancient, ivory tower theory.

Pan Am Shutdown Is Yet Another Tragic Loss, PR Newswire (Dec. 4, 1991).

²¹ *The Darkest Hour*, Economist (Mar. 22, 2003), at 53.

²² Mike France, *See Bankruptcy Reform Won't Fix Telecom*, Bus. Week (Oct. 21, 2002), at 40.

²³ Caroline Daniel, *ESOP Share Plan Was No More than Fable for United*, Financial Times, Dec. 10, 2002, at 35.

²⁴ At United Airlines, Chapter 11 is likely to produce two results that labor will abhor: (1) dramatically less favorable wages and working conditions, and (2) a significant reduction or total elimination of their equity ownership (stock). The enormously difficult task of transforming United into a sustainable company will likely further rupture already sour relationships between labor and management. One must remember that TWA flew thirteen straight years without a profit, so United is not likely to be liquidated anytime soon. But the path they must take will not be without serious pain. Nevertheless, if Lorenzo's Continental can be transformed into Bethune's Continental, anything is possible.

²⁵ To the contemporary crisis, the U.S. government responded with socialism -- having the taxpayers bail out the industry with an infusion of public money. The U.S. government has not only become the financial fuel injector, but the financial lender and insurer of last resort, holding a growing portfolio of airline stocks.

²⁶ Other developed nations, such as Europe and Japan, for example, have well developed, frequent, and reasonably priced intercity rail networks. For the United States, intercity rail is an infrequent and skeletal system on all but the Northeast Corridor.

²⁷ The Darkest Hour, *Economist* (Mar. 22, 2003), at 53.

²⁸ Paradoxically, deregulation proponents insist that deregulation produces billions of dollars of consumer savings, but has no impact whatsoever on the dismal economic performance of the industry.

²⁹ These clauses in bilateral air transport agreements typically require that the airline be “effectively owned and controlled” by nationals of the signatory state.

³⁰ Paul Dempsey, Competition in the Air: European Union Regulation of Commercial Aviation, 66 *J. Air L. & Com.* 979-1153 (2001).

³¹ Though freight must get to market, passenger demand for transport is quite fickle.

AVIATION SECURITY:

Joseph S. Szyliowicz

INTRODUCTION

The catastrophic events of September 11 has often been referred to as a wake up call and it is obvious that this tragedy has had a profound impact upon all aspects of our lives, including our approach to transportation security generally and aviation security specifically. But it was not the first wakeup call though it was the first that has yielded truly significant change. The list of terrorist attacks involving aviation is a long and bloody one. Aviation has always represented an appealing target and terrorists have not hesitated to strike at planes and airports of many countries. To cite but a few attacks --Avianca 203, Nov. 27, 1989--107 killed; UTA flight 772, Sept. 19, 1989--171 killed; KAL 858, Nov. 29, 1987--115 killed; PA 73, Sept. 5, 1986--brutally taken over, 22 killed, 112 injured; Air India 182, June 23, 1985--329 deaths; Gulf Air, Sept. 23, 1983--112 deaths.¹

Terrorists have found aviation to offer tempting targets for several reasons. To begin with, its facilities are often of symbolic significance – think of La Guardia or Kennedy. But aviation facilities are also of great functional importance, and their destruction wreaks widespread economic effects. They are an important contributor to international trade, business, and tourism. Aviation is a critical part of local and national economies around the globe. In the U.S. aviation is estimated to account for 6-7% of the nation's GDP. Finally, airports are often busy and crowded and have become even more attractive targets since the trend in terrorist attacks has shifted towards inflicting mass casualties. But aviation provides more than tempting targets. Its vehicles can be used as weapons as was demonstrated dramatically on September 11 when a horrified nation watched hijacked planes plunge into the Pentagon and the World Trade Center.

In short, the existence of a serious threat to aviation has been obvious for years and, especially after the 1988 Pan Am 103 disaster over Lockerbie, Scotland, the worst security-related disaster in the history of U.S. civil aviation until then, a proliferation of cries for action led to the adoption of important steps designed to enhance the security of our aviation system. These measures did not, unfortunately, prevent the destruction of the Twin Towers or the damage to the Pentagon and the loss of so many innocent lives.

In this paper I advance three related theses. First, the character of modern aviation systems make security highly difficult to attain. Second, important steps have been taken to eliminate the security shortcomings that existed prior to 9/11 but serious weaknesses remain. Third, given the nature of the terrorist threat an emphasis on prevention and law enforcement, though essential, can only be part of an overall strategy that incorporates the vital, though often overlooked foreign policy dimension.

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Modern aviation functions in ways that make them especially difficult to safeguard. First, It is a vast and complex system consisting of three main branches – commercial aviation, general aviation, and air cargo, each of which poses separate and complex security challenges. Furthermore, its infrastructure is extensive and widespread. It involves airports and the supporting assets, including aircraft and the national air space which relies upon complex command, control, and communications technologies. The latest report of the President's Commission on Critical Infrastructure (February, 2003) identified the following vulnerabilities of the commercial passenger and freight segments (National Strategy for the Physical Protection of Critical Infrastructure and Key Assets, pp. 54-55):

1. Volume – 97 U.S. carriers transport over 650 million passengers annually to and from 506 major airports which have 1000 screening points and handle more than 2.5 billion handheld and checked bags.
2. Limited capabilities and available space – the number, capability and ease of use of existing detection technologies is inadequate.
3. Economic Sensitivity – the shift to just in time delivery by many firms has made the U.S. economy vulnerable to delays in cargo shipments
4. Security versus convenience and cost – the need to minimize congestion and delays while maintaining security has major financial implications
5. Accessibility—airports are public spaces and are easily easy to talk to from highways

However, these vulnerabilities do not address the security issues posed by general aviation (which I will discuss below), nor those resulting from the rapidly changing nature of commercial aviation. Two trends are especially critical. First, aviation has become increasingly integrated with other modes , especially with light and heavy rail as the landside capacity of airports has become increasingly strained. Currently ten airport-rail links are being undertaken and another ten are in the planning stage so that by 2010, 20 of the country's top 30 airports will be served by rail. Such facilities pose new security challenges starting with their design and extending to such issues as ensuring effective communication between rail transit, airport, FAA, and other personnel so that they understand their proper roles in the security program and can manage it effectively. (p. 24)

Secondly, increased linkages between telecommunications and aviation compound the security problem. Because disruptions of telecommunications networks have profound consequences for global, regional, and national aviation systems, one cannot address aviation security as if it were independent of telecommunications. Of particular concern is the National Airspace System which is rapidly becoming modernized in order to deal with increasing traffic. Its obsolete, isolated subsystems are being replaced with an open systems architecture which will permit extensive data interchange and is thus highly vulnerable to cyber-attacks. Any attempt to enhance security must, accordingly, pay close attention to the ever present threat of hacking into computer data bases. But this is no easy matter. Even the U.S. government agencies have pervasive weaknesses that place their data bases and systems at risk, and the number of people attacking U.S. computer systems from throughout the globe continues to rise. The publicly known number of cases involving computer security rose from 9,850 in 1999 to 52,658 in 2001 and to 73,359 for the first nine months of 2002. And, it is estimated that up 80% of such incidents are never reported (Dacey, 2002).

Thirdly, aviation security is an international as well as a national issue. U.S. airlines are heavily involved in international travel and are becoming more and more intertwined through code sharing and other arrangements

with foreign airlines. Hence the issue of US aviation security must be viewed in its global context. It is instructive that the bomb was placed on PanAm103 in Frankfurt through an intramodal movement from a foreign airline originating in still another country by yet another country's intelligence service and that the tragedy itself occurred over Scotland. The tragedy involved activities in some five countries!

The problem arises from the absence of any international authority that can enforce regulations and mandates. The International Civil Aviation Organization's (ICAO), with some 184 member states, has attempted to deal with the issue of security by establishing overall standards and practices through Annex 17. Although the annex includes important measures and represents an accepted international standard subject to implementation by state authorities, it is considered by experts to establish, at best, a minimum, not especially, stringent standard. Moreover, it is enforceable by the host government which is responsible for providing security in its own territory. Over time it became obvious that most host governments, with the exception of Israel, were either incapable or unwilling to provide the level of security necessary to counter terrorist actions against US aviation at high-threat locations. Accordingly, in 1984 and 1990 (following the Pan Am 103 disaster) the U.S. enacted legislation providing for measures, including assessments, to provide additional security at high-threat locations, especially when the host government is not required under ICAO Annex 17 to provide the level of security at their airports necessary to protect US international aviation from terrorists.

Since 9/11 various measures have been undertaken to strengthen aviation security throughout the globe. ICAO recently adopted an "Aviation Security Plan of Action" which calls for "regular, mandatory, systematic and harmonized audits...in order to identify and correct deficiencies in the implementation of ICAO security related standards". However, implementation of this plan is estimated to cost \$17 million, of which \$15 million is to be derived from voluntary contributions. The International Air Transport Association (IATA) has also tried to persuade states to enforce annex 17 and generally to strengthen international security standards. Other international organizations such as Asia Pacific Economic Cooperation (APEC) are also emphasizing multilateral actions, supporting ICAO's mandatory aviation audit and urging that cockpit doors be reinforced by April 2003 "wherever possible" and that effective baggage screening procedures be implemented "as soon as possible" but by 2005 at the latest. Nevertheless significant problems remain at the global level.

THE PRE 9/11 SITUATION

The magnitude of the threat to air transportation posed by terrorism was so significant that the U.S. government accorded this mode priority attention. However, the many steps that were taken were sporadic and directed to the prevention of the repetition of a specific kind of attack which had been carried out successfully. The FAA was a reactive agency focused on the past; it was not proactive, paying little attention to anticipating future events or to potential contingencies. (This section draws upon V and S)

Such an orientation was based on a naïve assumption -- that terrorists were unable to adapt their tactics to meet new conditions -- but it continued to dominate the FAA's decisions even though evidence to the contrary quickly accumulated. The character of airline hijackings changed from the lone hijacker of the early 1960s making some personal or political point to its use by the 1970s as an organized terrorist tactic. This threat to airline travel was met in the US and abroad by the development and installation of passenger screening devices and processes at all major airports. When these measures proved successful -- within a few years, the number of hijackings dropped from 33 regularly scheduled airlines in 1969 and 56 foreign airlines in 1970 to a handful per year -- terrorists adapted quickly and switched their tactics. They now had access to

more sophisticated and lethal technologies -- deadly plastic explosives such as SEMTEX that are easily molded and shaped into innocuous looking objects such as suitcases and radios -- so the number of bombed aircraft expanded rapidly. Furthermore, they had access to automatic weapons so the late 1970s witnessed the first armed attacks against airports -- between 1975 and 1985, 30 incidents took 156 lives.

The Aviation Security Improvement Act in 1990 which resulted from the outcry that followed the Pan Am 103 disaster wrought many changes, especially within the FAA. It created a new high-level position of Assistant Administrator for Civil Aviation Security to head the Office of Civil Aviation Security, which had been established in 1962. Originally designed to deal with crimes, its mandate was expanded and its staff, which had grown from 126 to 684 in 1990 now dealt with all aspects of security, including drug and narcotics interdiction. In addition, a new Office of Intelligence and Security to coordinate transportation-security activities was established within the DOT, headed by a Director of Intelligence and Security, reporting directly to the Secretary of Transportation.

All these changes did not transform the FAA's culture or change the traditional approach to security. It remained charged with conflicting objectives. On the one hand the FAA was supposed to represent the passengers and the overall security interests of the country; on the other, it remains concerned with the financial well-being of the airlines. Thus, the FAA only made the rules (with an eye to their economic impacts upon the industry) -- corporations (airlines) and municipalities (airport operators) implemented or applied them. The act also charged the FAA with coordinating and inspecting security arrangements at large airports and required airports to provide a secure operating environment--the airport perimeter and aircraft operations area but the airlines remained responsible for the passenger and baggage screening arrangements that usually are carried out through a private-security subcontractor.

Even in the areas that fell under the FAA's jurisdiction, security lapses were common. A security audit at four major airports in 1993 found that unauthorized personnel had succeeded in gaining access to secure areas in 15 out of 20 attempts. A subsequent GAO report concluded that "the Federal Aviation Administration (FAA) oversight of airport security systems . . . was not aggressive and enforcement actions were limited."²³ Two years later, 40% of a group of investigators carrying plastic explosives still managed to get through airport security systems.

A fundamental reason for this state of affairs was the role of the airlines and other private transportation in shaping policy. Although a number of lower and mid-level employees often saw what needs to be done, they were usually unable to overcome opposition by the Air Transport Association and other interest groups. Many FAA administrators (and most high-level career staff members) also had vested interests in avoiding confrontation with the ATA, Congress, the Administration, or other Executive-branch agencies; they effectively blocked any lower-level initiatives unless they were extraordinarily well documented. Then, extensive media coverage and outraged citizens would bring pressures to bear upon Congress and the Administration which responded with new laws, regulations, studies, and plans. For its part, the FAA often responded by rushing various technologies, systems and procedures into operation without always giving due consideration to their utility, costs, and efficacy.

It did so, for example, in 1989, reacting to the destruction in 1987 of PSA flight 1771 by a disgruntled former employee, the FAA issued a rule to require new access-control systems. The costs of these systems procured by airports far exceeded earlier FAA estimates. Moreover, flight crews were subjected to the same screening process as passengers. These actions were widely criticized for their seeming irrelevance to the problem. An even more glaring example of hasty actions in the late 1980s was the decision by the Secretary

of Transportation to require the main 100 airports in the US to install a new thermal neutron analysis (TNA) machine that was expected to detect plastic explosives. The Secretary did this in response to the destruction of PanAm Flight 103 reportedly without assessing adequately the capabilities of the TNA explosives detector. Critics within the FAA contend that the Secretary would not have made this mistake had he not listened solely to members of the FAA Operations Staff, overlooking the advice and counsel that would have been offered by outside scientists as well as the FAA's own scientist in charge of the agency's explosives-detection research and development program.

Although dealing with safety rather than security per se, a more recent tragedy involving the crash of an ATR-72 turbo prop commuter plane in October 1994 near Roselawn, Indiana (where all 68 persons aboard the plane died) provides further evidence of the FAA's approach to safety and security issues.. According to an investigation and conclusion drawn by the New York Times: "The Federal Aviation Administration had for years brushed aside repeated warnings from pilots and experts, and from the behavior of the plane itself, that something was awry. The failure to heed those warnings raises troubling questions that go beyond the Roselawn crash, questions about the procedures and safeguards of the agency itself."²²

The salience of this point -- and the tendency of the FAA and the USDOT to make decisions that favored transportation firms at the expense of the public was tragically reinforced by the May 1996 crash of a ValuJet plane which killed 110 persons. The head of the FAA, David Hinson announced "The airline is safe to fly. I would fly it." Federico Pena, the Secretary of Transportation at the time echoed the party line, saying "ValuJet is a safe airline, as is our entire aviation system". Shortly thereafter ValuJet was grounded for safety reasons on June 17. Ms Schiavo, the former Inspector General of the USDOT, has described the FAA's role in this episode as follows:¹ The FAA didn't fall down just on ValuJet. It was incompetent at virtually all of its inspection responsibilities. It failed to watch over the examiners who certified aircraft mechanics, it was sloppy about inspection aircraft parts; it gave up altogether on surveying foreign factories that manufactured airplane engine and body components; it paid lip service to thousands of airplane checkups and pilot tests.

Most devastating was the FAA's failure to act promptly and decisively to implement the recommendations of the White House (Gore) Commission on Aviation Safety and Security established in 1996 following the crash of TWA 800 off Long Island, NY. By September 11, 2001 few of the 31 recommendations had been implemented, including more sophisticated profiling, passenger-bag matching, improved screening company performance, enhanced background checks for screeners and airport employees, and measures to deal with cargo threats. Although the FA claimed that 25 of the suggestions had been "completed", in actuality "most were still in development; some remained entangled in interagency squabbles and bureaucratic delays". The Commission's staff director commented "It's a governmental failure...We specifically said the FAA had to change, and they've proved resistant to change." J. Pasternak, FAA, Airlines Stalled Major Security Plans, NYT, 12/14/2002. See also "Delay, Dilute and Discard: How the Airline Industry and the FAA have stymied Aviation Security Recommendations, www.citizen.org)

The airlines contributed greatly to this situation. Focused on attracting and retaining passengers, they tended to view additional security measures and procedures as inconveniences that would alienate passengers and cost more than they were worth, particularly given the difficulties many of these firms have had turning even a modest profit. Hence security generally, and additional security measures especially, ranked relatively low on the list of priorities and the amounts of money expended on them reflects this. One estimate, for example, is that the airlines in the 1990s spent some 65c per passenger on security, \$6.50 on food--a one to ten security-to-food ratio! Contributing to the problem was the interdependent nature of the industry. No single airline had an incentive to enhance its security by making costly investments since effective security requires an

integrated approach and the lower standards of its competitors would continue to endanger it (H. Kunreuther et al., "Interdependent Security, Policy Brief 108).

Thus, the airlines also followed an essentially reactive policy; they lobbied actively against new measures that might increase their costs or conceivably deter people from flying. They implemented new procedures and technologies quite reluctantly, usually only when pressured to do so. Indeed, acting through the ATA, the airlines were generally regarded by FAA insiders as the biggest roadblock to any kind of safety enhancement within the US aviation industry: "If it costs money, they are against it!" They were unwilling, for example, to implement a computerized Passenger Screening Profile (CPSP) developed by the FAA even though the system would have greatly increased the effectiveness of profiling, provided an important data base for security planning, and might even have thwarted the 9/11 tragedy. The airlines' reluctance was based on the fear that implementing the CPSP would provide the FAA with a precise record of decisions made by their personnel as well as detailed passenger profile data which they guard. Similarly, airlines did not reconcile bags and passengers on domestic flights because of the expense and logistics involved. Nor are they eager to deal seriously with curbside luggage checkins.

The historical record is clear and it is not a pretty one: numerous warnings, reports and studies identified the problems that had to be resolved but the structure and culture of the key players, the policy context, and the nature of the aviation sector itself created an environment where a disaster was almost inevitable.

THE CONTEMPORARY SCENE

The tragedy of September 11 spurred a widespread reassessment of the state of aviation security and the implementation of a range of policy responses designed to minimize what remains a very serious threat to our national security. The most dramatic move has been the Bush Administration's reluctant decision to yield to outside pressures and to create a Department of Homeland Security, as had been advocated by Gary Hart and Warren Rudman, the co-chairs of the U.S. Commission on National Security / 21st Century, in their Phase III report, "Road Map for National Security: Imperative for Change". The largest governmental reorganization in decades involving 22 agencies and 170,000 employees (including critical transportation related agencies such as the Transportation Security Administration which was established in November, 2001, as part of the USDOT), the new Homeland Security Department (HSD) is expected to become functional in early 2004.

The first major steps naturally involved renewed and more stringent attempts to prevent hijackings. These included reinforcing cockpit doors and placing specially trained air marshals on many flights. Following considerable discussion, it was decided to allow pilots to carry guns but the TSA created much outrage among pilots when it announced publicly that the guns would not be available until the pilots were in the cockpit and the door was closed. The TSA also appointed 158 Federal Security Directors who are responsible for all 429 major airports. Here too the TSA has come under criticism for hiring persons who may have security backgrounds but do not possess any extensive knowledge of aviation.

Most obvious has been the replacement of the much criticized system of having private contractors provide passenger screening by poorly paid, badly trained, and inefficient personnel with a force of 60,000 federal workers. The TSA succeeded in hiring and deploying this large force in less than a year and greatly improved the screening procedures. The screeners behave professionally and courteously

and often go out of their way to help passengers, especially the elderly when they are selected for further screening. At DIA, for example, they have initiated a “kid friendly” program with hand puppets that is very popular. Furthermore, there is an abundance of screeners so that bottlenecks seldom occur and problems can be resolved quickly.

Most importantly, they are implementing the rules and regulations rigorously as anyone who has had to remove their shoes recognizes. In about a year, they confiscated almost 5 million items including 1.4 million knives, 1,101 guns, 15,666 clubs, almost 40,000 box cutters, and such unusual items as a trailer hitch, a kitchen sink pipe and a circular saw. The TSA has proudly claims that this achievement enhances security. What is not so obvious, however, is the significance of these results for a large percentage are probably items that people forgot about. (L. Miller, “U.S. Airport Screeners Tally 4.8 million Seized Items”, The Denver Post, March 11, 2003). Nor is it obvious how much a threat a smuggled box cutter actually represents for in the present climate, it is hard to imagine a hijacker wielding such a weapon not being tackled by a horde of passengers.

One can also query how many were not intercepted. To cite but one example, my daughter passed successfully through at least a dozen screenings since September 11 with a small Swiss army knife she had forgotten about before it was finally confiscated.. That this was not a unique case is reflected in the GAO’s report (July 25, 2002) that guns, bombs, and dynamite had eluded screeners 25% of the time at 32 major airports. The porousness of screening has been demonstrated by various enterprising reporters, most recently by one who carried explosives past the screeners at DIA. Significant traces of the chemical were placed on his belt buckle, shoes, and coat, his carry on bag, and on a laptop computer. He was placed in the line for further examination. The screener found a dark powdery substance on his hands, told the reporter that his bag was dirty, and politely cleaned it. He then used the explosive trace detector which failed to obtain a positive reading even though significant amounts of the chemical remained. On the next three tries, the reporter again passed through without the explosives being detected. The TSA spokesperson called these results “unrealistic and alarmist” and went on to say “screeners performed their jobs exactly as trained and proper screening procedures were followed”. (R. Sallinger, “Explosive Traces Evade DIA Security”, News4, 2/21/03)

The TSA originally awarded a \$107 million contract to hire and train the new federal screeners but the cost rose to about \$700 million. A review of how \$18 million of that total was spent revealed that “one-third to one-half was attributed to wasteful and abusive spending practices”. The TSA’s problems with its contracts and budgets extended well beyond this one contract. As the USDOT’s Inspector General noted “we have \$8.5 billion of contract and a limited infrastructure in place for overseeing them. When the lack of infrastructure contributed to gaps in contract oversight, that in turn led to tremendous growth in some contract costs”. He also noted the heavy costs that were being imposed on the airlines and airports at a time when the industry was suffering tremendous financial losses. (Testimony by Ken Mead, February 5, 2003- Hearing of the Aviation Subcommittee of the Senate Commerce, Science and Transportation Committee; Miller, “Airports: Baggage Screening Needs Work, AP, 02/05/03).

And, this army of screeners, whose contribution to aviation security is questionable, continues to be a very expensive item.. Hence the question arises whether the present system is financially viable. In its budget request for FY 2004, the TSA is requesting a total of about \$5 billion, \$1.8 billion of which is allocated to passenger screening. Will (or can), given the present budgetary climate, this level of expenditures continue? If layoffs take place, how will morale and efficiency be affected? The TSA has already announced plans to reduce the number of screeners (which ballooned from a projected 30-40,000 persons) from 51,000 to 48,000 in FY 2004..

A second major effort involved attempts to prevent bombs from being smuggled on board airplanes. Prior to 9/11 detection systems had been installed in about 10% of the country's airports. These machines were the CTX 5000 manufactured by InVision and first certified in December 1994 and a similar machine manufactured by L3 communications. Even the installed machines were underutilized, checking but a very small number of bags per day. Most of the baggage that was examined belonged to persons who fit the Computer Assisted Passenger Prescreening System (CAPPS) profile. In November 2000, the airlines were required, by law, to expand the use of the machines for random searches. The use of bomb sniffing dogs also became commonplace. The FAA planned to achieve 100% baggage screening only by 2014 but Congress mandated that this be achieved by December 31, 2002.

This measure aroused considerable controversy. Most major airport executives lobbied hard against the proposal, arguing that the large expense involved -- each CT machine cost \$1million, plus maintenance -- were not warranted because the certified technology was inadequate in terms of throughput and accuracy and new technologies were likely to render it obsolete in a short time. New neutron scanning and "fused technology" systems that combine X-ray and neutron technologies are being developed and the Heimann Systems Corporation had already produced a high throughput machine that combined the dual energy technology of EDS units with the volumetric density analysis of the CT which the FAA was expected to begin testing in May 2002. In the spring of 2003, Denver International Airport became a test bed for the EDtS. In addition the short time frame and the physical layout of many baggage systems meant that the machines (which take up 600 sq. ft. each) would have to be installed in already crowded terminals, thus causing major delays and inconvenience for travelers..

All objections were brushed aside and the deadline was officially met, though to what extent 100% baggage screening was actually realized remains controversial because, in order to meet the deadline, the TSA agreed to various makeshift arrangements which have to be amended in the future. Most obvious is the need to move these SUV sized machines from lobby areas and to integrate them into the baggage handling systems. Doing so will require an estimated \$5 billion, less than 10% of which is presently available and it is not anticipated that the Administration and Congress will provide any additional funds. Furthermore, questions have been raised about the ways in which the \$508 million contract signed with Boeing on June 7, 2002 was implemented. Boeing assumed responsibility for installing the machines, training the operators, renovating the airports and maintaining the equipment but airport officials claim that they had to make large investments of their own, in part to correct Boeing's mistakes. The USDOT's Inspector General is currently investigating the contract to determine the degree of waste and abuse. (Testimony by Ken Mead, February 5, 2003- Hearing of the Aviation Subcommittee of the Senate Commerce, Science and Transportation Committee; (Miller, "Airports: Baggage Screening Needs Work, AP, 02/05/03).

In addition to the waste and the economic and physical burdens placed upon the airports, the efficacy of the machines remains in doubt. It is not clear that the \$2 billion that was spent on the machines plus the additional billions needed to install them have enhanced the security of the flying public to a significant degree. The machines produce monochromatic X ray pictures which have to be interpreted by a skilled operator and yield a high percentage of "false positives", perhaps as high as 30%. Some experts have acidly noted that these pictures "cannot distinguish between a block of plastic explosives or a wedge of cheese". (Paul Eng, "Neutron Bomb Sniffer", ABCnews. Com, 02/04/03) Clearly, serious questions continue to be raised about the wisdom of this decision and the manner in which it was implemented by the TSA.

Even if the promise of the EDtS machine is realized and an accurate and reliable technology is deployed, the issue of baggage liability remains. Thefts, including organized looting, have been known to occur but the TSA assigns responsibility to the airlines which operate under a series of international rules and conventions. Essentially the system divides responsibility in a manner that makes it difficult for passengers whose belongings have been stolen to hold someone accountable but there is no easy solution. If TSA were to assume responsibility, many questions remain. Would the baggage handlers be federalized or replaced? Would they handle the baggage or merely watch it? And, to what extent would a change decrease present theft levels?

Given the volume, effective screening, whether of passengers or of baggage is fundamentally dependent upon careful profiling in order to identify potential terrorist threats who can receive more detailed security checks. Originally developed in 1994, the Computer Assisted Passenger Screening System (CAPS) utilizes a number of specific factors to identify individuals who fit a particular profile such as how and where the ticket was purchased and whether the traveler is a member of a frequent flyer program. Civil libertarians have often expressed concern about possible discrimination against particular groups even though such factors as race, religion, and ethnicity are apparently not included. Because of such concerns the Gore Commission asked the Justice Department to review the program. In 1997 it reported that CAPS did not discriminate but suggested a number of precautions.

CAPPS II is an enhanced version which is being developed by the TSA. Potentially an enormous intrusion on personal privacy, it is apparently being implemented in a manner that will protect individual rights. Should a controversy arise, an Ombudsman will be available. Nevertheless civil rights groups and many individuals are concerned about the potential abuse of this system which involves data mining of a wide range of personal information of all types. CAPPS II is being tested this spring (2003) and is scheduled to be operational by next summer. Every U.S. airline will provide reservation and ticketing information on its passengers. This information is then checked against a variety of commercial and governmental databases in order to uncover clues about potential threats even before the day of departure. Thousands of personal details about each passenger are analyzed, using predictive software, in order to arrive at a threat index. Those who rate high are then selected for additional investigation. This system, which will take years to complete, should not only enhance security, but also reduce the hassles that many travelers now undergo because a smaller number of passengers will have to undergo further screening. (R. O'Harrow Jr, "Intricate Screening of Fliers in Works". Washington Post, 1 February 2003)

A related problem is that of airport workers and staff. Airports are cities--their personnel engage in a variety of activities and represent vocations ranging from salespeople to mechanics to cleaners. This diversity of people provides terrorists with numerous opportunities and, in order to forestall them, the FAA requires checks of previous employment records and the wearing of badges. These measures, however, have not ensured the security of particular areas. And, terrorists can forge badges, although forging computerized badges is a far more difficult task requiring insider collaboration or access to the computerized data base and badging process. Terrorists can follow a potentially riskier path--using threats to family members to pressure employees or simply bribing them to gain access. This is not as farfetched as it might first seem--that security at airports and other transportation nodes remains a problem at the personnel level is suggested by the sheer amount of drugs that regularly flow undetected through these hubs.

New ID systems based on biometric information that is shared between various federal databases are being developed. Preliminary tests of a new technology that uses "smart" ID cards containing digitized photos, signatures, and biographical information have yielded promising results and is scheduled for use in 100 land, sea and air entry points within a year. (Lee, 2003) The need for such systems was recently highlighted by the results of a test by government officials equipped with false birth licenses and

driver's licenses that they had created using standard computer software. Claiming to be U.S. citizens, they successfully passed the INS inspection at Miami International Airport (Chardy, 2003).

The ever increasing reliance on interacting data bases inevitably raises the issue of cyber security. As noted above, cyber warfare is of direct relevance to transportation, given the new national airspace architecture and the ever growing dependence on modern information, tracking, and data processing systems by transportation companies and agencies. This is also an international issue since hacking knows no borders and there have been numerous attempts to break into computers from abroad. The Department of Transportation has been subject to many such efforts – its web sites have been defaced and over 25,000 attacks were recorded in 2002.

Yet transportation data bases remain highly vulnerable. A recent study by the GAO of the situation in various governmental agencies concluded that all continue to have “significant information security weaknesses that place a broad array of federal operations and assets at risk of fraud, misuse, and disruption” (“Information Security”). The Department of Transportation ranked last with a score of 28 points out of a 100. Nor can one overlook the high probability that private sector computer systems are also extremely vulnerable.

All of the hundreds of millions of dollars that have been spent on the measures discussed above apply primarily to commercial aviation. Yet even in regards to this mode the response mounted by the Administration and the TSA can not be considered to have truly minimized the terrorist threat. Not only does each of the steps that have been taken contain weaknesses but, most importantly, they are directed against known threats – a very dangerous assumption given what is known about al Qaeda and its followers. Furthermore, these steps are not and could not be either systematic or comprehensive because of the ways in which aviation security had been dealt with in the past. In the words of an expert panel:

...after the attacks, federal policymakers, seeking to secure commercial aviation and regain public confidence in air travel, did not have a well-designed security system in place that could be assessed methodically to identify gaps that needed to be filled (Deterrence, Protection and Preparation: The New Transportation Security Imperative, 2002).

What is required is precisely an approach that is systematic and comprehensive rather than a continuation of the former “guards, guns, and gates” strategy which failed so dismally to prevent the September 11 catastrophe. As the TRB panel noted: “By defeating one...perimeter defense – passenger screeners intended to intercept handguns – the September 11 attackers were able to defeat the entire security regime”. Accordingly, they stress the need for a “layered system” because:

Layered systems cannot be breached by the defeat of a single security feature – such as a gate or guard – as each layer provides backup for the others, so that impermeability of individual layers is not required. Moreover, the interleaved layers can confound the would-be terrorist (Deterrence, Protection and Preparation: The New Transportation Security Imperative, 2002, p. 2).

Such a layered system, or at least some version thereof, needs to be applied to the other elements of the aviation system, air cargo and general aviation which also pose very real threats. Cargo represents a potential threat not only to the freight carriers but also to passenger planes which also carry large amounts of cargo. Freight passes through many transfer points in its journey from the shipper to a plane, so that

opportunities for tampering are quite extensive. Air cargo theft, drug smuggling and other illegal activities indicate the degree to which the system is vulnerable.

There is a second dimension to cargo security. Cargo planes are just as powerful weapons as loaded passenger planes for they too carry an enormous amount of fuel. Yet cargo pilots are not permitted to carry guns, there are no federal marshals on cargo flights, cockpit doors are weak, if they exist at all, and the cargo ramps are insecure in comparison to passenger ramps. Thousands of people, many strangers, few if any with background checks work on loading and unloading air cargo. Yet, a terrorist attack aimed at blowing up several cargo planes simultaneously would have very damaging consequences for the U.S. economy and for global trade generally.

These and numerous other security risks have been recognized for some time and various measures have been implemented in the past decade by the FAA and the air cargo companies. However, the primary concern has always been and remains passenger aviation and the TSA has to date done little to minimize the threat to a passenger plane from the cargo that it carries or to ensure that the plane cannot be hijacked. A recent GAO report noted that such measures as work on explosive detection or cargo profiling are at best ongoing but that no comprehensive cargo-security plan has been developed by the FAA or the TSA. The importance of such a plan is summarized as follows:

Each potential improvement measure...needs to be weighed against other issues, such as costs and the effects on the flow of cargo. Without a comprehensive plan that incorporates a risk management approach and sets deadlines and performance targets, TSA and other federal decisionmakers cannot know whether resources are being deployed as effectively and efficiently as possible....(GAO, "Vulnerabilities and Potential Improvements for the Air Cargo System", December 2002).

A second critical element of the aviation system that has received scant attention is general aviation. This is an enormous enterprise involving some 550,000 pilots, 200,000 private planes and over 5,000 airports. Safeguarding these facilities would require billions of dollars and, though, some modest steps have been taken, access to these airports and their planes remains relatively open. The Aircraft Owners and Pilots Association (AOPA), a powerful lobby, argues that the threat is overblown and that by permitting general aviation to continue function, the government has decided that general aviation does not present a major threat. Furthermore, their industry has voluntarily taken steps to enhance security, small airports are inherently secure since strangers would be noticed immediately, and that the planes, most of which are small craft that are not easily stolen, cannot cause significant damage. It has therefore opposed various measures proposed by the TSA such as rules regarding the denial, suspension or revocation of pilot certificates to individual considered potential security risks. (AOPA Online, "General Aviation and Homeland Security" and "Regulatory Brief: FAA and TSA Security Direct Final Rules).

AOPA's optimistic view, however, is not shared by most experts. A simulated attack on the U.S, "Silent Vector" revealed what its planners called a "gaping hole" in aviation security – the charter services that operate small and medium jets. It is a simple matter to charter a plane with intercontinental range and sophisticated navigation equipment and to include a large bomb in the luggage, thus transforming the plane into the equivalent of a cruise missile. (S. Waterman, "Huge U.S. Aviation Gap", Washington Politics and Policy Desk, 3/7/2003). Nor can one dismiss the threat posed by smaller planes for it is possible to do considerable damage with even a small aircraft. It would not be a difficult matter for a terrorist to purchase a commercial sprayer, load a couple of drums with dangerous chemicals such as sulphur mustard in the plane and release them in a way that would terrorize people. At present, stealing a small plane is not a

difficult task. Even crop dusters are vulnerable for they are typically left in a hangar and tied down. Many farmers who do crop dusting have a little plane parked next to their combine. It is not even necessary to steal a plane for all that is required to rent a plane is a government issued photo ID, a license and a credit card.

In short, the use of general aviation to create panic might require planning but is certainly possible and it seems appropriate to consider additional security measures. Minimally, these should include enhanced background checks into who rents a plane and the use of a sophisticated form of ignition with embedded biometric data to deter theft.

Given the complexity of the challenge that safeguarding aviation requires, it is obviously necessary to mount a sophisticated and nuanced response. Any integrated, innovative approach to aviation security depends on the development and implementation of a carefully developed and comprehensive strategy that recognizes the weaknesses of each element and develops well thought out systematic measures based on careful assessments. It has been suggested that this should be the mandate of the TSA – that it should assume a strategic systems oriented research and planning role with a strong evaluative capability in key areas, especially technology and that its activities be closely linked to relevant national and international actors (Deterrence, Protection and Preparation: The New Transportation Security Imperative, 2002 pp. 3-7).

Successfully implementing this approach and these recommendations will be no easy matter given the massiveness of the bureaucratic reorganization that is now underway, the need to change organizational cultures, and the many traditional obstacles that have to be overcome. Indeed, one knowledgeable observer, a former staff director for the White House Commission on Aviation Safety and Security, has written “... the strategic role ... propose(d) for the TSA cannot be accomplished by the current organization with the current staff and under the existing legislation” (Kauver, 2002) because lobbyists influence departmental R & D programs and policy makers override the conclusions of researchers. Nor will the new Department of Homeland Security be able to carry out the analytical tasks suggested above given the immediate needs that it must deal with. Accordingly, he proposes assigning this task to academia and the private sector (Kauver, 2002).

THE FUTURE

Obviously much remains to be done to safeguard the aviation system from terrorist threats. How vulnerable the system remains, has been documented above, as has the need for a new approach to planning, operations and enforcement. Until now the focus has been upon safeguarding assets – airplanes and airports but there are simply too many facilities to safeguard and too many potential attack scenarios ranging from cyber to physical to biological, chemical or nuclear. Furthermore, the costs of a successful attack will vary greatly depending upon the event. The loss of an airplane is tragic, the disruption of the U.S. economy could be catastrophic. Accordingly, many experts have suggested that the focus should shift to the consequences of a successful attack not only at the system level but at the national as well.

Our national security is dependent upon complex interconnected systems and, the more complex the system (as is the case for international aviation), the greater the vulnerability. One element contributing to this complexity is the large number of actors, many of whom are in the private sector. Their cooperation is essential if appropriate levels of security are to be achieved. As was noted earlier, the airlines and other

private sector firms have not been interested, historically, in investing in security measures, apart perhaps from theft prevention, and resisted efforts to enhance the level of aviation security. If this pattern is to change incentives that will motivate the private sector to adopt different policies will have to be devised so as to create a situation where the private sector achieves economies while security is enhanced.

While every effort must obviously be made to safeguard existing systems, by reducing vulnerabilities, it is also necessary to begin to think creatively about designing systems that are less vulnerable than the ones that we have built heretofore. Such systems should be loosely coupled, resilient, flexible, possess redundant capacity, and not be based upon resources whose flow can be easily disrupted (Winner, 2002). Widespread changes in all aspects of aviation – in planning, design, implementation and operation -- are required, if such a system is to emerge..

The goal should be to incorporate security into every element of the system to the extent possible. Such a focus means a new approach to the planning, design, and operation of aviation. New concepts like robustness, flexibility, and redundancy will have to be operationalized and integrated into the planning process. Accepted ideas will have to be re-examined. For example, Is remote check in at transit stations desirable? Should we reverse the trend towards intermodal terminals? Should people and baggage be handled separately?

Research is underway to determine whether it is feasible to move passengers and luggage through different modes. Air travelers would drop off their check-in baggage a few days prior to departure at any of a number of locally authorized outlets or even have them picked up at home. The bags would be shuttled to a local transfer station for re-sorting to intercity transport. Bags would be dispatched by truck when possible to arrive in time to meet passengers at their destinations, airport, hotel, or home. The elements for such a system are already in place but would be integrated into a more effective and efficient system. The result would benefit all the participants. It would allow the airlines to save the money spent to handle and screen baggage and enable them to carry additional high value cargo, minimize the hassle that air travelers now undergo, and greatly enhance security by focusing only on people and their carry on luggage. Perhaps most important the proposed system fits easily into the “layered approach” to security recommended by the TRB. Nor can one overlook the long term advantages of enhancing the capacity of airports and facilitating travel for an aging population. Whether such a scheme is commercially viable remains to be seen but it represents the kind of innovative thinking that is required to reduce the vulnerability of the aviation system. Such a scheme would also illustrate how it is possible to gain the cooperation of private firms and enhance security by creating a win-win situation.

At the core of such a reappraisal would be a decision process based on clearly defined goals. At present such definition is not apparent. Is the goal of all the security measures enacted by the TSA to decrease the overall risk to passengers? If so then more stringent measures should be enacted. Is it to enhance the wellbeing of the airlines? If so, they should not be expected to bear the high costs. Is it to protect the national economy? If so, air cargo requires more attention. Is it to prevent the release of chemical or biological agents? If so, general aviation requires more attention. Is it to increase consumer confidence? If so, the least invasive procedures are probably desirable. Since some of these goals are contradictory, attempting to achieve them all leads to conflicting policies.

Once goals and objectives are specified, risk assessment methodologies that relate actions to potential threats and to costs can be utilized. These should be based on a realistic appraisal of the potential threat which evaluates such basic factors as the terrorists’ training, skill levels, resources, attack methods

and weapons, including chemical, biological, radiological and nuclear as well as more traditional ones. On the basis of such an analysis, it is possible to raise such basic questions as the following: (S. Polzin, Security Considerations in Transportation Planning, Southeastern Transportation Center; (S. Gale and L. Husick, “From MAD to MUD: Dealing with the New Terrorism” .Foreign Policy Research Institute, February 2003.)

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1. What are the consequences of both the proposed action and the failure to act?
2. What adverse security effects would be avoided if the proposal is enacted and which ones are unavoidable?
3. What are the alternatives to the proposed action, the expected criteria for decision making, and why the proposed action is the preferred choice?
4. What are the costs of the proposed action (including those imposed upon the nation) as compared to a successful attack?
5. What are the estimated costs of the proposed action and what is the estimated net present value of the investment required to take the proposed action?

Science and technology will inevitably comprise important elements in such a strategy. There is no doubt that technology can reduce the vulnerability of aviation in many important ways and, indeed, great hopes are being placed upon research and development to identify new methods of safeguarding telecommunications systems, of detecting biological, chemical, and nuclear agents, of checking baggage for explosives, and of tracking and protecting containers. Ideally the new technologies will increase efficiency at the same time that they enhance security. Such technologies are obviously more likely to be accepted rapidly by the many actors who are involved in the aviation system. Yet it is not clear that the high hopes will be realized. The Department of Homeland Security is composed of agencies that are not known for their experience in this area and the amounts devoted to R & D are quite small.. Only \$0.5 billion was allocated to R & D in the HSD’s FY 2003 budget which amounted to \$37.5 and the TSA’s budget FY 2004 allocated only \$75 million out of a total of \$5 billion. What is required is a national science and technology strategy for homeland security (of which aviation should be an important part) but at least one expert believes that “for some period of time more reliance will have to be placed on private initiative and resources” (Lewis Branscomb, oral comments, Homeland Security Conference, University of Colorado, October 2002)

Even if an appropriately funded national strategy is devised and implemented, however, it must be recognized that technology is not a panacea that can provide a “fix” to the problem of terrorism. For some threats, such as biological and chemical or radiological weapons of mass destruction, breakthrough technologies are not available. Long lead times are often involved in bringing technologies to market, they are often costly, and do not always meet the high expectations that are accorded them. Technologies also have social and economic consequences and it is essential to include these in any calculation of risks and benefits before making a decision to deploy a particular technology. In the past, federal agencies, such as the FAA, have rushed to deploy technologies whose efficacy was limited because of many false positives and whose financial and other costs were very high. Accordingly it is essential to apply the risk analytical approach when making decisions regarding technology. For example, the use of biometric technology to screen people at airports and other entry points is being discussed. These technologies can tie individuals accurately to travel documents, thus, greatly reducing, if not eliminating, problems of identity theft and forgery; but their implementation has significant implications for increased processing times and, thus, the flow of tourists and business travelers, especially, though not exclusively to border communities. Furthermore, Americans traveling abroad may be required to provide biometric samples to foreign governments (GAO, 2002).

Science and technology can also play an important role in enhancing consequence management which must also become a part of aviation security planning. Important steps have been taken in this regard but much remains to be done, given the financial limitations and the problems of coordinating the many actors involved, especially given the frequent lack of interoperability. DIA, for example has an emergency evacuation plan that calls, in the case of a major power failure, for sending people to nearby hotels. When consultants met with the State patrol, however, they learned that its plans called for closing the highway leading from the airport to the hotels. Of particular concern is the importance of preparing for effective communication with the public to avert panic.

Public education is but one dimension of the education and training needs that are required. Technology ultimately depends upon people. It is human beings who operate the technologies, who must interpret the results that technological tools provide. Ample evidence of this point can be found in the many tests at various airports which demonstrated the ease with which weapons could be smuggled past the screeners. Hence, issues of training and education are as important as the development of the technologies themselves. The creation of a safe and secure transportation system will require a change not only in the application of technology, but also in the ways that human resources apply knowledge and make decisions. Every aspect of transportation – planning, design, operation and maintenance will undergo organizational and technological changes. If these are to be implemented successfully, professionals with appropriate skills and perspectives will be required. Until recently, transportation security was not accorded a high priority, and education for transportation security received little attention. As a result, there are now few transportation professionals in either the public or the private sector who possess an appropriate understanding of security issues or the relevant skills required to function effectively in the new environment. Security in transportation organizations will improve when various levels of the organization assume ownership of security. However, this will take time and be dependent upon improving the technical and conceptual skills of all members of the transportation sector, from truck drivers responsible for transporting hazardous materials, and clerical staff opening the mail and entering data, to corporate level executives and government officials planning and implementing policy. Developing a coherent strategy to tackle such educational and training needs is no simple matter but it is an issue of great urgency.

Efforts to achieve aviation security must go beyond vulnerability management and crisis management. These are important elements but a comprehensive strategy must include measures designed to prevent or deter a terrorist action. These measures inevitably require the cooperation of foreign states if they are to be effective. Achieving such cooperation is seldom easy, for international politics is characterized by a system of autonomous states, each pursuing its own interests. It is further complicated by widespread hypocrisy and the application of double standards. The U.S. has not been immune from such practices, especially when strategic interests such as the flow of oil are concerned. Further complicating our efforts to gain support and cooperation in the struggle against terrorism is the administration's willingness to avoid participating in international treaties and to forsake the multilateral approach of its predecessors in favor of unilateralism. The newly declared U.S. security policy that emphasizes the right of preemption aroused further concerns about American leadership abroad. The decision to topple Saddam Hussein's regime in Iraq has resulted in the deepest rift between the U.S. and many of its traditional European allies, perhaps in history. The greater the growth of negative attitudes towards the U.S. - and these seem to have reached extraordinarily high levels throughout the globe - the more difficult it is to find allies who will cooperate fully and wholeheartedly in the struggle against terrorism.

To reduce the threat posed by Al Qaeda and similar organizations, it is necessary to deny these groups the ability to establish themselves in secure bases from which they can plan attacks, obtain the

necessary weapons and intelligence, and recruit followers with the appropriate training to carry them out. A preventative strategy would be aimed at identifying, as thoroughly as possible, the members of terrorist organizations, discouraging states from supporting them covertly, denying terrorists access to skills and resources, especially weapons of mass destruction, limiting their appeal and ability to recruit new members. (P. Heymann, "Dealing with Terrorism, an Overview", *International Security*, December 2001).

An important part of such a strategy includes recognizing and attempting to deal with the factors that drive individuals and groups to violence, to deal with the root causes that nurture it. Terrorism, in all its forms, is a criminal activity that warrants vigorous law-enforcement efforts. The enhanced security measures discussed above, including a robust intelligence capability that provides officials with the kind of information necessary to impede or foil terrorist or other criminal designs are all important elements in any coherent strategy. Apprehension, prosecution, conviction, and imprisonment of responsible parties eliminates the possibility of repeat performances and may temporarily disrupt their organizations (Szyliowicz and Viotti, 1997).

Such actions make terrorist operations more difficult but they pose more of a challenge to the determined than an effective deterrent, as al Qaeda has demonstrated only too tragically. To rely only on law enforcement and enhanced security measures is, at best, a partial remedy that only addresses the symptoms (or effects) of the underlying social and social-psychological causes. No amount of law enforcement or enhanced security measures can fortify or protect every carrier or terminal, much less every passenger. Furthermore, a trade off must often be made between enhanced security and civil liberties as the controversy over the Bush administration's Terrorism Information and Prevention System (TIPS) program demonstrated.

Grievances--real or imagined, just or unjust, legitimate or illegitimate--are still grievances and terrorism provides the weak or frustrated with a means for gaining attention, if not for achieving ultimate ends. To identify these motivations, of course, is not to sanction or apologize for what is still illegal, organized violence. It is only to recognize that a comprehensive approach to the aviation-security challenge has to go beyond law enforcement and enhanced security measures to grapple with the more difficult social causes. Addressing social causes requires great patience, which is often lacking in policy makers who habitually focus on short-term measures with more immediate, hopefully positive effects.

Longer-term attention to social causes, however, can yield much greater payoffs than either law enforcement or security enhancement alone. Terrorism, especially when its roots lie overseas, is less likely when inter-communal conflicts, if not resolved, are at least managed in a way that reduce tensions and build a stronger foundation for establishing the kind of confidence upon which resolution or reconciliation eventually might be based. This has been as true in Ireland with its various anti-British, Irish Republican Army (IRA) factions, for example, as in the Middle East where Palestinian-Israeli differences have been and continue to be the source of so much organized violence that has threatened transportation systems and carriers.

Dealing with such conflicts is, at best, a slow, difficult, aggravating process. Often the best that policy makers and diplomats can achieve in the short term is to manage such conflicts. Progress must be measured in modest terms but building the bases for accommodation, lowering conflict tensions, and reducing the likelihood that an aggrieved party will resort to terrorism are outcomes that contribute directly to the real security of transportation systems and intermodal networks.

Even modest improvements in conflict relations can have substantial impact on the propensity to resort to organized violence as a response to unattended or unresolved grievances. The same may also apply to terrorism promoted or supported by the "Axis of Evil" and other so-called rogue states. Foreign policies that isolate and further alienate such countries and their governments more likely will result in continuance, not curtailment, of state-sponsored terrorism. Turning rogue states into pariahs or denouncing them with

vivid rhetoric does not serve the interests of the pariah makers and can only worsen the transportation-security problem. It is an extraordinarily difficult problem, of course, to integrate disaffected groups and their “rogue”-state sponsors into the global mainstream. A careful and ever-patient diplomacy will balance condemnation of the actions of states which sponsor terrorism or engage in other destructive activities that have significant implications for terrorism (such as North Korea’s renewed commitment to becoming a nuclear power) with constructive efforts to bring such states into the global mainstream where adherence to global norms of acceptable state conduct is more routine. The case of Iran highlights the complexities involved, in terms of both foreign policy and domestic political considerations.

Such an approach should be guided by the following principles which emerge from a recent study by a former senior CIA official, aided by many experts: (Pillar, 2001):

- Inject the counterterrorist perspective into foreign policy decision-making
- Pay attention to the full range of terrorist threats
- Disrupt terrorist infrastructure worldwide
- Use all available methods to counter terrorism, while not relying heavily on any one of them
- Tailor different policies to meet different terrorist challenges
- Give peace a chance
- Legislate sparingly
- Keep terrorist lists honest
- Encourage reforming state sponsors to reform even more by engaging them, not just punishing them
- Help other governments to help with counter-terrorism
- Work with, not against, allies
- Use public diplomacy to elucidate Terrorism without glamorizing terrorists
- Level with the American people
- Remember that more is not necessarily better

Well before September 11, the precarious state of aviation security was apparent. Hopefully the reforms that have been initiated since then and the measures that are forthcoming will greatly improve the situation. Clearly much remains to be done. Prior to the destruction of the World Trade Center, a co-author and I wrote:

... designing an effective strategy to meet the problems posed by transportation security is no simple matter. It requires fresh thinking and new, integrated approaches.... While (terrorist) threats can never be eliminated completely, they are likely to increase over time unless they are addressed adequately (Szyliowicz and Viotti, 1997, 393-394).

Those words are as true today as they were in 1997.

REFERENCES

- “America Still Unprepared – America Still in Danger,” Report of an Independent Task Force Sponsored by the Council on Foreign Relations, 2002.
- Bemis, R. Statement before the Committee on Government Reform Subcommittee on National Security Affairs, and International Relations, November 18, 2002.
- Bonner, R. Presentation Before the Center for Strategic and International Studies, August 26, 2002.
- Chardy, A. “Lax Security at MIA,” The Miami Herald, January 31, 2003.
- Dacey, R. F. “Computer Security: Progress made, but critical Federal Operations and Assets remain at risk,” Statement Before the Subcommittee on Government Efficiency, Financial Management and Intergovernmental Relations, Committee on Government Reform, House of Representatives, U. S. General Accounting Office, November 19, 2002.
- “Deterrence, Protection and Preparation: The New Transportation Security Imperative,” Transportation Research Board, Special Report 270, 2002, p.2.
- “Information Security”, GAO-01-1004T, 8/03/2001. www.gao.gov
- Hosenball, M. and E. Thomas. “High Seas Hunting,” Newsweek, December 23, 2002
- Kauvar, G. B. “Transportation Security,” Issues in Science and Technology, Fall 2002, p. 6.
- Lee, J. “Progress Seen in Border Tests of ID System,” The New York Times, February 7, 2003.
- McIntyre, Dave. “Finding the Path Among the Trees,” ANSER Institute for Homeland Security, July 23, 2002.
- Perl, A and J. Szyliowicz. “Transportation Security: The Energy Dimension,” Journal of Urban Technology, December 2001, 134-136.
- “Post Attack Economy is Less Global, as Trade Falters,” Christian Science Monitor, October 17, 2001.
- Prince, T. “Sneak Preview,” American Shipper Magazine, January 2003.
- Slater, R, E. “Transportation: The Key to Globalization,” Economic Perspectives, Electronic Journal of the U. S. Department of State, 5(3), 7-10, [On-line 10/00] Available: <http://usinfo.state.gov/journals/ites/1000/ijec/ijec1000.htm>.
- Pillar, Paul. Terrorism and U.S. Foreign Policy. Washington, D.C.: The Brookings Institution Press, 2001.

Smith, O. A. "Enhancing Border Security," Statement Before the U.S. Senate Subcommittee on Immigration Committee on the Judiciary, February 10, 2000.

Szyliowicz, J. and P. Viotti. "Transportation Security," *Transportation Quarterly*, 1997.

U.S. Commission on National Security/21st Century. "Road Map for National Security: Imperative for Change", Phase III report. www.nssg.gov

The White House. "Border and Transportation Security", Department of Homeland Security. www.whitehouse.gov/deptofhomeland/sect3.html

"U. S. Customs Container Security Initiative Guards America, Global Commerce From Terrorist Threat", Press Release, [On-line 11/02] Available: <http://www.customs.ustreas.gov/hot-new/pressrel/2002/1029-01.htm>.

"Using Biometrics for Border Security", U.S. General Accounting Office, November 2002.

Winner, L. "Complexity, Trust and Terror," *Tech Knowledge Revue*, 3.1, October 22, 2002

(Footnotes)

¹ This article draws upon my previous work in this area, "The International Dimensions of Transportation Security, prepared for "Terrorism and Transportation" Symposium, Johnston, Van R. Ed., *Review of Policy Research*, Vol, 20, # 2, 2003, and J. Szyliowicz and Paul Viotti, "Transportation Security", *transportation Quarterly*, 1997.

SPEAKER BIOGRAPHIES – in order of appearance

Cruz Russell

Cruz Russell is the Director, Office of Policy and Planning at the Port Authority of New York and New Jersey. Mr. Russell has directed the Port Authority's Office of Policy and Planning since 1995. In this capacity, he has led the Port Authority's long-range planning process; developed some of the agency's major regional transportation initiatives, environmental and energy policies; and provided the agency and the region with regional demographic and economic analysis. He has worked extensively on community outreach efforts to ensure that Port Authority transportation improvements create benefits for neighboring communities, with a minimum of negative impacts. He currently serves on the boards of a number of community organizations, including the Business Outreach Center Network of NY, and the Greater Jamaica Development Corporation, and as a member of the North Jersey Transportation Planning Authority, Inc.

Previously, Mr. Russell served as the Port Authority's Secretary, as Assistant Secretary for State Relations, as Manager of Labor Force and Business Development, and as manager of various economic development programs. He received his undergraduate education at Dartmouth College, and his graduate education in urban planning at New York University.

Paul Stephen Dempsey

Paul Stephen Dempsey is Tomlinson Professor of Global Governance in Air & Space Law and Director of the Institute of Air & Space Law at McGill University, in Montreal, Canada. From 1979-2002, he held the endowed chair as Professor of Transportation Law and Director of the Transportation Law Program at the University of Denver. He was also Director of the National Center for Intermodal Transportation. He served as an attorney with the Civil Aeronautics Board and the Interstate Commerce Commission in Washington, D.C., and he was Legal Advisor to the Chairman of the I.C.C.

Professor Dempsey has written more than fifty law review and professional journal articles, scores of newspaper and news magazine editorials, and several books. Some include:

- *Airport Planning & Development: A Global Survey* (McGraw Hill 1999).
- *Airline Management: Strategies for the 21st Century* (Coast Aire 1997).
- *Air Transportation: Foundations for the 21st Century* (Coast Aire 1997).
- *Denver International Airport: Lessons Learned* (McGraw-Hill 1997).
- *Aviation Law & Regulation* (two volumes, Butterworth 1993).

Dr. Dempsey holds: A.B.J. and J.D. degrees from the University of Georgia, an LL.M. from George Washington University, and a D.C.L., McGill University. He is admitted to practice law in Colorado, Georgia and the District of Columbia. Professor Dempsey was a Fulbright Scholar, was awarded the Transportation Lawyers Association Distinguished Service Award, and was designated the University of Denver's Outstanding Scholar.

Dr. Dempsey is also Vice Chairman & Director of Frontier Airlines, Inc., and Director of the Jordan Center for Aviation Safety Security, in Amman, Jordan. He has served as a founder and first Chairman of the Board of Governors of the Certified Claims Professional Accreditation Council, Inc., and

President and Director of the Genesee Foundation, Inc. He has also served as a consultant to U.S. and foreign airlines, railroads, motor carriers, transportation labor organizations, government agencies, and telecommunications companies.

Joseph S. Szyliowicz

Joseph S. Szyliowicz is an internationally recognized expert on transportation policy, technology, and development, with a particular interest in security and development issues in the Middle East. He was named 'Outstanding Educator of the Year' by the Colorado Transportation Community in 2000 and is the recipient of the 2003 Distinguished Service Award from the University of Denver, the 1997 International Award for Transportation and Ethics from the Alliance for Transportation Research and the Outstanding Scholar award from the Burlington Northern Foundation (1986). He is a former Fulbright Senior Research Fellow and has received grants and fellowships from such Institutions as the Ford Foundation, National Science Foundation, the Social Science Research Council, the Sloan Foundation, IBM, HEW, the Rand Graduate Institute, the American Research Institute in Turkey.

He is author or co-author of a half-dozen books on transportation, energy, technology, and the Middle East and has written more than two dozen book chapters, articles and op-ed pieces that have appeared in *Transportation Research*, *Transportation Quarterly*, *Transportation Law Journal*, *Trends 2000*, *Policy Sciences*, *The Middle East Journal*, *Middle Eastern Studies*, *the International Journal of Middle East Studies*, *World Politics*, *the Chicago Tribune*, *the Denver Post*, and *Engineering-News Record*.

Some recent work includes:

- Co-author. *Intermodal Skills*. Asia Pacific Economic Cooperation. , 2001
- Co-author. "Revisiting transportation planning and decision making theory: The case of Denver International Airport." *Transportation Research, Part A: Policy and Practice*. 31(4): 263- 280, 1997
- Co-author. *Denver International Airport: Lessons Learned*, 1997

Professor Szyliowicz received a BA from the University of Denver, an MA from the Johns Hopkins University, and a Ph.D. from Columbia University. He has visited as a Senior Fellow at Bilkent University (Turkey), St Antony's College, Oxford University, the Harry S Truman Institute and the Institute for Advanced Studies at Hebrew University in Jerusalem.

A. Bradley Mims

A. Bradley Mims currently is a Marketing Representative for Booz/Allan/Hamilton specializing in projects relating to the U.S. Department of Transportation. Mr. Mims previously served as Transportation and International Affairs Specialist for the Ferguson Group. Mr. Mims assisted clients with wide variety of issues facing the aviation industry. His expertise was tapped for advice on aviation safety and security regulations to obtaining funding for airport improvements under U.S. DOT-FAA grant programs.

Mr. Mims served as Deputy Assistant Secretary for Aviation and International Affairs, U.S. Department of Transportation, Washington, D.C. August 1998 to January 2001. During this period, he also served as Acting Assistant Secretary for Aviation and International Affairs USDOT between March 1999 and September 2000. Mr. Mims's duties also included the negotiation and implementation of international aviation agreements, international route cases and the development of international aviation policy. He

oversaw a wide range of domestic aviation economic matters and the conduct of the Department's international affairs in trucking (NAFTA), rail, highway and maritime transportation. In this capacity, Mims worked closely with the Departments of State, Justice and the Federal Aviation Administration on a range of aviation and international policy issues.

Mr. Mims has extensive legislative experience. Mr. Mims served as Legislative Director for Congressman John Lewis of Georgia (D). He has also served as Legislative Director for Congressman Robert Garcia of New York (D) and Legislative Assistant for Congressman Julian C. Dixon of California (D).

William R. DeCota

William DeCota was appointed Director of Aviation in December 1999 for The Port Authority of New York and New Jersey. He leads a career staff of nearly 1,000 employees for the management of Kennedy International, Newark International and LaGuardia Airports, which together comprise the world's largest aviation system, as well as Teterboro Airport and the Downtown Manhattan Heliport. Previously, he served as Deputy Director of Aviation, Assistant Director for Business and Properties, as well as Manager of Business and Financial Services for the Aviation Department.

Mr. DeCota joined The Port Authority of New York and New Jersey as a Junior Financial Analyst in the Financial Planning and Analysis Division of the Comptroller's Department in 1982. He has a varied educational background, including studies in architecture at the University of Virginia, and pursued a Doctorate in Finance and Accounting at the University of North Carolina, Chapel Hill. He holds a Bachelor's Degree in Finance from the University of Mississippi, and an MBA with a concentration in corporate financial management from the University of Georgia.

Prior to joining the Port Authority, Mr. DeCota was a business analyst for Dun & Bradstreet, responsible for analyzing the financial position of small businesses located in the New York metropolitan region. He also had some experience teaching both finance and accounting at the graduate level.

Bill has been invited to speak at such forums as international planning and airport finance conferences, and is the author of several speeches and papers on these topics. He is a former Chair of the Finance and Administration Subcommittee of Airports Council International and currently serves on the Board of that organization as well as the Policy Review Committee of the Board of the American Association of Airport Executives. Mr. DeCota is also President of the Queens Council of the Boy Scouts of America, and a member of the Board of the Regional Business Partnership and the Airport Development Council.

Anthony Perl

Anthony Perl is the founding director of the City University of New York's Aviation Institute, based at York College in Jamaica, Queens. Prior to launching the Aviation Institute, he was a Visiting Scholar at the City University of New York's Institute for Urban Systems. From 1993 to 2001, Perl taught at the University of Calgary in Canada, where he was an Associate Professor of Political Science. He received an undergraduate honors degree from Harvard University, majoring in Government, an MA from the University of Toronto, specializing in Public Administration, and a Ph. D. from the University of Toronto in Political Science.

Perl's transportation research has crossed modes and disciplines to explore the organizational and political dynamics that influence transportation finance, ownership, and management. His work has been published in numerous journals including *Transportation Research*, *Transportation Quarterly*, *World Transport Policy and Practice*, *Journal of Public Policy*, *Journal of Policy Analysis and Management*, *Canadian Public Policy*, and *Scientific American*. His work has been recognized through conference prizes at the World Conference for Transport Research in 1992 and the Canadian Transportation Research Forum in 2001.

In 2002, Perl has published *New Departures: Rethinking Rail Passenger Policy in the Twenty-First Century* (Lexington: University Press of Kentucky). In addition to "New Departures," Perl has co-edited and co-authored of *The Politics of Improving Urban Air Quality*, published in 1999 by Edward Elgar, UK. He is currently completing a book about the integrity gap in Canadian environmental policy.

PROGRAM SCHEDULE

8:30 - 9:00 am	Registration and Continental Breakfast
9:00 - 9:20 am	Welcome <i>Dr. Russell Hotzler</i> , Interim President York College
9:20 - 9:25 am	Greetings from Congressman Gregory W. Meeks
9:25 - 9:45 am	CUNY's Aviation Institute: The Vision <i>Cruz Russell</i> , Director of Policy and Planning, The Port Authority Of New York and New Jersey
9:45 - 10:00 am	Break
10:00 - 11:15 am	Session 1: Economic Challenges, Part 1 <i>The Cyclical Crisis in Commercial Aviation: Causes & Potential Cures</i> <i>Introduction: William Fife</i> , Aviation Practice Leader, DMJM + Harris <i>Dr. Paul Stephen Dempsey</i> , Tomlinson Professor of Global Governance in Air and Space Law, Director Institute of Air and Space Law, McGill University, and Vice-Chair, Frontier Airlines
11:05 - 11:20 am	Break
11:20 am - 12:30 pm	Session 2: Today's Security Challenges <i>Aviation Security: Promise or Reality?</i> <i>Introduction: Dr. George Bugilarello</i> , Chancellor, Polytechnic University <i>Dr. Joseph Szyliowicz</i> , Founder - Intermodal Transportation Institute and Professor, Graduate School of International Studies, University of Denver

PROGRAM SCHEDULE

12:30 - 1:45 pm Luncheon Address

Global Competition and Security Issues in Developing Nations

Introduction: Morris Lee, Executive Dir. NY State Program,
Council for Airport Opportunity

A.Bradley Mims, Senior Associate, Booz/Allen/Hamilton
Former Deputy Asst. Secretary, USDOT

1:45 - 3:00 pm Session 3: Economic Challenges, Part 2

Introduction: Dr. Robert E. Paaswell, CUNY Distinguished
Professor, Director, CUNY Institute for Urban Systems &
University Transportation Research Center Region 2

William DeCota, Director Aviation Department,
The Port Authority of New York and New Jersey

3:00 - 3:30 pm Closing remarks: *Using Knowledge to Meet Aviation's Most Pressing Needs*

Dr. Anthony Perl, Director, CUNY Aviation Institute at York College

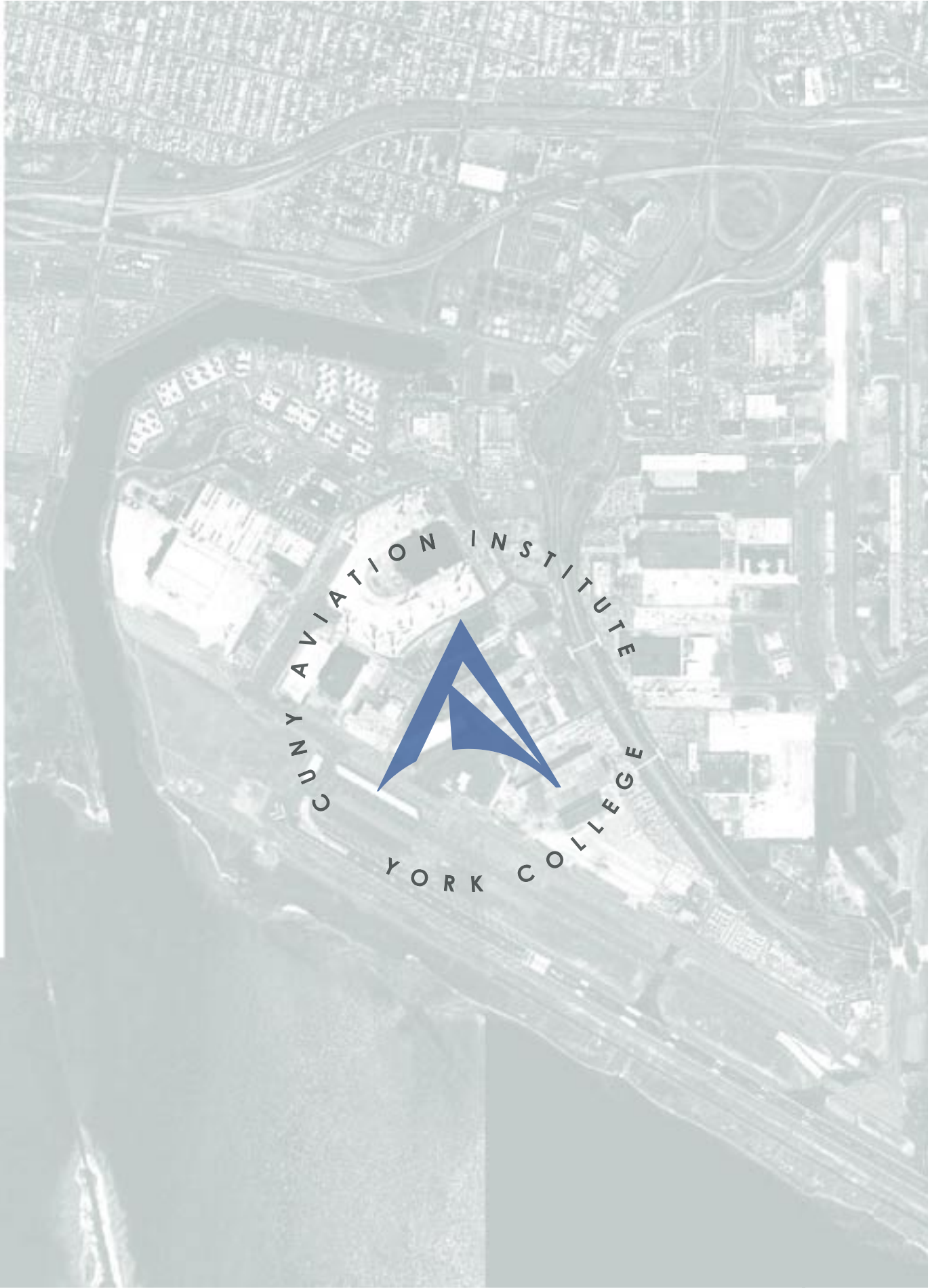
3:30 - 5:00 pm Reception

Post-conference reception hosted by Greater
Jamaica Development Corporation in the York
College Atrium.

A. Bradley Mims	Booz/Allen/Hamilton	Dr. Edward Weil	York College - CUNY
Abe Friedman	Port Authority of New York & New Jersey	Dr. Neville Parker	UTRC
Al Graser	Port Authority of New York & New Jersey	Dr. Robert E. Paaswell	UTRC
Alan Reiss	Port Authority of New York & New Jersey	Dr. Russell Hotzler	York College - CUNY
Allison L. C. de Cerreño	NYU Wagner Rudin Center For Transportation Policy and Management	Dr. William Divale	York College - CUNY
Anthony Perl	CUNY Aviation Institute at York College	Durand Branch	St. Francis College
Bella Pierson	NYU Rudin Center For Transportation	Edgar Grove	Assemblyman Scarborough's Office
Betty Braton	Queens Community Board 10	Elizabeth Perdomo	QCEDC
Boadnaraine Bharosay	York College - CUNY	Elliot G. Sander	NYU Rudin Center For Transportation
Bradley Rubinstein	Port Authority of New York & New Jersey	Elwina Humar	Jamaica One Stop Center
Camille Kamga	UTRC	Eric Lovecchio	Senator Hillary Rodham Clinton
Carl Selinger	Carl Selinger Services	Eric Tyrer	CUNY Aviation Institute at York College
Carlisle Towery	Greater Jamaica Development Corporation	Erno Akos Tekauer	St. Francis College
Carol Lee Whiting	SAFE	Felicia Davidson	Port Authority of New York & New Jersey
Charles Meara	Port Authority of New York & New Jersey	Francis Tenywa	York College - CUNY
Craig Jenks	Airline/Aircraft Projects inc	Frank Marsella	Port Authority of New York & New Jersey
Cruz Russell	Office of Policy and Planning	Fred Kamel	Accommodations Plus Inc
Daniel Evans	CCNY	Fredy Vinansaca	St. Francis College
Daniel M. Jacobs	AICP - SUNY Maritime	Gary Wenger	The Aviation Grp
Denise Hopkins	College of Aeronautics	Geoffrey Arend	Air Cargo News
Denise Jacobs	Port Authority of New York & New Jersey	George Bugliarello	Brooklyn Poly Tech
Derek Hawkins	Port Authority of New York & New Jersey	Glenna B. Hamilton-Jones	Council for Airport Opportunity
Dolores M. Hoffman	Queens Air Services Dev. Office	Henk J. Guitjens	JFK International Air Terminal LLC
Donna Gilmartin	Locust Grove Civic Association	Herbert Armstrong	College of Aeronautics
Donny Zahra	College of Aeronautics	Honorable Leroy Comrie	27th District
Dr. Claire McKnight	UTRC	Hugh Weinberg	Queens Borough President's Office
		Icema Gibbs	Jet Blue Airways
		Iola Davis	Port Authority of New York & New Jersey

James E. Larsen	Air Cargo Solutions	Martin Sklaver	Port Authority of New York & New Jersey
Jan David Blais	New York Airlines Liaison Office	Mary Grace Sileo	Port Authority of New York & New Jersey
Janette Sadik-Khan	Parsons-Brinkerhorff	Matthew Coogan	Consultant in Transportation
Janice Holden	JFKIAT	Mayer Horn	KLD Associates
Jennifer Class	AVPORT	Michael Flynn	Psychology
Jessica Baker	Greater Jamaica Development Corporation	Michael McGaddye	QCEDC
Joan McDonald	McDonald Consulting	Mike Ferrigno	Port Authority of New York & New Jersey
John Jacoby	Port Authority of New York & New Jersey	Minyaji Tsuyashi	College of Aeronautics
John Markunas	GJDC	Mohit Balani	College of Aeronautics
Joseph Szyliowicz	Graduate School of Intl. Studies University of Denver	Monika Borsy	Advanced Electronic Solutions
Karen Kahn	Port Authority of New York & New Jersey	Morris R. Lee	Council For Airport Opportunity
Kenneth D. Honig	Port Authority of New York & New Jersey	Noel F. Jablonski	Sam Schwartz Company
Kiran Mhtre	Bombardier Transportation	Omer Vucic	College of Aeronautics
Kurt A. Goddard	Washington Group Intl.	Pat McCabe	Councilmember Joe Addabbo
Kyriacos Raftis	Port Authority of New York & New Jersey	Paul Stephen Dempsey	Institute of Air & Space Law McGill University
Lawrence Frommer	CUNY Institute for Urban Systems	Phillipa Karteron	Jamaica One-Stop Center
Leidy Ramos	York College - CUNY	Prof. Ross Wiener	CUNY Institute for Urban Systems
Lola Ospanova	St. Francis College	Ralph Tragale	Port Authority of New York & New Jersey
Lou Scala	SUNY Farmingdale	Ranie Rampersaud	Port Authority of New York & New Jersey
Luis Juarbe	Port Authority of New York & New Jersey	Reeves Gandy	St. Francis College
Lynda Tollner	Port Authority of New York & New Jersey	Renaldo Gayle	York College - CUNY
Lynn Steinberg	Port Authority of New York & New Jersey	Reynold Ali	College of Aeronautics
Lysa Scully	Port Authority of New York & New Jersey	Rita Schwartz	General Contractor Association of NY
Marios Phili	Port Authority of New York & New Jersey	Robert Armocida	Port Authority of New York & New Jersey
Mark Seaman	NYU Rudin Center For Transportation	Robert Baker	UTRC
Martin Godly		Robert Boyle	Empire Strategies LLC
		Robert Shettlewood	York College - CUNY
		RoseAnn Darche	Queens Borough President's Office

Roz Griffin	QCEDC	William Radinson Yossi Berechman	Port Authority of New York & New Jersey UTRC
Sarah Spatz	Department of Labor NY State Senator Malcolm Smith		
Scott Celestin	Queen Borough President's Office		
Seth Bornstein	York College - CUNY		
Sharma LeBlanc	ESDC		
Shirely Leung			
Stanley Thomas	SUNY Farmingdale Port Authority of New York & New Jersey		
Steve Brown	SUNY Farmingdale		
Steve Lang	Bombardier Aerospace Port Authority of New York & New Jersey		
Steven Davis-Men- delow	Port Authority of New York & New Jersey		
Susan Bush	Port Authority of New York & New Jersey		
Ted Kleiner	Port Authority of New York & New Jersey		
Theresia Schatz	Port Authority of New York & New Jersey		
Thomas Bock	Port Authority of New York & New Jersey		
Tilcia DeJesus	College of Aeronautics		
Todd Goldman	UTRC		
Traci Turner-Hall	York College - CUNY		
Veana Sawant	NYU Wagner Council for Airport Opportu- nity		
Verdia Noel			
Vincent Delgatto	College of Aeronautics Port Authority of New York & New Jersey		
Warren Kroeppel	Port Authority of New York & New Jersey		
Wil Chabrier	Port Authority of New York & New Jersey		
William DeCota	Port Authority of New York & New Jersey		
William Fife	DMJM Harris Aviation Development Coun- cil		
William Huisman			



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