## 1AC

### 1AC – Inherency

#### Observation One: Inherency

#### a. Airline demand will grow exponentially in the near future – this will put incredible stress on our outdated air traffic control systems.

Bourgeois, ’10 (Daniel, Rochester Institute of Technology, “The Next Generation Air Transportation System: An Answer To Solve Airport Efficiency?,” Masters of Science and Public Policy Thesis, 8/9/2010, Proquest)

By 2025, the Federal Aviation Administration (FAA) forecasts there will be approximately 30,000 more operations per day than the 2007 estimate of 44,000 daily operations (FAA Regional Air Service Demand Study). The current ATC system cannot handle this projected future demand, even if the forecast is reduced to account for current economic or terrorist conditions. Even if the forecasted growth is significantly reduced, today’s ATC system is so inefficient that it will not be able to handle a modest increase in activity. The airline industry is the foundation of the commercial aviation sector, which comprises airlines, airports, manufacturers and associated vendors. U.S. commercial aviation ultimately drives $1.2 trillion per year in U.S. economic activity and 11 million U.S. jobs which is roughly 5.6% of the Gross Domestic Product (Pipes, 2008). By any measure, the U.S. airline industry is a valuable national asset and its continued economic health should be a matter of governmental concern because of the airlines size and contribution (May, 2009). By 2025, U.S. air traffic is predicted to increase two to three times above the current the current passengers’ level. The traditional air traffic control system will not be able to manage this growth so the change to the system is mandatory (JPDO 2009, Pearce, 2006). If the government is going to stop congestion and gridlock before it starts and keeps the economy moving in a growing and upward direction, there must be focused action to improve air transportation for the future (Pathways, 2005).

#### b. Respected authorities on aviation gave the US a ‘D’ for infrastructure. Something must be done.

Greg Principato, President of ACI-NA, an association of airports and airport-related businesses, October 2011, “U.S. Infrastructure Challenges,” Airport Improvement Magazine, <http://www.airportimprovement.com/content/story_result.php?article=00320>

There are few issues on which Democrats and Republicans agree in these politically charged times, but the need to improve our infrastructure seems to be one of them. Airport projects are proven job-creators that increase the safety and security of the aviation system. They also improve the efficiency of air travel and generally make it a better experience for passengers. The 2011 Capital Needs Survey by Airports Council International-North America (ACI-NA) documented $80.1 billion in needed capital investment for U.S. airports from 2011 to 2015. That’s about $16 billion per year. And we’re not alone in highlighting the deficiencies of our aviation system. Last year, the American Society of Civil Engineers gave aviation a “D” on its Infrastructure Report Card. The organization found a $40.7 billion shortfall in aviation infrastructure funds over the next five years and noted: “Travelers are faced with increasing delays and inadequate conditions as a result of the long overdue need to modernize the outdated air traffic control system and the failure to enact a federal aviation program.” It is clear that “funding needs” significantly exceed available “funding options” at U.S. airports. The short-term outlook is of grave concern, as the political and economic climate in Washington, D.C., likely means no increase in the passenger facility charge and a possible reduction of Airport Improvement Program grants in FY 2012.

#### c. SQ efforts to rollout NextGen air traffic technology are underfunded and lack political certainty.

Sakib bin Salam, Fellow @ Eno Center for Transportation, 2012 (M.A., Former research assistant at the Oregon Center for Public Policy, “NextGen: Aligning Costs, Benefits and Political Leadership,” ENO Publication, April 2012, https://www.enotrans.org/store/research-papers/nextgen-aligning-costs-benefits-and-political-leadership)-Mikee

On the policy-side, there are several obstacles to NextGen that hinder progress and the likelihood of a timely and cost- efficient implementation. First of all, there are uncertainties regarding the extent of the benefits NextGen can potentially provide. It is difficult to make forecasts about how much congestion or fuel consumption can be reduced to make the infrastructure investment worthwhile. This makes it challenging to create sustained political, financial, and industry support for the project. Secondly, there are doubts about costs and the FAA’s ability to deliver technology solutions of this magnitude. In the early 1980s, aviation modernization projects were projected to cost $12 billion and be ready in 10 years. NextGen infrastructure and equipage is now estimated to cost about $40 billion with expected completion by 2025.1 Testimony by the US Department of Transportation Inspector Gen- eral and a recent report by the Government Accountability Office (GAO) have pointed out cost overruns and delays in several NextGen programs. This continued uncertainty regarding the total infrastructure and equipage cost figure of NextGen has planted seeds of doubt amongst stakeholders and potential NextGen beneficiaries. Third, the airlines and general aviation users have been hesitant to bear equipage costs due to low profitability, econom- ic turmoil, and a lack of clear incentives to justify investing in NextGen. Operators are unlikely to invest until, at a minimum, the FAA is ready to deliver the promised benefits. This leads to a stalemate: operators are uncertain whether investing in NextGen is worthwhile, when the infrastructure is not yet fully in place, and without equipage the infrastruc- ture by itself is ineffective. The FAA has mandated equi- page of Automated Dependent Surveillance-Broadcast Out (ADS-B) that allows the equipped aircraft to send transmis- sion to other equipped aircraft ADS-B ground stations for all operators by 2020. However, there is uncertainty over when other NextGen on-board equipment will be required, particularly ADS-B In which allows the equipped aircraft to receive transmission from other ADS-B ground stations and other aircraft. Fourth, NextGen faces funding issues that pose some very difficult policy decisions. Work on the ground infrastructure aspect of NextGen is currently funded by the Facilities and Equipment account of the AATF and some progress, albeit slow, has been made on this project. However, recent reports by the Congressional Budget Office and the Government Accountability Office show that current AATF revenues are inadequate to fund NextGen.2 Despite recent resolution over the long overdue FAA reauthorization bill, little progress has been regarding securing a full-fledged modernization funding plan. The current bill authorizes a flat amount of $2.731 billion over four years for Next- Gen and funding is still subject to annual appropriation. A project that is already endangered by uncertainties regarding its worth would benefit from a stable and adequate funding source. A fifth problem facing NextGen is lack of Congressional political leadership in prioritizing a project of such potential value. In July 2011 the House of Representatives passed a short-term extension bill that failed to pass the senate, resulting in a shutdown that lasted a fortnight. The AATF received no tax revenues during the shutdown. As Con- gressional leaders argued over the Essential Air Services program, the trust fund lost over $400 million in foregone tax revenues. Those are funds that could have potentially been used towards an investment like NextGen. Further- more, according to the FAA some of the NextGen program delays can be attributed to the furlough of some of the FAA employees in July 2011 and a freeze on contractor funding which resulted in work stoppage orders for several projects.3 This impact of the impasse on NextGen was also docu- mented on the GAO report on the FAA’s NextGen cost- management.4

### 1AC – Plan

#### Plan:

#### The United States federal government should substantially increase its investment in the Next Generation Air Transportation System (NextGen).

### 1AC – Economy Advantage

#### 1. Growth – Economic growth is impossible without solving airline congestion. As the economy grows, demand for flights will increase. This collapses SQ aviation infrastructure and causes a double-dip recession.

#### a. Aviation affects all parts of the economy – the industry will collapse without new capacity to solve congestion.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

Civil aviation has become an integral part of the U.S. economy. It is a key catalyst for economic growth and has a profound influence on the quality of life of populations around the globe. It integrates the world economy and promotes the international exchange of people, products, investment, and ideas. Indeed, to a very large extent, civil aviation has enabled small community and rural populations to enter the mainstream of global commerce by linking such communities with worldwide population, manufacturing, and cultural centers. Civil aviation products and services generate a significant surplus for the U.S. trade accounts and are in the forefront in the development and use of advanced technologies. Fundamentally, civil aviation touches nearly every aspect of our lives, and its success will, to a great degree, shape American society and the U.S. economy in the coming decades. The ability of civil aviation to foster economic growth and engender social mobility is not, however, guaranteed. By 2000, the economic and personal cost of delays caused by constrained airport and airway capacity and reduced aviation system efficiency reached unacceptable levels. The recent economic downturn and the decline in air transportation following the tragic events of September 11, 2001, provided only temporary relief from the growing problem of congestion and delay—it by no means eliminated the problem. Without swift and thorough intervention, the costs of delay will continue to rise, further harming the U.S. economy, the competitiveness of its industries, and all who rely on aviation in the conduct of their business and personal affairs. Conversely, additional investment in the nation’s aviation infrastructure will facilitate economic growth.

#### b. SQ congestion and delays independently deck the economy.

Ann Brody **Guy**, College of Natural Resources, UC Berkley, October 18, **2010** “Flight delays cost $32.9 billion, passengers foot half the bill” (<http://newscenter.berkeley.edu/2010/10/18/flight_delays/>)

**The cost of domestic flight delays puts a $32.9 billion dent into the U.S. economy**, and about half that cost is borne by airline passengers, according to a new study led by researchers at the University of California, Berkeley. The research was commissioned by the Federal Aviation Administration (FAA), and the final report was delivered to the agency today (Monday, Oct. 18). The comprehensive new study analyzed data from 2007 to calculate the economic impact of flight delays on airlines and passengers, the cost of lost demand, and the collective impact of these costs on the U.S. economy. **The study authors found that increased delays directly correlate with increased costs. Of the total costs, $16.7 billion, or just over half the cost, was borne by passengers, the study found.** This number was calculated based on lost passenger time due to flight delays, cancellations and missed connections, plus expenses such as food and accommodations that are incurred from being away from home for additional time. “**This is the most comprehensive study done to date analyzing the monetary cost of airline flight delays**,” said Mark Hansen, UC Berkeley civil and environmental engineering professor and lead researcher on the study. Hansen said most previous studies have focused on the cost to airlines; the new study analyzed the complex relationship between flight delay and passenger delay, and considered how degraded service quality affects the demand for air travel. “Before this work, no one actually analyzed the data to see how flight delay affects airline cost or passenger lateness,” said Hansen. “While there are a lot of widely available data on flight delays, passenger itineraries and airline costs, this is the first attempt to fully exploit that information to measure the impacts of delay.” Hansen said previous estimates of these costs relied on assumptions and expert opinion, while the research team’s results are largely driven by the actual data. **The $8.3 billion direct cost to airlines included increased expenses for crew, fuel and maintenance, among others.** Nearly half this cost is due to padded schedules, the hidden delays that are built into schedules because the airlines anticipated them. In addition to the direct costs to the airline industry and its customers, flight delays have indirect effects on the U.S. economy, the report said. **The authors noted that inefficiency in the air transportation sector increases the cost of doing business for other sectors, making the associated businesses less productive.** **The study estimated that air transportation delays reduced the 2007 U.S. gross domestic product (GDP) by $4 billion.**

#### c. Economic decline triggers nuclear war

**Harris and Burrows 9** (Mathew, PhD European History at Cambridge, counselor in the National Intelligence Council (NIC) and Jennifer, member of the NIC’s Long Range Analysis Unit “Revisiting the Future: Geopolitical Effects of the Financial Crisis” <http://www.ciaonet.org/journals/twq/v32i2/f_0016178_13952.pdf>, AM)

Increased Potential for Global Conflict Of course, the report encompasses more than economics and indeed believes the future is likely to be the result of a number of intersecting and interlocking forces. With so many possible permutations of outcomes, each with ample Revisiting the Future opportunity for unintended consequences, there is a growing sense of insecurity. Even so, history may be more instructive than ever. While we continue to believe that the Great Depression is not likely to be repeated, the lessons to be drawn from that period include the harmful effects on fledgling democracies and multiethnic societies (think Central Europe in 1920s and 1930s) and on the sustainability of multilateral institutions (think League of Nations in the same period). There is no reason to think that this would not be true in the twenty-first as much as in the twentieth century. For that reason, the ways in which the potential for greater conflict could grow would seem to be even more apt in a constantly volatile economic environment as they would be if change would be steadier. In surveying those risks, the report stressed the likelihood that terrorism and nonproliferation will remain priorities even as resource issues move up on the international agenda. Terrorism’s appeal will decline if economic growth continues in the Middle East and youth unemployment is reduced. For those terrorist groups that remain active in 2025, however, the diffusion of technologies and scientific knowledge will place some of the world’s most dangerous capabilities within their reach. Terrorist groups in 2025 will likely be a combination of descendants of long established groups\_inheriting organizational structures, command and control processes, and training procedures necessary to conduct sophisticated attacks\_and newly emergent collections of the angry and disenfranchised that become self-radicalized, particularly in the absence of economic outlets that would become narrower in an economic downturn. The most dangerous casualty of any economically-induced drawdown of U.S. military presence would almost certainly be the Middle East. Although Iran’s acquisition of nuclear weapons is not inevitable, worries about a nuclear-armed Iran could lead states in the region to develop new security arrangements with external powers, acquire additional weapons, and consider pursuing their own nuclear ambitions. It is not clear that the type of stable deterrent relationship that existed between the great powers for most of the Cold War would emerge naturally in the Middle East with a nuclear Iran. Episodes of low intensity conflict and terrorism taking place under a nuclear umbrella could lead to an **unintended escalation** and broader conflict if clear red lines between those states involved are not well established. The close proximity of potential nuclear rivals combined with underdeveloped surveillance capabilities and mobile dual-capable Iranian missile systems also will produce inherent difficulties in achieving reliable indications and warning of an impending nuclear attack. The lack of strategic depth in neighboring states like Israel, short warning and missile flight times, and uncertainty of Iranian intentions may place more focus on preemption rather than defense, potentially leading to **escalating** **crises**. 36 Types of conflict that the world continues to experience, such as over resources, could reemerge, particularly if protectionism grows and there is a resort to neo-mercantilist practices. Perceptions of renewed energy scarcity will drive countries to take actions to assure their future access to energy supplies. In the worst case, this could result in interstate conflicts if government leaders deem assured access to energy resources, for example, to be essential for maintaining domestic stability and the survival of their regime. Even actions short of war, however, will have important geopolitical implications. Maritime security concerns are providing a rationale for naval buildups and modernization efforts, such as China’s and India’s development of blue water naval capabilities. If the fiscal stimulus focus for these countries indeed turns inward, one of the most obvious funding targets may be military. Buildup of regional naval capabilities could lead to increased tensions, rivalries, and counterbalancing moves, but it also will create opportunities for multinational cooperation in protecting critical sea lanes. With water also becoming scarcer in Asia and the Middle East, cooperation to manage changing water resources is likely to be increasingly difficult both within and between states in a more dog-eat-dog world.

#### d. Aviation infrastructure investment is uniquely productive – it solves delays, boosts competitiveness, enhances tourism, and promotes economic development.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

The total national economic impact of civil aviation exceeded more than $900 billion and 11 million jobs to the U.S. economy in the year 2000, roughly 9% of the total U.S. GDP; · Of this, one dollar in nine is contributed by general aviation; · Aggressive investment in air transportation infrastructure would reduce projected 2012 passenger delays by 64 million hours or 25 percent. Critically, every dollar of investment would generate as much as $5 in economic benefits to the U.S. economy; · For the period 2000 to 2012, timely, robust investment in airports and airways could mean an additional $30.7 billion for the U.S. economy—benefits that would accrue at a higher annual rate as volumes grow beyond 2012; · As a result, business operations would become more efficient, costs would be reduced, and U.S. international competitiveness would increase, particularly in aviation, including air cargo, and tourism, increasing economic development; · Further, with quicker, more robust investment in infrastructure, business and personal travel would rise, and the agony of delays and cancelled flights would be greatly mitigated; and · The increased connectedness of friends and family and more efficient use of the environment would lead to a greater quality of life for all of American society. Substantial agreement exists among the public, aircraft operators, and politicians that civil aviation delays in the base year 2000 were unacceptable. The magnitude of the damage caused by delays is not limited to mere passenger inconvenience; it also imposes considerable direct costs to civil aviation, travel and tourism, and economic development, and hence to the entire U.S. economy. FAA’s Operational Evolution Plan cannot keep pace with the forecast growth in scheduled airline passengers. 24 Therefore, it is an insufficient response to the delay problem because it merely reduces the increase in delay experienced by passengers through 2012 without attacking the base delay itself. The earlier the airport and ATC investment program addresses congestion at large, critical choke points, the more successful it will be in attacking overall system congestion. But even in the most aggressive scenario investigated in this study, annual passenger delay hours in 2012 increase 39% from unacceptable 2000 levels. More aggressive investment in civil aviation infrastructure is not only justified by benefit/cost analysis—it is also essential to the economic well being of the U.S. economy and its citizens.

#### 2. Competiveness –

#### a. An efficient aviation system is key to overall competitiveness.

Thea Graham et al., PhD economics FAA Manager Washington DC, August 2011, “The Economic Impact of Civil Aviation on the U.S. Economy, US Department of Transportation, Federal Aviaiton Administration, <http://www.faa.gov/air_traffic/publications/media/FAA_Economic_Impact_Rpt_2011.pdf>

In a world of decreasing barriers to trade, the U.S. civil aviation industry remains a unique engine for innovation and technological progress, one that provides infrastructure that keeps the nation competitive. This report found that, once all impacts are identified, civil aviation accounted for 5.2 percent of the U.S. economy in 2009. Aviation contributes to economic growth and to stronger ties to local and global markets for every region in the nation. The total output of civil aviation-related goods and services amounted to $1.3 trillion in 2009 and generated more than 10 million jobs, with earnings of almost $394.4 billion. Specific areas of civil aviation such as air cargo have contributed to more effective networking and collaboration between companies far and wide. Recovery in the wake of the recent recession presents many challenges and opportunities for aviation and the U.S. economy as a whole. There is evidence that the capacity reductions made by airlines and airports as the result of high fuel prices allowed the industry to better weather the storm, yet the prevailing economic winds will lead the industry to continue to innovate and become leaner and more responsive to volatile market conditions. The cost of fuel will likely remain a continuing concern for airlines and those affected by air transportation. Many analysts believe that the price of oil will continue to transform the airline industry for years to come, just as it will influence the prospects of other sectors of the economy. As it did in the past century, the role of air transportation will continue to grow for the U.S. and global economies. The economic impacts of civil aviation quantified in this report summarize the benefits made possible by a vital and innovative industry. The industry contributes positively to the U.S. trade balance, creates high-paying jobs, helps keep just-in-time business models viable and connects us to friends, family and commercial opportunities. As the role of air transportation evolves and becomes even more integral to our way of life, a safe and efficient air transportation system will continue to be a vital, even essential, component of a strong and healthy American economy in the 21st century

#### b. Airport infrastructure investment is also critical to US trade leadership

DRI ‘2 (Global Insight Company, “The National Economic Impact of Civil Aviation”. July. http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

The disadvantages associated with the baseline future case examined in this study will detrimentally affect economic activity within the United States; they also will constrain the ability of the United States to compete in global markets. This section identifies the degree of global competition among nations, explores the key ways that this competition can be affected, illustrates how the United States currently competes globally, and suggests how the U.S. global competitive stance could be affected by the disadvantages associated with increasing air traffic delays. Air Transportation and Economic Growth: From Economic Nationalism to a Global Economy Since World War II, a key direction of global commerce has been the increasing integration of national economic activity. Industrial nations came together to form the Organization for Economic Corporation and Development (OECD). The General Agreement on Tariffs and Trade (GATT) was formed and then superseded by the World Trade Organization (WTO) to help facilitate a new era of accelerated global trade. These trends reflect the global integration of economies as business increasingly sought not only to sell its products into wider markets, but also to coordinate production and distribution across national borders. Every region of the world has participated in these trends except for the Middle East, whose export statistics are distorted by the region’s huge exports of petroleum and related products. This steady increase in trade activity has been enhanced by the growth of global air transportation. Clearly, air transportation has facilitated business’ ability to move its products around the world. But it has played a far more important role in bringing business managers together, enabling them to build the links, communications, and personal relationships necessary to achieve such a level of international business activity. Despite continuous advances in telecommunications technologies, the growth in global business over the past 50 years could not have been achieved without the personal contact enabled by the world’s air transportation system. Not only is air transportation important to the global economy; it is also an important enabler of economic growth for individual economies. By developing its air transportation system, a country can better link itself to the global economy and provide an environment for its business that facilitates global activity. Conversely, there are distinct disadvantages for regions or communities that are beyond the reaches of efficient air transportation. In these regions, business remains more isolated and less able to reap the benefits offered by being connected to global economic activity. Both adequate airport capacity and the efficiency with which the air transportation system works are critical to generating economic benefits. The main body of this report examines the impacts that a constrained system in the United States would have on the U.S. economy later in the decade. But it is also true that these constraints would inhibit the ability of the United States to compete in global markets, damaging its international competitiveness in general andtheinternational competitiveness of U.S. civil aviation specifically. This chapter examines some of the elements of such potential damage. Competitiveness by Industry Air Cargo During the past three years, several analyses have shown that, in macroeconomic terms, U.S. integrated air express companies have created billions of dollars annually in reduced business inventory carrying costs, over $50 billion per year in logistics cost savings, and tens of billions of dollars of final demand and export sales that would not occur in the absence of their services. The air express industry itself, including its ground transportation and logistics services divisions, generates approximately $60 billion a year in revenue and employs approximately 600,000 workers. In addition, a significant portion of the world’s freight is still carried either in the bellies of passenger aircraft or by all-cargo aircraft specializing in traditional “heavy freight.” These segments of the marketplace allow those shippers not necessarily demanding “express” service to enjoy the relative speed of movements by aircraft and to permit the transportation by air of oversized cargo to remote regions of the nation and world. Global economic integration is characteristic of most of the world. Exports of goods and services in 2000 represented almost a quarter of the world’s GDP, up from just 10% in 1970. In turn, U.S. merchandise trade amounts to 22% of the world total. This steady increase in trade activity has been enhanced by the growth of global air transport. Air Transportation and Tourism In 1999, almost 48.5 million international visitors came to the United States, spending a total of $74.9 billion on travel-related expenses, such as lodging, gifts/souvenirs, food and beverages, and entertainment. They spent another $19.8 billion on U.S. air carriers in traveling to and from the United States. The total of air travel and travel related spending, $94.7 billion in 1999, has grown 62% since 1990, when international visitors spent about $58.3 billion in travel and travelrelated expenses to visit the United States. 22 This amount of spending is significant (the International Trade Administration—the source of these figures—estimates that foreign travel in the United States in 1999 supported over 1.1 million U.S. jobs), and exceeds the amount spent by Americans visiting other countries by $13.9 billion. In other words, the United States runs a surplus in its travel trade balance. Anything adversely affecting this surplus, such as constrained infrastructure or regulatory barriers to adapting to market forces, would imply a decrease in the United States’ global competitiveness. Other Industries The increase in production costs added to American business by air transportation delays affects the U.S. global competitiveness of all industries. In this case, the increased air transportation costs implied by congestion delays raises the costs of production and distribution across the U.S. economy, resulting in a decrease in global competitiveness. An increase in air transportation costs impacts U.S. industries in two ways: higher air passenger transportation costs increase business travel and entertainment expenses, and higher air cargo costs affect those industries that utilize this form of transportation in their logistics. Improved air transport infrastructure not only increases U.S. competitiveness in general, but also allows U.S. aviation itself to compete more effectively with foreign entities. Constraints in the U.S. air transport system first affect the economic well being of the aviation industry itself.

#### c. US Trade leadership is key to free trade.

Panitchpakdi ‘4 (Supachai Panitchpakdi, secretary-general of the UN Conference on Trade and Development, 2/26/2004, American Leadership and the World Trade Organization, p. http://www.wto.org/english/news\_e/spsp\_e/spsp22\_e.htm

The second point is that strengthening the world trading system is essential to America's wider global objectives. Fighting terrorism, reducing poverty, improving health, integrating China and other countries in the global economy — all of these issues are linked, in one way or another, to world trade. This is not to say that trade is the answer to all America's economic concerns; only that meaningful solutions are inconceivable without it. The world trading system is the linchpin of today's global order — underpinning its security as well as its prosperity. A successful WTO is an example of how multilateralism can work. Conversely, if it weakens or fails, much else could fail with it. This is something which the US — at the epicentre of a more interdependent world — cannot afford to ignore. These priorities must continue to guide US policy — as they have done since the Second World War. America has been the main driving force behind eight rounds of multilateral trade negotiations, including the successful conclusion of the Uruguay Round and the creation of the WTO. The US — together with the EU — was instrumental in launching the latest Doha Round two years ago. Likewise, the recent initiative, spearheaded by Ambassador Zoellick, to re-energize the negotiations and move them towards a successful conclusion is yet another example of how essential the US is to the multilateral process — signalling that the US remains committed to further liberalization, that the Round is moving, and that other countries have a tangible reason to get on board. The reality is this: when the US leads the system can move forward; when it withdraws, the system drifts. The fact that US leadership is essential, does not mean it is easy. As WTO rules have expanded, so too has as the complexity of the issues the WTO deals with — everything from agriculture and accounting, to tariffs and telecommunication. The WTO is also exerting huge gravitational pull on countries to join — and participate actively — in the system. The WTO now has 146 Members — up from just 23 in 1947 — and this could easily rise to 170 or more within a decade. Emerging powers like China, Brazil, and India rightly demand a greater say in an institution in which they have a growing stake. So too do a rising number of voices outside the system as well. More and more people recognize that the WTO matters. More non-state actors — businesses, unions, environmentalists, development NGOs — want the multilateral system to reflect their causes and concerns. A decade ago, few people had even heard of the GATT. Today the WTO is front page news. A more visible WTO has inevitably become a more politicized WTO. The sound and fury surrounding the WTO's recent Ministerial Meeting in Cancun — let alone Seattle — underline how challenging managing the WTO can be. But these challenges can be exaggerated. They exist precisely because so many countries have embraced a common vision. Countries the world over have turned to open trade — and a rules-based system — as the key to their growth and development. They agreed to the Doha Round because they believed their interests lay in freer trade, stronger rules, a more effective WTO. Even in Cancun the great debate was whether the multilateral trading system was moving fast and far enough — not whether it should be rolled back. Indeed, it is critically important that we draw the right conclusions from Cancun — which are only now becoming clearer. The disappointment was that ministers were unable to reach agreement. The achievement was that they exposed the risks of failure, highlighted the need for North-South collaboration, and — after a period of introspection — acknowledged the inescapable logic of negotiation. Cancun showed that, if the challenges have increased, it is because the stakes are higher. The bigger challenge to American leadership comes from inside — not outside — the United States. In America's current debate about trade, jobs and globalization we have heard a lot about the costs of liberalization. We need to hear more about the opportunities. We need to be reminded of the advantages of America's openness and its trade with the world — about the economic growth tied to exports; the inflation-fighting role of imports, the innovative stimulus of global competition. We need to explain that freer trade works precisely because it involves positive change — better products, better job opportunities, better ways of doing things, better standards of living. While it is true that change can be threatening for people and societies, it is equally true that the vulnerable are not helped by resisting change — by putting up barriers and shutting out competition. They are helped by training, education, new and better opportunities that — with the right support policies — can flow from a globalized economy. The fact is that for every job in the US threatened by imports there is a growing number of high-paid, high skill jobs created by exports. Exports supported 7 million workers a decade ago; that number is approaching around 12 million today. And these new jobs — in aerospace, finance, information technology — pay 10 per cent more than the average American wage. We especially need to inject some clarity — and facts — into the current debate over the outsourcing of services jobs. Over the next decade, the US is projected to create an average of more than 2 million new services jobs a year — compared to roughly 200,000 services jobs that will be outsourced. I am well aware that this issue is the source of much anxiety in America today. Many Americans worry about the potential job losses that might arise from foreign competition in services sectors. But it’s worth remembering that concerns about the impact of foreign competition are not new. Many of the reservations people are expressing today are echoes of what we heard in the 1970s and 1980s. But people at that time didn’t fully appreciate the power of American ingenuity. Remarkable advances in technology and productivity laid the foundation for unprecedented job creation in the 1990s and there is no reason to doubt that this country, which has shown time and again such remarkable potential for competing in the global economy, will not soon embark again on such a burst of job-creation. America's openness to service-sector trade — combined with the high skills of its workforce — will lead to more growth, stronger industries, and a shift towards higher value-added, higher-paying employment. Conversely, closing the door to service trade is a strategy for killing jobs, not saving them. Americans have never run from a challenge and have never been defeatist in the face of strong competition. Part of this challenge is to create the conditions for global growth and job creation here and around the world. I believe Americans realize what is at stake. The process of opening to global trade can be disruptive, but they recognize that the US economy cannot grow and prosper any other way. They recognize the importance of finding global solutions to shared global problems. Besides, what is the alternative to the WTO? Some argue that the world's only superpower need not be tied down by the constraints of the multilateral system. They claim that US sovereignty is compromised by international rules, and that multilateral institutions limit rather than expand US influence. Americans should be deeply sceptical about these claims. Almost none of the trade issues facing the US today are any easier to solve unilaterally, bilaterally or regionally. The reality is probably just the opposite. What sense does it make — for example — to negotiate e-commerce rules bilaterally? Who would be interested in disciplining agricultural subsidies in a regional agreement but not globally? How can bilateral deals — even dozens of them — come close to matching the economic impact of agreeing to global free trade among 146 countries? Bilateral and regional deals can sometimes be a complement to the multilateral system, but they can never be a substitute. There is a bigger danger. By treating some countries preferentially, bilateral and regional deals exclude others — fragmenting global trade and distorting the world economy. Instead of liberalizing trade — and widening growth — they carve it up. Worse, they have a domino effect: bilateral deals inevitably beget more bilateral deals, as countries left outside are forced to seek their own preferential arrangements, or risk further marginalization. This is precisely what we see happening today. There are already over two hundred bilateral and regional agreements in existence, and each month we hear of a new or expanded deal. There is a basic contradiction in the assumption that bilateral approaches serve to strengthen the multilateral, rules-based system. Even when intended to spur free trade, they can ultimately risk undermining it. This is in no one's interest, least of all the United States. America led in the creation of the multilateral system after 1945 precisely to avoid a return to hostile blocs — blocs that had done so much to fuel interwar instability and conflict. America's vision, in the words of Cordell Hull, was that “enduring peace and the welfare of nations was indissolubly connected with the friendliness, fairness and freedom of world trade”. Trade would bind nations together, making another war unthinkable. Non-discriminatory rules would prevent a return to preferential deals and closed alliances. A network of multilateral initiatives and organizations — the Marshal Plan, the IMF, the World Bank, and the GATT, now the WTO — would provide the institutional bedrock for the international rule of law, not power. Underpinning all this was the idea that freedom — free trade, free democracies, the free exchange of ideas — was essential to peace and prosperity, a more just world. It is a vision that has emerged pre-eminent a half century later. Trade has expanded twenty-fold since 1950. Millions in Asia, Latin America, and Africa are being lifted out of poverty, and millions more have new hope for the future. All the great powers — the US, Europe, Japan, India, China and soon Russia — are part of a rules-based multilateral trading system, greatly increasing the chances for world prosperity and peace. There is a growing realization that — in our interdependent world — sovereignty is constrained, not by multilateral rules, but by the absence of rules.

#### d. The impact is great power conflict and nuclear terrorism

Panzner, investment banker, 8 **-**faculty at the New York Institute of Finance, 25-year veteran of the global stock, bond, and currency markets who has worked in New York and London for HSBC, Soros Funds, ABN Amro, Dresdner Bank, and JPMorgan Chase Michael, Financial Armageddon: Protect Your Future from Economic Collapse, Revised and Updated Edition, p. 136-138

Continuing calls for curbs on the flow of finance and trade will inspire the United States and other nations to spew forth protectionist legislation like the notorious Smoot-Hawley bill. Introduced at the start of the Great Depression, it triggered a series of tit-for-tat economic responses, which many commentators believe helped turn a serious economic downturn into a prolonged and devastating global disaster, But if history is any guide, those lessons will have been long forgotten during the next collapse. Eventually, fed by a mood of desperation and growing public anger, restrictions on trade, finance, investment, and immigration will almost certainly intensify.   Authorities and ordinary citizens will likely scrutinize the cross-border movement of Americans and outsiders alike, and lawmakers may even call for a general crackdown on nonessential travel. Meanwhile, many nations will make transporting or sending funds to other countries exceedingly difficult. As desperate officials try to limit the fallout from decades of ill-conceived, corrupt, and reckless policies, they will introduce controls on foreign exchange, foreign individuals and companies seeking to acquire certain American infrastructure assets, or trying to buy property and other assets on the (heap thanks to a rapidly depreciating dollar, will be stymied by limits on investment by noncitizens. Those efforts will cause spasms to ripple across economies and markets, disrupting global payment, settlement, and clearing mechanisms. All of this will, of course, continue to undermine business confidence and consumer spending.  In a world of lockouts and lockdowns, any link that transmits systemic financial pressures across markets through arbitrage or portfolio-based risk management, or that allows diseases to be easily spread from one country to the next by tourists and wildlife, or that otherwise facilitates unwelcome exchanges of any kind will be viewed with suspicion and dealt with accordingly.  The rise in isolationism and protectionism will bring about ever more heated arguments and dangerous confrontations over shared sources of oil, gas, and other key commodities as well as factors of production that must, out of necessity, be acquired from less-than-friendly nations. Whether involving raw materials used in strategic industries or basic necessities such as food, water, and energy, efforts to secure adequate supplies will take increasing precedence in a world where demand seems constantly out of kilter with supply. Disputes over the misuse, overuse, and pollution of the environment and natural resources will become more commonplace. Around the world, such tensions will give rise to full-scale military encounters, often with minimal provocation.  In some instances, economic conditions will serve as a convenient pretext for conflicts that stem from cultural and religious differences. Alternatively, nations may look to divert attention away from domestic problems by channeling frustration and populist sentiment toward other countries and cultures. Enabled by cheap technology and the waning threat of American retribution, terrorist groups will likely boost the frequency and scale of their horrifying attacks, bringing the threat of random violence to a whole new level.  Turbulent conditions will encourage aggressive saber rattling and interdictions by rogue nations running amok. Age-old clashes will also take on a new, more healed sense of urgency. China will likely assume an increasingly belligerent posture toward Taiwan, while Iran may embark on overt colonization of its neighbors in the Mideast. Israel, for its part, may look to draw a dwindling list of allies from around the world into a growing number of conflicts. Some observers, like John Mearsheimer, a political scientist at the University of Chicago, have even speculated that an "intense confrontation" between the United States and China is "inevitable" at some point.  More than a few disputes will turn out to be almost wholly ideological. Growing cultural and religious differences will be transformed from wars of words to battles soaked in blood. Long-simmering resentments could also degenerate quickly, spurring the basest of human instincts and triggering genocidal acts. Terrorists employing biological or nuclear weapons will vie with conventional forces using jets, cruise missiles, and bunker-busting bombs to cause widespread destruction. Many will interpret stepped-up conflicts between Muslims and Western societies as the beginnings of a new world war.

#### e. NextGen key to preserve US trade competiveness

**ATA**, Air Transport Association of America, 2/9/**12**, “ATA: NextGen Air Traffic Control Will Boost U.S. Economy” http://www.travelpulse.com/ata-nextgen-air-traffic-control-will-boost-us-economy.html

The chief executive of the Air Transport Association of America (ATA), the industry trade organization for the leading U.S. airlines, has testified before the House Transportation and Infrastructure Committee on reauthorization of the Federal Aviation Administration (FAA), calling for investment in the nation's air traffic control system to create jobs, grow the economy and enable global competitiveness. **Commercial aviation drives $1.2 trillion in economic activity annually, supports nearly 11 million jobs and is responsible for more than 5 percent of the nation's gross domestic product. "No other industry has such a powerful economic multiplier effect as commercial aviation,"** said ATA President and CEO Nicholas E. Calio. "**Aviation provides the key connections that make the economy grow. If we want to double our nation's exports over the next five years, there is no way to do it without commercial aviation."** ATA called on Congress to view FAA reauthorization as a jobs bill, as **an investment in NextGen air traffic management** that **will lead to the creation of 150,000 jobs immediately, and more over time. Other countries, including China, are investing heavily in their aviation infrastructure, to help transform their economies. China recently announced the equivalent of a $228 billion investment in aviation. "[NextGen] is about the underlying strength of the U.S. economy and the ability of American industries to compete -- and win -- on the global stage**," Calio said. "**The antiquated, ground-based air traffic control system in place today is a major drag on productivity and job creation. By accelerating NextGen, more than 150,000 jobs can be created, fuel consumption can be cut by as much as 12 percent and delays, which cost the United States $31 billion in 2007 alone, can be reduced."** **ATA urged that Congress** and the administration craft a cohesive national airline strategy that **would** include **accelerate**d **deployment of NextGen** and a rationalizing of the industry's tax burden, which has soared from $3.7 billion in 1990 to more than $16 billion in 2010.

#### 3. Aerospace

#### a. The US aerospace industry is falling behind – leadership in air traffic control is critical to manufacturing and innovation.

2010, “Expediting Air Traffic Modernization and Accelerating NextGen”, National Association of Manufacturers (the nation’s largest industrial trade association), http://www.nam.org/~/media/9D17E31A28104FE69FBBE244FEEB59E9/NextGen\_to\_NowGen.pdf

The nation’s air transportation system is a unique public-private system that requires significant investment and leadership from both public and private sources to deliver benefits to the traveling public and other users of the system. The U.S. competitive position in the aviation sector is being challenged by the European Union (E.U.) and the U.S. civil aerospace industry will be outpaced if we do not consider the transition to NextGen as a serious national objective. U.S. passenger traffic will more than double over the next 20 years and almost triple globally. Other nations with growing air traffic, like China and India, are looking to the U.S. or the E.U. to guide the evolution of their air transportation systems. If the U.S. is not the perceived leader in deploying this technology, opportunities for U.S. manufacturers and workers will be lost forever.

#### b. Strong aerospace is critical to overall US military power – sustains heg

National Aerospace Week 10 (September 18, “Aerospace and Defense: The Strength to Lift America,” <http://www.nationalaerospaceweek.org/wp-content/uploads/2010/04/whitepaper.pdf>) National Aerospace Week

 The beginning of a new decade presents the defense industry with challenges that aren’t new, but are becoming more urgent. Developing a national strategy to ensure a robust industrial base and modernizing our military hardware must become frontburner priorities. The health of the industrial base is at the heart of our ability to supply our nation with the weapons systems it requires. As we wrote in our landmark study on the industrial base in 2009: “Military technologies used to be much more closely related to civilian technologies. They even used common production processes. But because DOD is today the sole customer for industry’s most advanced capabilities, the defense industrial base is increasingly specialized and separate from the general manufacturing and technology sectors. That means even a healthy general economy will not necessarily help underwrite the industrial capabilities DOD most needs.” A huge step forward was made this year when the industrial base was included in the Quadrennial Defense Review as a factor to be considered in its long-term planning. We’re optimistic that the next step — inclusion of industrial base considerations in program plans and policy — will be executed as directed by the QDR — ensuring that it becomes incorporated into long-range defense plans. However, we remain concerned about the fragility of the supplier base. With another round of acquisitions and consolidations imminent along with a projected decline in defense spending, the supplier base remains particularly vulnerable. These small businesses are critical to the primes and to the government. They face multiple challenges overcoming barriers to federal contracting and once they leave the contracting base, they and their unique skills cannot be recovered. 2010 Aerospace Industries Association of America, Inc. 4 Along with our concern about the industrial base is the long-term issue of modernizing our military hardware. The 1980s defense build-up is now 25 years old, and systems acquired then are in need of replacement. The decade of 2010-19 is the crucial time to reset, recapitalize and modernize our military forces. Not only are many of our systems reaching the end of their designed lives, but America’s military forces are using their equipment at many times the programmed rates in the harsh conditions of combat, wearing out equipment prematurely. Delaying modernization will make it even harder to identify and effectively address global threats in the future. The requirements identified in the QDR — for the United States to overmatch potential adversaries and to execute long-duration campaigns in coming years against increasingly capable potential opponents — will require complex and expensive aerospace capabilities. This is a concern that the Defense Department recognizes. Under Secretary of Defense Ashton Carter has said that the department is looking to develop a “family of systems” for future strike options that will be supported by the “family of industry.” 9 This is welcome news. However, defense modernization is not optional. While the fiscal 2011 budget request is a reasonable target that takes into account funding needed to fight two wars, the pressure on the procurement and research and development budget is sure to increase in the future. At the same time, America must adapt its defenses to new kinds of threats. A large-scale attack on information networks could pose a serious economic threat, impeding or preventing commerce conducted electronically. This would affect not only ATM transactions, but commercial and governmental fund transfers and the just-in-time orders on which the manufacturing sector depends. It could even pose threats to American lives, interrupting the transfer of medical data, disrupting power grids, even disabling emergency communications links. In partnership with the government, our industry is on the forefront of securing these networks and combating cyber attack. The American people also demand better security for the U.S. homeland, from gaining control of our borders to more effective law enforcement and disaster response. The aerospace industry provides the tools that help different forces and jurisdictions communicate with each other; monitor critical facilities and unpatrolled borders, and give advance warning of natural disasters, among other capabilities. In many cases, government is the only market for these technologies. Therefore, sound government policy is essential not only to maintain current capabilities, but to ensure that a technology and manufacturing base exists to develop new ones.

#### c. Hegemony stops great power wars and creates global stability

Kagan, Senior Fellow at Brookings, 3-14-’12 (Robert, “America has made the world freer, safer and wealthier” CNN, http://us.cnn.com/2012/03/14/opinion/kagan-world-america-made/index.html?hpt=hp\_c1)

We take a lot for granted about the way the world looks today -- the widespread freedom, the unprecedented global prosperity (even despite the current economic crisis), and the absence of war among great powers. In 1941 there were only a dozen democracies in the world. Today there are more than 100. For four centuries prior to 1950, global GDP rose by less than 1 percent a year. Since 1950 it has risen by an average of 4 percent a year, and billions of people have been lifted out of poverty. The first half of the 20th century saw the two most destructive wars in the history of mankind, and in prior centuries war among great powers was almost constant. But for the past 60 years no great powers have gone to war. This is the world America made when it assumed global leadership after World War II. Would this world order survive if America declined as a great power? Some American intellectuals insist that a "Post-American" world need not look very different from the American world and that all we need to do is "manage" American decline. But that is wishful thinking. If the balance of power shifts in the direction of other powers, the world order will inevitably change to suit their interests and preferences. Take the issue of democracy. For several decades, the balance of power in the world has favored democratic governments. In a genuinely post-American world, the balance would shift toward the great power autocracies. Both China and Russia already protect dictators like Syria's Bashar al-Assad. If they gain greater relative influence in the future, we will see fewer democratic transitions and more autocrats hanging on to power. What about the free market, free trade economic order? People assume China and other rising powers that have benefited so much from the present system would have a stake in preserving it. They wouldn't kill the goose that lays the golden eggs. But China's form of capitalism is heavily dominated by the state, with the ultimate goal being preservation of the ruling party. Although the Chinese have been beneficiaries of an open international economic order, they could end up undermining it simply because, as an autocratic society, their priority is to preserve the state's control of wealth and the power it brings. They might kill the goose because they can't figure out how to keep both it and themselves alive. Finally, what about the long peace that has held among the great powers for the better part of six decades? Many people imagine that American predominance will be replaced by some kind of multipolar harmony. But multipolar systems have historically been neither stable nor peaceful. War among the great powers was a common, if not constant, occurrence in the long periods of multipolarity in the 16th, 17th, and 18th centuries. The 19th century was notable for two stretches of great-power peace of roughly four decades each, punctuated, however, by major wars among great powers and culminating in World War I, the most destructive and deadly war mankind had known up to that point. The era of American predominance has shown that there is no better recipe for great-power peace than certainty about who holds the upper hand. Many people view the present international order as the inevitable result of human progress, a combination of advancing science and technology, an increasingly global economy, strengthening international institutions, evolving "norms" of international behavior, and the gradual but inevitable triumph of liberal democracy over other forms of government -- forces of change that transcend the actions of men and nations. But there was nothing inevitable about the world that was created after World War II. International order is not an evolution; it is an imposition. It is the domination of one vision over others -- in America's case, the domination of liberal free market principles of economics, democratic principles of politics, and a peaceful international system that supports these, over other visions that other nations and peoples may have. The present order will last only as long as those who favor it and benefit from it retain the will and capacity to defend it. If and when American power declines, the institutions and norms American power has supported will decline, too. Or they may collapse altogether as we transition into another kind of world order, or into disorder. We may discover then that the United States was essential to keeping the present world order together and that the alternative to American power was not peace and harmony but chaos and catastrophe -- which was what the world looked like right before the American order came into being.

#### d. Accelerating NextGen infrastructure will stimulate the aerospace industry and preserve leadership in the sector.

Marion C. **Blakey**, President and CEO of Aerospace Industries Association, 2/15/**11** “The future of NextGen” http://thehill.com/blogs/congress-blog/economy-a-budget/144119-the-future-of-nextgen

The U.S. air transportation system has been the world’s gold standard for more than half a century. But to remain so, we need to bring our system into the 21st Century. Air service demand will return to pre-recession levels, but along with the return of that demand will come the return of gridlock—you can count on it. The best means of addressing the gridlock to come is acceleration of the full deployment and implementation the Next Generation Air Transportation System. That makes funding NextGen a government investment, not government spending. Even in these tough economic times, it makes more sense to accelerate NextGen than slow it down. Cutting NextGen will ultimately cost the government and our economy much more than it will save. One of the larger challenges facing our ability to realize NextGen’s enormous benefits is the issue of establishing a sound business case for equipping civil aircraft with upgraded avionics systems. Quite frankly, without equipage there is no NextGen. Innovative and careful structuring of government support for equipage can help resolve the obstacles to full implementation of NextGen. However, with the nation’s need to address the growing federal deficit, it is important also to look at ways to leverage the available private-sector capital markets. To this end, AIA recommends language in the FAA Reauthorization bill that encourages funding equipage with the participation of private-sector investment capital. FAA should have the authority to enter into government-guaranteed loan arrangements that can be used in innovative ways to incentivize the retrofitting of commercial and general aviation aircraft with NextGen avionics equipment. Critical to leveraging available private-sector capital markets is reducing risk to stimulate investment. A key message from industry throughout the FAA Reauthorization deliberations is the need for government accountability for achieving progress. FAA must establish a set of progress metrics so that the administration, the Congress, industry stakeholders and the public can measure and track the operational improvement that is actually being achieved by the program. These metrics need to track performance outcomes, not just activity. Both industry and the regulators must be capable of determining whether efforts are actually improving safety, capacity and efficiency. A big part of NextGen are the thousands of new satellite-based procedures that allow more efficient takeoffs and landings. All these airspace procedures must be designed and implemented, and most will require an environmental assessment. The National Environmental Policy Act process can be extremely protracted and time-consuming. Given the volume of expected airspace redesigns and the immediate economic and environmental benefits their implementation will provide, AIA recommends including NextGen-related airspace redesigns in the Airport Streamlining Approval Process as defined in Section304 of Vision 100 and an FAA-EPA interagency review to produce a more streamlined process. With a streamlined NEPA process, new flight tracks and procedures will be implemented expeditiously. FAA estimates these satellite-guided procedures will be quieter, reduce delays and save fuel. By 2018, these procedures will save aircraft 1.4 billion gallons of fuel, which means they will emit 14 million fewer tons of CO2. To implement these procedures even quicker, AIA recommends the FAA certify third- party procedure development. Far more procedures could be put in place in less time and each would be checked and approved by FAA inspectors. The civil aviation industry is an economic engine that contributes positively to the U.S. trade balance, creates high paying jobs, keeps just-in-time business models viable and connects all Americans to friends, family and business opportunities. All of that economic activity is funneled through the nation’s air traffic system. Full NextGen deployment requires the production and installation of hundreds of thousands of high-tech avionics products assembled by skilled workers in U.S. factories and maintenance stations in every state. Lack of an authorization bill has kept NextGen and other critical programs on life support. It’s time to give FAA the tools to keep our nation the leader in civil aviation.

### 1AC – Airspace Advantage

#### Our National Air Space is finite and used for by countless agencies and sectors. Absent action, increased demand and limited control will cause aviation catastrophes.

#### 1. Miscalculation.

#### a. NextGen increases the FAA and DOD interoperability to protect our airspace

Catherine Bolczak and Chih-Chia Vanessa Fong, of MITRE, 5/7/08, “Shared Situational Awareness to Meet Future Airspace Security Mission Needs,” MITRE, <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4559169>

Airspace security is a mission that is shared by the Federal Aviation Administration (FAA), Department of Defense (DoD), Department of Homeland Security (DHS), and National Airspace System (NAS) users among others including civil airspace users. Because events can unfold rapidly in the air domain, Shared Situational Awareness among the players is needed to facilitate rapid decision-making that can have life-or-death consequences. The current airspace security operation relies heavily on telephonic coordination with limited shared situational awareness, and treats potential threats in a “one-size-fits-all” manner, rather than focusing on highest risk. The future vision is the Next Generation Air Transportation system (NextGen) Secure Airspace concept, which is part of a multi-layered, adaptive security service that is risk-informed, is integrated into trajectorybased operations, and operates in a net-enabled environment. This paper describes the airspace security mission, the future concept, mission partner perspectives for information sharing, and challenges and opportunities in improving shared situational awareness. The current air transportation system is not scalable to meet the expected growth in air traffic demand and complexity. Increasing numbers and diversity of operations such as Unmanned Aircraft Systems, Very Light Jets and similar “unscheduled” operations inject more complexity into the system. This scalability challenge also applies to aviation security. Many people already recognize this issue when they experience long waits at security checkpoints at the airport. Airspace security also faces a scalability challenge. Currently, the airspace security function involves “eyes on the glass” identification of potential threats to a significant extent, while decision timeframes to respond to threats span only minutes. As traffic grows in volume and diversity, airspace security operations can no longer rely on manual coordination only and will require more automation support, to allow humans to focus on the greatest threats, as well as shared situational awareness to facilitate decisionmaking in a timely manner. In NextGen, we envision a net-enabled, information-rich environment in which information from numerous sources will be available to authorized users. Providing timely, relevant information in a manner that facilitates rather than hinders decision-making is a major challenge. NextGen is intended to meet the future air transportation challenges. This paper describes the current airspace security mission and how it is envisioned in the NextGen Concept of Operations (CONOPS) to operate in the future. Mission partners’ perspectives on information sharing are also presented. The paper also includes future operational scenarios to illustrate the role of information sharing and shared situational awareness among diverse stakeholders. Finally, some challenges and opportunities for improving shared situational awareness are presented.

#### b. Agency interoperability in airspace solves miscalculation

Christopher **Bolkcom**- Specialist in National Defense Foreign Affairs, Defense, and Trade Division-June 6, 20**06**, “Defending U.S. Airspace”, Homeland security, <http://www.fas.org/sgp/crs/homesec/RS21394.pdf>

Command & Control. Several options exist for improving NORAD’s air defense C2 capabilities. One menu of options focuses on improving NORAD’s ability to detect, identify, and track threats originating from CONUS. DOD has engaged in a $30 million upgrade of NORAD’s computers to better integrate FAA and military airspace management systems.13 Other options that might be pursued would be to make permanent, ad hoc C2 relationships devised after September 11th to integrate NORAD radars with Customs Service aerostats and with the Navy’s AEGIS ship radars. NORAD may also wish to find ways to leverage the Civil Air Patrol for air defense. The Civil Air Patrol is an auxiliary of the Air Force and typically flies disaster relief, search and rescue, and counter drug surveillance missions. Properly integrated with NORAD C2, however, the Civil Air Patrol might perform niche air defense functions. A second menu of options pertains to improving NORAD’s ability to counter an attack by low flying and stealthy cruise missiles. DOD has attempted to improve theater air and cruise missile defenses by promoting interoperability among the services and creating a Single Integrated Air Picture. DOD may consider expanding these efforts to make them applicable to CONUS air defense. It is not clear that the C2 improvements designed to counter cruise missile attacks would also help detect and counter threats originating from inside CONUS. Another option for improving C2 would be to mandate improved Identification Friend or Foe hardware and procedures for civilian aircraft that operate near high risk areas. This could help reduce the number of accidental incursions into restricted airspace (which require a military response and risk downing a civilian aircraft) but would likely be resisted by civilian pilots due to increased costs. Intercept. Similar to the options for air defense surveillance, options to intercept aircraft and cruise missiles can be divided into surface- and air-based, each offering strengths and weaknesses. Fighter aircraft are well suited to shoot down other aircraft and cruise missiles. They are inherently deployable and flexible. They also tend to cost more to procure and operate than other intercept options. Immediately following September 11th, the Air Force began 24 hour combat air patrols over New York and Washington, and intermittent patrols over other major cities. Cost estimates of these patrols vary between $100 million to $200 million per month.14 These costs, the strains they put on pilots and other personnel, and the unanticipated wear and tear they put on fighter aircraft have led some to recommend reducing these patrols and search for other intercept solutions.15 The costs of using combat aircraft for air defense might be reduced in three ways. First, combat aircraft could be kept on 15 minute strip alert, rather than having them fly patrols. During the Cold War, NORAD kept aircraft on strip alert at over 100 sites.16 Some loss of responsiveness would be expected. On January 6, 2002 a private aircraft flew into an office building in Tampa, FL, passing over MacDill AFB in the process. The Air Force’s inability to intercept the aircraft before it crashed suggests how strip alert may be less responsive to intercept needs than fighter CAP. Another way to reduce the cost of using combat aircraft for air defense would be to design aircraft specifically for this mission. One company claims it can build an interceptor for $4 million, a fraction of the cost of modern fighters.17 The feasibility of building such a low cost combat aircraft is still unproven. A third potential way of reducing aircraft costs would be to field air-to-air missiles on UAVs. The Air Force is currently experimenting with the Stinger on its Predator UAV, which reportedly engaged in a dogfight with an Iraqi fighter aircraft.18 DOD operates many SAM systems. The Army’s Patriot, the Marine Corps’ Hawk, and the Navy’s ship-based Standard Missile, are examples of SAMs that could be part of a CONUS air defense. SAMs tend to be less expensive than combat aircraft, and carry more missiles. The Hawk, for instance, costs approximately $25 million, and a battery can fire 48 missiles.19 SAM warheads are generally larger than air-to-air missile warheads, which provides more destructive power. Unlike aircraft, SAMs cannot chase enemy aircraft and cruise missiles, and their deployment must be carefully planned. Unlike combat aircraft, SAMs cannot visually identify a target and determine if it is hostile. Regardless of which systems are deployed, a CONUS air and cruise missile defense system will likely be made up of layered elements. A mix of fighter aircraft and SAMs (or other options) is typically more attractive than deploying only fighters or only SAMs. Similarly, defense planners will likely lean toward a mix of surveillance platforms and sensors rather than just one type. A mix of systems reduces the chance of “single point failure,” complicates an adversary’s attack planning, and can make a more effective system. Determining the best mix, however, may be critical.

#### c. Miscalc would spark a nuclear retaliation

Conley 03 (Chief of the Systems Analysis Branch, Directorate of Requirements, (Lt. Col Harry W. Headquarters Air Combat Command (ACC), Langley AFB, Virginia. Air & Space Power Journal, http://www.airpower.maxwell.af.mil/airchronicles/apj/apj03/spr03/conley.htm

Context Our response to a “bolt-from-the-blue” CBW attack is likely to be far different than if US armed forces were attacked during a conflict or period of hostilities. During hostilities, the mind-set of American leaders and the public is at a higher state of alert. If casualties in a conflict have already occurred from conventional means prior to a CBW attack, the leadership and the public may be somewhat hardened and may not react as strongly as they would in a peacetime scenario. Moreover, during hostilities, US forces are likely to use CBW defense equipment, such as masks and detection devices, which could serve to minimize the adverse effects of a CBW attack. In fact, depending upon the nature and scope of the attack, US forces could “take it in stride,” with little if any change in operational plans. In this case, a specific reprisal action may not be necessary. The international legal standards for retaliation during peacetime are much higher. Richard Erickson makes the point that reprisal has a “very low level of acceptability” in international law. “The general view is that articles 2(3) and 2(4) of the UN Charter have outlawed peacetime reprisals. . . . When states have relied upon it, the UN Security Council has condemned their action soundly.”45 Thus, reprisals in peacetime will have to pass a stricter set of criteria. Adversary Class One must also determine whether the perpetrator is a state or nonstate actor. International law gives clear guidance as to how states may legally respond to attacks from other states, but the law is murky when it deals with nonstate actors; hence, any proposed US retaliatory action must take this difference into account. For example, despite the evidence and strong justification for its actions against terrorist facilities in Afghanistan and Sudan, the United States endured much condemnation from the international community- not to mention internal criticism. US reprisal attacks against nonstate actors are likely to require much more evidence and justification, compared to similar actions against state actors. Many kinds of military actions can be taken against a state actor, whereas those against nonstate actors may be limited. The type of actor involved, therefore, will heavily influence the nature of the reprisal.

#### 2. Airpower

#### a. NextGen key to airpower – effective use of airspace and training missions.

Bourgeois, ’10 (Daniel, Rochester Institute of Technology, “The Next Generation Air Transportation System: An Answer To Solve Airport Efficiency?,” Masters of Science and Public Policy Thesis, 8/9/2010, Proquest)

Government Use of the National Aerospace System: Private industry is not the only users of the NAS. The government in many forms uses the infrastructure for its own benefit, purposes, or operations. By all means the NextGen system will be a public good that will be provided by the government because the private actors cannot work out the problems of congestion themselves. But, the government in the form of the military stands as a beneficiary as well in the matter of national security. Another kind of direct correlation between the NAS and the government is that the NAS is controlled by the US government. In the US code of transportation laws it states in section 40103 that, ―(1) The United States Government has exclusive sovereignty of airspace of the United States‖ (US Code: Justia. 2003). Since the government has exclusive responsibility to control the airspace, this creates a responsibility to ensure safety and security. For example they closed the NAS during the 9/11 attacks and diverted all flights to either Canada or Mexico. What the United States was closing was the Aerial Defense Identification Zone (ADIZ) this area surrounds the nation’s eastern, southern, and western borders. To cross this boundary and enter the US there are several requirements and limitations. This information is published, but is at times hard to remember. Most of the information is provided at the bottom of sectional charts, these are sky maps and they contain the information on when the no fly zone rules are in effect, and the controlling facilities which to contact to get further information. Some of the information is also published in the form of NOTAMS; these are ―notices to airmen‖ which are read during the Automatic Terminal Information Service (ATIS). These are hourly broadcasts of current airport information. An ATIS report also includes weather conditions, current active runways, and closed facilities like taxiways or VOR’s. But, these areas are breached quite frequently either accidentally or on purpose, and the consequences of doing so are very serious. They cost not only the government lots of time and money, but also cost the pilot who broke the rules. The FAA is a member of the national Capital Region Coordination center, this is a group compromised of representatives of security and military agencies to ensure that, in the event of a threat from an unidentified aircraft, coordinated action can be taken to appropriately address the threat and keep the area safe. Here is one such account of such an occurrence... ...on 11 May 2005...in Washington D.C at 1128 the FAA and the NCRCC became aware of an aircraft entering the Aerial Defense Identification Zone (ADIZ) from the north east, approximately 44 miles from DC. The FAA’s watch officer for key communications contacted the Potomac Terminal Radar Approach Control which confirmed to the FAA that the unknown aircraft was not in communication with air traffic controllers, it had not filed a flight plan, and the transponder was not communicating a normal but unique code. At this point the aircraft was seen as a track of interest because it was flying parallel with the ADIZ, and was not concerned a immediate threat, so it was monitored closely... the aircraft suddenly turned southbound toward the capital, at this point the Customs and Border Protection Office of Marine Operations ordered the launch of its Blackhawk helicopter and Citation Jet aircraft...in addition two F-16 aircraft were scrambled from Andrews Air Force Base. The Blackhawk initially intercepted the air craft about 10 miles north of the capitol. When the aircraft continued to proceed south toward the capitol the F-16’s moved to intercept. The aircraft was visually identified as a high-winged, single-engine Cessna-type aircraft. Attempts by the Blackhawk helicopter to signal to the pilots of the Cessna and get them to communicate on an emergency frequency were unsuccessful. At 1200 the Department of Defense authorized the F-16 pilots to use flairs. The flairs were used when the aircraft was 6.7 miles from the capitol building. At this time the Secret Service and the US Capitol Police made the decision to evacuate the White House and Capitol. The Blackhawk continued to signal to the pilots to get them to communicate with them. Ultimately, the Cessna pilots were able to make contact with Citation on an emergency frequency and the Cessna turned west, avoiding the capital building. But, the Cessna proceeded through the prohibited airspace over the Naval Observatory, with the F- 16s in escort the aircraft exited the airspace then Blackhawk rejoined the escort north... the Cessna was forced to land at an airport in Fredrick Maryland being escorted by the Blackhawk and the two F-16’s all the way to the pavement. Upon landing, the occupants of the aircraft were taken into custody by the FBI, Secret Service, and Maryland State Authorities for questioning. (States, Senate, Science Committee on Commerce, and Transportation, Congress. 2006) You can see in this example how much is orchestrated in order to pull something like this off and how important it is that the government be watching the air space as a public good. No one entity could do this alone, it is only the reach of the Federal Government that could pull something like this together. Also we can get an idea of how much money is spent in conducting such an operation. But this is not the only way that the government is involved in the NAS. Listed here are additional examples of how the government controls the NAS. There are also sections of airspace denoted as National Security Areas. These are sections of air space that are established around areas requiring special security precautions. These are places like government or military instillations, large power plants, and/or ammunition stores. Pilots are required to avoid flying low in these areas to prevent an accidental crash. The restrictions for these sections of the air space are also provided in NOTAM’s (Administration, Federal Aviation. AIM 2010 3-5-7). As you can see by the extensive examples provided the government has a very large hand in the NAS. So there is a Federal Government interest in updating the flying infrastructure through NextGen technologies. As was touched on earlier mistaken civilian aircraft flying thorough the ADIZ costs large amounts of money and time. Not to mention it may start a ―crying wolf‖ pattern and real threats may be ignored for frequent misclassification of non-threats. Pilots drift into these areas at times by accident because their radar position is not very accurate. When Korean airlines Flight 007 was shot down due to it drifting into Soviet restricted air space Ronald Regan ordered GPS to be available for civilian use so that future navigational errors like this do not happen again (Ghosh, n.d). NextGen further enhances the capabilities of the GPS system to help prevent such occurrences. Now that aircraft have a better idea of where they are in real time they can not only stay clear of the ADIZ but also all of the other controlled air spaces. NextGen’s data communications will also increase information flow over voice communications. As in the case of knowing where the President is to stay clear of TFR’s. Pilots frequently misread the information in sectional charts, or forget to get the NOTAM. In most cases the NOTAM is enacted on short notice preventing the pilot’s ability to properly plan ahead. It can also be the case that he arrives after you have already departed and the TFR becomes active while you’re crossing it. The data communications would allow all aircraft in the area to be alerted of the change at the same time, rather than a flight service center having to call each one up, one at a time to advise them of the change. This keeps both the pilots and government officials safer. Another reason that the government also has a vested interest in updating the current aircraft navigation system is that aviation has many stakeholders. Other than the flying community there are a lot of people and interest groups that rely on the aviation system to stay running efficiently. If the government works hard and makes NextGen live up to its potential it will have more influence, power, and recognition than if it were to intervene in another market. People would recognize that if it could save the airlines, then maybe their trust in the government would be rejuvenated.

#### b. Independently, NextGen provides for transparent communication between civil and military aviation personnel – That’s key to CMR.

Ruwantissa **Abeyrante**, Ph.D. Coordinator for IACO, 20**03**, Managing Airspace in Civil and Military Aviation, Cambridge Press, http://www.saa.com.sg/saaWeb2011/export/sites/saa/en/About\_Us/downloads/Managing\_Airspace\_Civil\_Military\_Aviation.pdf

At the Global Air Traffic Management Forum on Civil and Military Cooperation6, convened by ICAO7 on 19 October 2009, the International Air Transport Association (IATA)8 noted that, given the equal importance of civil and military aviation, it was imperative that airspace be managed as a whole, as a continuum and one common source and not a collection of segregated areas. This called for minimal restrictions on the use of airspace by both users, which in turn called for a structured and systematic management of the scope and duration of the use of airspace. At the Forum, the Civil Air Navigation Services Organisation (CANSO)9 underscored the fact that increasing growth in civil air transport and traffic was putting pressure on limited airspace resources and that civil-military cooperation was becoming imperative.CANSO, while calling for a global platform of cooperation, emphasised that the key to successful cooperation is the establishment of trust, respect, transparency and flexibility on all key players and that States could play a lead role in developing a framework of cooperation. It also stated that a regional approach (as opposed to a national approach) was essential, citing the European Organisation for the Safety of Air Navigation (EUROCONTROL)10 as a true civil-military agency which involved both civil and military offices at the policy-making level. In summing up, CANSO called for a fully integrated civil-military ATM, leading to the complete union of civil-military partners at the national, regional and global level11. A good example of the management system called for by IATA, and balanced cooperation as referred to by CANSO, is the establishment of a Single European Sky (SES) legislation.This legislation aims to ensure a harmonised regulatory framework for ATM and which uniformly and harmoniously applies in all 27 member States of the European Union (EU) and 28 other associated States surrounding the Union. This legislation is accompanied by a technology programme called Single European Sky Air Traffic Management Research (SESAR) which modernises and helps run the European air traffic control infrastructure modernisation programme, making SES and SESAR the essential components of the full air transport policy of Europe. The outcome of this merger between policy and infrastructure technology has resulted in a robust civil- military aviation cooperation enabling all EU member States to be represented by a civilian and a military officer in the EU Single Sky Committee (which develops legislation) and military officers to be included in other bodies working on SES and SESAR. The counterpart of SESAR in the US is the Next Generation Air Transport System (NextGen). NextGen, which is scheduled to be effective from 2012 to 2025, calls for a shift in airspace management to a trajectory-based system. It will have the following five attributes: Automatic Dependent Surveillance Broadcast which will use the Global Positioning System satellite signals to provide air traffic controllers and pilots with much more accurate information that will help to keep aircraft safely separated both in the air and on runways; System-wide Information Management System which will provide a single infrastructure and information management system to deliver high quality, timely data to many users and applications; Next Generation Data Communications which will provide an additional means of two-way communication for air traffic control clearances, instructions, advisories, flight crew requests and reports; Next Generation Network Enabled Weather which will reduce weather-related delays at least by half; and National Airspace System Voice Switch which will replace existing voice systems with a single air- to-ground and ground-to-ground voice communications system. Both SESAR and NextGen, targeted for post-2020, would improve the performance of the ATM system by combining increased automation with new procedures that improve and achieve benefits related to safety, economic efficiency, capacity and environmental protection.

#### c. CMR is key to keep military access to airspace and military readiness.

Buchanan et al 1 – Major General and Deputy Chief of Staff of Air and Space Operations USAD (Maj. Gen. Walter E. L. Buchanan III, General Robert L. Van Antwerp, Commanding General of the U.S. Army Corps of Engineers, Admiral James Amerault, Deputy Chief of Naval Operations, “Readiness Impact of Range Encroachment Issues, Including Endangered Species and Critical Habitats; Sustainment of the Maritime Environment; Airspace Management; Urban Sprawl; Air Pollution; Unexploded Ordinance; and Noise”:Hearing Before the Subcommittee on Readiness and Management Support of the Committee on Armed Services United States Senate One Hundred Seventh Congress)

Maintaining continued access to our ranges and airspace is critical to readiness. These areas are national assets, which allow the Air Force to test new equipment, develop new tactics and train our aircrews. AF ranges also accommodate important civilian industry aeronautical testing, and provide for public use and natural and cultural resource protection. background Current ranges are the successors of test and training ranges designed to support the Army Air Corps in World War II. Tactical fighters used decentralized ``backyard'' ranges (now called ``primary training ranges'') to practice the release of live and practice bombs. Such ranges usually were located within a 150 nautical mile (NM) radius of their home bases. Strategic bombers trained on ranges and simulated deliveries using radar bomb scoring sites thousands of miles away. These ranges were customized to fulfill the training requirements of individual aircraft types and various missions. Large-scale exercises were conducted on training and test ranges, usually in the west, which could accommodate such tactics. Today, these ranges include an extensive electronic warfare array, an instrumentation system for tracking and recording aircraft activities, and multiple target concentrations. The Eglin Range, FL; Nevada Test and Training Range, NV; Barry M. Goldwater Range, AZ; and the Utah Test and Training Range, UT, are our largest ranges. present ranges Today, management of Air Force (AF) ranges is the responsibility of several AF commands. Air Combat Command (ACC) is generally responsible for the majority of combat training that occurs on our ranges. Other commands that manage ranges predominately for training include the Air National Guard (ANG), Air Force Reserve Command (AFRC), Pacific Air Forces (PACAF), Air Education and Training Command (AETC), and United States Air Forces Europe (USAFE). Air Force Material Command (AFMC) is responsible for ranges primarily tailored toward test activity and Air Force Space Command is responsible for the management of the East and West Launch Ranges. Currently, all commands and service components share ranges. For example, the AF operates 17 ranges on U.S. Army lands in the continental U.S. (CONUS) and Alaska. present airspace The FAA manages the complex multi-use nature of the National Airspace System (NAS) to provide both safety and efficiency for civil and military users. Viewed in a two-dimensional perspective, military Special Use Airspace (SUA) appears to cover a large portion of the CONUS. Adding the third dimension (depth) shows that civilian air traffic uses the airspace above SUA even when it is active. But to gain a true perspective of the AF's use of the National Airspace System (NAS), the fourth dimension (time) must be considered. In other words, as our force structure has decreased, the time we use the NAS has also decreased. ranges and airspace in the future Consolidation of units after base closures, more capable aircraft systems, long range precision weapons such as JDAM, JSOW, and AMRAAM and constantly changing tactics will continue to obligate the AF to modify and consolidate our ranges and SUA to allow our aircrews to be the most proficient possible. The training range of the future will still exist in three basic formats--smaller primary training ranges that provide a chance for local units to hone their skills on a day-to-day basis, intermediate size ranges such as the Air National Guard's Combat Readiness Training Centers which allow for more complex skill training in an increasingly instrumented environment, and large ranges which provide a complex environment of threats, targets, and instrumentation needed for large force exercises. Ranges will continue to be needed for test purposes providing the large air and land areas necessary for advanced and live weapons evaluations. Test and space ranges also accommodate a substantial number of civilian aviation and space activities. Large training ranges, dedicated to large force exercises will routinely include three types of participants--real operations on the scene, operations from participants linked by simulators, and simulated players. Primary Training Ranges will continue to serve nearby flying organizations. Some long-range weapons delivery tactics will be simulated. However, the Primary Training Range will still be important and will require modifications for basic weapons and electronic warfare training in the future. range management in the air force In the coming years, our ability to modify ranges and airspace will be critical to maintaining AF readiness. However, the legal and procedural requirements are more and more complicated and time consuming and military needs can change quickly. In 1994, the Air Force was in the middle of an important range project that eventually failed and an equally important airspace project that was ultimately successful. General Ralston, the AF Deputy Chief of Staff for Plans and Operations at the time, reorganized his staff to consolidate operational range and airspace management policy and provide operational leadership in this important area. Although ranges and airspace are still managed by either individual units or the major commands, General Ralston set the vision for range and airspace management that we still follow today. Our goal is to meet the military need while addressing and resolving, to the extent possible, public concerns and Federal, tribal, state, and other agency issues. We have adopted a spirit and practice of flexibility, and a willingness to adapt when we can without compromising our operations. We also realize the importance of establishing and maintaining permanent relationships with stakeholders. Most of those stakeholders are very supportive of the AF and our mission. Sustainable access to ranges benefits many people. Our ranges contain significant cultural and natural areas, are used for grazing and agriculture, and allow hunting or other forms of outdoor recreation. challenges to sustainable ranges and airspace In this session, I intend to focus on five areas that stress our ability to maintain sustainable access to ranges and airspace. They are unexploded ordnance, air quality, noise, the NAS Redesign, and endangered species. These areas are generally referred to as encroachment issues. Encroachment on ranges and airspace is a serious and growing challenge to the Air Force, as well as the other services. Encroachment issues are complex and involve multiple Federal, state, tribal and local agencies, as well as Congress and the public. Meeting the challenges to readiness posed by these issues will be key to meeting the military need and abiding by the myriad of laws regulating ranges and airspace. unexploded ordnance (uxo) UXO and the disposal of residue material (primarily scrap metal) on air to ground ranges is one area where we have taken a hard look at our practices and policies recently. UXO and range residue (used targets, inert ordnance, etc.) physically occupy only a very small part of any air to ground range, but its presence is an increasingly expensive problem. The costs associated with clearing closed ranges have led us to the conclusion that we need to plan and manage for the entire lifecycle of a range. The AF first started clearing ordnance from active ranges in the late 1940s. Active range clearance not only provides for safe target area operations, but also provides airfield-recovery training for our Explosive Ordnance Disposal specialists. AF policy requires that active air to ground ranges be cleared on a quarterly, annual, and 5-year basis at varying distances from each target. We have reviewed our practices and found that we could make some changes that would still allow us to meet our military need and lessen the impacts and costs in the future. This, combined with our current scheduled UXO and residue removal program, will ensure long-term range sustainability and the safety of personnel on the range. Our ultimate goal is to manage our ranges effectively and efficiently throughout the life-cycle process that allows for sustainable operations, safe and effective UXO and residue treatment, and long term environmental stewardship. These policies are not without costs. One of our commands, Air Combat Command, is currently undertaking a project to remove the legacy of residue that has accumulated on some of our ranges. In fiscal year 2000, the AF dedicated $4.8 million to this effort, removing residue at the rate of 1 million pounds per month. At current funding levels, it is estimated it will take approximately 4 years to remove known accumulated residue from ACC's primary training ranges alone. Remediating closed ranges and clearing active ranges will need to be a long and incremental process to be affordable under today's budgets. The same active range operations and maintenance budgets that fund targets and electronic warfare operations for our aircrews fund UXO and range residue removal. Anything more aggressive than a long-term program will significantly strain present readiness accounts. air quality Many of our largest and most important installations are located in areas that are experiencing rapid growth and the attendant pressures resulting from air quality standards. A number of our bases are currently located in ``nonattainment'' areas, and more bases are in areas that surely are destined to become nonattainment areas. Air quality pressures generally affect operations at our installations more than ranges, and they potentially limit our basing options to support force realignment and weapon system beddowns. If the beddown action is found not to conform to the state implementation plan for Clean Air Compliance, the Air Force must either obtain air quality credits, or reduce other emissions at the base to counter balance the impact. Otherwise, the proposed action can not take place. We are working very hard to lower our emissions at our installations. We are working to ensure that environmental, safety, and health considerations--including air quality--are integral to requirements definition and the acquisition process. We are working with state regulators and local communities to ensure we have the flexibility to base aircraft at our installations which have huge investments in infrastructure not only on the installation itself, but also in the ranges used by installation aircraft. noise Noise from military aircraft is one of the most obvious byproducts of military readiness and has long been a dilemma at our bases. Additionally, many people are increasingly concerned with noise along many of our low-level flying routes, in our military operating areas, and on our ranges. Today, noise is the AF's number one concern when we try to modify or establish new airspace. We often hear the ``not in my backyard'' philosophy. Some people say they want a strong national defense as long as the AF flies ``somewhere else.'' However, if you look at a map of the U.S., ``somewhere else'' doesn't exist. In fact, ``somewhere else'' is always ``right here'' for someone else. In some cases, we can accommodate public noise concerns with no loss to the effectiveness of our training. When apprised of a noise sensitive area, we routinely chart it and avoid it if possible. In a few instances, we have made allowances for short periods in National Park recreation areas when the park experiences its maximum number of visitors. When we cannot deconflict schedules, we try to communicate to users and managers alike to let them know what we are doing; when we are flying and why. We have found that altering their expectations and increasing their knowledge of what is going on can reduce a person's negative reaction to noise. The services have formulated a plan that will eventually lead to a unified DOD noise program to address the full range of noise issues not only from aircraft, but also from other military operations, testing and training. This program will coordinate policy, plans, and funding for noise effects, maintain noise models, and oversee R&D efforts. It will also include efforts to ensure that environmental, safety, and health considerations--including noise--are integral to requirements definition and the acquisition process. national airspace redesign Despite a decrease in military force structure and total flying hours, the DOD has a continuing requirement for airspace to train in. At the same time, fueled by deregulation and relatively affordable fares, the civil airline industry has grown steadily. The projected growth rate of the civilian airline industry is expected to continue at a 6 percent annual increase for the foreseeable future. In 1998, the Federal Aviation Agency (FAA) initiated the National Airspace Redesign program. This program has been commonly called ``Free Flight.'' The goals of the redesign are to maintain system safety, decrease system delay, increase system flexibility, increase predictability, and increase user access. A part of ``user access'' is DOD Special Use Airspace (SUA), which is necessary to conduct critical testing of equipment and training of aircrews. In the future, the key to the successful establishment, modification and use of SUA will require the application of four following parameters: Volume--enough to accomplish operational, test or training objectives Proximity--distance to operating airfields Time--available when operations, test, or training required Attributes--ability to accomplish specific air/land/sea events The first three are self-explanatory. The term ``attributes'' refers to the quality that differentiates one piece of airspace from another. For instance, there might be a range under the airspace, or mountainous terrain needed for a particular test or instrumentation needed for training. The key to maintaining our access to SUA is to work closely with the FAA. The senior members of the DOD Policy Board on Federal Aviation along with the Department of Transportation/FAA are currently determining a plan for effective joint FAA-DOD interaction. We will have to be able to predict and articulate our requirements. In order to move toward more real-time use, we will have to work with the FAA to focus on the technology necessary to make real-time work. Finally, we will have to take advantage of the natural flexibility of air operations to work creative solutions to difficult issues.

#### d. Lack of airspace access destroys air force deterrent abilities

SIRRA 05 (Sustainable Installations Regional Resource Assessment, Think tank analyzing the affects surrounding military installations, Elisabeth M. Jenicek, U.S. Army Engineer Research and Development Center Construction Engineering Research Laboratory “Proximity to Military Training Routes, Fighter Range” <http://datacenter.leamgroup.com/sirra/indicator-tabular-data/airspace/mtrf.html>)

National security depends largely on the deterrent effect of our airborne military forces. To be proficient, the military services must train in a wide range of airborne tactics. One phase of this training involves "low level" combat tactics. The required maneuvers and high speeds are such that they may occasionally make the avoid aspect of flight more difficult without increased vigilance in areas containing such operations. In an effort to ensure the greatest practical level of safety for all flight operations, the Military Training Route (MTR) was conceived. The MTR program is a joint venture by the Federal Aviation Administration and the Department of Defense. MTRs are mutually developed for use by the military for the purpose of conducting low-altitude, high-speed training. Generally, MTRs are established below 10,000 feet (mean sea level) for operations at speeds in excess of 250 knots (Air Force, 2005). However, route segments may be defined at higher altitudes for purposes of route continuity. For example, route segments may be defined for descent, climb-out, and mountainous terrain. This indicator provides a measurement of MTR airspace available to fighter aircraft. Availability is measured by the aircrafts un-refueling range as defined by the U.S. Air Force (Air Force, 2005). Having available airspace is typically a necessity for military training. Inadequate access is a strong indicator of limitations on military development and missions. This would then place the military installation in a vulnerable state, affecting the type and intensity of training that could take place on the installation. It is important to note that although this indicator describes availability of fighter aircraft MTRs, not all installations make use of training airspace. Ideally, installations are prepared for transformations to any mission. However, it may not be realistic. It is important to use local knowledge of an installation’s current and future mission requirements when interpreting this indicator.

#### e. Airpower is key to deterring multiple nuclear conflicts in Asia

Ashley J. Tellis et al, Chung Min Lee, James Mulvenon, Courtney Purrington, and Michael D. Swaine, sources of conflict in the 21st century, availible via the rand website @ rand.org. chapter 3, 1998

The first key implication derived from the analysis of trends in Asia suggests that American air and space power will continue to remain critical for conventional and unconventional deterrence in Asia. This argument is justified by the fact that several sub-regions of the continent still harbor the potential for full-scale conventional war. This potential is most conspicuously on the Korean peninsula and to a lesser degree, in South Asia, the Persian Gulf, and the South China Sea. In some of these areas such as Korea and the Persian Gulf, the United States has clear treaty obligations and therefore has pre-planned the use of air power should contingencies arise. U.S. Air Force assets could also be called upon for operations in some of these other areas. In almost all these cases, US airpower would be at the forefront of an American politico-military response because (a) of the vast distances on the Asian continent; (b) the diverse range of operational platforms available to the U.S. Air Force, a capability unmatched by any other country or service, (c) the possible unavailability of naval assets in close proximity, particularly in the context of surprise contingencies; and (d) the heavy payload that can be carried by U.S. Air Force platforms. These platforms can exploit speed, reach, and high operating tempos to sustain continual operations until the political objectives are secured. The entire range of warfighting capability—fighters, bombers, electronic warfare (EW), suppression of enemy air defense (SEAD), combat support platforms such as AWACS and J-STARS and tankers—are relevant in the Asia-Pacific region, because many of the regional contingencies will involve large, fairly modern, conventional forces, most of which are built around large land armies, as is the case in Korea, China-Taiwan, India-Pakistan and the Persian Gulf. In addition to conventional combat, the demands of unconventional deterrence will increasingly confront the U.S. Air Force in Asia. The Korean peninsula, China, and the Indian subcontinent are already arenas of WMD proliferation. While emergent nuclear capabilities continue to receive the most public attention, chemical and biological warfare threats will progressively become future problems. The delivery systems in the region are increasing in range and diversity. China already targets the continental United States with ballistic missiles. North Korea can threaten northeast Asia with existing Scud-class theater ballistic missiles. India will acquire the capability to produce ICBM-class delivery vehicles, and both China and India will acquire long-range cruise missiles during the time frames examined in this report. The second key implication derived from the analysis of trends in Asia suggests that airand spacepower will function as a vital rapid reaction force in a breaking crisis. Current guidance tasks the Air Force to prepare for two major regional conflicts that could break out in the Persian Gulf and on the Korean peninsula. In other areas of Asia, however, such as the Indian subcontinent, the South China Sea, Southeast Asia, and Myanmar, the United States has no treaty obligations requiring it to commit the use of its military forces. But as past experience has shown, American policymakers have regularly displayed the disconcerting habit of discovering strategic interests in parts of the world previously neglected after conflicts have already broken out. Mindful of this trend, it would behoove U.S. Air Force planners to prudently plan for regional contingencies in nontraditional areas of interest, because naval and air power will of necessity be the primary instruments constituting the American response. Such responses would be necessitated by three general classes of contingencies. The first involves the politico-military collapse of a key regional actor, as might occur in the case of North Korea, Myanmar, Indonesia, or Pakistan. The second involves acute politicalmilitary crises that have a potential for rapid escalation, as may occur in the Taiwan Strait, the Spratlys, the Indian subcontinent, or on the Korean peninsula. The third involves cases of prolonged domestic instability that may have either spillover or contagion effects, as in China, Indonesia, Myanmar, or North Korea.

### 1AC – Solvency

#### Observation Three: Solvency

#### a. NextGen is key to reducing delays and congestion.

Council of Economic Advisers, ’12 (“A NEW ECONOMIC ANALYSIS OF INFRASTRUCTURE INVESTMENT,” A REPORT PREPARED BY THE DEPARTMENT OF THE TREASURY WITH THE COUNCIL OF ECONOMIC ADVISERS, MARCH 23, 2012)

NextGen is also a timely initiative. American air travelers lose substantial time due to congestion, flight delays, cancellations and missed connections. The total cost of these delays to passengers was estimated at $16 billion in 2007. Problems in our aviation system result in significant cost increases to airlines as well, with an estimated $8 billion in increased costs.26 Adopting a next generation air traffic control system (NextGen) could significantly reduce these delays and their associated costs. NextGen would help both the Federal Aviation Administration and airlines to install new technologies and, among other improvements, move from a national ground-based radar surveillance system to a more accurate satellite-based surveillance system – the backbone of a broader effort to reduce delays for passengers, increase fuel efficiency for carriers, and cut airport noise for those who live and work near airports. According to one study, implementation of NextGen technology would result in a reduction of 4 million hours of passenger delay annually, savings of 3 billion gallons of fuel, and the elimination of 29 million metric tons of carbon emissions. Total projected savings from NextGen implementation would result in $29 billion of net benefits annually for the United States by 2026. These benefits justify the President’s request to increase federal investment in NextGen to over $1 billion in fiscal year 2013.

#### b. Accelerating the implementation of NextGen would yield massive benefits

Tom Captain, Vice Chairman, Principal, U.S. Aerospace and Defense Sector Leader, Leader, Deloitte Deloitte LLP LLP and and Global Global Aerospace and Defense Sector Leader, Deloitte Touche Tohmatsu Limited, June, 13, 2011“Transforming the Air Transportation System: A business case for program acceleration” (<http://www.deloitte.com/assets/DcomUnitedStates/Local%20Assets/Documents/>AD/us\_ad\_Transforming\_ATS\_06132011.pdf)

One of **the primary purposes of this business case is to assess the investment return of the potential acceleration of global ATS transformation programs by five years, with completion by the end of 2020.** However, as described in detail above, there are significant challenges and risks that would prevent an accelerated implementation, no matter what the financial merits. But given the opportunity to overcome these risks, we found that in all scenarios, an assumed inclusion of all three Tiers of benefits, the business case improves in terms of NPV, payback, and IRR metrics. In summary, we found the business case NPV improvement is in a range of between $68 billion in the Grounded scenario to $131 billion in the Takeoff scenario. Projected IRR investment metrics improve in a similar fashion under the ATS program acceleration case. As stated earlier, however, the Grounded scenario at the lower end of the improvement range only includes Tier 1 benefits of direct fuel and operating savings. We believe this is a very unlikely scenario, as air travel demand would be expected to grow at least moderately over the investment time horizon through 2035. Acceleration of ATS transformation program In summary, the Deloitte base business case (Steady Flight), without program acceleration, has an NPV of $897 billion as stated earlier. However, **we found that by accelerating global programs with completion by 2020, the NPV increases $100 billion to $997 billion, an 11 .1% improvement. For the U .S. accelerating the NextGen program increases the NPV $20 billion to $301 billion. Accelerating the SESAR program increases the NPV $51 billion to $318 billion. NPV increases for the ROW rise $29 billion to $378 billion.** With program acceleration in the base case, **aircraft delay reductions by the end of 2020 are expected to reduce emissions by 128 million metric tons of CO2**, N 2 O, and SOX, and save **15 million hours saved in flight delays, representing $41 billion of additional benefit to airlines and a further $17 billion of savings to the global economy in passenger productivity.** Finally, the transformation is expected to free up additional capacity in terms of **increased aircraft movements,** which **translates to $21 billion** in additionaloperating revenue **for airlines and $49 billion** in added value **to the global economy.** The following table illustrates the varying levels of improvements in the business case under each scenario in the “what-if” case of accelerating the global ATS program initiatives. From a cost perspective, we estimate cumulative expenditures of $56 billion to global air network service providers (ANSP) and airports as well as $57 billion to global airline infrastructure are required. Expenditures consist of both one-time equipage and infrastructure costs, as well as recurring costs associated with personnel and programs to operate the transformed ATM systems. Taking into account the required investment and expenses, **total program PV costs are estimated at $113 billion.** As stated earlier, these costs are consistent with estimates made by global ATS authorities, but include a 10% contingency for risk as described earlier.

#### c. Plan provides the needed political certainty and financial stability to make NextGen successful.

Sakib bin Salam, Fellow @ Eno Center for Transportation, 2012 (M.A., Former research assistant at the Oregon Center for Public Policy, “NextGen: Aligning Costs, Benefits and Political Leadership,” ENO Publication, April 2012, https://www.enotrans.org/store/research-papers/nextgen-aligning-costs-benefits-and-political-leadership)-Mikee

In order for NextGen to succeed, there must be greater certainty about potential benefits and costs. In the highly competitive low profit-margin airline industry, few want to take on the burden of paying for something that spreads speculative benefits so widely. It will also be essential to have a mechanism that raises sufficient capital for NextGen infrastructure in a transparent and equitable manner, while imposing minimal burdens on those who pay for it. Without a sustainable, stable, and reliable strategy for both continued infrastructural improvements and incentives for equipage, there is no guarantee that NextGen can be implemented in a timely and cost-effective manner. Without strong political leadership, a clear and unbiased delineation of costs and benefits, a transparent source of funds, and incentives for operators to equip, it is unlikely that NextGen benefits can be delivered in a timely manner if at all.

# Inherency

#### Not enough funding for NextGen now.

Cooper, ’12 (Donna, Senior Fellow with the Economic Policy Team at the Center for American Progress, “Meeting the Infrastructure Imperative: An Affordable Plan to Put Americans Back to Work Rebuilding Our Nation’s Infrastructure,” February 2012)

Through the Federal Aviation Administration’s Airport and Airway Trust Fund, the federal government invested $15.5 billion in airport improvements in FY 2010. Trust revenues come from a basket of federal taxes and fees levied on pas- senger and airlines. In 2010, $5.3 billion in supplemental general fund revenues were added to the Trust Fund in order to meet congressionally authorized expen- ditures of $15.5 billion.72 In addition to the traditional capacity and expansion needs of our airports, the Federal Aviation Administration expects to spend approximately $20 billion to build a state- of-the-art air traffic control system known as “NextGen” by 2025.74 NextGen provides critical new infrastructure capacity to our airport safety systems. The FY 2010 appropriations for NextGen were $868 million.75 Although this basic technology upgrade of our air traffic system could be reasonably considered as a critical element of our air travel infrastructure, we have not factored these capital costs into our infrastructure funding proposal because, to date, these facility improvements are paid for with general revenues. That’s not enough. The FAA estimates that the capital funding distributed via the Airport Improvement Fund needs to grow by $7 billion on top of the $15 billion that was appropriated for 2010 for a total of $21.5 billion annually for at least the next five years.73

#### NextGen faces serious issue now, needs major overhaul.

Bill **Carrey,** senior editor with Aviation International News, 1/2/**2012, “**Happy Y2K12: FAA’s NextGen Faces Unsettled 2012 and Beyond” (<http://www.ainonline.com/?q=aviation-news/aviation-international-news/2012-01-02/happy-y2k12-faas-nextgen-faces-unsettled-2012-and-beyond>)

**The FAA’s ambitious ATC modernization effort known as the Next Generation Air Transportation System (NextGen) faces an unsettled 2012 and beyond after a number of setbacks in 2011. The top leadership of NextGen–and the FAA itself–is in flux.** Michael Huerta, confirmed as FAA deputy administrator in June 2010, has served as the agency’s lead on what is now a billion-dollar-plus annual expenditure in developing NextGen. With the abrupt resignation of Administrator Randy Babbitt in December after a drunken driving arrest, Huerta assumed responsibility for the entire FAA as acting Administrator. He may well stay in that capacity through the November presidential election to prevent a nomination battle in Congress over a new Administrator. Within the FAA, the Air Traffic Organization (ATO), which oversees the nation’s ATC system, is primarily responsible for implementing NextGen programs. ATO saw the abrupt resignation in April of its chief operating officer, Henry “Hank” Krakowski, following a series of incidents in which controllers were found sleeping on duty. David Grizzle, formerly FAA chief counsel, replaced him. Both Krakowski and Huerta served on the RTCA NextGen Advisory Committee, a high-level group representing aviation stakeholders from industry and government. Huerta is the designated federal official. **The FAA’s budget instability continued through 2011. Partially shut down for two weeks in July and August because of a political stalemate in Congress, the agency at year-end was operating on its 22nd funding extension and hadn’t experienced a stable, multiyear budget since 2007. The latest extension is due to expire January 31.** NextGen includes six “transformational” programs–automatic dependent surveillance-broadcast (ADS-B), data communications (DataComm), System Wide Information Management (Swim), NextGen Network Enabled Weather, National Airspace System Voice Switch and Collaborative Air Traffic Management Technologies. It also depends on supporting efforts, including the $2.1 billion En Route Automation Modernization (Eram) program to replace computers at 20 FAA air route traffic control centers. However, the Department of Transportation inspector general advised Congress in October that the costs, benefits and schedules of ADS-B, DataComm and Swim remain uncertain. And Eram has encountered significant software problems; it is expected to be completed four years late, in 2014, at an additional cost of $330 million. Nevertheless, the FAA is forging ahead with core NextGen programs. The agency issued a request for offers for DataComm services last July and was evaluating industry proposals submitted in October. It says a contract award is on track for this year. FAA and prime contractor ITT Exelis have been rolling out the ground infrastructure for ADS-B, a nationwide network of 794 radio stations, since late 2007. The system is slated for on-time completion in 2013. Fifteen months after FAA chartered it, the aviation rulemaking committee (ARC) tasked with developing a strategy for deploying ADS-B in, the capability to receive ADS-B traffic data on cockpit displays, submitted its recommendations to the agency in September. Emblematic of the one step forward, one step sideways progress of NextGen, the ARC said it does not support equipping aircraft for ADS-B in at this time because the investment in displays and onboard computing cannot be justified. “As a general proposition, it was clear to us on the committee as we did our work, sometime in the May-June time frame, that the compelling business case for [an ADS-B in] mandate was not there,” said Steve Brown of NBAA, the ARC co-chairman with Thomas Hendricks of Airlines for America. **“While it’s a very promising set of applications that are likely to have benefits in the future, there were many things that needed to be done to really be sure that our belief of its benefits was actually true.”**

#### Current airports are outdated and insufficient.

**Mouawad ’12** (JAD MOUAWAD“Airport focus on the ground”, June 14, 2012, <http://www.nytimes.com/2012/06/15/business/building-boom-takes-hold-at-us-airports.html?_r=1&pagewanted=all>)

At a time when federal and state public works programs are stalled, the nation’s biggest airports are in the midst of major renovations or expansions that, taken together, amount to some of the largest infrastructure projects in the country. Related Los Angeles International Airport’s plans for a $1.5 billion international terminal will add 18 gates. New York’s three major airports, as well as the. **airports in Los Angeles, Dallas, Atlanta and Chicago, are spending billions of dollars** **Many of the airports have aging terminals, some built in the 1960s and 1970s, that are ill suited to the bigger planes, bigger security lanes and bigger crowds of modern-day air travel.** They are replacing or improving existing terminals, updating food concessions and parking garages, or adding runways to keep up with growing demand. These investments are concentrated at the largest international gateways, where the growth of foreign travel has been fastest. Unlike international hub airports overseas, like Changi Airport in Singapore, Hong Kong International Airport or Frankfurt Airport, which consistently fare well in traveler surveys, airports in the United States receive low marks for customer service with more delays, more congestion and older amenities. Skytrax, a British consulting firm, found recently that six of the 10 best airports this year were in Asia, three in Europe, and one in Canada. **For years, the major domestic airports had put off these improvements as airlines struggled to make a profit and passenger traffic slowed. But they can no longer afford to wait: symbols of the jet age, like Kennedy Airport’s 50-year-old Terminal 3, are obsolete and falling apart**. Most airports in the United States are owned by cities or local authorities but are not dependent on taxpayer money to finance themselves and are, therefore, less affected by the current political mood to rein in spending. Instead, they typically finance investments through the revenue they generate, including airline fees, passenger charges and the sale of bonds tied to passenger traffic. Investments in airports “are going to be among the largest public work projects going on around the country,” said Patrick Foye, the executive director for the Port Authority of New York and New Jersey, which operates five airports, including Kennedy Airport, La Guardia Airport, and Newark Liberty International Airport. **The need to accommodate bigger airplanes**, like the double-deck Airbus A380 which can seat about 500 passengers, **and the increase in the number of foreign carriers flying into the United States have helped spur many of the new investments**. **Airline mergers, too, have created the need for bigger terminals. “Clearly, investment in aviation facilities has lagged the demand, but you could probably make the same case for most of our other infrastructure as well**,” **said** Jerry Orr, the chief executive of Charlotte Douglas International Airport, which has about $1 billion in improvements in the works. “But airports are businesses, and airports need the services that airlines provide.” The latest project to be completed is the $1.4 billion terminal for international passengers at Hartsfield-Jackson Atlanta International Airport, the nation’s largest airport by number of passengers, which opened last month. The work, part of a $6 billion renovation plan first drawn in 1999, includes a 1.2 million-square-foot concourse (roughly the size of 21 football fields), 12 additional boarding gates, more than 3,500 additional parking spots and a new highway entrance on the eastern side of the airport. I n Las Vegas, McCarran International Airport will open a $2.4 billion new Terminal 3 at the end of the month. The terminal is aimed at attracting more international visitors. Dallas/Fort Worth International Airport, which built a new terminal in 2005, is in the midst of a seven-year, $2 billion renovation of its older terminals to add more parking and concession stands and bigger security lanes. Los Angeles International Airport kicked off a $4.1 billion expansion program three years ago. The latest phase is a $1.5 billion new international terminal, billed as the largest public work project in the city’s history, that will add 18 gates capable of accommodating the largest planes, including the Airbus A380. **The airport currently has only two gates capable of handling the A380, although five A380 flights land there every day**. “ **We have facilities that are not only dated and not meeting the current customer expectations but we also have facilities that are falling apart,” said Gina Marie Lindsey, the executive director of Los Angeles World Airports**, which includes Los Angeles International, known by its airport code LAX. “Basically, we are rebuilding LAX.” But because airports are dependent on airlines for part of their revenue, carriers can delay or even derail airport investments. Philadelphia International Airport has struggled in recent years to persuade US Airways, its biggest airline, to help pay for a $5 billion expansion, including plans to lengthen two of the four runways and build a fifth one along the Delaware River. “Airlines are fussy about spending money on airports,” said Joshua L. Schank, the president of the Eno Center for Transportation, a research group. “With the consolidation in the airline industry, airports are dominated by one or two airlines that can typically dictate what they want done with the money.” Houston was thrust into the middle of a battle between United Airlines and Southwest Airlines after the city approved a proposal by Southwest to build a five-gate extension for international flights from William P. Hobby Airport. The city’s 16-1 vote last month angered United, which has a major hub 30 miles north of Hobby, at George Bush Intercontinental Airport. It argued that its own international business would be hurt by the international gates at Hobby. Shortly after the vote, United, which is based in Chicago, said that it would cut 1,300 jobs at Bush airport and that its plans for a $700 million expansion at Bush, Houston’s biggest airport, were now “in significant doubt.” “Unfortunately, the city of Houston will suffer the consequences of this decision for decades to come,” Jeff Smisek, United’s chief executive, said at the time. In some cases, local opposition can also slow expansion. It took Seattle nearly 30 years, for instance, to add a third runway to its airport. In other cases, there are geographic limits to airport expansion. The footprint of the three big airports in the New York region is one-fourth the size of Denver International Airport’s alone, which is spread over nearly 53 square miles of unpopulated prairie. The Denver airport’s sprawl, and its three pairs of parallel runways, mean it can handle the same number of daily flights as New York’s three airports combined, according to a 2011 report by the Regional Plan Association, an independent urban research firm. (Denver airport, the last major airport built in the United States, opened in 1995 at a cost of $4.8 billion.) New York airports have little wiggle room for new traffic — old terminals must be demolished to create room for new buildings or additional parking space for airplanes. At Kennedy, Delta Air Lines is currently building a $1.2 billion expansion to Terminal 4, which will eventually replace the **obsolete Terminal 3, built in 1960 as Pan American’s Worldport. That circular terminal has become an embarrassment to both the airport and the airline, and a dreaded destination for passengers. It is narrow, parts of its roof are crumbling and leaking, and it is too cramped to accommodate enough security gates.** It will be demolished next year, once Delta’s new terminal is completed. Likewise, to make room for the planned expansion of JetBlue’s Terminal 5 at Kennedy, the airport chose to tear down Terminal 6, a 1969 building known as the National Airlines Sundrome that was designed by the architect I. M. Pei and was renowned for its sweeping glass walls. JetBlue said last month that it planned to invest $200 million to expand its terminal, which was built in 2008, to create a new international arrival zone. La Guardia Airport and Newark are also getting badly needed makeovers. The Port Authority is planning a $3.6 billion rebuilding of the aging Central Terminal Building at La Guardia, which opened in 1964. A similar $2 billion plan is also being considered to replace Terminal A at Newark. A $350 million renovation of Terminal B there is nearly finished. The Port Authority plans to spend $7.5 billion on its airports in the next decade, and expects more direct investments from airlines as well, according to Mr. Foye, its executive director. “Each of the airports is in a densely populated area,” Mr. Foye said. “Each has the ability to make better use of its real estate.”

#### Airlines cannot handle increased user demand.

John Ferguson, M.A. of science, 2012, “A METHODOLOGY FOR EVALUATING ECONOMIC AND POLICYIMPACTS ON AIRLINE AND PASSENGER BEHAVIOR”, George Mason University, <http://catsr.ite.gmu.edu/pubs/Ferguson_Dissertation_Final_2012_seApr25_v3.pdf>

Can the United States air transportation system seat throughput capacity grow, in the most populated areas? This question is especially important since air transportation helps regional economic growth. Current United Stated national airspace (NAS) models are trying to predict the impact of continued domestic passenger demand growth, since FAA forecasts (FAA 2011a) project passenger demand will increase 165% and aircraft operations are projected to increase to 150% within the next 20 years. • Are there mechanisms that will encourage airlines to up-gauge the size of aircraft at congested airports? Historical analysis (Ferguson, et al. 2010) indicates that the airline industry has been purchasing regional jets whose capacity ranges between 50 and 80 passengers and using these aircraft at capacitated airports such as LGA, DCA, BOS, ORD, ATL and PHI. Without up-gauging aircraft the airlines might not be able to service this increased passenger demand over the next 20 years.

# Advantages / Harms

## Economy Advantage

### General Aviation Key

#### Airports Key to economy

Chris Farrell-economics editor of Marketplace Money-January 27,2012, “The role of airports in building the economy”, Marketplace Economy, <http://www.marketplace.org/topics/economy/role-airports-building-economy>

Jeremy Hobson: The latest ranking of the best airports in the world does not offer much good news for the United States. Only one terminal makes the top ten on the list from Frommers.com -- that would Jet Blue's Terminal 5 at New York's JFK airport. Meanwhile, the U.S. is home to four of the ten worst airports on the list, including Delta's Terminal 3 at JFK. Does it matter? Well, for answers, let's bring in Marketplace economics correspondent Chris Farrell. Good morning. Chris Farrell: Good morning, Jeremy. Hobson: Well Chris, why does a good airport matter to our economy really? Farrell: Well, besides that a bad airport is a miserable experience whenever you travel? Look, over the years, you've talked a lot about this evolving global economy. And if you think about it, airports, airlines, commercial aviation -- I mean, this is a linchpin infrastructure in this global economy. It's important locally, it's important nationally, it's important around the world. And the U.S. accounts for about a third for the world's total air traffic. So, if the United States wants to continue to be the major player in the global economy, you need a really efficient, robust aviation system. Hobson: But we've got incredibly high unemployment right now, we've got very high deficits. Should we really be spending money on airports or high-speed trains or other infrastructure like that at a time like this? Farrell: You know, Jeremy, it's really striking whether you're doing research into the airports and the airlines or looking at the railways or the roads. There's a constant theme that our transportation network is starved of investment capital, that we've neglected it for too long. And the thing about public investment and transportation is that it makes the private sector more efficient. So it's easier for people to do business travel, it's easier for goods to travel their way on an airplane -- a lot of goods have to go on airplanes. Think of FedEx and UPS. So this is the kind of investment that makes the private sector more efficient, which would lead to more jobs, which leads to more wealth. Hobson: But does this kind of investment have to happen right now, at a time when we've got such big problems? Farrell: I was watching Ben Bernanke and his press conference the other day and there was a question about low interest rates that savers are getting, and he said, well that's, you know, the economy that we're in. Let's flip it around -- those low interest rates, that means that the cost of capital, the cost of building your infrastructure is really cheap. The time to do it is now, because the capital's low and there's a lot of labor that would like a job.

#### Aviation is a large part of the U.S. GDP, and with time, it will worsen.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

In 2000, the total impact of civil aviation exceeded $900 billion and 11 million jobs, representing 9% of the U.S. gross domestic product. This economic contribution is split as 88% commercial aviation and 12% general aviation. 2. Congestion and delays had a significant negative effect on the economy and the traveling public in 2000. Commercial airline passenger delays, averaging 12.0 minutes per flight segment for a total of 142 million hours of passenger delay, amounted to $9.4 billion in U.S. delay costs. 7 Hundreds of millions of dollars in additional delays accrued to general aviation and commercial cargo operators. 8 3. If committed OEP aviation infrastructure projects are under-funded or not completed on schedule, the present situation will deteriorate significantly. If no new airport construction or air traffic system improvements are completed, average delay per flight segment will rise to 14.5 minutes in 2007 and 16.5 minutes in 2012, increases of 21% and 38%, respectively, over the 2000 average. Between 2000 and 2012 inclusive, the cost to the U.S. economy of no further infrastructure enhancement beyond 2000 would approach $170.2 billion. 4. Even if currently committed projects are completed on schedule, the situation in 2012 will be worse than in 2000. Average 2012 delay-per-flight segment would be 14.7 minutes, an increase of almost three minutes over 2000. Total 2012 passenger delay would rise to 231 million hours, a 63% increase over 2000. Total U.S. congestion-related costs for 2000-2012 would fall to $156.7 billion, a $13.5 billion improvement relative to no investment.

### Congestion/Delays

#### Congestion is increasing, but the infrastructure will not be able to keep up with growing demand.

Steven Morrison, Professor and Chair in the Department of Economics at Northeastern University, Editor in Chief of the Journal of Transport Economics and Policy, May 2008, “Delayed! U.S. Aviation Infrastructure Policy at a Crossroads”, Brookings, http://www.brookings.edu/research/articles/2008/05/aviation-winston

In the aftermath of the September 11 terrorist attacks, travelers’ fears of flying have given way to their anxieties about delays they may encounter when going through airport security, leaving the departure gate and taking off, flying to their destination, and landing and disembarking from the aircraft. In 2005 inflight delays and earlier airport arrivals for security screening were estimated to cost passengers and airlines in the United States $40 billion annually.1 Of course, delays are hardly a new concern with airline travel.As shown in figure 2-1, travel times have been increasing for the past three decades. Forecasts by the Federal Aviation Administration (FAA) call for more than 1 billion passenger enplanements by 2016, indicating that landside and airborne delays and their associated costs will become significantly worse unless the nation’s aviation infrastructure—airports and air traffic control—improves the efficiency with which it helps passengers get to their destinations.2

#### Delays hurt the economy and waste money.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

Year 2000 commercial airline passenger delays were 142 million hours annually—an average of 34 minutes per passenger per round trip—and caused $4.7 billion in annual costs to passengers and $4.7 billion in annual costs to the economy, for a total of $9.4 billion in delay costs. · With no new investment, delays and related costs would rise to 205 million hours and $13.5 billion in 2007 and to 261 million hours and $17.2 billion in 2012. · Given current investment plans, they would rise instead to 185 million hours and $12.2 billion annually in 2007, and to 231 million hours and $15.2 billion annually in 2012. Thus, current investment plans are insufficient to effect a material reduction in delays and their economic costs.

#### Airline congestion reduces business travel.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

Business travel includes all individuals who travel for the purpose of work. Business travel is the most profitable market segment for airlines, and the erosion of this segment has significant implications on the bottom line for the entire civil aviation economy, as well as for industries related to travel, such as hotels and rental car companies. In 2000, business travel accounted for 14% (139.6 million) of total domestic U.S. person-trips as recorded by the Travel Industry Association. Air travel was the mode of transportation used by 41% of all business travelers that year. In 1999, 8.4 million Americans traveled overseas for business, including conventions. Business Travel Alternatives Corporations seeking to minimize their business travel costs associated with air traffic congestion and delays are finding alternative ways to "stay in touch" with their customers by using technology instead of flying. In addition, many corporations choose to consolidate satellite offices geographically to minimize travel expense. Within civil aviation, business aircraft are now becoming more common, especially for transporting sales and management teams from both large and mid-size corporations. Corporations also use these planes to transport other company personnel and to deliver timecritical parts and products. In addition, customers and clients are brought to company facilities for factory tours and product demonstrations. In most cases, companies fully own their business aircraft. However, a trend toward alternative arrangements between different companies is on the rise. Chartering, leasing, fractional ownership, time-sharing agreements, interchange agreements, and partnerships all reduce the overall costs to a corporation—fractional ownership is one of the faster growing segments. In addition, corporations are increasingly using private “shuttle” operations that service frequent business travelers on a “regular and frequent” basis. Among the benefits of owning their own fleets, flight crews, maintenance technicians, and other support personnel, large multinationals and other corporations see the following: · Time-saving, through fewer unscheduled delays · Increased productivity, as employees can work in complete privacy · Control of all aspects of the travel plan · Accessibility to more destinations than served by airlines · Full control of fleets and maintenance · Enhanced corporate image Airlines are trying actively to attract business travelers despite troubles with airport and air traffic congestion. Technology has been used to help customers cope with the congestion (e.g., adding automated check-in machines to avoid long lines), and some airlines have installed paging services that will notify the customer of delays in advance. However, these are only short-term solutions that improve service, but do not tackle the core of the problem.

#### Congestion and delays hurt company productivity.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

Airport congestion is an added expense for companies that rely on air transportation for the dayto-day conduct of their business. The long-term capacity enhancements required to allow business air travel to grow to its full potential have fallen short in recent years. Flight delays or cancellations result in lost productive work and personal time for the business traveler. Companies incur losses due to missed sales opportunities, added travel expenses, and unproductive employee hours. The increase in demand for air travel has not been met with an adequate level of infrastructure and capacity investment, resulting in more frequent and extended flight delays and traffic congestion. According to the FAA OPSNET database, 450,000 flights were delayed by air traffic control in the United States in 2000—approximately 393,000 delays were recorded in 1990, the previous record. Flight delays are a source of frustration and an added financial burden—according to this study $9.4 billion in 2000, split between costs to the economy ($4.7 billion) and the value of passengers' time ($4.7 billion). That is only for the scheduled airlines. The financial cost impacts the bottom line of all participants, from aircraft operators to shippers and passengers. In particular, there is a significant financial impact on business operations as business passenger travel and air cargo shipments are directly affected. How businesses cope with these issues will depend on economic conditions and the actions taken by government and aviation operators.

#### **New tech key to avoid delays.**

Roberts 2011 (Chief engineer at MITRE’s independent research and development of air traffic management and an associate fellow of the American Institute of Aernautics and Astronautics, “Research Challenge: The Next Generation Air Transportation System (NextGen)”, MITRE Corporation, <http://www.mitre.org/work/tech_papers/2011/11_2464/11_2464.pdf>)-Jeremiah

Adverse weather conditions cause approximately 70 percent of all delays in today’s NAS. The JPDO asserts that two-thirds of these delays are avoidable. Resolving the shortcomings in the current system could potentially reap savings of $19 billion or more a year. The NAS operates most efficiently under visual flight conditions: when pilots have positive visual contact with other aircraft, obstacles, and the runway surface. Capacity is degraded under poor visibility conditions, because pilots and controllers lack the sensors and decision support tools to ensure safe operations and must build in extra operational safety margins to compensate. This situation presents an opportunity to supplement their operating environment with capabilities that provide situational awareness equivalent to what they have under visual conditions Severe weather activity, such as blizzards or lines of summer thunderstorms, can significantly disrupt the flow of aircraft. Current safety regulations bar commercial aircraft from flying through thunderstorms, and frequently these storms extend so high into the atmosphere that flying over them is precluded. As a result, traffic patterns around the weather become complex and difficult for air traffic controllers to handle, further decreasing throughput. Traffic flow managers would benefit greatly from better tools for forecasting and tracking these events, and for re-planning traffic in and around them in a safe and effective manner.

### Competitiveness

#### U.S. aviation industry falling behind China

Roy David Chesson, Foreign Area Officer, U.S. Navy, M.A. Security Sciences, 2011, How China Could Affect The Future Of U.S. Defense Corporations, U.S. Navy, <http://www.stanford.edu/group/sjeaa/journal111/China3.pdf>

There are many different types of rivalries that exist in the market. Raytheon, Lockheed Martin, and Northrop Grumman mainly compete with each other for defense contracts and their civilian revenue is relatively low compared to others. This indicates that they are somewhat protected from a Chinese exploitation of their key rivalries. Conglomerate corporations might have several different rivals by the existence of multiple sectors and markets under which they operate. Therefore no one company is completely identical to that of another conglomerate corporation and the existence of a specific rivalry is rare. UTC is a conglomerate that has different civilian sectors like Otis elevators and Carrier air-conditioners.33 The sanctions against UTC would result in fewer Otis elevators and Carrier products; however, there are many different elevator and air-conditioner companies operating in China and therefore no specific competitor would gain from such sanctions. This does not affect the global competitiveness of the civilian sector of UTC; rather it affects local competitiveness in the Chinese market. With this in mind, it is fair to say that the sanctions will not make UTC as vulnerable. Boeing on the other hand has one major rival, Airbus. As most would claim, the rivalry be- tween Boeing and Airbus is the largest international rivalry in the world.34 Both companies are identical in that their civilian sectors develop comparable commercial aircraft that are competitive on the global market. Foreign corporations that choose to buy a commercial jet are usually considering whether or not they choose Airbus or Boeing and at times will use the two corporations to play each other off in a bidding war. The stakes are extremely high for each corporation, meaning that a single deal with an airline could be a deciding factor between success and failure in a multibillion-dollar investment.35 Therefore on of the best strategies for both Boeing and Airbus is that of persuading prospective buyers, such as nationally owned airlines, to purchase their own planes instead of those of the respective other. 36 The competition between Boeing and Airbus has been extremely tight over the years. Neither company has been able to pull away from the other, so the slightest change in their global market share can give a company an advantage over the other. For such a close race it can be seen how important the Chinese market is to both companies. According to China’s own projections, they believe they will quadruple their aircraft fleet to 3,900 by 2025, which could create a large amount of potential revenue for Boeing or Airbus.37 To further this, Boeing expects China to spend over US$400 billion to purchase planes over the next couple of years, thus making China the second largest aeronautics market in the world.38 According to Airbus China President Laurence Barron, China “probably has the most potential of any significant market in the world”.39 However, despite tight contention, is Boeing at a point where it can handle a head-to-head challenge with Airbus in China, especially if sanctions by the Chinese government are enacted? With airlines in other markets struggling and Boeing still trying to recover from its much- delayed Dreamliner 787 project, Boeing seems to be on shaky grounds and stands to lose more than Airbus.40 To make matters worse, before the arms sales to Taiwan, Airbus was already winning more orders from China than Boeing.41

#### Air transport improves economic integration.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

During the past three years, several analyses have shown that, in macroeconomic terms, U.S. integrated air express companies have created billions of dollars annually in reduced business inventory carrying costs, over $50 billion per year in logistics cost savings, and tens of billions of dollars of final demand and export sales that would not occur in the absence of their services. The air express industry itself, including its ground transportation and logistics services divisions, generates approximately $60 billion a year in revenue and employs approximately 600,000 workers. In addition, a significant portion of the world’s freight is still carried either in the bellies of passenger aircraft or by all-cargo aircraft specializing in traditional “heavy freight.” These segments of the marketplace allow those shippers not necessarily demanding “express” service to enjoy the relative speed of movements by aircraft and to permit the transportation by air of oversized cargo to remote regions of the nation and world. Global economic integration is characteristic of most of the world. Exports of goods and services in 2000 represented almost a quarter of the world’s GDP, up from just 10% in 1970. In turn, U.S. merchandise trade amounts to 22% of the world total. This steady increase in trade activity has been enhanced by the growth of global air transport.

### Air Mobility

Air mobility essential to the U.S. economy
NSTC 10 **(**National Science and Technology Council 10 Chaired by President Obama and VP Biden (Executive Branch to Coordinate Science and Technology Policy “National Aeronautics Research and Development Plan” [http://www.whitehouse.gov/sites/default/files/microsites/ostp/aero-rdplan-2010.pdf Feb 2010](http://www.whitehouse.gov/sites/default/files/microsites/ostp/aero-rdplan-2010.pdf%C2%A0Feb%202010))

Mobility through the air is a key function of the nation’s air transportation system . The U.S. economic system revolves around the capability to move goods and people efficiently throughout the nation and the world. Aviation contributes an estimated $741 billion to the U .S . economy or roughly 5 .6 percent of the nation’s gross domestic product . Over 11 million jobs with $369 billion in wages are estimated to be associated with the aviation industry . The aerospace products and parts sector is the largest U .S . manufacturing exporter and contributes a net surplus of approximately $61 billion to the U.S. trade balance. 7 Enabling mobility through the air with sufficient flexibility and affordability to accommodate the full range of aircraft requirements and attributes, as well as projected passenger and cargo traffic, is essential to America’s economic success.

### Tourism

#### Investment in airplanes is good for boosting tourism.

Ruwantissa Abeyrante, Professor of Aero Political Law and Policy, 2007, “Investing in Air Transport – A Prudent Move?” Transportation Law Journal <https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=34+Transp.+L.+J.+327&srctype=smi&srcid=3B15&key=a9c210bdbea4e4486e17df4a1b98f7f7>

Despite the forecast of a substantial loss to the air transport industry in the five years ending in 2005, n186 ICAO forecasted that scheduled passenger [\*353] traffic will grow by 5.2 percent in 2006. n187 This brings to bear the need for investment, to ensure that the necessary air transport services will be available to the public, while also making sure that overinvestment in aircraft capacity is avoided at all cost. Investment in air transport will also have a beneficial effect on the robust synergy between aviation and tourism, particularly because of the overarching dependence by the tourism industry on aviation for the carriage of tourists to their destinations. The growing interdependence between the two industries has resulted in a significant increase in the combined contribution of aviation and tourism to the gross domestic product, generating employment and investment opportunities.

#### Tourism key to economy-WTO proves

Massimo Grosso AND-Researcher on trade services for the Organization For Economic Cooperation and Development

Alain Dupeyras-researcher for the Organization For Economic Cooperation and Development-February 2008, “Opening up Trade in Services: Key for Tourism Growth”, Policy Brief, <http://www.oecd.org/dataoecd/38/11/40191324.pdf>

Tourism is one of the world’s largest and fastest-growing industries and its importance for economic development is widely acknowledged. What makes tourism different from many other services is that the supplier stays where he is, and the tourist comes to him rather than the supplier taking his services to the consumer. Tourism can thus play a key role in poverty alleviation, bringing jobs for unskilled or semi-skilled workers in hotels, resorts and at cultural sites, as well as encouraging job creation in supply industries.

These are all critical contributors to growth in developing economies. But if tourism is to offer a sustainable path to poverty alleviation, policies are needed to ensure that the benefits are shared and spread to poor communities, and that measures are taken to minimise the adverse impact of tourism on the environment. The importance of the tourist sector is reflected in the relatively liberal environment currently in place in most countries. Nearly 130 World Trade Organization (WTO) members have made commitments to open up their tourist sector, more than for any other service sector, reflecting a desire to expand tourism and attract foreign direct investment. But there is still a great deal of scope for developing countries to expand tourism and the opportunities it offers for socio-economic development. One factor restricting such growth is a lack of adequate services and infrastructure, such as transport, telecommunications, financial services, or electric power and sewage treatment facilities. Any country wanting to boost its tourism industry also needs to be able to build hotels, provide an adequately educated and trained workforce, and advertise for tourists. Opening up markets to trade in services and investment, could substantially contribute to the development of tourism. But any market opening needs to be properly designed and implemented, taking account of the social and environmental impact, if sustainable tourism and growth are to be achieved. This Policy Brief looks at the importance of market reforms in services for tourism development. The tourism sector has suffered from a lack of political and popular support in many countries because its economic importance has been underestimated. The industry and its impact can be difficult to define and measure since it comprises sellers of many heterogeneous products. The WTO’s General Agreement on Trade in Services (GATS) offers a relatively limited definition of tourism, which excludes a number of related services such as computer reservation systems, cruise ships and many other transport services, or hotel construction. International efforts to improve measurement of the economic impact of tourism led to the development of the Tourism Satellite Account (TSA), which attempts to provide a credible measure of the true contribution of tourism to a national economy. Broadly defined, tourism could be regarded as one of the world’s largest and fastest growing industries. According to the World Travel and Tourism Council (WTTC), an organisation made up of executives from the travel and tourism industries, the contribution of travel and tourism to worldwide gross domestic product (GDP) will rise from 10.3% (USD 4,9 billion) to 10.9% (USD 9 billion) between 2006 and 2016. The sector is a major direct employer and supports a much wider indirect employment base in supplying industries. Employment is estimated by WTTC at 234 million jobs in 2006, 8.7% of total worldwide employment or 1 in every 12 jobs. Direct employment growth in 2005 was estimated at 2.1 million new jobs, 6.5 million counting indirect job creation. Tourism is a key export for many developing countries and a crucial (often the leading) source of foreign exchange.

### FAA Spending Good

#### FAA spending boosts jobs and private investment.

David Grizzle, Chief Operating Officer Air Traffic Organization Federal Aviation Administration, August 2011, “The Economic Impact of Civil Aviation on the U.S. Economy” , www.faa.gov/air\_traffic/.../FAA\_Economic\_Impact\_Rpt\_2011.pdf

Previous FAA economic impact analyses did not include federal spending on air traffic control and other related activities. Federal expenditures on the provision of safe airspace and infrastructure are often overlooked factors behind civil aviation’s successful contribution to the U.S. economy. Whether by directly employing people to oversee our National Airspace System (NAS) or providing the funds necessary for the development of infrastructure, the FAA has an important and vital role in the U.S. economy. Even during times of economic contractions, the FAA’s ability to maintain safe skies, finance projects and support job creation is even more apparent. FAA expenditures impact the U.S. economy in four important ways by: • Providing state and local job opportunities • Facilitating opportunities for private entities • Distributing aid for infrastructure to local airports through grants • Keeping the industry operating efficiently and safely

#### Aviation investment helps the economy.

DRI WEFA, ‘2 (A Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. “National Economic Impact of Civil Aviation”, 07-2002, http://www.aia-aerospace.org/stats/resources/DRI-WEFA\_EconomicImpactStudy.pdf)

The FAA estimates that $11.5 billion will be required to implement OEP air traffic control improvement projects in full; an additional $5 billion is needed for the runway portion of the OEP. However, history and the pace of current efforts suggest that it will be a challenge to complete these projects according to FAA’s current schedule and budget. Aggressively timed, additional investments in aviation infrastructure are fully justified on a cost-benefit basis. Accelerated investment in airport and airway capacity will produce compelling national economic paybacks. Every dollar invested will generate up to five dollars in return for the U.S. economy, a function of reduced congestion costs through the year 2020. If only the very brief stream of benefits through 2012 were considered, benefits would still exceed the required investment by a factor of 2.8. A long-term, sustained effort beyond the OEP is needed to eliminate congestion and delay. Even in the most aggressive scenario investigated in this study, annual passenger delay hours rise to unacceptable levels, largely a function of projected growth in demand. If these delays were greatly mitigated, personal and economic cost savings would stimulate U.S. economic growth and employment; businesses would realize greater efficiencies and thus compete more effectively in the global arena; the U.S. trade surplus from aviation manufacturing activity and air transport services would increase; the quality of life for U.S. citizens would improve; and environmental benefits would accrue from reduced aircraft emissions.

#### Investment is key to poverty reduction and stimulation of economy.

Ruwantissa Abeyrante, Professor of Aero Political Law and Policy, 2007, “Investing in Air Transport – A Prudent Move?” Transportation Law Journal <https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=34+Transp.+L.+J.+327&srctype=smi&srcid=3B15&key=a9c210bdbea4e4486e17df4a1b98f7f7>

The World Bank has reported that a robust global investment climate is central to growth and poverty reduction. n19 In this regard, the preeminent goal of governments should be to create opportunities for the private sector for investment while at the same time creating expansion and employment within the State sector. In other words, the goal should be to create a sound investment environment for everyone so that society as a whole would benefit. Of course, this is easier said than done, as developing nations have their own internal concerns and pressing needs brought to bear by both social and natural factors. It calls for a certain symbiosis between the developed and developing world as well as an enduring commitment from the international community to assist the developing world in three main areas: removing distortions in developed countries that harm the investment climates of developing countries; providing increased and effective assistance; and sharing knowledge and experience. These three areas of contribution from the international community have to be applied to the basic axiom that economic development requires adequate and effective transportation. Each country has a theoretically optimum amount of transport capacity. Transportation plays a multifaceted role in the pursuit of development objectives of a nation as well as the need to maintain international communication networks. n20 Air transport enables goods and passengers to be transferred between and within production and consumption centres. Therefore, it could be argued that investment is vital to air transport.

### Stimulus Good

#### Transportation infrastructure investment solves economic growth – it creates jobs, is cost-effective, creates strong rates of return, and boosts productivity and competitiveness.

Council of Economic Advisers, ’12 (“A NEW ECONOMIC ANALYSIS OF INFRASTRUCTURE INVESTMENT,” A REPORT PREPARED BY THE DEPARTMENT OF THE TREASURY WITH THE COUNCIL OF ECONOMIC ADVISERS, MARCH 23, 2012)

An analysis of the economic impact of transportation investment indicates that now is an optimal time to increase the nation’s investment in transportation infrastructure. Investing in transportation infrastructure would generate jobs to employ workers who were displaced because of the housing bubble. We estimate that the average unemployment rate among those who would gain employment in the jobs created by additional infrastructure investment has averaged approximately 13 percent over the past twelve months. There is also accumulating evidence that construction costs are currently low because of underutilized resources, so it would be especially cost-effective to seize this opportunity to build the quality infrastructure projects that are ready to be built. Historically, we also know that state and local governments are more prone to cut back on infrastructure spending during tough economic times, despite the growing need and demand for these projects. Americans overwhelmingly support increasing our infrastructure investment, as evidenced by consistent support for local investments on ballot initiatives. This is hardly surprising given that our report documents that the American public is less satisfied with our transportation infrastructure than residents of most other OECD nations. Merely increasing the amount that we invest, however, must not be our only goal. Selecting projects that have the highest payoff is critically important, as is providing opportunities for the private sector to invest in public infrastructure. Given the significant need for greater investment, the federal government cannot, and should not, be expected to be the sole source of additional investment funds. More effectively leveraging federal investment by pairing it with state, local, and private investment is necessary to meet the challenges we face in expanding our transportation network. Thus, establishing a National Infrastructure Bank, along with other significant reforms in our infrastructure financing system, should remain a top priority. Evidence also shows that well-functioning infrastructure systems generate large rates of return not only for the people who travel on the systems every day – the direct beneficiaries – but also for those in the surrounding regions and our nation more generally. Investment in infrastructure today will employ underutilized resources and raise the nation’s productivity and economic potential in the future. By contrast, poorly planned, non-strategic investment is not only a waste of resources, but can also lead to lower economic growth and production in the future. That is why any increase in investment should be coupled with broad-based reform to select infrastructure projects more wisely. The President’s proposal to increase our nation’s investment in transportation infrastructure, coupled with broad-based reform of our transportation funding system, would have a significant and positive economic impact in both the short and long term, raising our nation’s economic output, creating quality middle-class jobs, and enhancing America’s global economic competitiveness.

#### The government must invest in infrastructure now – economic benefits outweigh everything else.

Heather Boushey, senior economist at the Center for American Progress, 9/22/11, “Now Is the Time to Fix Our Broken Infrastructure,” Center for American Progress, <http://www.americanprogress.org/issues/2011/09/aja_infrastructure.html>

Investing in infrastructure creates jobs and yields lasting benefits for the economy, including increasing growth in the long run. Upgrading roads, bridges, and other basic infrastructure creates jobs now by putting people to work earning good, middle-class incomes, which expands the consumer base for businesses. These kinds of investments also pave the way for long-term economic growth by lowering the cost of doing business and making U.S. companies more competitive. There is ample empirical evidence that investment in infrastructure creates jobs. In particular, investments made over the past couple of years have saved or created millions of U.S. jobs. Increased investments in infrastructure by the Department of Transportation and other agencies due to the American Recovery and Reinvestment Act saved or created 1.1 million jobs in the construction industry and 400,000 jobs in manufacturing by March 2011, according to San Francisco Federal Reserve Bank economist Daniel Wilson.[1] Although infrastructure spending began with government dollars, these investments created jobs throughout the economy, mostly in the private sector.[2] Infrastructure projects have created jobs in communities nationwide. Recovery funds improved drinking and wastewater systems, fixed bridges and roads, and rehabilitated airports and shipyards across the nation. Some examples of high-impact infrastructure projects that have proceeded as a result of Recovery Act funding include: An expansion of a kilometer-long tunnel in Oakland, California, that connects two busy communities through a mountain.[3] An expansion and rehabilitation of the I-76/Vare Avenue Bridge in Philadelphia and 141 other bridge upgrades that supported nearly 4,000 jobs in Pennsylvania in July 2011.[4] The construction of new railway lines to serve the city of Pharr, Texas, as well as other infrastructure projects in that state that have saved or created more than 149,000 jobs through the end of 2010.[5] Infrastructure investments are an especially cost-effective way to boost job creation with scare government funds. Economists James Feyrer and Bruce Sacerdote found for example that at the peak of the Recovery Act’s effect, 12.3 jobs were created for every $100,000 spent by the Department of Transportation and the Department of Energy—much of which was for infrastructure.[6] These two agencies spent $24.7 billion in Recovery dollars through September 2010, 82 percent of which was transportation spending. This implies a total of more than 3 million jobs created or saved. Analysis of all fiscal stimulus policies shows a higher “multiplier” from infrastructure spending than other kinds of government spending, such as tax cuts, meaning that infrastructure dollars flow through the economy and create more jobs than other kinds of spending. Economist Mark Zandi found, for example, that every dollar of government spending boosts the economy by $1.44, whereas every dollar spent on a refundable lump-sum tax rebate adds $1.22 to the economy.[7] In a separate study conducted before the Great Recession, economists James Heintz and Robert Pollin of the University of Massachusetts, Amherst, found that infrastructure investment spending in general creates about 18,000 total jobs for every $1 billion in new investment spending. This number include jobs directly created by hiring for the specific project, jobs indirectly created by supplier firms, and jobs induced when workers go out and spend their paychecks and boost their local economy.[8] Investing in transportation infrastructure in particular boosts employment. The Federal Highway Administration periodically estimates the impact of highway spending on direct employment, defined as jobs created by the firms working on a given project; on supporting jobs, including those in firms supplying materials and equipment for projects; and on indirect employment generated when those in the first two groups make consumer purchases with their paychecks. In 2007, $1 billion in federal highway expenditures supported about 30,000 jobs—10,300 in construction, 4,675 in supporting industries, and 15,094 in induced employment.[9] Investing in infrastructure not only creates jobs; it increases the productivity of businesses small, medium, and large. At the most basic level, infrastructure investments make it possible for firms to rely on well-maintained roads to move their goods, on an electricity grid that is always on to run their factories, and water mains that provide a steady stream of clean water to supply their restaurants. There is a large body of empirical work that documents this. Although the specific effect differs across studies, European Investment Bank economists Ward Romp and Jakob de Haan conclude that “there is now more consensus than in the past that public capital furthers economic growth.”[10] Because infrastructure investments create jobs and boost productivity, these investments have historically had bipartisan support. In early 2011, for example, AFL-CIO President Richard Trumka and U.S. Chamber of Commerce President Thomas Donohue issued a joint statement in favor of greater infrastructure investment in the near-term: “With the U.S. Chamber of Commerce and the AFL-CIO standing together to support job creation, we hope that Democrats and Republicans in Congress will also join together to build America’s infrastructure.”[11] But investments in infrastructure are now being pared back as states and localities struggle with budget constraints. Even so, there is a long list of infrastructure projects that municipalities, states, and the federal government can invest in. The American Society of Civil Engineers estimates that we need to spend at least $2.2 trillion over the next five years just to repair our crumbling infrastructure.[12] This doesn’t even include things like high-speed rail, mass transit, and renewable energy investments we need to free ourselves from foreign oil and climate change. The American Jobs Act seeks to remedy this situation by investing $105 billion in infrastructure.[13] This should raise U.S. economic output by $151.2 billion based on economist Mark Zandi’s most recent economic multiplier for the impact of infrastructure spending on GDP.[14] The American Jobs Act addresses a number of specific infrastructure investments. The $105 billion includes $25 billion to modernize and upgrade our school infrastructure and an additional $5 billion to modernize community colleges. We know there is great need for this kind of investment.[12] The accumulated backlog of deferred maintenance and repair for schools alone amounts to at least $270 billion.[15] The total investment in infrastructure also includes $50 billion in immediate investments for highway, highway safety, transit, passenger rail, and aviation activities. Of that $50 billion, $27 billion will make our nation’s highway systems more efficient and safer for passenger and commercial transportation. Another $9 billion of investments will repair our nation’s transit systems, $2 billion will improve intercity passenger rail service, and $2 billion will improve safety, add capacity, and modernize airport infrastructure across the country. In addition, $10 billion of American Jobs Act funds will be used to set up a National Infrastructure Bank that would provide loans for projects including transportation infrastructure, water infrastructure, and energy infrastructure. The remaining $15 billion would provide funding for neighborhood stabilization projects and the repurposing of vacant properties. Infrastructure is a good investment now because it will get people to work, and at this point, given the lingering high unemployment, we shouldn’t be too concerned if projects take a bit of time to get up and running. As Mark Zandi said in August 2011: Infrastructure development has a large bang for the buck, particularly now when there are so many unemployed construction workers. It also has the potential for helping more remote hard-pressed regional economies and has long-lasting economic benefits. It is difficult to get such projects up and running quickly—“shovel ready” is in most cases a misnomer—but given that unemployment is sure to be a problem for years to come, this does not seem in the current context as significant a drawback.[16] We can create jobs. With nearly 14 million Americans unemployed, now is the time to make long-lasting investments in infrastructure that will not only get people to work today but pave the way for long-term economic growth. Repairing potholes, upgrading an elementary school’s aging furnace, and replacing old water mains are all infrastructure investments. These are repairs that must be done and are often cheaper to do as maintenance than waiting to repair a totally failed system. Now is the right time for America to invest in maintaining and upgrading our infrastructure. We have millions of American workers who want to get off the unemployment queue and into a job and borrowing costs at decade lows, making it extraordinarily cost effective to make big investments today.

#### Now is the key time for infrastructure investment—it is vital to long-term growth.

Boushey 11 — Heather Boushey, Senior Economist at the Center for American Progress, previously held economist positions with the Joint Economic Committee of the U.S. Congress, the Center for Economic and Policy Research, and the Economic Policy Institute, holds a Ph.D. in economics from the New School for Social Research, 2011 (“Now Is the Time to Fix Our Broken Infrastructure,” Center for American Progress, September 22nd, Available Online at http://www.americanprogress.org/issues/2011/09/aja\_infrastructure.html, Accessed 06-09-2012)

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#### Timing matters – stimulus now is uniquely beneficial because construction bids will be more competitive.

Council of Economic Advisers, ’12 (“A NEW ECONOMIC ANALYSIS OF INFRASTRUCTURE INVESTMENT,” A REPORT PREPARED BY THE DEPARTMENT OF THE TREASURY WITH THE COUNCIL OF ECONOMIC ADVISERS, MARCH 23, 2012)

There are other factors that make current construction especially timely and costs low, translating into lower project costs. This impact on project costs is well-illustrated by the Federal Aviation Administration’s experience awarding $1.1 billion in Recovery Act funds for airport improvements. The money was designated for 300 projects. The winning bids for those projects came in over $200 million below the engineers' estimates. A second round of projects was selected, which also received lower bids than anticipated. As a result of these cost savings, 367 runway and airport improvement projects were funded with the money that was originally intended to support 300 projects. The states and transit authorities that selected most of the highway ($26.6 billion) and transit ($8 billion) projects supported by the Recovery Act reported similar experiences, and similar bid savings. Overall, the Department of Transportation (DOT) estimates that more than 2,000 additional airport, highway, bridge, and transit projects were funded because of low bids or projects being completed under budget.

## Emissions/Pollution Adv

### SQ Airlines Increase Pollution

#### Airport congestion due to poor technology leads to more disorganization, wasted money, and more emissions.

NATS, [National Air Traffic Services – organization consisting of one thousand engineers and 13,000 support staff manages air traffic control and navigation services], 2012 “More than just a timekeeping issue.” http://www.nats.co.uk/nats-services/issues/issue-congestion/

Congestion is the most visible consequence of operational inefficiency at an airport. Even the smallest hold ups in the system can have a dramatic knock on effect, leading to delays or even missed slots. Aside from frustrated passengers, congestion also creates: environment problems, with increased emissions; unnecessary cost, with increased fuel consumption and possible cancellation of flights; and bad PR for the airport, its ANSP and associated businesses. There are two main causes of congestion: Existing systems and technology may not be flexible enough to deal with unexpected problems. These are often the result of poor communication, arising from people and systems not talking to each other in a timely manner, due to infrastructure and procedural inefficiencies. Major problems, such as severe weather, ash clouds or industrial action. While these can’t be anticipated the effects can be mitigated with more efficient systems and technology to get things up and running again, faster.

#### Aviation causes global warming.

Gerald Dillingham, Ph.D., Director of Physical Infrastructure Issues at the GAO, 05-06-2008, “NextGen Research and Development are Keys to Reducing Emissions and Their Impact on Health and Climate”, Government Accountability Office, http://www.gao.gov/assets/120/119976.pdf

Currently, aviation contributes a modest proportion of total emissions in the United States, but its share could increase in the future, and aviation emissions can have a detrimental effect on health and the environment. Aircraft are the primary source of aviation emissions, but airport operations, including those of service and passenger vehicles, also produce emissions. Together, aircraft operations in the vicinity of the airport and other airport sources emit nitrogen oxides, which lead to the formation of ground-level ozone (also known as smog), and other substances that contribute to local air pollution, as well as carbon dioxide and other greenhouse gases that rise into the atmosphere and contribute to climate change. Aircraft operations in the upper atmosphere are, however, the primary aviation-related source of greenhouse gas emissions. Currently, according to EPA estimates, aviation emissions account for less than 1 percent of local air pollution nationwide and about 2.7 percent of U.S. greenhouse gas emissions. This proportion is, however, expected to grow with projected increases in air traffic, despite expected improvements in fuel efficiency. Notably, according to FAA, emissions of nitrogen oxides from aviation sources will increase by over 90 percent by 2025 if not addressed. This increase is likely to increase ozone, which aggravates respiratory ailments. Increases in air traffic also mean increases in carbon dioxide emissions and increases in aviation’s contribution to climate change, according to the International Panel on Climate Change (IPCC).

#### Current aviation causes increasing amounts of pollution.

Gerald Dillingham, Ph.D., Director of Physical Infrastructure Issues at the GAO, 05-06-2008, “NextGen Research and Development are Keys to Reducing Emissions and Their Impact on Health and Climate”, Government Accountability Office, http://www.gao.gov/assets/120/119976.pdf

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#### The U.S. contributes largely to emissions and air pollution.

18-06-2012, “EPA Refuses to Control Pollution From Ships, Aircraft and Non-road Engines”, EarthJustice (environmental law firm), <http://earthjustice.org/news/press/2012/epa-refuses-to-control-pollution-from-ships-aircraft-and-non-road-engines>

Independent U.S. scientists, having evaluated the paleoclimate and instrumental records, as well as increasingly sophisticated geophysical models, have determined with high confidence that global warming caused by greenhouse gas emissions from the burning of fossils fuel has begun to disrupt global and regional climate systems. They predict that, unless these emissions are reduced sharply within decades, natural and human systems on which species and civilization respectively depend will be disrupted irretrievably. In partial response, the U.S. EPA has begun to restrict such emissions from new cars and light trucks, but the U.S. government’s determination to act strongly to preserve a habitable climate system remains in question. Major sector sources of GHG emissions, including aircraft, vessels and other non-road vehicles and engines, must not be given a free ride. Aviation and Global Warming: Aircraft emit 11 percent of carbon dioxide emissions from U.S. transportation sources and 3 percent of the United States’ total greenhouse gas emissions. The United States is responsible for nearly half of worldwide CO2 emissions from aircraft, and such emissions from aircraft are anticipated to increase substantially in the coming decades due to the projected growth in air transport. According to the Federal Aviation Administration, emissions from domestic aircraft will increase 60 percent by 2025. While some countries, such as the European Union, have already begun to respond to these challenges, the United States has failed to address this enormous pollution source.

### NextGen Solves

**NextGen key to solve air pollution
RAA 08**– Regional Airline Association (An airline association, “NextGen Stimulus Request”<http://www.raa.org/Portals/0/News/equipaircrafttoreduceco2andcreatejobs010709_.pdf> 2008)

\*ABD-S = Nextgen

According to FAA, the full implementation of NextGen could reduce greenhouse gas emissions from aircraft by up to 12 percent by 2025. This reduction in CO2 production is roughly equivalent to taking 2.2 million cars off the road for one year. As recently as May, 2008, the Government Accountability Office (GAO) recommended that NextGen technologies and procedures be deployed “as soon as practicable” to realize these environmental benefits. The GAO concluded that NextGen will allow for more direct routing, which will improve fuel efficiency and reduce carbon dioxide emissions, as well as the emission of other air pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrogen oxides, unburned hydrocarbons, hazardous air pollutants, and ozone. Key pieces of NextGen include “Automated Dependent Surveillance – Broadcast” Out/In (ADSB Out/In). ADS-B Out/In components would provide controllers with much more precise aircraft position information, which safely enables closer separation standards and more efficient use of airspace, improving the passenger experience and economics, while also reducing emissions. Other critical components are performance-based navigation capabilities known as RNAV and RNP (Area Navigation and Required Navigational Performance) that are based on precise satellite navigation, which complements ADS-B benefits. One additional component, the Electronic Flight Bag (EFB), provides an information management platform designed to significantly reduce the likelihood of runway incursions while also providing pilots access to navigation charts and airport displays. ADS-B, in conjunction with Continuous Descent Arrivals and RNP/RNAV approaches, has the ability to reduce the fuel burn of every arrival by up to 2000 lbs. It can change the way oceanic traffic operates – reducing a trans-Atlantic flight by 45 minutes and dramatically reducing fuel burn and CO2 production. The environmental improvement from these direct routes and their reduced fuel burn are significant. But, aircraft must be appropriately equipped to use these technologies.

**NextGen will save money via more efficient routes**

Jill **Tullman**, senior writer at the AOPA, quoting FAA president Michael Huerta, March, 12, **2012** “Airline could save $25 in fuel for every mile not flown” ([http://www.aopa.org/flightplanning/articles/ 2012/120312airline-](http://www.aopa.org/flightplanning/articles/%202012/120312airline-)could-save-for-every-mile-not-flown.html)

**The FAA’s Next Generation Air Transportation System (NextGen) will make the National Airspace System safer and more efficient as aircraft will be traveling fewer miles and burning less fuel**, FAA Acting Administrator Michael Huerta said March 9. “With NextGen our system will be safer and more efficient,” Huerta said at the twenty-third annual International Women in Aviation conference in Dallas. Aircraft will burn less fuel and emit fewer greenhouse gases. They will be able to fly more directly and receive more efficient routes and more direct approaches, he said. At Hartsfield-Jackson Atlanta International Airport, **better flight paths will let airlines operating there fly about 1.2 million fewer miles per year**, Huerta said. **Combined with other measures such as fuel-saving descents, he said that translates to 2.9 million gallons per year in savings, or 30,000 fewer metric tons of carbon emissions released into the air.** “What happens in Atlanta really affects the entire system,” he said. “These are huge benefits.” Huerta said **Southwest Airlines estimates it will save about $25 in fuel for every mile that is not flown because of a shorter flight track**. “We’re creating environmentally friendly optimized profile descents,” or OPDs, in which aircraft can make managed descents at reduced power. There are four OPDs in place at Phoenix Sky Harbor International Airport. The total savings there by two carriers is estimated at $6.4 million, he said. Airspace modernization efforts have been launched in Houston, Atlanta, and Charlotte, and are under way in Washington, D.C., Huerta said. “We will soon start in California and improve the complex airspace around New York and Chicago,” he said. At long last, the FAA has a new four-year budget plan that authorizes funds through fiscal year 2015, Huerta said. President Barack Obama’s proposed budget includes $1 billion for fiscal year 2013. “What these funds will do is help us expedite deployment,” he said.

#### NextGen reduces emissions.

Gerald Dillingham, Ph.D., Director of Physical Infrastructure Issues at the GAO, 05-06-2008 , “NextGen Research and Development are Keys to Reducing Emissions and Their Impact on Health and Climate”, Government Accountability Office, http://www.gao.gov/assets/120/119976.pdf

Two key federal efforts, if implemented effectively, can help to reduce aviation emissions—near-term NextGen initiatives and R&D over the longer term to fully enable NextGen and reduce aircraft emissions. Some NextGen technologies and procedures, such as satellite-based navigation systems, should allow for more direct routing, which could improve fuel efficiency and reduce carbon dioxide emissions. According to FAA, the full implementation of NextGen could reduce greenhouse gas emissions from aircraft by up to 12 percent by 2025. Federal R&D efforts—led primarily by FAA and NASA and often conducted in collaboration with industry and academia—have achieved significant reductions in aircraft emissions over the last 30 years, and FAA and NASA officials and aviation experts agree that such efforts are the most effective means of achieving further reductions in the longer term. As part of the a national plan for aeronautics R&D, issued by the White House Office of Science and Technology Policy, the federal government supports a comprehensive approach to R&D on aviation emissions involving FAA, NASA, and other federal agencies that is intended both to improve scientific understanding of the impact of aviation emissions and to develop new technologies, fuels, and air traffic management approaches. Better understanding of the nature and impact of aviation emissions can inform the development of loweremitting alternative fuels, more efficient air traffic management technologies and procedures, and more fuel-efficient aircraft engines.

#### NextGen is proven to save a large amount of fuel

**Salam, ‘12** (Sakib bin, M.A, Fellow at the Eno Center for Transportation, Former researcher at the Oregon Center for Public Policy, Apirl 2012 “NextGen: Aligning Costs, Benefits, and Political Leadership,” Eno Publication <https://www.enotrans.org/store/research-papers/nextgen-aligning-costs-benefits-and-political-leadership>)

**In Atlanta, arrivals making use of Performance Based Navigation (PBN) procedures have saved hundreds of thousands of gallons of fuel and thousands of tons of carbon dioxide and air pollutants.** Similar **fuel savings and reductions in emissions have resulted from the use of precise, continuous descents into Los Angeles and** customized descents into **San Francisco.** Preliminary **results from a surface management initiative in Boston point to a fuel savings of 5,100 gallons and a reduction in carbon dioxide emissions of 50 tons during periods of heavy congestion. Shared surface surveillance data coupled with aircraft metering techniques are creating taxi-out time savings of up to 7,000 hours a year at New York’s John F. Kennedy airport and 5,000 hours a year at Memphis, Tenn**.

Synergy more economically and fuel efficient.

 (John McGinnis, senior member of the AIAA  recognized aircraft designer among the [EAA](http://www.eaaapps.org/presenterinfo.aspx?id=1006), 2012,  <http://www.kickstarter.com/projects/launchsynergy/synergy-aircraft-project>)

In this second century of flight, we believe that ordinary families should have fast options to travel where they want, when they want, in quiet safety, with better economy than a car. Without the exhausting airport hassle. That's not how it is right now. Existing 'direct travel' airplanes are extremely expensive, incredibly cramped, noisy gas guzzlers; most of them three decades old. On the other hand, they're powerful time machines; essential to modern business and a lot of fun to fly! This project is about demonstrating a phenomenal new way to tackle the whole problem. If airplanes are to re-connect with their potential customers- or their potential to society- they desperately need an update. Almost everything else in modern life has developed well beyond the elite-yet-obsolete standard of personal air travel. [We think](http://www.facebook.com/pages/Synergy-Aircraft/112353422181543) that in addition to all the best [new technology](http://verticalpower.com/vp-400/), airplanes should provide, at a minimum: Way more room. A quiet, smooth ride... with a view! Far greater economy, using better fuels. Easier operation. Greatly reduced travel time. True passenger safety. Far lower price. Quiet, friendly, neighborhood manners. Adaptability to hybrid, electric, and advanced engine technologies. Synergy can deliver all of the above - and much more - through innovative solutions that work in greater harmony with the invisible physics of flight*.* Synergy doesn't just [look amazing](http://www.facebook.com/media/set/?set=a.112355052181380.25484.112353422181543&type=3), it truly is amazing: the first systematic use of six proven breakthroughs for major drag reduction. These principles haven't been put together in a form simple enough to deliver their liberating potential... until now. Designed to show ten times the fuel economy of a small jet at ten percent of the cost, Synergy not only offers fast, fun, direct transportation (in comfort above the weather) but also greater range and the ability to land at safer, slower speeds on local airfields. In its category it is widely considered the most promising aircraft design yet seen. Synergy can deliver all of the above - and much more - through innovative solutions that work in greater harmony with the invisible physics of flight. What it means: Synergy doesn't just look amazing, it truly is amazing: the first systematic use of six proven breakthroughs for major drag reduction. These principles haven't been put together in a form simple enough to deliver their liberating potential... until now. Designed to show ten times the fuel economy of a small jet at ten percent of the cost, Synergy not only offers fast, fun, direct transportation (in comfort above the weather) but also greater range and the ability to land at safer, slower speeds on local airfields. In its category it is widely considered the most promising aircraft design yet seen.

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## Airpower Adv

### NextGen Solves

#### Funding into NextGen solves for intercooperability between DOD & FAA.

GAO ’10 (United States Government Accountability Office, “NEXT GENERATION AIR

TRANSPORTATION SYSTEM Challenges with Partner Agency and FAA Coordination Continue, and Efforts to Integrate Near-, Mid-, and Long-term Activities Are Ongoing”, April 21, 2010, <http://www.gao.gov/new.items/d10649t.pdf>, Pg. 8-10)

Limited funding and staffing to dedicate to NextGen activities. Industry stakeholders and agency officials we spoke to stated that some partner agencies’ ability to coordinate with other agencies was affected by the levels of funding and staff that could be dedicated to NextGen activities. Officials at some partner agencies we spoke with stated that partner agencies allocated little or no budgetary funding specifically for NextGen activities and because of competing priorities for funds, they were limited in the resources they could dedicate to NextGen planning and coordination efforts. With respect to future investments, according to JPDO and DOT data, in fiscal year 2011, among NextGen partner agencies, three—FAA, NASA, and the Department of Commerce’s NOAA—requested some funding for NextGen activities. DOD and DHS did not request funding in their budgets specifically for NextGen activities. OSTP is working with the Office of Management and Budget to improve agency alignment and identification of NextGen-related budgets. Differences in agency mission. Differences among agencies’ mission priorities, particularly DHS’s and DOD’s, also pose a challenge to coordination efforts. DHS’s diverse set of mission priorities, ranging from aviation security to border protection, affects its level of involvement in NextGen activities. For example, events such as the 2009 Christmas Day terrorism attempt can shift DHS priorities quickly and move the agency away from focusing on issues such as NextGen, which are not as critical at that particular time. Agency officials also stated that although different departments within DHS are involved in related NextGen activities, such as security issues, the fact that NextGen implementation is not a formalized mission in DHS can affect DHS’s level of participation in NextGen activities. Industry stakeholders told us that there are potential consequences if DHS is not involved in long-term NextGen planning, including potentially marginalizing DHS’s NextGen areas, such as aviation security. Industry stakeholders reported that FAA could more effectively engage partner agencies in long-term planning by aligning implementation activities to agency mission priorities and by obtaining agency buy-in for actions required to transform the national airspace system. • Undefined near-term roles and responsibilities of partner agencies. Some stakeholders and agency officials told us that FAA could do more to clearly define each partner agency’s role in key planning documents that guide NextGen implementation efforts, particularly in the near term. Our work has shown that coordinating agencies should work together to define and agree on their respective roles and responsibilities, including how the coordination effort will be led. 11 We reported in 2008 that a key intended purpose of these planning documents, according to JPDO officials, is to provide the means for coordinating among the partner agencies and to identify each agency’s role in implementing NextGen capabilities, but that stakeholders said that the planning documents did not provide guidance for their organizational decision making. 12 Some stakeholders and agency officials we spoke to more recently told us that the NextGen Implementation Plan, which identifies near- and midterm implementation efforts, still does not specify how partner agencies will be involved or what outcomes are required from them. Another industry stakeholder explained that if partner agencies do not see their roles reflected in key planning documents, projects which depend on interagency coordination will not be fully integrated across all partner agencies. One area in particular where coordination is important is related to how FAA, DOD, and DHS information networks will share information in the future to allow for a shared awareness of the national airspace. Information sharing across agencies is necessary for such things as advanced capabilities related to optimizing the use of certain airspace by the diverse set of users under the auspices of these agencies (e.g. military aircraft, commercial aircraft, general aviation, unmanned aerial vehicles, etc.). Protocols and requirements for inter-agency information sharing have yet to be determined. Limited agency participation in near-term coordination efforts, including establishing protocols on information sharing across agencies, could hamper coordination over the long term. Both the House and Senate FAA reauthorization bills include provisions for improving coordination among partner agencies that could address, in part, some of the challenges identified by industry stakeholders and agency officials. 13 Some of the related provisions in the bills call for, among other things, revised memorandums of understanding with partner agencies that describe the respective responsibilities of each agency, including budgetary commitments.

#### NextGen solves readiness and DOD interoperability

William Nix, Booz Allen Hamilton, Associate, Winter, 2011 “NextGen Wargaming and UAS Integration Exploration”, <http://www.boozallen.com/media/file/NextGen_Wargaming_and_UAS_Integration_exploration.pdf>

Wargaming is a powerful process for imagining the future. Wargames allow participants to understand and experience the potential outcomes of future choices prior to committing their organization to a particular course of action. The gaming process allows individuals and organizations to challenge conventional wisdom, “known truths” and prior assumptions. Wargames provide dynamic interaction between participants in a realistic environment, act as a catalyst to invoke intuition, encourage creativity, and can deliver a shared vision for the direction or decisions an organization(s) should pursue. Most importantly, unlike traditional forms of analysis, wargames allow system stakeholders to play out a full range of options against potential pitfalls and develop increased understanding of dynamic variables including stakeholder actions and responses, potential reactions, unexpected friction, fatal surprises, and evolving futures. The Department of Defense (DoD) and the Federal Aviation Administration (FAA) have identified numerous (near and mid-term) challenges related to the integration of current and planned systems into the Next Generation Air Transportation System (NextGen). These challenges will affect stakeholders/users across the National Airspace System (NAS). Key examples include: • Use and integration of data-link messages between air and ground automation systems; • Use and depiction of flexible airspace boundaries to support capacity and security requirements; • Aircraft merging, spacing, and self-separation standards and exchanges of four dimensional (4D) trajectories; The FAA is transitioning from an obsolescent groundbased air traffic control system to an enhanced collaborative NextGen system in which aircraft are critical nodes in a Service Oriented Architecture (SOA) that will rely on data communications and System Wide Information Management (SWIM). Projected NextGen capabilities will require new systems, procedures, and policies, as well as new user and service provider behavior. One pressing challenges is the integration of an Unmanned Aircraft System (UAS) into non-segregated NAS airspace. This concern is not limited to the United States and agencies like the FAA and DoD. The Department of Homeland Security (DHS), the National Aeronautics and Space Administration (NASA), state and local law enforcement organizations, and the overall UAS industry are critically interested in this issue. Internationally, there are more than 50 countries now producing UASs and more than 200 various UASs fully developed and on the market. Within the United States alone, more than 400 companies are involved in the manufacturing and development of UASs. Teal Group’s 2009 market study estimated that Unmanned Aerial Vehicle (UAV) expenditures will double within a decade from $4.4 billion annually to $8.7 billion, with a total investment of more than $62 billion over the next ten years. UAS use within the NAS presents a unique set of challenges and opportunities for the FAA, DoD, DHS, NASA and all other stakeholders. Successful NextGen evolution will require a new approach to integrating future systems like UAS into the NAS. A NAS-UAS oriented war game series would enable the exploration of mission integration elements including policy and governance, leadership and culture, planning and operations, technology and standards, and management and budgeting. The war game would be a key element in validating existing Certificates of Authorization (COA), Standard Operating Procedures (SOP), Concepts of Operation (CONOPS), Tactics Techniques and Procedures (TTP), and higher-level policies. The war game would assist in identifying critical gaps and validating ongoing efforts to manage risk. In addition, the wargame would also provide participants with a holistic UAS mission space view, enable discovery and consensus building, and measure FAA and stakeholder operational readiness to fully explore and assess the challenges and complexity of integrating unmanned systems in the NAS. The FAA, DoD, DHS and other stakeholders are considering many different UAS scenarios and options regarding how to detect, sense, and avoid from an airborne, ground based, or multimodal air and ground-based combination. Wargames allow stakeholders the opportunity to confront difficult scenarios and test a range of behavioral options while developing reliable strategies with predictable outcomes. The gaming context allows participants to test assumptions, mitigate risks, reveal unintended consequences of potential decisions, and allow other possible options to emerge. The true value of a wargame is that is allows the exploration of ideas with limited information and captures and incorporates the differing opinions and perspectives of stakeholders to develop shared understanding. A wargame allows UAS stakeholders to test their existing operational expectations in an environment that simulates predicted execution complexity, providing insights and information to inform stakeholder system integration and implementation plans. Wargames can be structured in a variety of ways and can support a variety of objectives. The basic NAS-UAS wargame structure would include objectives, key questions, and intended results

### Air Power Good – Warfighting

#### Air power key to winning war

Benjamin S. Lambeth (B.A. in political science, University of North Carolina; M.A. in government, Georgetown University; Ph.D. in political science, Harvard University) 2000 “THE ROLE OF AIR POWER GOING INTO THE 21ST CENTURY” RAND Institute

There is nothing, of course, new about this in and of itself. In a sense, “information warfare” has been practiced by belligerents ever since the days of sticks and stones. The difference today, however, is that commanders and planners are now at the threshold of under- standing its importance and mastering it. Indeed, the broad area of sensor fusion is arguably more pivotal than any other single area of technology development, because it is the sine qua non for extract- ing the fullest value from the new imposition options that are now becoming available. Thanks to the enhanced awareness picture it now promises, this synergistic fusion of information and precision attack capability will strengthen the hands of warfighters up and down the chain of command, from the highest level to individual shooters working within tactical confines. A second payoff area worth emphasizing is the broadened ability of air power to do things it could not do before, as well as to accomplish more with less for a joint force commander. On the first count, it has shown the ability to maintain air dominance over the heart of an en- emy’s territory, enforce no-fly and no-drive zones, and engage en- emy armies effectively from relatively safe standoff ranges. On the second count, increased information availability and directability has enabled reduced cycle time, yet another force multiplier which creates a larger apparent force from smaller numbers by permitting a higher operations tempo. Relatedly, the current generation of com- bat aircraft embodies significant improvements in reliability, main- tainability, and sustainability, making possible greater leverage from fewer numbers. Such enhancements now allow both greater concentration of force and a reduction in the amount of time it takes to perform an operational task. A third major payoff afforded by recent improvements in air power is situation control from the outset of combat, such that the first blow can decide the subsequent course and outcome of a war. Air power now permits the attainment of strategic goals through simultaneity rather than through the classic sequence of methodical plodding from tactical through operational-level to strategic goals at an exorbitant cost in lives, forces, and national treasure. Yet its principal objectives are no longer the familiar ones of leadership, infrastructure, economic potential, and so on invoked by past “strategic bombardment” proponents. Instead, they embrace key assets that make up an enemy’s fielded forces and capacity for organized action. Before long, the initial attack may even be surreptitious—for example, into computer systems, to pave the way for fire and steel to follow. Finally, the maturation of air power has enabled the maintenance of constant pressure on an enemy from a safe distance, increased kills per sortie, selective targeting with near-zero unintended damage, substantially reduced reaction time, and, at least potentially, the complete shutdown of an enemy’s ability to control his forces.13 These and other payoffs in no way add up to all-purpose substitutes for ground forces. However, they now permit joint force comman- ders to rely on air power to conduct deep battle for the greater extent of a joint campaign, foreshadowing an end to any need for friendly armies to plan on conducting early close-maneuver combat as a standard practice. As Desert Storm showed, the ability of indepen- dently applied air power to own the air and shape the battlefield eliminated any urgent need for the coalition’s commanders to commit allied ground troops to battle. The only factor driving a need to wrap things up quickly was the certainty of approaching summer heat, which would have made operations for all forces much more difficult.

#### Air power is the nexus of winning war – Desert Storm proves

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INTRODUCTION

Air power took a quantum leap in credibility and perceived importance after the opening days of Operation Desert Storm in 1991. The convergence of high technology with intensive training and determined strategy that was attested by the allied coalition’s successful air campaign against Saddam Hussein’s Iraq bespoke a breakthrough in the strategic effectiveness of the air weapon after a promising start in World War II and more than three years of misuse in the Rolling Thunder bombing campaign against North Vietnam from 1965 to 1968. Indeed, the speedy attainment of allied air con- trol over Iraq and what that allowed allied air and space assets to ac- complish afterwards by way of enabling the prompt achievement of the coalition’s military objectives on the ground marked, in the view of many, the final coming of age of air power. There was no denying the effect that initial air operations had in shaping the subsequent course of the war. The opening coalition at- tacks against Iraq’s command and control facilities and integrated air defenses proved uniformly successful, with some 800 combat sorties launched in the blackness of night in radio silence against Iraq’s most militarily critical targets and only one coalition aircraft lost—a U.S. Navy F/A-18, presumably to a lucky infrared missile shot from an Iraqi MiG-25. Over the next three days, the air campaign struck at the entire spectrum of Iraq’s strategic and operational-level assets, gaining unchallenged control of the air and the freedom to operate with impunity against Iraq’s airfields, fielded ground forces, and other targets of military interest. In the aftermath of the war, the predominant tendency, not just among airmen, was to credit coalition air power with the bulk of re- sponsibility for having produced such a lopsided win. Senator Sam Nunn, initially a doubter about the wisdom of the Bush Administration’s going to war for the liberation of Kuwait, hailed the result as attesting to the advent of a “new era of warfare.”2 Three years later, Eliot Cohen of the Johns Hopkins University’s School of Advanced International Studies observed that “although ground ac- tion necessarily consummated the final victory for coalition forces, air power had made the final assault as effortless as a wartime opera- tion can be.”3 Cohen, who earlier had led the U.S. Air Force’s Gulf War Air Power Survey, went on to note that air power had all but taken on a mystique in the public mind as a result of its success in the Persian Gulf.

#### Air power is the best scenario for forward deployment and de-escalation of conflict – nothing else comes close to matching it

Maj. Gen. Carpenter 9, Commander of 8th Air Force, June 3, 2009, Dept of the Air Force presentation to the Senate Armed Services Committee, Subject: Air Force Strategic Programs, <http://armed-services.senate.gov/statemnt/2009/June/Carpenter%2006-03-09.pdf>

Unquestionably, there are a myriad of applications for the use of bombers. These include but are not limited to: 1) the demonstration of national resolve through force generation and arming with either conventional or nuclear weapons; 2) upon order, covert or overt dispersal within the US or deployment to forward locations; 3) strike operations from single-aircraft to multi-aircraft conventional and/or nuclear packages, which, most importantly, can be executed, retargeted, or recalled; and 4) employment of a vast array of weapons to include conventional unguided general purpose bombs, cluster munitions, precision guided munitions, hard target penetrators, nuclear gravity weapons, and conventional or nuclear cruise missiles. Further, bombers have a unique ability to communicate de-escalation through visible down-loading and removal from alert status and/or redeployment to home stations. Overall, and possibly most notable, bombers are differentiable from other strategic nuclear weapon systems—there-by not forcing an enemy into assuming a worst case nuclear scenario. In the new Strategic Triad, it is the bomber that provides the most flexibility to US command authorities, with this flexibility being multifaceted and unique among the triad components. Air Force bombers are recallable, scalable, directional and visible and provide our President and Secretary of Defense with both assurance and deterrence at the same time. This deterrence flows not only from the bombers’ nuclear strike capability but also from the robust demonstrated conventional capability that can hold any target on the planet at risk. Another unique feature of our bomber force is the ability to deter even while strike operations are being executed. Simply put, deterrence from bombers can continue despite shots being fired. Furthermore, by enabling the effectiveness of other US and partner instruments of power, bomber conventional capability can provide alternatives for deterrence beyond the obvious threat of annihilation. The most illustrative example is US bombers operating in conjunction with indigenous ground forces in Serbia, which ultimately helped facilitate enemy capitulation without large scale NATO ground force insertion. To be sure, all components of the Strategic Triad are critical to our National Security Strategy but the bomber force has and will continue to be unique in its ability to assure allies, shape environment, dissuade potential adversaries, complicate adversary planning, provide escalation control, and offer alternatives to our combatant commanders and the President and Secretary of Defense. Bombers are the only platform in the Strategic Triad which can be employed in either conventional or nuclear roles. As our forces continue to redeploy from forward bases around the world, long-range strike aviation will remain one of our nation’s key power projection capabilities in the foreseeable future. This long-range strike capability provides the nation the most powerful means to rapidly respond or attack around the globe and offers our nation’s leaders freedom of choices and freedom of action in the new world environment. Our national security will increasingly depend on strategic bombers to meet the demands of responding rapidly and decisively to security threats. Thank you for this opportunity. I look forward to your questions.

#### Airpower is the crux of military operations

Benjamin S. Lambeth (B.A. in political science, University of North Carolina; M.A. in government, Georgetown University; Ph.D. in political science, Harvard University) 2000 “THE ROLE OF AIR POWER GOING INTO THE 21ST CENTURY” RAND Institute

Third, air power, properly understood, knows no color of uniform. It embraces not only Air Force aircraft, munitions, sensors, and other capabilities, but also naval aviation and the attack helicopters and battlefield missiles of land forces. In this regard, it is worth highlight- ing that the first allied weapon impact in Operation Desert Storm was not a laser-guided bomb delivered by an F-117 stealth fighter, but a Hellfire missile launched against an Iraqi forward air defense warning site by a U.S. Army AH-64 Apache attack helicopter. As was well borne out by that example, air power entails a creative harness- ing of all combat and combat support elements, including space and information warfare adjuncts, that exploit the medium of air and space to visit fire and steel on enemy targets. Recognition and acceptance of the fact that air warfare is an activity in which all services have important roles to play is a necessary first step toward a proper understanding and assimilation of air power’s changing role in joint warfare.

### Air Power Good – Heg

#### Air power key to heg, shapes the environment for international interactions – solves prolif, violence, wmd and cultural clash

Maj. Gen. Carpenter 9, Commander of 8th Air Force, June 3, 2009, Dept of the Air Force presentation to the Senate Armed Services Committee, Subject: Air Force Strategic Programs, <http://armed-services.senate.gov/statemnt/2009/June/Carpenter%2006-03-09.pdf>

Chairman Nelson, Ranking Member Vitter, and distinguished Members of the Subcommittee, thank you for this opportunity to represent the men and women of the Eighth Air Force and to answer your questions regarding the use of bomber aircraft in the United States Air Force. A key component in our nation’s ability to conduct long-range strike missions is found within our Air Force bombers. This unique capability is not possessed by any other branch of our armed services or by any other nation. Globally, the distance of our potential adversaries and lack of basing options hampers our ability to perform in a variety of theaters and scenarios. Long-range strike aviation is one of the few hedges our nation maintains to mitigate these fundamental challenges. Air Force strategic bombers are a critical element of our National Security Strategy and National Military Strategy, providing unique capabilities to fulfill combatant commanders’ mission objectives from shaping and deterring to large scale conventional operations and even nuclear scenarios. Despite the age of our nation’s three bombers, the Air Force long-range bomber force is unmatched in its ability to provide conventional power for initial response to regional crises within hours. Additionally, our bombers can provide sustained operations in any region of the world employing either conventional or nuclear options. As we move away from forward overseas basing, the speed, range and payload of today’s manned bombers allow for a US presence anywhere on the globe within 24 hours. The end of the Cold War brought about a false feeling of global security, especially surrounding the long feared use of nuclear weapons between the Cold War superpowers. Shortly after the end of the Cold War we saw the world in its new form—violent and unstable. Different from the last century, non-state actors, specifically radical fundamentalists, moved to the forefront of the international stage. Our national security debates centered on not only how to counter this threat, but whether insurgent radical fundamentalism is the likely dominant form of warfare for the 21st century. These are critically important questions when deciding the best national military force structure size and composition. But in an effort to “tailor” our force structure we would be remiss if we were to assume this type of warfare will totally dominate the global security horizon for the foreseeable future. For at least the first 25 years of the 21st century, instability, violence, proliferation of weapons of mass destruction, and cultural/religious clashes will be center stage on the global arena. However, we must guard against absolute predictions of what forms of warfare may occur in the future. As we moved into the 21 century, the 2002 Nuclear Posture Review revealed that the Cold War’s Triad was limited in scope and in need of an update. Our deterrence foundation still relies on our strike capability composed of a formidable balance of Intercontinental Ballistic Missiles (ICBM), Submarine Launched Ballistic Missiles (SLBM) and manned recallable and re- targetable bombers. In today’s threat environment where non-state actors and counter insurgency operations are center stage, the importance of our bomber force to deterrence is often overlooked and little understood. The strategic bomber is unique in its ability to assure allies, shape the environment, dissuade potential adversaries, complicate adversary strategy, provide the President and Secretary of Defense escalation control options, and ultimately offer alternatives to the insertion of precious ground forces on foreign soil.

#### Air power key to maintain US military superiority

General Ronald R. Fogleman, (USAF (Ret.) Former Chief of Staff, USAF) 2000 “AIR POWER: THE 21ST CENTURY CATALYST FOR PROGRESS, CHANGE, AND PROSPERITY” RAND Institute

Just as the impetus and challenge of World War II brought air power to the forefront of military operations, a series of events in the last decade of the 20th century has come together to once again change not only the nature of warfare but also the nature of economic inter- course between nations of the world. This movement is sometimes called a Revolution in Military Affairs (RMA). It encompasses the fol- lowing: an explosion of computer power, with capacity doubling every eighteen months and becoming ever cheaper, giving the world unheard of processing capability for a variety of applications. At the same time the miniaturization of digital electronics combined with other revolutions in information technology when integrated with traditional characteristics of air and space power; speed, range, flexibility, and presence will once again fundamentally change the nature of warfare in the opening decades of the 21st century. The ability to find, fix, track, target, and engage with precision anything of consequence anywhere on the globe in near real time will change the nature of warfare. As we have seen in the nineties, air power has already become the first to fight among the arsenal of land, sea, and air forces. It will come to dominate warfare in the 21st century as the phalanxes and legions did in the Ancient World, as naval power did during the Age of Discovery and the dawning of the Industrial Revolution. Land and sea forces will still be important, but their structures will have to be dramatically altered to remain relevant and effective. Nowhere is this any more important than in Northeast Asia.

### Air Power Good – Deterrence

#### US airpower key to conventional deterrence but shift in balance threatens loss

Rebecca Grant 9, Ph.D., a senior fellow of the Lexington Institute, “U.S. air superiority faces new challenges”, March 17, <http://www.upi.com/Security_Industry/2009/03/17/US-air-superiority-faces-new-challenges/UPI-53251237298018/>

In the last two decades, the United States has used airstrikes to contain dictators, punish aggression, turn around international violations of sovereignty and stop regime-inflicted humanitarian disasters. No-fly zones squelched Iraqi military activity for a decade. There's no reason to think the United States and its armed forces will depend less on airpower for conventional deterrence in the future. It remains just the type of flexible, proportionate tool essential to credible, conventional deterrence. U.S. Defense Secretary Robert Gates explained the need for options well. "A conventional strike force means that more targets are vulnerable without our having to resort to nuclear weapons," he said in an Oct. 28 speech to the Carnegie Endowment for International Peace in Washington. It is therefore reasonable to ask: Is the United States keeping far enough ahead to make its conventional deterrence effective? The answer depends, in part, on U.S. airpower in general and the Lockheed Martin/Boeing F-22 Raptor in particular. There is an exceptionally vital aspect of conventional deterrence: how to assure that the United States can open up the airspace and execute a conventional strike. Trends now suggest that the U.S. armed forces can't take that advantage for granted or rely on airpower's conventional deterrence for much longer. Potential adversaries are moving way too fast on aircraft, weapons and tactics, and the gap is narrowing. Instead of nuclear-warhead throw weight and survivable second strike, the technical details of the balance for conventional deterrence in the 21st century may come down to stealth and supersonic speed without afterburner. The tactics necessary to exert conventional deterrence are changing. America's defense officials once followed the relative standings of conventional forces very closely. Conventional deterrence came into vogue in the 1980s when Cold War tensions with the Soviet Union revived interest in strong conventional forces as deterrents in their own right. Back then, scholars researched case studies on historical and regional conflicts and re-examined how military might on each side influenced the causes of wars. Keen interest developed in whether the U.S.-led North Atlantic Treaty Organization and the Soviet-led Warsaw Pact could restrain themselves and fight a conventional war in Europe without resorting to nuclear weapons -- and if so, who would prevail. Major improvements in air and land forces followed. All that preparation for Europe turned out to be unnecessary -- but highly useful elsewhere. No challengers arose to test the ability of the United States to employ airpower as it chose. However, there are very clear indications that the military balance may be shifting again.

#### Current deterrence policies fail – now is the key time for action

Michael G. Mullen 8, Admiral, U.S. Navy, Chairman of the Joint Chiefs of Staff, “From the chairman: it's time for a new deterrence model”, Joint Force Quarterly, Oct 2008

It is way past time to reexamine our strategic thinking about deterrence. General Vessey's belief in "cleaning clocks," characteristically blunt though it was, summed up nicely the urgency and the intent of our Cold War mentality. Unfortunately, that is just about where we left it--back in the Cold War, strewn among the rubble of the Berlin Wall. Deterrence today is tougher and more complex; more than one nation can now reach out and touch us with nuclear missiles. Americans are potential targets of terrorism wherever they travel, and regional instability in several places around the globe could easily erupt into large-scale conflict. Even before Russia's move against Georgia over South Ossetia and Abkhazia in August, U.S. allies were revisiting longstanding assumptions about America's protective security umbrella. The United States may not face a nation-state enemy right now, but as many writers in this issue of Joint Force Quarterly point out, the threats we do face are just as treacherous, just as deadly, and even more difficult to discern. Yet we have done precious little spadework to advance the theory of deterrence. Many, if not most, of the individuals who worked deterrence in the 1970s and 1980s--the real experts at this discipline--are not doing it anymore. And we have not even tried to find their replacements. It is as if we all breathed a collective sigh of relief when the Soviet Union collapsed and said to ourselves, "Well, I guess we don't need to worry about that anymore." But worry we must. And act quickly we should. Terrorists are trying to obtain weapons of mass destruction. Some states, against international pressure, are trying to build and/or improve their own nuclear weapons. The specter of state-on-state conflict, though diminished, has not disappeared. We need a new model for deterrence theory, and we need it now. Time is not on our side.

## Science Diplomacy Adv

### NextGen Solves

#### NextGen necessary to exercise science diplomacy

JPDO 10 – Joint Planning and Development Office of the USFG (“Next Generation Air Transportation System International Strategy”<http://www.jpdo.gov/library/InformationPapers/JPDO_International%20Strategy.pdf> 1/7/10)

To be successful, ICAO member States will need to collectively support the efforts of global harmonization, and many States will look to the U.S. for leadership in the area of NextGen technologies. Traditional and virtual communities are vehicles to share U.S. concepts and promote U.S. technologies with international partners. Fostering avenues for knowledge sharing within the international aviation commnity will provide a work environment where stakeholders can collectively reflect and create knowledge, and more readily harmonize worldwide equipage and procedural standards. The JPDO partner agencies and members of industry have ample opportunities to promote NextGen globally at agency and industry supported venues. The U.S. must leverage these opportunities with International Strategy Joint Planning and Development Office n JPDO Paper n www.jpdo.gov a focus towards promoting NextGen worldwide. Readily available communications media for NextGen, such as written briefings and graphic presentations, will be required and should be customized for various international audiences. To ensure agency representatives deliver a consistent message, a library of briefings and handouts will be developed. In addition, the U.S. will work with international partners on technical training in NextGen technologies and procedures through appropriate channels.

### Science Diplomacy Good – Conflict

#### Peaceful solutions to conflicts

Himelfarb ’11 (Sheldon Himelfarb, Director, Center of Innovation: Media, Conflict, and Peacebuilding / Director, Center of Innovation: Science, Technology and Peacebuilding, 1/20/11, United States Institute of Peace, “On the Issues: Science Diplomacy”, <http://www.usip.org/publications/the-issues-science-diplomacy>)

Science diplomacy is one of the most promising areas of innovation for how to deal with the great transnational challenges of this century, including nuclear disarmament, climate change, food security, disease, and many other aspects of international peacebuilding. On January 19th and 20th, 2011, USIP co-hosted a major program with the National Academy of Science's Committee on International Security and Arms Control entitled "Reykjavik to New START: Science Diplomacy for Nuclear Security in the 21st Century." USIP's Sheldon Himelfarb talks about the issue. \* Tell us more about this unique program on January 19-20, 2011, and what issues you are tackling? \* Where do you see science diplomacy going in the new year? Tell us more about this unique program on January 19-20, 2011, and what issues you are tackling? This was an exciting meeting for a couple of reasons. First, we brought together distinguished members of the American and the Russian Academies of Science, along with other prominent experts in the field, to reflect on the role that collaboration between scientists played in nuclear security across the 80's and 90's, and distilled insights from their collaboration that might be of value going forward. New START was a great way to signal a new era of cooperation; we'll use this meeting with some of the most experienced people in this field to look for the specific "success factors" in what occurred before, as well as mistakes to avoid going forward. On a more specific level, there was a good deal of discussion on monitoring and verification measures, because they were areas where scientists were instrumental in figuring out ways to enhance communication and confidence-building - which will remain one of the persistent challenges in the 21st century. But again, here too, we will look at a very perplexing issue not merely as a technical issue but one where using the lens of "science diplomacy" might produce better results. For example, how can scientists from different nations, working together despite adversarial political contexts, make progress? Issues of verification, fissile materials security, more proliferation-resistant forms of nuclear energy, and more will be on the table. Scientists, particularly those with specific experience in nuclear-related science diplomacy, represent a relatively small community that does not frequently meet to discuss these issues. This conference sought to develop updated and new modes of cooperation between American and Russian nuclear scientists, and then expand the boundaries to address the nuclear issues of the present and future, including India-Pakistan, Iran, North Korea, and others. Back to Top Where do you see science diplomacy going in the new year? These are exciting times for those of us working at the nexus of science diplomacy and peacebuilding. Rarely have we seen such high profile expressions of hope and support for science diplomacy as a tool of conflict management, as we have from this administration - starting with President Barack Obama's Cairo speech in 2009, where he gave science diplomacy a special role in helping to set our relationship with the Middle East and the Muslim world at large on better footing. And then, Secretary of State Hillary Rodham Clinton appointed three scientific luminaries as "science envoys" to engage more extensively with the Muslim world in scientific and technical collaborations. More recently, the administration followed through by requesting new funding for global engagement programs like this - and appointed a new class of science envoys to spearhead outreach to other countries outside of the Middle East - including in South and Southeast Asia, Africa and Central Asia/Caucuses. So clearly our political leaders have great hopes that science diplomacy will help to ease tensions around the world, and we share this optimism in the year ahead. It won't be easy; we need to learn a lot more about why some scientific and technical collaborations morph into powerful peacebuilding initiatives and why others do not, for example. And how can we leverage these scientific and technical collaborations before conflict has become intractable. These are tough questions, but the good news is that we see more and more people starting to ask them as we go into the new year. We certainly will continue to work on them with partners such as the National Academy of Sciences and the National Academy of Engineers throughout the new year and with our networks in other countries. Furthermore, the upcoming Seoul Nuclear Summit, continuing concerns about Iran and North Korea, ongoing India-Pakistan challenges will inevitably spotlight what scientific cooperation can contribute to non-proliferation in the years ahead. But just as the issues are too big an issue for one country to solve on its own, so too scientific cooperation needs the wisdom of many.

#### Science Diplomacy is effective, it ensures global cooperation

Turekian and Wang No Date Cited [Vaughan Turekian, Chief International Officer of the American Association for the Advancement of Science and Tom Wang, Director of International Cooperatoin for the American Association for the Advancement of Science, “Building an International Network of Knowledge”]

In the decades since the depths of the Cold War, scientists and engineers in the United States and Russia have built a special bond. As relations between their governments have shifted from acute tension to the thaw of détente to friendship and back to mutual wariness, our researchers have worked side-by-side on a range of successful projects.  This cooperation has been critical in building and enhancing relationships that, while outside of the political realm, have helped to promote understanding and trust among the our people. And the relationships produced important science in fields ranging from physics, health, and space exploration to the development of Internet-based information-sharing networks and the control of nuclear proliferation. Today, the world is a vastly different place than it was 40 years ago, or even 10 years ago. Though tensions remain among countries, we no longer struggle with the strong polarization of national philosophies that characterized the Cold War. At the same time, common issues confront us on a global scale. The current financial crisis, international terrorism, the changing climate, and competition over energy supplies all show how interrelated we are.  National leaders are ever more aware of the reality that solving these and other challenges will require the innovative power of science, engineering and technology. Russia’s leaders understand that, and U.S. President Barack Obama does, too. These developments suggest that science diplomacy is entering an important new era, and that, if it is employed to help nations share knowledge and seek common solutions, it can be a powerful force of prosperity and peace.  Science diplomacy is not a new concept between Russia and the United States. During the Cold War, despite the geopolitical deadlock between the Soviet Union and the United States, the two powers used scientific exchanges to initiate a thaw. The relationships that grew from those first tentative agreements have since produced vast knowledge, billions of dollars in economic activity and real improvement in human well-being. At a time of financial crisis and renewed geopolitical tension, there is an inclination to pull back from such cooperation. Indeed, there is an unspoken sense among some U.S. policymakers that science cooperation is a one-way street, a form of aid dispensed or withheld to achieve our own national ends. But this view is short-sighted. Two years ago, the United States and Russia renewed an ambitious science-cooperation agreement; the U.S. Department of State cited a range of valuable accomplishments by the nations’ researchers. A 2002 RAND report prepared for the White House Office of Science and Technology Policy concluded that the joint efforts provided great benefits to the United States.  U.S. scientists cite many cases in which Russian colleagues have shared valuable knowledge: Treating radioactive coolants; Using soil and climate data to understand climate change; Developing new treatments for bone cancer.  These past examples show the potential of continuing cooperation. We have broad areas of common interest: Fundamental research in nuclear physics; fusion energy research; counter-terrorism; nanotechnology; the control of infectious disease; arctic science; and development of clean energy sources.  The Russia-U.S. relationship has tended to be bilateral, but as the world grows more interconnected, this will have to evolve. Nations on every continent are investing in science and research capacity: South Korea and China have been transformed, seemingly overnight, by investing in innovation. Cuba has become a world leader in biomedical research. Rwanda is wiring itself for the Internet, and has begun to distribute thousands of computers to its young students. Argentina, as it develops its capacity in biotechnology and nanotechnology, is building cooperative science relationships not just in Latin America, but with Europe, Africa and the Arab world.  However different these nations are, each recognizes that science and technology will be the currency of the future; investments today will pay off in economic growth and societal development tomorrow.  It is in this context that international science cooperation provides the opportunity to build bridges between countries, both through governments and through civil society relationships. To be most effective, such an approach needs commitment from all interested parties—not just scientists and engineers, but policy-makers, the foreign policy community, educators and the public.  This emerging reality inspired the American Association for the Advancement of Science to establish a Center for Science Diplomacy earlier this year. In October, the Center convened intensive meetings with top U.S. leaders from foreign policy, business, education and science to discuss the best ways to pursue international partnerships, even with nations such as North Korea and Cuba, where governmental relationships have been profoundly strained. Still, an overarching challenge confronts us now: At a time of financial crisis, we must work together to address world problems in a way that contributes to sustainable, long-term economic growth. Governments play an important role in such partnerships, but they cannot succeed without the commitment of individual researchers in Russia, the United States, and many other countries. If scientists and engineers take leadership, we can pursue new discoveries and solutions to shared problems even as we build understanding and trust between our nations.

### Science Diplomacy Good - Warming

#### Science diplomacy solves the internal link to every major impact– resolves issues related to warming, resource shortages, economies and public health

Federoff ‘8 (Nina Federoff, Penn State professor and Obama secretary of state science and technology adviser, April 2 8. “TESTIMONY BEFORE THE HOUSE SCIENCE SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION” <http://gop.science.house.gov/Media/Hearings/research08/April2/fedoroff.pdf>)

The welfare and stability of countries and regions in many parts of the globe require a concerted effort by the developed world to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, becoming regional or global threats. The United States has no monopoly on knowledge in a globalizing world and the scientific challenges facing humankind are enormous. Addressing these common challenges demands common solutions and necessitates scientific cooperation, common standards, and common goals. We must increasingly harness the power of American ingenuity in science and technology through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S. interests in foreign policy. There are also important challenges to the ability of states to supply their populations with sufficient food. The still-growing human population, rising affluence in emerging economies, and other factors have combined to create unprecedented pressures on global prices of staples such as edible oils and grains. Encouraging and promoting the use of contemporary molecular techniques in crop improvement is an essential goal for US science diplomacy.

#### Global warming causes extinction

Cummins and Allen ‘10 (Ronnie, Int’l. Dir. – Organic Consumers Association, and Will, Policy Advisor – Organic Consumers Association, “Climate Catastrophe: Surviving the 21st Century”, 2-14, <http://www.commondreams.org/view/2010/02/14-6>)

The hour is late. Leading climate scientists such as James Hansen are literally shouting at the top of their lungs that the world needs to reduce emissions by 20-40% as soon as possible, and 80-90% by the year 2050, if we are to avoid climate chaos, crop failures, endless wars, melting of the polar icecaps, and a disastrous rise in ocean levels. Either we radically reduce CO2 and carbon dioxide equivalent (CO2e, which includes all GHGs, not just CO2) pollutants (currently at 390 parts per million and rising 2 ppm per year) to 350 ppm, including agriculture-derived methane and nitrous oxide pollution, or else survival for the present and future generations is in jeopardy. As scientists warned at Copenhagen, business as usual and a corresponding 7-8.6 degree Fahrenheit rise in global temperatures means that the carrying capacity of the Earth in 2100 will be reduced to one billion people. Under this hellish scenario, billions will die of thirst, cold, heat, disease, war, and starvation. If the U.S. significantly reduces greenhouse gas emissions, other countries will follow. One hopeful sign is the recent EPA announcement that it intends to regulate greenhouse gases as pollutants under the Clean Air Act. Unfortunately we are going to have to put tremendous pressure on elected public officials to force the EPA to crack down on GHG polluters (including industrial farms and food processors). Public pressure is especially critical since "just say no" Congressmen-both Democrats and Republicans-along with agribusiness, real estate developers, the construction industry, and the fossil fuel lobby appear determined to maintain "business as usual."

### Science Diplomacy Good – Relations

#### Circumvents low relations

**Hsu** ’11 (Jeremy Hsu, InnovationNewsDaily Senior Writer, 4/8/11, InnovationNews, “Backdoor Diplomacy: How U.S. Scientists Reach Out to Frenemies” <http://www.innovationnewsdaily.com/science-diplomacy-soft-power-1882/>)

Near the end of World War II, U.S. nuclear physicists asked a Japanese colleague if he could persuade Japan's leadership to surrender. Their message was parachuted in a capsule just before a U.S. bomber released the "Fat Man" atomic bomb over Nagasaki, and it ended up in the Japanese physicist's hands one month later. Today U.S. science representatives reach out to fellow scientists in nuclear power-hungry North Korea and Iran as a way of breaking the ice and creating backdoor channels for talks. They also build closer cooperation with rising powers such as China and India and serve as U.S. envoys on behalf of President Barack Obama's scientific outreach to Muslim countries. Few people know science diplomacy as well as Norman Neureiter, a senior adviser for the American Association for the Advancement of Science (AAAS). A chemist in a past life, Neureiter headed the first U.S.-Japan science committee and became the first U.S. science attaché in Eastern Europe. He advised on scientific elements of historic agreements with the Soviet Union and China while serving in President Richard Nixon's Office of Science and Technology. Neureiter also served as science adviser to two U.S. secretaries of state, Madeleine Albright and Colin Powell. He joined the AAAS Center for Science, Technology and Security Policy in 2004. Here are edited highlights of an InnovationNewsDaily phone interview with Neureiter. InnovationNewsDaily: Many people talk about science diplomacy but they use different definitions. What's your definition? Norman Neureiter: It does mean different things to different people. It's often equated with science cooperation, but I've been focusing on countries where relations with the U.S. are really bad. Science diplomacy is an intentional effort to engage with other countries where the relationship is not good otherwise. The science allows you to deal with non-sensitive issues that both sides can work on together for the good for all. InnovationNewsDaily: President Obama proposed scientific partnerships with Muslim countries during a visit to Cairo in 2009. Has that worked out as a good example of science diplomacy? Neureiter: President Obama made a pretty vigorous speech that really stirred up a tremendous positive response. U.S. envoys went around the world to listen to the interests and needs, came back and made recommendations. It was stated there would be three centers of excellence built or created: one focused on science policy, one on climate, one on water. But the impression [among Muslim countries] is that things are moving too slowly and nothing much is happening because of funding problems. I was recently in Pakistan, and I heard from people in Egypt. A lot of their enthusiasm was giving way to an air of disappointment. There is still a tremendous desire on the part of these countries to work with us. Science is an active way of reaching out to the Muslim world in an area where we know they admire us. There were polls done throughout the Muslim world in the early 2000s. Invariably, we ranked pretty high in terms of science and technology. Even in Iran, 90 percent or so admired the U.S. for its science and technology. I was at U.S. State Department [at the time], and I wrote a memo saying, "Gee, what an opportunity." I think President Obama did a commendable thing in recommending scientific partnerships with Muslim countries. InnovationNewsDaily: Iran has a pretty bad relationship with the U.S. these days. How has science diplomacy worked there? Neureiter: If you look at Muslim countries today, Iran is second only to Turkey in the number of scientific publications. It seems appropriate if you believe in scientific engagement to try and engage with Iran. There is actually an agreement among the [U.S. and Iranian] science academies that began around 2000. I got involved when [the U.S. National Academy of Sciences] asked me if I would like to be on a science policy delegation in 2004. My wife and I went around to [Iranian] universities and gave talks. We also visited science parks where young aspiring engineers or scientists who wanted to be entrepreneurs could try to develop their ideas as inventions. There have been at least 20 workshops with Iran over the last decade on food-borne disease, earthquakes, solar energy and urban transportation. Despite the serious disagreements over the nuclear issue and despite the sanctions, both the U.S. and Iranian [science communities] have maintained their relationships. There is enough solid science on both sides so that this engagement is really of mutual benefit. InnovationNewsDaily: Speaking of mutual benefit, China and the U.S. have a long history of science and technology cooperation. Do you think that will change with the growing sense of competition? Neureiter: Two years ago, we had the big anniversary for the U.S.-China Science and Technology Agreement that was signed on January 31, 1979. Today the combined science cooperation among Chinese and U.S. institutions, plus the number of Chinese students studying in the U.S., is greater than that of any other country partnership. We've trained 1 million Chinese students, including two thirds in science and technology. Now you hear people starting to worry as China has advanced scientifically and technologically. There are a lot of articles about China taking over. I personally feel that there's no alternative in the long term except for more cooperation with China, so that we can tackle some of the grand challenges facing the world. Energy, climate change, food security – these are all big issues that we can certainly work on together. When we have 9 billion people on the planet, if we don't cooperate we're going to kill each other. Despite people saying, "You're a fool about China, they're trying to take us over," I feel very strongly about cooperation. If you do cooperate, you have to be very realistic. Each country should act in its own interests, but it should also find areas where cooperation is possible. I think we should seize every opportunity for constructive, mutually beneficial science cooperation with whomever.

### Science Diplomacy Good – North Korea

#### Science diplomacy solves conflict with North Korea - uniquely spills over to relations

Thorson and Seo, 09 (Dr. Stuart Thorson is with the Maxwell School, SyracuseUniversity; Hyunjin Seo is with the S. I. Newhouse School ofPublic Communications, Syracuse University, Academic Science Engagement with North Korea, April 2009 • Volume 4 • Number 4)

Science diplomacy refers to international scientific cooperation aimed simultaneously at advancing scientific knowledge and improving and strengthening broader relations between participating countries and groups. Science diplomacy has proved to be especially helpful in engaging countries where traditional diplomatic relations have been problematic. Successful science depends on the trusted application of shared protocols and thus encourages the development of trust among participants. In this paper we present evidence from a long-term academic science engagement between the United States and North Korea (DPRK; the Democratic People’s Republic of Korea) that (1) sustained science engagement provides a valuable context for developing trust between individuals from countries with strong political differences, and (2) this trust can spill over into more traditional diplomatic engagements. We describe an academic engagement in the area of information science between Syracuse University (SU) in the United States and Kim Chaek University of Technology (KUT) in North Korea. This engagement has been carried out in close cooperation with the Korea Society, a nongovernmental organization (NGO) located in New York City. The science engagement was initiated in 2001 and has to date resulted in 13 exchanges of scientifi c personnel and in the construction and implementation of the first digital library in North Korea. The trust-centric nature of collaborative science is especially relevant in engaging North Korea because, as with some other Northeast Asian countries, trust flows more from relationships than from quid pro quo contracts. Thus, we argue, science engagement provides a useful context for developing the relationships ultimately required for more broad-gauged cooperation. We then discuss several follow-on science collaborations, including the four-nation Regional Scholars and Leaders Seminar Program for Chinese, North Korean, South Korean, and U.S. information scientists and linguists; the first-ever participation by North Korean undergraduate students in the Association for Computing Machinery’s International Collegiate Programming Contest; and the U.S.-DPRK Scientific Engagement Consortium based in Washington, D.C. The paper concludes with a discussion of lessons learned regarding the role academic scientists, acting both as educators and researchers, can play in helping to create the conditions for more familiar forms of diplomacy. This is of particular relevance in the United States, where academic institutions have an enhanced (though nonetheless constrained) legal capability to deal with academics in countries such as North Korea where many other modes of cooperation might be nearly impossible. When properly administered, science diplomacy can leverage the global credibility of U.S. science to provide an important mechanism for supporting more traditional diplomatic relationships. Science and Diplomacy There are many, often incompatible, definitions of diplomacy and related terms such as cultural diplomacy, science diplomacy, and public diplomacy. Although these definitional differences are interesting and have scholarly consequence, a systematic treatment of them is beyond the scope of this paper. For our present purpose, diplomacy can be understood as engagements that include, but need not be limited to, the intent to enhance cooperative relations between the participating parties. In this paper we are interested in a particular kind of diplomacy—that which involves the building of robust trusted engagement between science entities in countries where there are minimal offi cial diplomatic relations. Prior to getting to the case, however, we want to make a few more general points regarding science diplomacy and how it relates to more traditional forms of diplomacy. In its strictest sense, international diplomacy refers to negotiations among offi cial representatives of nations. However, the science and technology of a nation are an important factor that can influence foreign publics’ views on the nation. For example, the Pew Global Attitudes Project showed in 2002 that people around the world have high admiration for U.S. science and technology despite their rejection of “Americanism,” such as the diffusion of U.S. ideas and customs.1 Historically, science engagement helped countries with minimal official diplomatic relations build mutual trust. Examples include U.S. civilian scientifi c exchanges with the Soviet Union during the Cold War, U.S.-Japan science and technology cooperation in the 1960s, and the U.S.-China Agreement on Cooperation in Science and Technology in 1979.2 However, the issues can become especially complex in this case.

#### North Korean war triggers every impact – it destroys the ozone layer, global agriculture, the economy, and the global nonproliferation regime

Hayes and Green, 10 - \*Victoria University AND \*\*Executive Director of the Nautilus Institute (Peter and Michael, “-“The Path Not Taken, the Way Still Open: Denuclearizing the Korean Peninsula and Northeast Asia”, 1/5, http://www.nautilus.org/fora/security/10001HayesHamalGreen.pdf)

The consequences of failing to address the proliferation threat posed by the North Korea developments, and related political and economic issues, are serious, not only for the Northeast Asian region but for the whole international community. At worst, there is the possibility of nuclear attack1, whether by intention, miscalculation, or merely accident, leading to the resumption of Korean War hostilities. On the Korean Peninsula itself, key population centres are well within short or medium range missiles. The whole of Japan is likely to come within North Korean missile range. Pyongyang has a population of over 2 million, Seoul (close to the North Korean border) 11 million, and Tokyo over 20 million. Even a limited nuclear exchange would result in a holocaust of unprecedented proportions. But the catastrophe within the region would not be the only outcome. New research indicates that even a limited nuclear war in the region would rearrange our global climate far more quickly than global warming. Westberg draws attention to new studies modelling the effects of even a limited nuclear exchange involving approximately 100 Hiroshima-sized 15 kt bombs2 (by comparison it should be noted that the United States currently deploys warheads in the range 100 to 477 kt, that is, individual warheads equivalent in yield to a range of 6 to 32 Hiroshimas).The studies indicate that the soot from the fires produced would lead to a decrease in global temperature by 1.25 degrees Celsius for a period of 6-8 years.3 In Westberg’s view: That is not global winter, but the nuclear darkness will cause a deeper drop in temperature than at any time during the last 1000 years. The temperature over the continents would decrease substantially more than the global average. A decrease in rainfall over the continents would also follow...The period of nuclear darkness will cause much greater decrease in grain production than 5% and it will continue for many years...hundreds of millions of people will die from hunger...To make matters even worse, such amounts of smoke injected into the stratosphere would cause a huge reduction in the Earth’s protective ozone.4 These, of course, are not the only consequences. Reactors might also be targeted, causing further mayhem and downwind radiation effects, superimposed on a smoking, radiating ruin left by nuclear next-use. Millions of refugees would flee the affected regions. The direct impacts, and the follow-on impacts on the global economy via ecological and food insecurity, could make the present global financial crisis pale by comparison. How the great powers, especially the nuclear weapons states respond to such a crisis, and in particular, whether nuclear weapons are used in response to nuclear first-use, could make or break the global non proliferation and disarmament regimes. There could be many unanticipated impacts on regional and global security relationships5, with subsequent nuclear breakout and geopolitical turbulence, including possible loss-of-control over fissile material or warheads in the chaos of nuclear war, and aftermath chain-reaction affects involving other potential proliferant states. The Korean nuclear proliferation issue is not just a regional threat but a global one that warrants priority consideration from the international community.

## CMR Advantage

### CMR Solves Terrorism

#### CMR critical to effective war on terror

Guttieri, Professor Naval Postgraduate School, 2003

(Karen, “Homeland Security and US Civil-Military Relations”, Strategic Insights, Vol. 2, No. 8, August 2003, Columbia International Affairs Online)

The American strategic policy community—for example, the US Commission on National Security in the 21st Century—was concerned with homeland defense prior to 9/11. After that fateful day, the Bush administration began using a new, more proactive sounding term: homeland security. The Pentagon, however, treated this new term not as a replacement for, but as separate from, homeland defense. A seemingly simple matter of semantics reveals a great deal about US civil-military relations. America's post-9/11 obsession with securing the "homeland" shifted the domestic political landscape, including American civil-military relations. The American model of civil-military relations has been characterized by a contract according to which the military defends the nation's borders while domestic police keep order at home. "On September 11," in the words of DoD Transformation "czar" Arthur K. Cebrowski, "America's contract with the Department of Defense was torn up and a new contract is being written."[1] This Strategic Insight describes some of the forces compelling military changes in the historical context of US civil-military relations. Although the military itself may resist change, institution-building (outside and within that organization) and attitudinal changes in response to massive terrorist attacks at home cannot but alter American civil-military relations. Much of the shift in American politics since 9/11 has to do with the nature and requirements of homeland security: it is both public and private, interagency (involving a number of government elements) and civil-military. Implementing the new national security strategy will require cooperation across sectors of activity and jurisdictions of authority.[2] Government-private sector coordination is vital to critical infrastructure protection. Agency-to-agency coordination is the foundation of any national response to security threats involving multiple levels of government in a nation consisting of more than 87,000 government jurisdictions.[3] Civil-military coordination is indispensable for ensuring adequate military support to civilian agencies responsible for homeland security. The quality of America's civil-military relations will be a factor in the effectiveness of America's "war on terror," while by the same token, the conduct of the war will irrevocably shape those relations. Given the US military's lead in homeland defense, civilian control of the military should be a topic of particular interest to anyone concerned with the function of democracy in wartime.

#### Extinction

**Sid Ahmed 04** (Mohamed, Al-Ahram Political Analyst, Éxtinction!,” http://weekly.ahram.org.eg/2004/705/op5.htm)

What would be the consequences of a nuclear attack by terrorists? Even if it fails, it would further exacerbate the negative features of the new and frightening world in which we are now living. Societies would close in on themselves, police measures would be stepped up at the expense of human rights, tensions between civilisations and religions would rise and ethnic conflicts would proliferate. It would also speed up the arms race and develop the awareness that a different type of world order is imperative if humankind is to survive. But the still more critical scenario is if the attack succeeds. This would lead to a third world war, from which no one will emerge victorious. Unlike a conventional war which ends when one side triumphs over another, this war will be without winners and losers. When nuclear pollution infects the whole planet, we will all be losers.

### CMR Solves War

#### Impact-Civil-military relations are critical to preventing major wars

Kohn, Professor of History, University of North Carolina-99

FDCH POLITICAL TRANSCRIPTS, November 4, ‘99, p. Nexis

My focus is on the relationship of the military to society. Civil-military relations are critical to national defense. If the armed forces diverge in attitude or understanding beyond what is expected of the military profession in a democratic society, have less contact, grow less interested in or knowledgeable about each other, the consequences could be significant. Each could lose confidence in the other. Recruiting could be damaged. Military effectiveness could be harmed. The resources devoted to national defense could decline below what is adequate. Civil-military cooperation could deteriorate, with impact on the ability of the United States to use military forces to maintain the peace or support American foreign policy.

#### Civil military affairs have global implications.

Eliot Cohen, Professor of Strategic Studies at Johns Hopkins, ORBIS, Spring 1997, p.155

More important, civil-military relations in the United States now no longer affect merely the closet-room politics of Washington, but the relations of countries around the world. American choices about the use of force, the shrewdness of American strategy, the soundness of American tactics, and the will of American leaders have global consequences. What might have been petty squabbles in bygone years are now magnified into quarrels of a far larger scale, and conceivably with far more grievous consequences.

**Decline in relations leads to military disobedience**

Peter D. Feaver, Assistant professor of political science at Duke University, ARMED FORCES AND SOCIETY, Spring 1998, p. proquest

The military's reluctance to embrace the Somalia, Bosnia, and Haiti missions has been well-documented. The resistance to President Clinton's decision to allow homosexual persons to serve openly in the military has also been widely discussed. Less well known, at least outside of the defense expert community, but nonetheless further evidence of shirking were similar efforts to resist the dramatic changes in the allocation of service roles and missions contemplated by Senator Nunn and then-candidate Clinton. Indeed, the crisis literature largely consists of claims that the military has been engaging in behavior that the agency model would call shirking: failure to do what civilians asked for or compliance in a way that undermines the relational privileges of civilian principals.

#### Military backlash => involvement in conflict, including nuclear conflict.

Peter D. Feaver, Assistant professor of political science at Duke University, ARMED FORCES AND SOCIETY, Winter 1996, p. proquest

A direct seizure of political power by the military is the traditional worry of civil military relations theory. Less obvious, but just as sinister, is the ability of the military to destroy society by draining it of resources in a quest for ever greater strength as a hedge against the enemies of the state. Yet another concern is that a rogue military could involve the society in wars and conflicts contrary to society's interests, either directly as in the hypothetical precipitation of a nuclear war or indirectly as in the World War I case of rigid mobilization schedules that came to dictate state policy in the final days of the crisis. And, finally, there is a concern over the simple matter of obedience: even if the military does not destroy society, will it obey its civilian masters or will it use its considerable coercive power to resist civilian direction and pursue its own interests?

### CMR Solves Accidental Launch

#### Decrease in civil-military relations increases the chance of accidental nuclear launches

Sagan, Associate Professor of Political Science and Chair of the International Relations Program, Stanford University, and a consultant to the Organization of the Joint Chiefs of Staff, the Office of the Secretary of defense, and the Los Alamos National Laboratory, ’95 [The Spread of Nuclear Weapons: A Debate, this is Sagan’s response to Waltz, Ford Professor of Political Science, UC Berkeley, pg. 83]

Third, accident‑prone nuclear operations will be more prevalent in states with volatile civil‑military relations because military officers, who have organizational biases in favor of maintaining high readiness for war, will be less constrained by more safety‑conscious civilian authorities. Pakistan is the most worrisome case in point. The Pakistan air force apparently plans to use U.S. F‑16 aircraft in nuclear weapons delivery roles, if necessary in a war. In 1992, however, the U.S. director of Central Intelligence suggested that Pakistan had not perfected the electrical mechanisms to permit safe maintenance transportation, and delivery of weapons by F‑16s The existence of such safety problems makes the reports that the Pakistani air force may have loaded nuclear weapons on its F‑16 aircraft, without informing Prime Minister Bhutto, during the 1990 Kashmir crisis even more alarming than previously recognized.

#### Accidental nuclear launch causes millions of deaths immediately and results in escalation to full-scale nuclear war and billions of deaths globally

PR Newswire, April 29, ’98

Despite the end of the Cold War, American and Russian nuclear arsenals remain on high-alert. That, when combined with significant deterioration in Russian control systems, produces a growing likelihood of an "accidental" nuclear attack, in which more than six million American men, women, and children could die, according to a study published in the April 30 New England Journal of Medicine. The authors, physicians, public health professionals, and nuclear experts, will hold press conferences on April 29 in seven U.S. Cities, including Boston, beseeching the U.S. Government to seek a bilateral agreement with the Russians that would take all nuclear missiles off high-alert as an "urgent interim measure" toward the only permanent solution: the abolition of nuclear weapons worldwide. "It is politically and morally indefensible that American children are growing up with the threat of an accidental nuclear attack," says Lachlan Forrow, MD, principal author of the NEJM article, "'Accidental' Nuclear War: A Post-Cold War Assessment," and internist at Beth Israel Deaconess Medical Center. His study cites numerous instances of 'broken arrows' -- major nuclear accidents that could have killed millions and exposed millions of others to potentially lethal radiation from fallout if disaster had not been averted. "Nuclear weapons do not make us safer, their existence jeopardizes everything we cherish." Forrow adds, "We are calling upon the mayors and citizens of all U.S. and Russian cities to join us in appealing to Presidents Bill Clinton and Boris Yeltsin to end this threat by taking all weapons off high-alert status immediately." A strike on Boston would likely target Logan Airport, Commonwealth Pier, the Massachusetts Institute of Technology, and Harvard University, resulting in 609,000 immediate fatalities, according to the researchers. Depending on wind patterns, says Dr. Forrow, hundreds of thousands of other Boston-area residents could be exposed to potentially lethal fallout. Launching nuclear missiles on false warning is the most plausible contemporary 'accident' scenario, according to the authors. More than mere conjecture, this scenario almost played out to horrifying results in 1995 when a U.S. scientific rocket launched from Norway led to activation of the nuclear suitcases carried by the top Russian command -- the first time ever in Soviet- Russian history. It took eight minutes for the Russian leadership to determine the rocket launch was not part of a surprise nuclear strike by Western nuclear submarines -- just four minutes before they might have ordered a nuclear response based on standard launch-on-warning protocols. An 'accidental' nuclear attack would create a public health disaster of an unprecedented scale, according to more than 70 articles and speeches on the subject, cited by the authors and written by leading nuclear war experts, public health officials, international peace organizations, and legislators. Furthermore, retired General Lee Butler, Commander from 1991-1994 of all U.S. Strategic Forces under former Chairman of the Joint Chiefs of Staff, General Colin Powell, has warned that from his experience in many "war games" it is plausible that such an attack could provoke a nuclear counterattack that could trigger full-scale nuclear war with billions of casualties worldwide. The authors describe the immediate effects of an "accidental" launch from a single Russian submarine that would kill at least six to eight million people in firestorms in eight major U.S. cities. With hospitals destroyed and medical personnel killed, and with major communications and transportation networks disrupted, the delivery of emergency care would be all but impossible, according to Forrow and his colleagues.

## Terrorism

**NextGen would stop plane crashes and hijacks**

Thom **Patterson,** senior writer at CNN, March 11, **2011**, “Will air traffic overhaul make us safer?” (<http://articles.cnn.com/2011-03-11/travel/nextgen.safety_1_flight-instructor-plane-crash-blue-grass-airport/4?_s=PM:TRAVEL>)

About a year after losing his dad in a plane crash, Matt Snoddy climbed into the cockpit for an emotional flight. His kids Charlie, age 5 and Alice, 3, were tucked in the back of the tiny Cessna and his flight instructor was seated alongside. Snoddy pulled back on the stick and they were airborne. The Lexington, Kentucky, landscape spread out below them as the plane gained altitude. Snoddy couldn't help but gaze down at Blue Grass Airport, where **Comair Flight 191 crashed during takeoff, killing** his father, Tim Snoddy, and **48 others. A government investigation blamed the crash on Flight 191's pilots, who attempted takeoff from a wrong runway**. **The FAA administrator** at the time **said disasters like Flight 191 might be avoided under NextGen,** the nation's sweeping air traffic overhaul set to roll out by 2025. Memories of the crash had kept Snoddy -- a longtime private pilot -- out of the cockpit until his wife offered the flight as a gift for Father's Day. "She wanted me to take the kids up and to see if I wanted to keep flying." Snoddy and his father shared a love for flying -- Matt Snoddy as a pilot and his dad as a passenger. Tim Snoddy enjoyed flying so much he'd been talking about getting his pilots' license, too. Tim Snoddy, a 51-year-old accountant and consultant for legal cases, was a frequent business traveler who left his Lexington home many times a year to spend a total of six months away at his offices in Asheville, North Carolina, and near Fort Lauderdale, Florida. Matt Snoddy, an IT consultant, had set up shop with his dad in the same Lexington building, where their father-son relationship strengthened. Everything changed on the dreary Sunday morning of August 27, 2006. Matt Snoddy was home with his wife and kids when a friend called. "She said, 'Matt your dad was on that airplane.' I said, 'What airplane?' and she goes, 'Turn on the news,' and sure enough there was the crash." Matt's first thought was: "There's no way he was on that plane. Why would he be flying out on a Sunday?" But the friend who called knew his father had changed his departure date. "So I immediately called my dad's cell and it went straight to voice mail and I left a message saying, 'Dad, just give me a call. I'm just checking on you.' " Snoddy wasn't sure if he really wanted to get back in the cockpit so soon after the crash, but he found himself doing so -- creating a kind of emotional test to gauge his loss and how it had transformed him. It was likely he might choose never to fly again. And that feeling became stronger during the flight. He realized his love of flying, which he'd cherished since his teens, had suddenly disappeared. "Something was different and I just didn't feel comfortable doing it anymore," Snoddy said. "The flight was my way of saying, 'OK that's it, farewell. We've had some good times but now it's time to move on.'" **If planes are outfitted with cockpit displays pinpointing their locations on airport surface maps, crashes like Comair 191 might be prevented,** then-FAA Administrator Marion Blakey told Louisville's Business First newspaper. A map display could have alerted crew members they were on the wrong runway, say experts. With NextGen technology, the lone controller on duty that morning also might have had access to a similar map display, which experts say also may have helped avert the crash. Experts throughout the industry agree the United States enjoys the world's safest air traffic system, with no deaths from commercial airline crashes last year. But **NextGen aims to head off future safety concerns from gridlock expected as the skies and airports become more crowded**. As many as 6,000 aircraft are in the skies during peak traffic times, according to the FAA. But get ready for that number to increase. The number of annual U.S. air passengers is projected to pass 1 billion by 2021. Radar -- the technology that currently tracks all flights -- dates back to the early 20th century. It's less accurate than GPS, its data is delayed by about 10 seconds and pilots can't use it to see their positions on a cockpit display. **NextGen's GPS-based technology promises to increase safety by allowing pilots to see their locations** and locations of surrounding aircraft via a cockpit display **in real time**. This visual aide vastly improves what pilots call situation awareness, a mental picture of where their aircraft is in relation to its surroundings. Any kind of technology that provides pilots with more information is a good thing, said Snoddy, who believes better situation awareness in the cockpit might have saved his father's life. A GPS-based tracking technology called ADS-B (automatic dependent surveillance-broadcast) is already used to some extent by UPS, Southwest Airlines, and soon, JetBlue. By 2020, the FAA will require all U.S. aircraft to broadcast their positions using ADS-B. In smaller general aviation aircraft, ADS-B has proved its value for Marisha Falk. The pilot instructor at Embry-Riddle Aeronautical University in Daytona Beach, Florida, credits ADS-B with saving her life and the life of her co-pilotin 2007. During a cross-country air race over Kentucky, another plane was bearing down from behind and above Falk's aircraft -- a blind spot where eyesight alone would have left her unaware. The approaching plane triggered a warning from the ADS-B -- and Falk took action. "If we wouldn't have sidestepped to the right, they would have just landed right on top of our airplane," she said. National security Big questions remain unanswered surrounding NextGen and the security of the nation's airspace. **On 9/11, terrorist hijackers shut off radar transponders aboard their hijacked airliners, making it hard to identify and track them en route to their targets.** Without transponders, planes are visible on radar screens, but impossible to ID. Would hijackers be able to do the same thing with ADS-B? It's unclear how vulnerable the ADS-B system would be to hackers, terrorists and other attackers compared with the nation's current radar-based tracking. "Without closer coordination and agreement about surveillance requirements, there is potential for duplicative efforts and gaps in airspace coverage," DOT Inspector General Calvin Scovel told a House panel. The situation is enough to prompt concern among members of the powerful Senate Commerce Science and Transportation Committee, which has a big say in NextGen funding. As the fifth anniversary of the Lexington crash approaches, Matt Snoddy doesn't miss being in the cockpit as much as he thought he would. He's still healing from the disaster's emotional scars, and he still prefers to drive -- if possible -- rather than fly commercial. In a 9/11 scenario**, if both a plane's ADS-B and its radar transponder are shut off, experts say the plane would be harder to track but still visible on radar, which would be available as an ADS-B backup.** The FAA refused to discuss details about ADS-B and security issues, but **a spokesman said protections are part of the program and are being developed**. "That's the reality of today's environment, that we have to take all these things into account, which we are," said FAA spokesman Paul Takemoto. For example, testing is under way in the Southwest on ways to prevent hackers from "spoofing," which involves intentionally interfering with ADS-B signals to create false targets on ADS-B displays. The FAA plans to decommission some radar stations as it relies more on ADS-B. By 2020, will there still be enough radar stations to protect U.S. airspace? In February, the Department of Transportation inspector general warned about potential gaps in the system. Top U.S. security authorities, Homeland Security and the Department of Defense, haven't yet agreed with the FAA on how to jointly monitor so-called "noncooperative" aircraft, in other words aircraft possibly piloted by terrorists that aren't transmitting flight information. "It's difficult for some people to give up that control," Snoddy said, "especially when they've been through something like I've been through -- and the rest of my family and the families of the 48 other people on the plane." He'll mark the fifth anniversary of the crash in a ceremony at the University of Kentucky arboretum, where he will help unveil a 25-foot memorial statue depicting 49 silver birds forever suspended in flight. Years ago Snoddy said farewell to piloting an aircraft ever again, but lately he doesn't rule it out -- someday. "Maybe," he said. "Not right now. It's just going to take time." This is the final report of a three-part series surrounding the FAA's "NextGen" overhaul of the U.S. air traffic system. Previous parts discussed NextGen technology and how the program will affect consumers.

#### NextGen allows multiple agents to cooperate as shown by a threat response scenario.

Catherine Bolczak and Chih-Chia Vanessa Fong, of MITRE, 5/7/08, “Shared Situational Awareness to Meet Future Airspace Security Mission Needs,” MITRE, <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4559169>

In NextGen, a potential threat is alerted based on risk assessment, so that “routine” alerts for otherwise low-risk situations are not raised to human operators. Alert escalation occurs only when a threshold of cumulative risk indicators is reached. When a threat situation is detected, there are a number of information elements that need to be shared. The first element is: what is the threat, or possibly multiple threats? The threat can include lost communications, discovery of a Person of Interest/No Fly on board an airborne flight, a disturbance report, a hijack report, a deviation from the approved 4DT, or non-compliance with ATC. Non-compliance may include a non-cooperative flight that has penetrated security airspaces. Depending on what the threat (or threats) is, it could have one or more sources. An initial source may be the ANSP automation, but the aircraft itself could be down-linking status and maneuver information. Sources can include human intelligence, multiple surveillance sources, flight operations center, the crew (via voice or data link), reports by crews for other aircraft in the vicinity, or on-board law enforcement. The flight status needs to be shared at the outset of the threat identification. Minimally, this may be only a location and vector, or perhaps the last communication and known location; for ANSPmanaged flights there will be flight identification and other information available. Each of the mission partners responds according to mission objectives and authorities. The ANSP assesses the threat in the context of its procedures, and prepares contingencies such as identification of potential diversion airports, or more wide-ranging traffic flow measures. The flight operator confirms operations normal with the subject flight, and perhaps all or part of the fleet depending on circumstances. All known relevant information about the flight and aircraft will be reviewed. Security and law enforcement providers review any manifest or screening anomalies associated with the flight, identify other threats that may be related, and follow up on pertinent intelligence. Additional security measures may be requested to be implemented to mitigate a heightened threat environment. Defense providers assess asset readiness and plan the mission to intercept the threat, and to possibly deploy additional assets such as Combat Air Patrols over sensitive areas. These response actions and results are shared, and are used to inform unified decision-making and response execution. Figure 5 summarizes shared situational awareness for Threat Detection and Response in the NextGen context.

#### NextGen IRM is key to airport security

JPDO, ConOps specialty, June 13 2007, Security Annex Concept Operations for the Next Generation Transportation System, Joint Planning Development Operations, <http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20090030054_2009017065.pdf>

Risk management is the ongoing process of understanding the threats, consequences, and vulnerabilities that can be exploited by an adversary to determine which actions can provide the greatest total risk reduction for the least impact on limited resources. Risk management is continuous; it is conducted from the strategic to the tactical levels. In this section, the strategic aspects of the IRM process are described. The following sections briefly mention the relevant tactical aspects of IRM for that particular threat vector. The NextGen layered, adaptive security’s IRM capability is an overall federated risk assessment and risk mitigation framework for guiding multiple security service enterprises to assist in making decisions, allocating resources, and taking actions under conditions of uncertainty. This framework is a planning methodology that outlines the process for setting security goals through a) prevention, b) protection, c) response and mitigation, and d) recovery. It derives its importance from the following needs: • Understand the spectrum of threats that could be mounted against the NextGen.• Identify the vulnerabilities that can be exploited by an adversary.• Evaluate and prioritize assets and activities to be protected from attack.• Determine which protective actions can provide the greatest total risk reduction for theleast impact on limited resources.• Provide the most focused and adaptive security measures to reduce the impact of security systems and procedures on air transportation.IRM is characterized by a specific and consistent terminology to describe its various aspects. Threats are the likelihood of a terrorist attack on a particular asset. Vulnerabilities are weaknesses in the design, implementation, or operation of an asset or system that can be exploited by an adversary or disrupted by a natural disaster. Consequences are the result of an attack on infrastructure assets reflecting level, duration and nature. Risks are measures of potential harm that encompasses threat, vulnerability, and consequence.The assessment of risks provides a prioritized list of vulnerabilities and potential mitigation strategies. The terrorist has freedom to choose targets and modes of attack; therefore, the NextGen Security system must develop (but not necessarily universally deploy) operationally feasible mitigations to as many potential threats as possible. Because of limited resources, mitigation requiring substantial investment (e.g., system cost or infrastructure intensive) is applied (deployed) in the order of risk level. For example, external attacks on aircraft may be an issue at some airports requiring mitigation. This does not mean that General Aviation airports will have or need such systems.Another way to stretch resources is through technical advances in sensor design and fusion and in cost efficiencies typical of information processing system upgrades. With the development of low-cost CBRNE sensors for low-volume operations, it is possible to conduct screening in 2025 at sites that would have been economically infeasible in 2006 for a given risk profile (thus permitting many more airports to provide commercial service). This does not mean that all noncommercial operations need to screen passengers or cargo for flights posing below threshold risk levels. Many flight operations occur far from major metropolitan areas or national security restricted areas. However, flight operations to sensitive areas need to make adjustments to reduce their risk profile.In summary, it is essential to remember that the security system responses and procedures throughout the NextGen are applied based on the risk profile of each flight object and airport facility. Facilities or flights that do not adopt particular security processes may still operate in the NextGen but may need to observe some restrictions depending on the given risk profile created. Yet, their overall access and performance in NextGen, even with some (self-imposed) security restrictions, is considerably greater than their access in 2006.

## Aerospace Industry Good

### Economy

#### The aerospace industry is key to millions of jobs and exports billions annually.

**FIND ’12** (Federal Information & News Dispatch, Inc., an electronic and custom provider of government and business information, “House Science, Space, and Technology Subcommittee on Space and Aeronautics Hearing”, June 7th 2012, <http://insurancenewsnet.com/article.aspx?id=345260>)

The Aerospace Industries Association (**AIA) represents over 350 aerospace manufacturing companies and their highly-skilled employees**. These companies make the spacecraft, launch vehicles, sensors, and ground support systems employed by NASA, NOAA, the Department of Defense, the National Reconnaissance Office (NRO), other civil, military and intelligence space organizations throughout the globe, and many of the commercial communication satellites. **This industry sustains nearly 3.5 million jobs, including much of the high-technology work that keeps this nation on the cutting edge of science and innovation**. The **US aerospace manufacturing industry remains the single largest contributor to the nation's balance of trade, exporting $89.6 billion and importing $47.5 billion in relevant products, for a net surplus of $42. n1 billion.** US space launch capabilities are essential to our nation's security and its ability to lead in space exploration. To sustain this capability, **a healthy US space launch industrial base is needed; as with aviation, to mitigate cyclical impacts, this industrial base would ideally serve military, civil government and commercial customers**. Unfortunately, in recent years, our nation's space launch industrial base has been struggling to adapt to reduced demand by government - especially due to the end of the Space Shuttle program - and downward pressures on DOD, NASA and NOAA budgets that threaten to exacerbate the risk to the industrial base. Furthermore, international launch providers have been aggressively bidding and winning commercial opportunities, often with the help of their governments in the form of either financial assistance or low cost financing. The sad reality is that the US launch services industry has had a minimal share of the commercial worldwide market for launches; indeed, in 2011, there were NO commercial orbital launches from a US space port. Nonetheless, recent private sector investments by US industry - including AIA member companies ATK, Aerojet, Boeing, Lockheed Martin, Northrop Grumman, Sierra Nevada, Space X and Virgin Galactic as well as others - and supportive policies by government agencies are enabling the emergence of new domestic space launch capabilities. These new systems have the potential to increase the US share of the commercial launch market while also opening up exciting new markets. These companies have made their investments within the existing domestic launch business climate and domestic policy framework, but they face a challenging international competitive environment.

#### Aerospace sector key to stable econ: exported 95.1 billion dollars of exports last year.

(Aerospace Industries Association of America, Inc, premier trade association representing the nation's major aerospace and defense manufacturers. “Aerospace and Defense: The Strength to Lift America”, 2009, <http://www.aia-aerospace.org/assets/wp_strength_aug09.pdf>, Pg. 1)

As the U.S. economy moves through uncertain times, **America’s aerospace industry remains a powerful, reliable engine of employment, innovation, and export income. Aerospace contributed $95.1billion in export sales to America’s economy last year.** Conservatively, **U.S. aerospace sales alone account for 3-5 percent of our country’s gross domestic product, and every aerospace dollar yields an extra $1.50 to $3 in further economic activity. Aerospace products and services are pillars of our nation’s security and competitiveness**. In these challenging times, **the aerospace industry is solidly and reliably contributing strongly to the national economy and the lives of millions of Americans**. We strongly believe that keeping this economic workhorse on track is in America’s best interest, To accomplish this, **our government must develop policies that strengthen the positions of all workers in all industries, especially economic producers like aerospace and defense.** This paper explains what’s at stake, and ways to ensure that a proven economic success continues to endure and thrive.

### Hegemony

#### Aerospace key to our overall leadership.

Christopher E. **Kinne**, United States Air Force Lieutenant Colonel, **11** [Air Force Journal of Logistics, “Preserving the Indus: Is the United States Air Force Responsible?”, http://www.aflma.hq.af.mil/shared/media/document/AFD-101122-031.pdf /Ghosh]

The commission had a great deal to say about these topics. After months of meetings and discussions covering the broad spectrum of topics, the commission published its final 300-plus page report in November 2002. The commission report begins with a positive statement about the US aerospace industry and claims in its opening sentences that “the role of aerospace in establishing America’s global leadership was incontrovertibly proved in the last century...[and] aerospace will be at the core of America’s leadership and strength in the twenty-first century.”12 However, the report also includes nine recommendations that address many concerns of the aerospace industry and the panel members themselves. The commission identified several trends it believed must be corrected to both preserve the US aerospace industry and to improve US national security. Most importantly, the commission observed: “The contributions of aerospace to our global leadership have been so successful that it is assumed US preeminence in aerospace remains assured. Yet the evidence would indicate this to be far from the case.”13

#### Aerospace sector key to US leadership, supports military.

Walker 02, Chairman of the USAI, Robert Walker, et cal, Chair of the Commission on the Future of the United States Aerospace Industry Commissioners, 2002, “Final Report of the Commission on the Future of the United States Aerospace Industry Commissioners,” <http://www.trade.gov/td/aerospace/aerospacecommission/AeroCommissionFinalReport.pdf>

Defending our nation against its enemies is the first and fundamental commitment of the federal govern-ment.2 This translates into two broad missions—Defend America and Project Power—when and where needed. In order to defend America and project power, the nation needs the ability to move manpower, materiel, intelligence information and precision weaponry swiftly to any point around the globe, when needed. This has been, and will continue to be, a mainstay of our national security strategy. The events of September 11, 2001 dramatically demonstrated the extent of our national reliance on aerospace capabilities and related military contribu-tions to homeland security. Combat air patrols swept the skies; satellites supported real-time communica-tions for emergency responders, imagery for recov- ery, and intelligence on terrorist activities; and the security and protection of key government officials was enabled by timely air transport. As recent events in Afghanistan and Kosovo show, the power generated by our nation’s aerospace capabilities is an—and perhaps the—essential ingredient in force projection and expeditionary operations. In both places, at the outset of the crisis, satellites and reconnaissance aircraft, some unmanned, provided critical strategic and tactical intelligence to our national leadership. Space-borne intelligence, com-mand, control and communications assets permitted the rapid targeting of key enemy positions and facil-ities. Airlifters and tankers brought personnel, materiel, and aircraft to critical locations. And aerial bombardment, with precision weapons and cruise missiles, often aided by the Global Positioning System (GPS) and the Predator unmanned vehicle, destroyed enemy forces. Aircraft carriers and their aircraft also played key roles in both conflicts. Today’s military aerospace capabilities are indeed robust, but at significant risk. They rely on platforms and an industrial base—measured in both human capital and physical facilities—that are aging and increasingly inadequate. Consider just a few of the issues: • Much of our capability to defend America and project power depends on satellites. Assured reli-able access to space is a critical enabler of this capa-bility. As recently as 1998, the key to near- and mid-term space access was the Evolved Expendable Launch Vehicle(EELV), a development project of Boeing, Lockheed Martin and the U. S. Air Force. EELV drew primarily on commercial demand to close the business case for two new launchers, with the U.S. government essentially buying launches at the margin. In this model, each company partner made significant investments of corporate funds in vehicle development and infrastructure, reducing the overall need for government investment. Today, however, worldwide demand for commer-cial satellite launch has dropped essentially to nothing—and is not expected to rise for a decade or more—while the number of available launch platforms worldwide has proliferated. Today, therefore, the business case for EELV simply does not close, and reliance on the economics of a com-mercially-driven market is unsustainable. A new strategy for assured access to space must be found. • The U.S. needs unrestricted access to space for civil, commercial, and military applications. Our satellite systems will become increasingly impor- tant to military operations as today’s information revolution, the so-called “revolution in military affairs,” continues, while at the same time satellites will become increasingly vulnerable to attack as the century proceeds.To preserve critical satellite net-works, the nation will almost certainly need the capability to launch replacement satellites quickly after an attack. One of the key enablers for “launch on demand” is reusable space launch, and yet within the last year all work has been stopped on the X-33 and X-34 reusable launch programs • The challenge for the defense industrial base is to have the capability to build the base force struc-ture, support contingency-related surges, provide production capacity that can increase faster than any new emerging global threat can build up its capacity, and provide an “appropriate” return to shareholders. But the motivation of government and industry are different. This is a prime detrac-tion for wanting to form government-industry partnerships. Industry prioritizes investments toward near-term, high-return, and high-dollar programs that make for a sound business case for them. Government, on the other hand, wants to prioritize investment to ensure a continuing capa-bility to meet any new threat to the nation. This need is cyclical and difficult for businesses to sus-tain during periods of government inactiv-ity. Based on the cyclic nature of demand, the increasing cost/complexity of new systems, and the slow pace of defense modernization, aerospace companies are losing market advantages and the sector is contracting. Twenty-two years ago, today’s “Big 5” in aerospace were 75 separate companies, as depicted by the historical chart of industry con-solidation shown in Chapter 7. • Tactical combat aircraft have been a key compo-nent of America’s air forces. Today, three tactical aircraft programs continue: the F/A-18E/F (in production), the F/A-22 (in a late stage of test and evaluation), and the F-35 Joint Strike Fighter (just moving into system design and development). Because of the recentness of these programs, there are robust design teams in existence. But all of the initial design work on all three programs will be completed by 2008. If the nation were to con- clude, as it very well may, that a new manned tac- tical aircraft needs to be fielded in the middle of this century, where will we find the experienced design teams required to design and build it, if the design process is in fact gapped for 20 years or more? • More than half of the aerospace workforce is over the age of 40.4, and the average age of aerospace defense workers is over 50.5Inside the Department of Defense (DoD), a large percent of all scientists and engineers will be retirement eligible by 2005. Given these demographics, there will be an exodus of “corporate knowledge” in the next decade that will be difficult and costly to rebuild once it is lost. There will be a critical need for new engineers, but little new work to mature their practical skill over the next several decades. Further, enrollment in aerospace engineering programs has dropped by 47 percent in the past nine years6, and the interest and national skills in mathematics and science are down. Defense spending on cutting-edge work is at best stable, and commercial aircraft programs are struggling and laying workers off. As the DoD’s recent Space Research and Development (R&D) Industrial Base Study7 concluded, “[s]ustaining a talented workforce of sufficient size and experience remains a long-term issue and is likely to get worse.” In short, the nation needs a plan to attract, train and maintain a skilled, world-class aerospace workforce, but none currently exists. • The current U.S. research, development, test and evaluation (RDT&E) infrastructure has a legacy dating back to either World War II or the expan- sion during the Space Age in the 1960s. It is now suffering significantly from a lack of resources required for modernization. In some cases, our nation’s capabilities have atrophied and we have lost the lead, as with our outdated wind tunnels, where European facilities are now more modern and efficient. In the current climate, there is inad- equate funding to modernize aging government infrastructure or build facilities that would support the development of new transformational capabil- ities, such as wind tunnels needed to design and test new hypersonic vehicles. The aerospace indus-try must have access to appropriate, modern facil- ities to develop, test and evaluate new systems. Throughout this dynamic and challenging environ-ment, one message remains clear: a healthy U.S. aerospace industry is more than a hedge against an uncertain future. It is one of the primary national instruments through which DoD will develop and obtain the superior technologies and capabilities essential to the on-going transformation of the armed forces, thus maintaining our position as the world’s preeminent military power.

#### Aerospace industry key to national security: essential for communication, warning about natural disasters and monitoring facilities and borders.

(Aerospace Industries Association of America, Inc, premier trade association representing the nation's major aerospace and defense manufacturers. “Aerospace and Defense: The Strength to Lift America”, 2009, <http://www.aia-aerospace.org/assets/wp_strength_aug09.pdf>, Pg. 2)

**America’s battle against terrorism is a fundamentally new kind of conflict, in timely information and rapid, coordinated threat responses are critical to success**. Intelligence, surveillance and reconnaissance, along with the tools necessary to integrate and disseminate critical information, are key to anticipating and preventing terrorist attacks. **America’s aerospace and defense companies provide the advanced systems that make this new kind of threat response possible.** When specific targets are identified, more traditional means can be used to neutralize a threat. But America’s military hardware urgently needs modernization. The 1980s defense build-up is now 25 years old, and systems acquired then are in need of replacement. The decade of 2010-19 is the crucial time to reset, recapitalize and modernize our military forces. Not only are many of our systems reaching the end of their designed lives, but America’s military forces are using their equipment at many times the programmed rates in the harsh conditions of combat, wearing out equipment prematurely. Delaying modernization will make it even harder to address and effectively address global threats in the future. Defense modernization is not optional. To defend America’s global interests in 2018 and beyond, our military must be able to project its power globally, around the clock, in any weather. We must be able, for example, to ensure energy supplies can pass through the Straits of Hormuz economy must not be impeded by foreign aggression. When a natural disaster strikes a friendly nation, we must be able to respond quickly. America’s armed forces must be able to meet any and all challenges to our security, safety, freedom and prosperity, as they always have in the past. **America has deferred defense and aerospace modernization to the point that modernization and recapitalization are increasingly lengthy and expensive. The bill is now due. If we want to be able to influence events and protect our interests overseas, we must revitalize the “arsenal of democracy” through consistent defense investment.** At the same time, America must adapt its defenses to new kinds of threats**. A large-scale attack on information networks could pose a serious economic threat, impeding or preventing commerce conducted electronically.** This would affect not only ATM transactions, but commercial and governmental fund transfers and the just-in-time orders on which the manufacturing sector depends. It could even pose threats to Americans’ lives, interrupting the transfer of medical data, disrupting power grids, even disabling emergency communications links. In partnership with the government, our industry is on the forefront of securing these networks and combating cyber attack. The American people also demand better security for the U.S. homeland, from gaining control of our borders to more effective law enforcement and disaster response. **The aerospace industry provides the tools that help different forces and jurisdictions communicate with each other; monitor critical facilities and unpatrolled borders; and give advance warning of natural disasters, among other capabilities.** In many cases, government is the only market for these technologies. Therefore, sound government policy is essential not only to maintain current capabilities, but to ensure that a technology and manufacturing base exists to develop new ones.

#### Aerospace and defense industry account for 3.5 million jobs both directly and indirectly.

**Deloitte ‘12**, (Deloitte, firm of experts in Commercial Aircraft, Business and General Aviation and Defense sectors, “The Aerospace and Defense Industry in the U.S.

A financial and economic impact study” April 2012, <http://www.aia-aerospace.org/assets/deloitte_study_2012.pdf>, pg. 12)

We found that for each direct employee of the aerospace and defense industry, there are between 4.67 and 0.40 additional employees which are indirectly employed, with variability principally due to the employee’s geographic location. The reason for the range of employment multipliers is that each state has its own characteristics of wages and job classifications present in its geographies. Thus we have identified employment multipliers for each state, and developed a weighted average total for the nation as a whole. For the entire nation, we found the average employment multiplier was 2.36. This employment multiplier is a “direct effect” multiplier, which accounts for primary and secondary effect employment associated with the aerospace and defense industry. It does not contemplate “final demand,” or employment associated with tertiary effect employment well beyond the direct effect of this industry’s employment base. Thus, we found that at the national level, indirect and induced employment in the aerospace and defense industry totals 2.48 million jobs. Together with the direct employment described above, grand total employment inclusive of direct and indirect employment is 3.53 million jobs. It should be noted that the multiplier analysis assumes that additional workers taken on by a new business were unemployed before, thereby potentially overstating the total employment of a particular industry. The following chart illustrates our findings of the numbers of indirect employment for each job category. As can be seen from Figure 10, it is not surprising that aerospace parts and products manufacturing has the largest number of indirect and induced employment, at 1.22 million jobs, or almost half of the total industry’s indirect and induced employment. We also conclude that aerospace and defense related services is the second largest employer of indirect and induced jobs, with 719,403 employees, followed by companies that manufacture search, detection, navigation, guidance, aeronautical and nautical systems and instruments, at 356,749 employees.

### STEM

#### Aerospace industry key to creating jobs in STEM field.

**NAW ’11** (National Aerospace Week, website dedicated to supporting the aerospace and defense industry, “Aerospace and Defense: Second to None”, September 11 2011, <http://www.nationalaerospaceweek.org/wp-content/uploads/2010/04/whitepaper.pdf>)

The aerospace and defense industry directly employs approximately 800,000 Americans, located in every state of the union — and supports more than two million jobs in related fields. Our people bring a diverse set of skills and capabilities to their jobs: engineers on the cutting edge of advanced materials, structures and information technology; machinists fabricating complex shapes and structures; and technicians from almost every degree field, testing, applying and integrating the latest technologies. Most of these positions are high-skill, quality jobs, paying above average wages. Production workers average $34.11 an hour; entry-level engineers average more than $50,000 a year, with more senior engineers well into six figures. Many of these jobs are unique and require skills that take time to develop. It takes 10 years for a degreed aerospace engineer to master the intricacies of aerospace vehicle design. Technicians skilled in applying stealth coatings, programmers fluent in satellite-control algorithms, metallurgists expert in high-temperature jet engine design — these skills and many more are very hard to replace. Because many of our programs involve national security, America’s aerospace and defense industry must rely on home-grown talent. Of the positions open in the industry in 2008, 66.5 percent required U.S. citizenship.These jobs can’t be sent overseas. However, the American workforce is in trouble. Recent student assessments show that American youth ranked 21st out of 30 in science literacy and 25th out of 30 in math literacy. Developing the science, technology, engineering and math — the so called STEM skillset — is a priority for our industry. And, because the stakes are so high — the average aerospace worker is 45 years old — the aerospace and defense industry has been a leader in investing in STEM. We’re increasingly working with educators at federal, state and local levels in many ways — adopting schools, sponsoring competitions, providing internships and scholarships and other measures. The challenges extend beyond attracting young people to our industry. We need to better incorporate flexible work styles into our workplace to reduce the voluntary attrition rate of young professionals and increase the representation of women and minorities among our numbers.

#### Investment into Aerospace industry creates technological innovation.

**Deloitte ‘12**, (Deloitte, firm of experts in Commercial Aircraft, Business and General Aviation and Defense sectors, “The Aerospace and Defense Industry in the U.S: A financial and economic impact study”, April 2012, <http://www.aia-aerospace.org/assets/deloitte_study_2012.pdf>, pg. 28)

Advances in science and technology have been the lifeblood of the aerospace and defense industry. Due to the advances in rocket and jet propulsion, navigation, aerodynamics and materials sciences, the U.S was able to land a man on the moon in possibly the most visible and iconic moment in the short history of the industry. Many of the great innovations in science and technology have emanated from the aerospace and defense industry. This can be explained by a number of factors, most significantly the tightly coupled relationship between aerospace and defense suppliers and their customer, particularly the government defense customer. Unlike other supplier/customer relationships, the U.S. government has the resources and capacity to fund the budgets necessary to create scientific and technological advancements. The industry, especially during the Apollo program in the 1960’s, attracted the most talented and skilled engineers to the profession. As computing power has increased exponentially, and the functionality, mission and purpose of the products developed have become significantly more complex, the demands placed on product designers have increased as well. At DARPA, NASA, our nation’s National Laboratories and in the test labs of the commercial companies conducting applied research, significant new technology innovations continue to be created. This is in spite of the lack of “allure” once enjoyed by the industry, perhaps as perceived during the run-up to the moon landing in 1969. As mentioned earlier, and despite the current challenge to attract, recruit, develop and retain the next generation of human capital, the industry continues to create and experiment with technology innovations which form the basis for tomorrow’s game changing inventions. Some of the technologies being developed include micro-UAVs, wireless transmission of high voltage electricity, supersonic missiles, directed energy weapons using high power microwave, personal jets, remote controlled commercial jets, electric powered flight, carbon fiber nanotube construction and remote controlled warfare, to name a few.

### Competitiveness

#### Space systems key to national competitiveness.

(Deloitte, firm of experts in Commercial Aircraft, Business and General Aviation and Defense sectors, “The Aerospace and Defense Industry in the U.S.

A financial and economic impact study” April 2012, <http://www.aia-aerospace.org/assets/deloitte_study_2012.pdf>, pg. 47)

Space systems drive our nation’s competitiveness, economic growth and innovation. U.S. soldiers in the mountains of Afghanistan, farmers, bankers and emergency responders here at home all have a common reliance on a space infrastructure in orbit above the Earth. Everyday activities, taken for granted by many Americans, are supported or even driven by space systems. These systems are hidden to us and rarely noticed unless the services they provide are interrupted. However, the lack of visibility of space systems doesn’t diminish their importance — both our nation’s economy and national security are tied directly to this critical infrastructure. Communications drive today’s commerce, and space systems are a chief global conduit of our nation’s commercial and national security communications. The Internet, e-mail and wireless devices have all become the standard for businesses and recreation. Direct-to-home television and satellite radio have become standard in many American homes and automobiles. These all depend on our satellite communications systems. Similarly, the Global Positioning System, originally designed for military use, is now relied on for banking transactions, ATMs, improved agriculture, air traffic and ground transportation systems and by emergency responders. All of these applications add up to substantial economic activity. Of $214 billion in aerospace industry sales in 2009, direct space system industry sales topped $40 billion. Total direct and indirect global space activity for 2008 was $257 billion. Even harder to quantify — but no less valuable — is the impact that technology spinoffs from space activities bring to our economy. In 2009 alone, NASA entered into more than 250 agreements with private and other external entities for development of dual-use technologies.

# Solvency

### NextGen Good

#### NextGen is the future of air traffic control, and it opens economic potential.

24-08-2007, “Business Case for the Next Generation Air Transport System”, Joint Planning and Development Office (JPDO), <http://www.jpdo.gov/library/nextgen_business_case_ver_1.pdf>

As a catalyst for economic growth and prosperity, our nation’s airspace system must be scalable and adaptable. Merely investing in “technology refresh” programs, patchwork integration of decision support tools, and procedural solutions will not achieve this objective. NextGen represents a complete transformation of our nation’s airspace system to a performance based, scalable, network-enabled system that minimizes operational constraints, providing a cohesive architecture that can adapt to the emerging demand profiles. NextGen will use technologies such as satellite-based navigation, surveillance, and networking, which are flexible and scalable. Investments in new technology provide the means to move from a command and control system, where controller workload is driven by directing aircraft step-by-step, to a more decentralized, user-driven, planned-in-advanced, strategic management concept. The economic impact of the NextGen investment is characterized by a liberalized economy that is driven by free market forces, the desires of the flying public, and industry competition that strives to serve (rather than to survive). NextGen provides a wide range of commercial opportunities for private firms, including small businesses. The projected demand for air travel offers new opportunities for industry to supply the aircraft, avionics, Air Traffic Management (ATM) infrastructure, and services to accommodate this demand. The commercial aviation industry can capitalize on this opportunity by modernizing its fleets to accommodate the emerging travel profiles and desires of the flying public. This dynamic creates opportunities for burgeoning aircraft operations and business models (e.g., VLJs, on-demand air taxi service, super-jumbo aircraft, on-demand point-topoint service) and encourages innovation and healthy competition. Increased opportunities are available for smaller companies that specialize in modeling and simulation, which is used to define system requirements. The output of these early activities will help lay the groundwork for large-scale system requirements to be implemented by major aerospace contractors. Investment opportunities in the early years of this transition will be focused in the avionics and ground equipment required for precision navigation and surveillance. These opportunities will be followed rapidly by systems integration programs, facility consolidation, and ground infrastructure transformation projects. Service firms will also have many opportunities based on training needs for new technologies and contract support needed by those performing the technical work in support of the NextGen effort. The bottom line is that our NAS infrastructure must serve as a catalyst that stimulates these free market dynamics that are essential to a vibrant economy, rather than being a constraint that stifles innovation and competition. NEXTGEN OPERATIONAL ENHANCEMENTS NextGen is an evolutionary transformation of our nation’s air transportation system that integrates a combination of new procedures and advances in the technology to improve service delivery to both civil and military users. The goal of NextGen is to significantly increase the safety, security, capacity, efficiency, and environmental compatibility of air transportation operations; and by doing so, to improve the overall economic well-being of the country. Figure 7 shows an overall operational view of the environment supported by NextGen. With a focus on users, the NextGen is more agile in responding to user needs. Capacity is expanded to meet demand by investing in new infrastructure, shifting NextGen resources to meet demand, implementing more efficient procedures, and minimizing the effects of constraints, such as weather and special use airspace, on overall system capacity. The NextGen system will be nimble enough to adjust cost effectively to varying levels of demand, allowing more creative sharing of airspace capacity for law enforcement, military, commercial, and GA users. Restrictions on access to NextGen resources are limited in both extent and time to those required to address a safety or security need. NextGen is designed to accommodate and address the aviation-related operational and strategic needs of the Department of Defense (DoD) such as global access and compatibility, airspace access for test, and training and readiness. NextGen also integrates homeland defense requirements such as non-cooperative surveillance and network-enabled intelligence integration. Lastly, DoD’s acquisition and resource issues related to aviation, such as fleet certification and equipage, integration, and planning and investment for deployable air traffic control and landing systems, are addressed in NextGen.

#### NextGen Good

**Blakely 6/30/**2011**-** President and CEO of the Aerospace Industries Association

(Marion C., "Second to None - Maintaining U.S. Aerospace Leadership in the 21st Century,” <http://www.aia-aerospace.org/assets/speech_063011.pdf>, June 30)

So from a policy standpoint, how do we tackle our challenge to keep America on top? I’ll offer four steps for your consideration now. • Fully fund NextGen. • Preserve procurement and R&D for the Defense Department and for NASA. • Exploit our breakthroughs in aircraft, integrate unmanned aerial systems in civil airspace and let’s export them! • Press forward with the President’s goal of doubling our exports, and that means export-control reform. First, NextGen. It may seem foolhardy to call for full funding in this budget environment. But when you compare the constraints of our current ATC system with the benefits of NextGen and how quickly we can realize them, I think it’s clear that NextGen is a smart investment. Just recently, American Airlines worked out with the FAA a tailored approach to Miami International for flights from London Heathrow. The Center uplinks the approach two hours prior to landing. The Boeing 777 crew flies a constant descent at idle thrust. Projected savings: 1,000 to 2,000 pounds of fuel, reduced emissions. Plus greater safety. Wow! But just one of many examples. Look -- commercial aviation is back on track today to grow at a steady annual average of 5 percent a year. The reality is our current ATC system can’t handle that growth. If this sounds familiar, it should. Many have sounded this warning. I did so right here before the Aero Club back in 2007, in my last speech as FAA administrator. I said then that we had a solution – NextGen – but that to succeed it needed a few things, including a steady stream of funding and a strong commitment from government and industry. The progress we’ve made in NextGen since 2007 – and we’ve made quite a bit – came despite expiration of FAA reauthorization that same year. Having spent time at the FAA, I can tell you the stop-and-start effect of 20 reauthorization extensions is no way to run a program that should be setting ATC standards for the rest of the world. And, we as an industry have failed to commit as we should have to NextGen. We’ve differed on its benefits and the means of paying for it, particularly the onboard equipment that aircraft will need to use it. Now NextGen, like every other federal program, faces the knife. The President’s 2012 Budget Request proposed funding NextGen at $1.24 billion – an increase of $100 million from the proposed budget for this year. That’s the funding level Congress should approve.

#### NextGen is critical to a successful aerospace industry – government incentives key

Michels 11(Jennifer Michels, writing for Aviation Daily; “Federal Funding Cuts Must Not Hurt NextGen Development, Groups Say”; 2/10/11; Lexis)

Keeping funding intact to further the satellite-based NextGen air traffic control program and providing user incentives were of paramount importance to aviation groups testifying yesterday on FAA funding before the House of Representatives subcommittee on aviation, whose members are seeking guidance on how to cut $1.3 billion from the fiscal 2011 FAA budget. Aerospace Industries Association (AIA) President and CEO Marion Blakey told the panel that estimated costs of $12-15 billion to substantially complete NextGen by 2018 are reasonable; $5-7 billion of that amount would be borne by industry. She cautioned, however, that these cost estimates depend on not delaying NextGen because the faster and more efficiently it is implemented, the lower the costs. To move the program forward, the U.S. must address the issue of who is paying to equip the airlines. «Quite frankly, without equipage, there is no NextGen,» she said. AIA, therefore, recommends equipage funding legislation that «encourages participation of private sector investment capital and gives FAA the authority to enter into government-guaranteed loan arrangements.» She told the panel that this would give airlines and general aviation the incentives to retrofit with new avionics equipment.

#### **NextGen improves the status quo.**

Morrison and Winston 08 – (Steven, Professor and Chair in the Department of Economics at Northeastern University, Editor in Chief of the Journal of Transport Economics and Policy, and Clifford, Senior Fellow of Economic Studies at Brookings, May 2008, “Delayed! U.S. Aviation Infrastructure Policy at a Crossroads”, Brookings, http://www.brookings.edu/research/articles/2008/05/aviation-winston)

Moreover, by the time the FAA’s upgrade is complete, the system will be approaching technological obsolescence. Air travel can become even safer and faster if air traffic control replaces its ground-based radar systems with more accurate and reliable satellite communications. The satellite-based system, known by the acronym ADS-B (automatic dependent surveillance-broadcast) would allow pilots and controllers to be cognizant of the planes in the vicinity as well as their speeds, headings, and flight numbers. Travel times would be reduced because pilots would be able to fly closer together and take the most direct routes to their destination using signals from global position satellites to navigate. Pilots would also be able to operate in cloudy weather much as they do on clear days. Radar is imprecise—it typically updates aircraft positions every 4.8 seconds, while ADS-B does it every second—and forces controllers to separate aircraft by several miles to avoid collisions. The FAA has recently proposed a rule for airlines to equip all aircraft operating in controlled airspace with ADS-B-compatible avionics by 2020. Managing the next generation air traffic control system, referred to as NextGen, would be much simpler and less costly than managing the current system because it would require a few dozen facilities dispersed throughout the country.Much of the current system of radar towers, TRACONS, and en route centers would be eliminated. The remaining facilities would be consolidated and kept as a backup in case the satellite system faltered; they would also be used to help detect planes with defective ADS-B devices and planes whose pilots were trying to avoid detection. Key components of the system are moving forward and being tested in Alaska. The FAA reports that since satellite communications were first deployed in aircraft, the fatality rate for general aviation in Alaska has dropped roughly 40 percent.10 The system’s technology is also being used by UPS at its air cargo hub in Louisville, Kentucky. The FAA plans to switch from today’s radar-based to satellite-based air traffic control, but the timetable, as outlined by the Joint Planning and Developing Office that is coordinating the effort, calls for NextGen to take twenty-five years to complete at a cost estimated to be at least $30 billion.11

#### NextGen makes landing processes more efficient

**Salam, ‘12** (Sakib bin, M.A, Fellow at the Eno Center for Transportation, Former researcher at the Oregon Center for Public Policy, April 2012 “NextGen: Aligning Costs, Benefits, and Political Leadership,” Eno Publication https://www.enotrans.org/store/research-papers/nextgen-aligning-costs-benefits-and-political-leadership)

The FAA maintains that **NextGen will benefit operators by increasing fuel efficiency and reducing congestion**, potentially **saving the industry billions of dollars in the process.** First the direct fuel savings are calculated, followed by the congestion savings to operators. The current aviation system uses radar to scan through an area periodically and reports any nearby operating aircraft to ATC. **The lack of continuous precise detection means that aircrafts must maintain a minimum separation distance of at least five miles in the en route airspace and three miles in the terminal airspace for safety.** Moreover, airplanes are required to fly through predetermined air corridors similar to imaginary highways in the air, limiting en route flexibility, though this is a procedural requirement by the FAA and not necessarily due to the limits of existing technology. **The precision of GPS would allow reduction in the aircraft separation standard, which would greatly enhance air traffic management and flow.** NextGen’s Area Navigation (RNAV) would allow pilots to choose more direct and shorter routes, to their destination, assuming FAA develops appropriate procedures to allow direct navigation. This could result in substantial fuel savings. **Another procedure through which NextGen would save fuel is during aircraft landing.** Under the current system, an aircraft follows a fuel-intensive stepped descending approach where it descends to a lower altitude, levels off to a constant altitude, and then descends further by periodically altering engine power. Optimal Profile Descent **(OPD) would allow the aircraft to glide continuously prior to landing instead of using additional engine power.**9 By reducing fuel consumption, **NextGen could provide relief to the airline industry’s fuel costs, one of the largest components of total operating cost**. Airline profitability in recent years has been stifled in part due to substantial increases in fuel prices: from under $1/gallon between 2000-2004 to over $2.20/gallon in 2010, including record prices of about $3/gallon in 2008 (Figure 8, Appendix A). Prior to jet fuel price hikes starting in 2004, fuel expenses accounted for about a quarter of total operating expenses. Since 2004, about half of total operating expenses are from fuel costs (Figure 1).

#### NextGen key to econ- specifically the aviation industry

Michael P. **Huerta**, Acting FAA Administrator, March **2012**, “NextGen Implementation Plan” http://www.faa.gov/nextgen/implementation/media/NextGen\_Implementation\_Plan\_2012.pdf

NextGen will provide a number of benefits for National Airspace System (NAS) users, our environment and our economy. In fact, **we are already seeing substantial improvements from reduced fuel use, environmental performance and airspace flexibility.** As more NextGen capabilities become available**, those benefits will continue to grow, contributing greatly to the economic vibrancy of aviation in the United States**. Recognizing that NextGen provides improvements is not enough, however. We must also understand that **without NextGen we will not be able to sustain the performance of the U.S. airspace system and our economy will suffer.** To estimate future benefits, we incorporate data from capabilities already implemented in the NAS into our everimproving models. This enables us to refine overall NextGen benefit estimates each year. Our latest estimates show that **by 2020**: NextGen improvements will reduce delays, in the air and on the ground, by 38 percent compared with what would happen if no further NextGen improvements were made beyond what we have done already. **Delay reduction will provide $24 billion in cumulative benefits to aircraft operators, the traveling public and the FAA. We will save 1.4 billion gallons of fuel, reducing carbon dioxide emission by 14 million metric tons, also cumulative.**

#### NextGen solves- laundry list of impacts

**FAA**, Federal Aviation Administration, 3/17/**11,** “Why Nextgen Matters” (<http://www.faa.gov/> nextgen/why\_nextgen\_matters/)

**NextGen is a comprehensive overhaul of our National Airspace System to make air travel more convenient and dependable, while ensuring your flight is as safe, secure and hassle-free as possible.** In a continuous roll-out of improvements and upgrades, the FAA is building the capability to guide and track air traffic more precisely and efficiently to save fuel and reduce noise and pollution. **NextGen is better for our environment, and better for our economy.** NextGen will be a better way of doing business. **Travel will be more predictable because there will be fewer delays**, less time sitting on the ground and holding in the air, with more flexibility to get around weather problems. **NextGen will reduce aviation’s impact on the environment. Flying will be quieter, cleaner and more fuel-efficient.** We’ll use alternative fuels, new equipment and operational procedures, lessening our impact on the climate. More precise flight paths help us limit the amount of noise that communities experience. **NextGen will help us be even more proactive about preventing accidents** with advanced safety management to enable us, with other government agencies and aviation partners, to better predict risks and then identify and resolve hazards. NextGen boils down to getting the right information to the right person at the right time. It will help controllers and operators make better decisions. This data will assist operators in keeping employees and passengers better informed. **Our nation’s economy depends on aviation. NextGen lays a foundation that will continually improve and accommodate future needs of air travel while strengthening the economy with one seamless global sky**. NextGen will help communities make better use of their airports. **More robust airports can help communities attract new jobs, and help current employers expand their businesses**. By doing this the U.S. will strengthen its economy and help communities realize all the benefits that aviation can bring. **NextGen will allow us to meet our increasing national security needs and ensure that travelers benefit from the highest levels of safety.**

### Federal Action Key

#### Federal involvement in NextGen is critical – 5 reasons.

Bourgeois, ’10 (Daniel, Rochester Institute of Technology, “The Next Generation Air Transportation System: An Answer To Solve Airport Efficiency?,” Masters of Science and Public Policy Thesis, 8/9/2010, Proquest)

The Federal Government needs to become involved in the case of implementation of the NextGen system in several ways. First, because if left completely left alone markets only work on market forces. Supply, demand, and the need to increase profits and reduce costs become the most important factors governing CEO’s decisions. Throughout this process of decision making ethics is often lost of foregone in order to expand or continue the status quo. To best show how this mind set was in action in the air transportation system I will show the story of the Comet, the world’s first jet powered airliner. Second, the amount of funding that is needed to implement such a system is not able to be paid by even the largest US companies. The top three, Wal-Mart, Exxon Mobil, and, Chevron combine total profits do not amount to the total price tag of NextGen. Third, fixing the National Aerospace System (NAS) will not only benefit the aviation industry. Fixing this will have spillover effects, both good and bad, onto other industries and boundaries as well. Fourth, civilians are not the only users of the NAS. The government in the form of the military also uses the system for operations. The government is also responsible for setting the laws and regulations that govern how traffic and airspace is used. Fifth, having a standard way of operation is essential for efficient flying so that one aircraft is not given precedence over another solely on business relations. All of these reasons will be explained further in chapter three.

#### Federal government involvement in airports is key to global competitiveness.

Joshua **Schank**, President and CEO of ENO center for transportation, 6-20-**2012**, “The Federal Role in Transportation: Four Ideas for Greater Federal Involvement”, Eno newsletter, <http://www.enotrans.org/eno-brief/the-federal-role-in-transportation-four-ideas-for-greater-federal-involvement>

We often think of **airports** as local economic generators, and they are that, but some also **have substantial national importance**. The aviation network is dependent on large hub airports for the efficient and timely movement of passengers across the country and the world. **A** safe **and reliable aviation network is essential for maintaining our competitiveness in the global economy**. Unfortunately, **we are in danger of losing our edge** in this area **because of congestion**. Successful **NextGen implementation could greatly alleviate the problem**, but even if that happens airlines could take advantage of the new capacity and provide more frequent flights. Once economic growth picks up again we are likely to see airport congestion and delays increase as well. Airports such as Newark, San Francisco, and Chicago O’Hare already have approximately 30-40 percent of their flights delayed. Airports face substantial challenges in trying to tackle this issue on their own. The most widely recommended solution is pricing airport runways by time of day. But this politically unpopular solution has faced substantial opposition from communities such as smaller cities flying into hubs, or general aviation aircraft that are concerned about being effectively priced out of the market for a given airport. **Congested airports** would **have a** much **greater chance of succes**s if they were trying to tackle congestion **in partnership with the federal government** and other local transportation agencies. The federal role could be improved by **dedicating a portion of the** Airport Improvement Program (**AIP**) **to provide grants to airports** in regions **that have a plan to** work collaboratively **to reduce congestion** and overcome some of the political barriers to more effective pricing. **Or the AIP could be retooled to set specific performance goals for airports and rewarding achievement**. However it is done, there is a clear national interest at play here and the federal government needs to be more involved.

#### Feds key to standardization.

Bourgeois, ’10 (Daniel, Rochester Institute of Technology, “The Next Generation Air Transportation System: An Answer To Solve Airport Efficiency?,” Masters of Science and Public Policy Thesis, 8/9/2010, Proquest)

Lastly, there is a standardization problem. This is a problem of favoring one business over the other. If the air transportation was privatized, I already established that one form or even a conglomerate of firms cannot afford to implement the entire NextGen program alone, but what if it was the case that one firm implemented just an airport and the general surrounding areas with NextGen. The single firm would want to get the greatest benefits from the system while at the same time trying to minimize the benefits of others. This turns the situation into more of a competition. For example, say that it is American Airlines that updates the Greater Rochester International Airport with NextGen. What would happen when there is only one active runway and there is an American Airlines jet and a Southwest jet in the pattern, which would be aloud to land first? Furthermore say that the Southwest jet is on time and the American Airlines jet is running late. What jet would be given preference over the other this time? It is extremely likely that the American Airlines jet would be given precedence and would be allowed to land before the Southwest jet would even though it is late. This situation now only further decreases the efficiency of the air traffic by creating two late flights instead of one. How else would Southwest try and keep flights into Rochester on time without competing with American flights? I speculate that it would be something like the cell phone companies have now. If the airlines were left to updating the traffic system they would build their own versions at their own airports. So instead of the state or county owning the airport it would be the aviation firm and there would be several different forms of NextGen just like how each cell phone company uses its own separate different towers. If you wanted to fly you would go to Southwest’s airport or American Airlines airport. This way they would be able to have the maximum benefit from their investment. They would be able to land their flights without having to be in competition with other flights. The same way that the cell phone companies have towers right next to each other. Rather than sharing the same network of communication towers, they all build, maintain, and use their own. Then one airline may outgrow a few others and start consuming other airlines. The single airline may continue to grow and take over all of them, and create a monopoly of the market. They could then take advantage of the customers and would warrant another market failure and need more government involvement to strictly regulate the market or break up the monopoly. In this case it is evident that government involvement of standardization as preventative maintenance that now prevents this problematic situation from ever occurring. On a final note I would like to mention that just because the government is doing something it does not mean that they are the right person for the job. We should take this analytical framework and apply it to the current implementation of the NextGen system. Throughout this section I provided several reasons for why the government was the right person for the job; from the correction and protection of a fragile market to the incredibly high cost of orchestration.

### FAA Good

#### FAA good, their past actions have been effective.

Benjamin Williams, former senior principal of labor relations for American Airlines, Spring 2009, “Playing the Slots: the FAA gambles with its controversial congestion management plan for New York’s busiest airports” Lexis

The FAA's slot auction plan is a rational, market-based method of fairly allocating a scarce resource. The plan skillfully combines the right amount of market-based principles and competition-promoting methods to effectively, if only temporarily, control the airspace congestion exigency facing New York. Given the reality of today's air travel system - and the overcrowding of New York airspace specifically - government action is necessary to provide safe and efficient air access to New York. [\*471] A well-conceived congestion management plan fits the bill. Congestion management, however, should not come at the expense of competition, nor should it induce prohibitively high airfares. The FAA has shown care and great diligence in ensuring that such undesirables do not come to bear. The auction plan, while an admittedly novel use of its authority, is nevertheless legal under the current provisions of the FAA's property management power. The fact that airlines hope to avoid paying for what was previously allocated to them for free is understandable, particularly in today's frosty economic climate. However, the public's interest in safe, reliable travel to and from New York, in a manner that does not create artificially high airfares or an anticompetitive landscape, must prevail. If the courts find that the FAA lacks the authority to implement its slot-auction scheme, then Congress should begin work immediately to bestow express authority upon the FAA to conduct the auctions. The FAA and the DOT should, in turn, continue airspace infrastructural improvements that will, in time, increase air traffic capacity in the New York area and reduce or eliminate the need for controversial slot capping and allocation. In the absence of a sensible fix to the current congestion crisis plaguing the airspace, however, the problem is a brimming cauldron which will soon enough reach another boiling point - as it did in the summer of 2007 - and the travel-weary public will again suffer the stinging brunt of the consequences

#### Federal government is the best method of funding airport infrastructure, states can’t handle the amount needed to spend.

Grant Bennett, August 1999, “Funding Airport Infrastructure: Federal Options for Solvency”, [www.wise-intern.org/journal/1999/bennett99.pdf](http://www.wise-intern.org/journal/1999/bennett99.pdf)

The FAA, through the Airport Improvement Program (AIP), addresses infrastructure needs. The AIP was established to promote and enhance safety, security, capacity, noise mitigation and environmental concerns, and to promote the use of existing infrastructure (i.e., using former military airports for civilian use).22 In general, the AIP receives money from the Aviation Trust Fund to address infrastructure and development needs and concerns at airports. Although the AIP is tasked to support airport infrastructure, the demand for further funding is not met by these federal dollars and the burden is falling on state and regional authorities. The overall capital development by airports in 1998 is shown in the chart below.23

### Build More Aiports Solvency Advocates

#### New infrastructure key, airports have unmet needs and are important to the economy.

Greg Principato, president, Airports Council International-North America, 3-27-2012, “Why we should invest today in 'Airports Inc.'”, The Hill, http://thehill.com/blogs/congress-blog/labor/218525-faa-why-we-should-invest-today-in-airports-inc

With the latest Federal Aviation Administration (FAA) forecast predicting a doubling of passengers and cargo by 2030, the current funding system is not up to the job of ensuring airports will have the infrastructure they need to handle such dramatic increases in traffic. This will have far-reaching consequences. Commercial airports are powerful economic engines, generating 10.5 million jobs and $1.2 trillion for the U.S. economy, according to a new Airports Council International-North America study. Across the country, workers and businesses count on local airports to attract investment and move people and goods around the world. Since 2001, the total number of jobs associated with airports has increased by more than 50 percent. Despite unprecedented growth and clear evidence of the economic benefits of infrastructure investments, airports expect to have $80 billion in unmet needs through 2015 because of the flawed system used to pay for infrastructure projects.

#### Key to competition- we are falling behind our international competitors who know the need for growth is coming.

Greg Principato, president, Airports Council International-North America, 3-27-2012, “Why we should invest today in 'Airports Inc.'”, The Hill, http://thehill.com/blogs/congress-blog/labor/218525-faa-why-we-should-invest-today-in-airports-inc

The result is that in 2010, airports were responsible for about 8 percent of U.S. gross domestic product and 7 percent of all U.S. jobs. By any standard, that is a significant return on investment. Dollar for dollar, commercial airports rate as a remarkably worthwhile infrastructure investment. This is not news to other countries. Our international competitors recognize the benefits of modern airport infrastructure. That’s why they are building and expanding airports at a rapid pace (China alone is now building 12 to 15 new airports per year) to prepare for predicted growth in global travel and business. Unfortunately, we are retreating from these policy and investment decisions at just the wrong time. After five years, 23 extensions and a 14-day shutdown, Congress passed an FAA Reauthorization bill early this year that did not provide for any new funding for airports – the passenger facility charge ceiling was not raised and Airport Improvement Program funding was cut. Yet as the FAA data show, commercial airports need to begin investing now in order to meet the long-term needs of the traveling public over the next two decades. Commercial airports must have new runways and terminals, and aging facilities must be upgraded. This requires long lead times – as much as eight years – to move through the planning and permitting process. And don’t forget that successful implementation of the future air traffic control system known as NextGen depends on airport infrastructure investment as well. We need to grant power to our localities and allow them to raise their own revenues and restore the national investment in aviation infrastructure. The answer to creating another two decades of good news is to ensure that our commercial airports are recognized as America’s economic engine – where job creation takes off.

**We must invest in airport infrastructure: key to economic growth**

**Bowens ’09** (Thella F. Bowens President & CEO San Diego County Regional Airport Authority, “Downturn is Prime Time for Airport Infrastructure Projects”, Friday, 13 Nov 2009, <http://www.cnbc.com/id/33907668/Downturn_is_Prime_Time_for_Airport_Infrastructure_Projects>)

This recession isn’t to be taken lightly. But even though the airline industry is evolving, demand for air travel will rebound and increase. When it does, we will need the infrastructure in place to meet that future demand. That’s why, in July, San Diego International Airport broke ground on a $1 billion improvement project called The Green Build. The project, the largest in the airport’s history, includes 10 new jet gates, a dual-level roadway to separate arriving and departing passengers, expanded parking for aircraft, additional security lanes and new restaurant and shopping options. There’s good reason. An economic downturn is actually a good time for a major capital improvement project. Due to the economic environment, we’re benefiting from decreased construction costs and increased bargaining power. Bids are coming in lower, as companies need the work. It’s a win-win situation – the airport is saving money while giving business to local companies and providing much-needed jobs for area residents. We estimate that at peak construction, The Green Build will provide approximately 1,000 construction-related jobs. But starting construction now is about more than just saving money. **It is absolutely critical that we start now because of the long-term nature of airport projects.** It has taken almost ten years to plan, entitle and begin construction of The Green Build. That is not unusual for major infrastructure projects of this nature. **The bottom line is, we can’t wait for constantly long lines, overcrowded terminals and delayed flights before we decide to move forward with improvements. We need to think ahead, be proactive and maintain high levels of customer service for the traveling public.** **The success of an airport is also critically important to the local economy it serves. Airports are revenue drivers. In San Diego, the airport contributes some $10 billion annually in economic impact to the region. Other, larger airports have an even bigger impact**. **Local businesses and tourism also rely on airports – if the airport suffers, they suffer**. These improvement projects will ensure that airports continue to support the vital industries that matter to their respective regions, that they help grow the economy and continue to bring in much-needed revenue. But construction itself isn’t all that matters. Focusing on efforts to reduce greenhouse gasses and keep the environment front and center are also of utmost importance. The Green Build is pursuing Leadership in Energy and Environmental Design (LEED) silver certification, which will include elements that reduce energy usage and water consumption, as well as other sustainability measures. Airport capital improvement projects must be well planned and environmentally forward-thinking. Other airports are also moving forward. In August, JFK Airport in New York kicked off a $376.3 million construction project, citing economic impact, job creation and a commitment to the community as reasons. Duluth International Airport in Minnesota broke ground on a new terminal, a $65 million project, in September. And Salt Lake City began construction on a public transit line to the airport, estimated to cost $250-290 million. Sounds like a forward-thinking group. But **more airports and transportation authorities need to step up, take advantage of the times, support our economy and consider moving forward with well-planned, environmentally-friendly, job-generating construction projects.** We’re seeing it happen more and more, with Los Angeles, Sacramento and Atlanta also leading the way. Here’s hoping the aviation industry sees more projects like this take flight.

#### New airport projects good.

Matt Molnar, Editor and Director of Technology NYCAviation.com, September 16, 2010, Top 4 Ways to Spend Money on U.S. Air Travel Infrastructure, Popular Mechanics, <http://www.popularmechanics.com/technology/aviation/news/top-4-ways-to-spend-money-on-us-air-travel-infrastructure>

1. Repair RunwaysRelative to the countless passenger complaints about the dreary experiences in many of the nation's airline terminals, the condition of runway surfaces outside those buildings is in surprisingly good shape. The most recent Federal Aviation Administration (FAA) report to Congress regarding the state of aviation infrastructure reveals that 98 percent of the runways at U.S. airports with commercial service were in good or fair condition, soundly exceeding the FAA's goal of 93 percent. But that doesn't mean they'll stay that way. The pounding these surfaces take from aircraft and weather is relentless, and most need to be repaved every two decades or so. Throw on the additional planes needed to accommodate an FAA-forecasted 25-percent increase in commercial air travel over the next ten years, and the good standing of runways can drop quickly. Major airport infrastructure upgrades can take more than a decade to plan and implement, and in many cases, there just isn't room for growth. Keeping working runways in top-notch shape is an obvious but effective way to keep air travel infrastructure up with demand. 2. Lengthen or Widen RunwaysLengthening and widening runways can make way for larger aircraft, helping meet the growing demand for air travel. While some of the airports that would benefit from this most—such as New York's LaGuardia Airport and Midway Airport in Chicago—tend to be constrained by a lack of available land, others could offer more-affordable flights as well as increased access to more airlines. 3. Build New and Improved Taxiways The biggest safety concern on the ground at any airport is the potentially deadly runway incursion, defined by the International Civil Aviation Organization (ICAO) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft." This occurs when, for example, a plane crosses an active runway while another plane is taking off. Many airports are laid out in such a way that planes are forced to taxi across active runways, each time creating not only the possibility of a dangerous incursion but also extending the amount of time spent taxiing and waiting to cross the runway. Los Angeles International Airport recently completed construction of a new taxiway to help alleviate the problem, and other airports would benefit from similar projects. 4. Upgrade Air Traffic Control SystemsThe American Society of Civil Engineers graded the nation's aviation infrastructure a dismal ‚"D" in their 2009 Transportation Infrastructure Fact Sheet, acknowledging that the airports themselves are in decent shape, but lambasting the antiquated air traffic control system failing to keep up with the growing number of flights in U.S. airspace. The FAA has a plan, but it's not cheap, and it will take years to implement. Under development since 2003, NextGen—short for Next Generation Air Transportation System—is the FAA's program to reduce air traffic congestion in the skies and on the ground. Most of NextGen's planned upgrades involve technological advances in the way planes navigate and communicate. Among many other changes, GPS-guidance will allow aircraft to fly quicker, more direct routes than the current ground-based navigation system, while data about speed, altitude and location will be transmitted to air traffic controllers electronically in real time, allowing them to space planes more efficiently than with the current limitations of radar. NextGen is to be implemented in stages between 2012 and 2025 and expected to cost as much $40 billion by the time it is done. Legislation that would raise the FAA fees paid by travelers, airlines and pilots to help finance the program has languished in Congress, so an instant jolt of cash could go a long way toward getting NextGen off the ground

#### Airport investment crucial to sustaining aviation into the future.

Catherine Lang, former director of FAA’s Office of Airport Planning, current FAA deputy associate administrator, April 2012, “Finding the Opportunities Hidden in Uncertainty**”,** Airport Improvement Magazine, http://www.airportimprovement.com/content/story.php?article=00368

Periods of economic uncertainty necessarily prompt greater caution and frugality and can be instructive in sorting out what are our most essential priorities and how to most effectively leverage our investments. All over the country, airports are going through the healthy process of recalibrating development plans and energetically looking for non-aeronautic sources of revenue to fill in the financial valleys. In some cases, airport operators are discovering that major programs previously projected to be bundled and constructed in compressed schedules can be phased and stretched into usable but more affordable blocks, better managing both uncertainty and risk. In other communities, local officials have made the tough decisions to mothball new airports or runways urgently needed five years ago, but are now not needed in the foreseeable future as aviation forecasts have changed. The decade behind us was driven by the goal of adding capacity to meet aggressive forecasts of aviation growth. The decade before us is about ensuring aviation system reliability and efficiency during a period of slower growth. Amid all the uncertainty and belt-tightening, new opportunities will emerge if we continue to look beyond the challenges or setbacks at hand and ask new questions. At FAA, that's just what we're doing: • How do we take safety to the next level when considering the wide range of risk and economic constraints among airports? • How can we assist airports to improve their ability to raise non-aeronautic revenues while preserving long-term aeronautic development? • How can we adjust airport rates and charges policies to expand the financial toolbox, considering the changing dynamics of the airline industry? • How can we harness NextGen technologies to make better use of existing airport infrastructure and offer greater flexibility and affordability on future infrastructure? • How can NextGen technologies make airports safer for operators and better for neighbors? • How do we adjust our planning tools to better manage uncertainty and risk, enabling incremental choices implemented over longer time? • How can we encourage airports to adopt new technologies and alternative fuels that will provide dual benefits to the environment and financial bottom line? • How do we ensure that airports of all sizes have the infrastructure they need to achieve critical public goals and flourish as integral parts of sustainable communities? • How do we improve the connectivity and synergies between various modes of transportation to make limited dollars go farther and advance shared, mutual goals? You get the idea. In tough economic times, collectively we have to ask and probe the value questions. Sustained public investment requires sustained public confidence that we are all responsible stewards of the public trust. To do this well and get it right means we must engage in constant, constructive dialogue and partnership as an aviation community, focusing first on the tactical problems we need to manage today while looking strategically toward the goals we aspire to achieve.

### Interesting Solvency Advocate Ideas

Shannon 10 (Darren Shannon, reporter for Aviation Daily; “AIA Calls For Renewed Focus, Investment In NextGen”; 9/17/10; Lexis)

The U.S. aerospace industry’s chief lobby group is calling for greater government funding and increased industry involvement in the FAA’s Next Generation Air Transport System, or NextGen in a white paper released Sept. 16. Aerospace Industries Association’s action plan comes amid a small, albeit solid, recovery in U.S. commercial aviation that could increase pressure on a domestic air transport system unable to bear the strain of increased capacity. But according to AIA, harmonization of NextGen with other world ATC systems, especially Europe’s, equipage incentives and expanded roles for industry and FAA alike could improve civil aviation’s **efficiency** and environmental impact over the next decade. According to AIA, eight policy initiatives will strengthen NextGen. First, it calls for a «cash for carbon» program, under which the U.S. government issues grants or loans to expedite installation of Automatic Dependent Surveillance-Broadcast equipment on board aircraft in return for emissions guarantees from operators, or additional emissions research from suppliers. "Such a scheme, which could incorporate general aviation through President Barack Obama’s recently announced Transportation Infrastructure Bank, is preferable to carbon emissions trading, which the association says stifles development,» the association added. AIA is also calling for consolidation of FAA facilities as the introduction of new technologies and procedures makes some ground operations redundant, and improved processes for airspace designs, which AIA says is hampered by exhaustive and costly environmental reviews. The U.S. government should also extend the Airport Improvement Program (AIP), currently used to fund construction, to cover approach technologies, such as required navigation performance, area navigation (RNAV), continuous descent arrivals and four-dimensional trajectories. But **the public sector will need industry’s help**, says the trade group, which argues that FAA can perform best if it expands outsourcing through its organization designation authorization (ODA) program to include companies that design and install performance-based navigation (PBN) procedures. Government should also be more involved with industry’s attempts to reduce aviation’s environmental footprint, notably an effort to achieve carbon-neutral growth by 2020, called CNG 2020+, said AIA. To this end, government can continue to make «targeted investments in the areas of aircraft engine design, airframe design and the development of sustainable alternatives to jet fuel.» «The future of civil aviation depends on the entire industry—manufacturers and operators alike—advancing technologies and procedures that will allow aircraft to operate in a more efficient and environmentally friendly way, without compromising the outstanding safety record the industry has built for itself,» AIA argues. «In order to achieve that goal, timely and targeted contributions are required from every stakeholder that benefits directly or indirectly from a safe, efficient and environmentally responsible air transportation system.» This investment can reap greater rewards if the U.S. government pushes for greater harmonization with other air traffic management systems, especially Europe’s Single European Sky Air Traffic Management Research program, or SESAR, while more involvement is required on the international stage, especially in forums such as the United Nation’s International Civil Aviation Organization, to ensure that the development of global environmental standards do not overtly penalize industry. The report’s release comes during National Aerospace Week in the U.S. and coincided with the Senate Aerospace Luncheon, where Transportation Secretary Ray LaHood was key note speaker. Although LaHood had not read the entire report, he confirmed that «NextGen is a big part of the solution [to make] travel safer and alleviate delays.» LaHood also agreed with AIA’s assertion that the country’s aviation industry had to address both congestion and the industry’s environmental impact, but would only say that these issues were part of a larger debate ongoing within the White House, which is now discussing the President’s $50 billion infrastructure plan with Congress and the Office of Management and Budget. However, the DOT secretary during his luncheon speech emphasized that during his Labor Day speech, Obama «talked specifically about NextGen.» «Investment in aviation ? is an investment in America’s future. This is not about election year politics,» added LaHood.

# 2AC

### A2: T – Infrastructure

#### Plane equipage is also transportation infrastructure

Stephen Goldsmith et al, the Daniel Paul Professor of the Practice of Government and the Director of the Innovations in American Government Program at Harvard's Kennedy School of Government. Stephen is also the Chair of the Corporation for National and Community Service. March 2010. “Assuring the Transition to the Next Generation Air Transportation System” http://www.ash.harvard.edu/extension/ash/docs/nextgen.pdf

The historic paradigm—and current practice—says that airlines pay for planes; government pays for infrastructure. Government has always underwritten air traffic control infrastructure—towers and runways, for example—as public benefits. The airlines have always equipped the planes. “Clearly,” one respondent observed, “government needs to pay for the FAA’s infrastructure or the infrastructure that’s necessary to deliver the service.” This includes radars, transmitters, ground infrastructure, and controllers who operate the system. The NextGen paradigm arguably shifts this equation: under NextGen, public benefit infrastructure relocates from the ground to the cockpit. With infrastructure moving to the cockpits, many believe that government should fund the capital improvements. After all, the very virtue of NextGen is that avionics in the aircraft are not just serving the airlines or the airplane operation anymore. They are serving the system—making it more capable and providing benefits across the board. This then became a case of supporting an important public benefit infrastructure that has moved from the ground to the plane. If the airplane is to become a central cog in the air traffic control system, should government not subsidize the required technology on par with subsidies for ground-based air traffic control equipment?

### A2: States CP

#### Federal funding Key: small airports can’t succeed without it.

Grant Bennett, August 1999, “Funding Airport Infrastructure: Federal Options for Solvency”, www.wise-intern.org/journal/1999/bennett99.pdf Increasing PFC’s for a large infrastructure burden could have significant negative effects on the NPIAS and small airports. A Congressional Budget Office report states that large airports could succeed without federal aid if caps on PFC’s were raised or eliminated. This method would leave smaller airports in a difficult spot to finance capital Investment since PFC’s help large airports the most.40 The report states that small airports’ finances are not all the same, but the federal role of funding is still important. The AIP, with a mission complementary and contrasting to PFC’s purpose, stands to help the national aviation system instead of PFC’s helping individual airports. The federal role in funding airport infrastructure needs to be resolved before system philosophies can be debated.

#### The federal government has better control over funding already, keeping it in their hands is the easiest and most efficient solution.

Grant Bennett, August 1999, “Funding Airport Infrastructure: Federal Options for Solvency”, www.wise-intern.org/journal/1999/bennett99.pdf

Allowing Congressional and Presidential control over Aviation Trust Fund tax and fee levels would allow for necessary funding to be brought into the system, especially if current levels in the Trust Fund are not enough to cover the costs. The federal government could then have oversight in developing our nation’s airports without letting political concerns withhold funding from vital areas. Clearly this is a far off thought from the current state of affairs, but the federal government should have oversight of the national airport system.

The federal government already oversees control of these taxes, so changing the levels could be done with little hassle. This measure would clearly address the problems at hand, but a link between infrastructure need and federal funding is necessary first.

#### State CP Fail

Cooper, ’12 (Donna, Senior Fellow with the Economic Policy Team at the Center for American Progress, “Meeting the Infrastructure Imperative: An Affordable Plan to Put Americans Back to Work Rebuilding Our Nation’s Infrastructure,” February 2012)

Some members of Congress are calling for the federal role in transportation to be “devolved” to the states. This is a bad idea. States already are responsible for the oversight of the federal surface-transportation funds. They oversee the local planning process and have the authority to decide how their federal highway, transit, and specialized surface transportation funds are spent. One obvious consequence of devolving federal highway and transit programs to the states would be shifting the political consequences of higher gas taxes or insufficient transportation funding entirely onto state elected officials. More importantly, our country would no longer have a single entity responsible for ensuring a highly functional interstate highway system and national safety standard, all of which are essential for goods movement, commuting, national secu- rity, and leisure travel. But states do need a more rational federal structure. The Department of Transportation alone administers more than 100 federal programs for transportation, and state and local infrastructure agencies typically tap more than one federal program for large-scale projects.158 Under the current system, it’s a Herculean feat for state or local agencies to line up federal grants, loans, and tax benefits in a timely manner so that infrastructure projects can proceed.

### A2: Privatization CP

#### The FAA and federal government are key to airline regulation.

Jarret Jackson, BS in policy analysis and management from Cornell and writer for the Georgetown Public Policy review, 2009, “MARKET FAILURES, GOVERNMENT SOLUTION? THE PROPER ROLE OF GOVERNMENT IN THE ECONOMY: THE UNIQUE ROLE OF GOVERNMENT IN THE AVIATION INDUSTRY,” Georgetown Public Policy Review, <https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=14+Geo.+Public+Pol'y+Rev.+43&srctype=smi&srcid=3B15&key=69d421f34ddc7b18d6ddc6bb0c0478c4>

The role of the FAA is distinct from that of other regulators because of the unique issues involving airlines. In the case of the railroad industry, the volume of traffic and the movement of trains on tracks make safety and efficiency easier to manage. The credit crisis that is currently plaguing the financial services industry underlines the need for effective regulation to protect consumers. But regulation in that case serves to improve financial security. The FANs concern is primarily the physical safety of consumers. Like the FAA, the FDA and CPSC set standards to ensure consumer safety. Yet the issues of safety addressed by those agencies are related to manufacturing and can be attributed to specific goods and processes that can be reactively adjusted. The FAA, however, must act proactively to prevent problems that affect the safety of airline passengers, which changes the nature of how the industry is regulated. In sum, the role of the FAA is unique among regulators. Given the requirements to protect consumers and efficiently operate the national airspace, the FAA is able to be most effective through greater interaction with the industry. Perhaps this model of cooperation with the regulator is something that might benefit other industries.

#### The government is still necessary in airline regulation – their railroad example is drastically different.

Jarret Jackson, BS in policy analysis and management from Cornell and writer for the Georgetown Public Policy review, 2009, “MARKET FAILURES, GOVERNMENT SOLUTION? THE PROPER ROLE OF GOVERNMENT IN THE ECONOMY: THE UNIQUE ROLE OF GOVERNMENT IN THE AVIATION INDUSTRY,” Georgetown Public Policy Review, <https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=14+Geo.+Public+Pol'y+Rev.+43&srctype=smi&srcid=3B15&key=69d421f34ddc7b18d6ddc6bb0c0478c4>

Shortly after deregulation of the airline industry began, the Staggers Rail Act of 1980 was passed to deregulate the railroad industry. The act granted the railroads with greater freedom to set their own prices, streamlined merger timetables, expedited the process of line abandonment and allowed for confidential contracts with shippers (Northeast Midwest Institute 2008). It is generally believed that deregulation of the railroads has led to significant improvements in economic welfare (Ellig 2002, 143). Rates have gone down and service has improved. The Surface Transportation Board (STB) (the successor agency of the Interstate Commerce Commission) has jurisdiction over railroad's rate and service issues and transactions involving rail restructuring (STB 2008). However, the agency is significantly less involved in safety and operational issues than the FAA. The STB is primarily focused on consumer protection. [\*51] For example, in January 2007, as fuel prices were on the rise, the STB banned "excessive fuel surcharges", instead requiring that railroads "link...surcharges directly with the actual fuel costs for each rail shipment" (The Associated Press, January 26, 2007). This ruling does not prevent railroads from raising prices or charging a fuel surcharge as gas prices increase. However, it did prohibit calculating fuel costs into price hikes if the shipment costs already included other fuel surcharges (The Associated Press, January 26, 2007). Without question, the railroad industry is significantly different from the airline industry. The track system alone changes the nature of the need for government involvement. In particular, there are fewer risks to safety, which may be reason enough for less government involvement in operations.

#### Deregulation of the airline industry changed little. If anything, it made it slightly worse.

Jarret Jackson, BS in policy analysis and management from Cornell and writer for the Georgetown Public Policy review, 2009, “MARKET FAILURES, GOVERNMENT SOLUTION? THE PROPER ROLE OF GOVERNMENT IN THE ECONOMY: THE UNIQUE ROLE OF GOVERNMENT IN THE AVIATION INDUSTRY,” Georgetown Public Policy Review, <https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=14+Geo.+Public+Pol'y+Rev.+43&srctype=smi&srcid=3B15&key=69d421f34ddc7b18d6ddc6bb0c0478c4>

The purpose of the ADA was to introduce competitive market forces into the airline industry, allowing airlines greater flexibility in setting fares, routes and schedules. The newly created FAA was responsible for ensuring the safety of passengers. But "there was to be maximum reliance on competition to bring about the objectives of efficiency, innovation, low prices and price/service options while still providing the needed air transportation system" (Brenner et al 1985). In particular, the act states that the FAA remains responsible for issues of safety and for ensuring the availability of a variety of appropriate, efficient and affordable services from airlines. The act stresses the importance of heavy reliance on the competitive markets in order to provide consumers with an air transportation system and allow efficient and well-managed airline carriers to earn profits. This includs encouraging new carriers to enter the market and current carriers to expand their services. Furthermore, the act requires that actions be taken to avoid any practices that would inhibit the free market, including monopolization. [\*45] In an effort to continue a degree of universal service, the act also requires "maintenance of a comprehensive and convenient system of continuous scheduled interstate and overseas airline services for small communities and for isolated areas in the United States with direct Federal assistance where appropriate." The act gives the FAA responsibility for "the encouragement, development, and maintenance of an air transportation system relying on actual and potential competition to provide efficiency, innovation, and low prices, and to determine the variety, quality, and price of air transportation services." In some ways, requiring the FAA to use market forces to encourage efficiency seems to counter its stated mission: "to provide the safest, most efficient aerospace system in the world" (FAA 2008). This will be explored further with the discussion of slot auctions. Although the success of ADA continues to be debated, there have been measurable costs and benefits to both airlines and consumers. Following deregulation, fares have gone down. "Between 1976 and 1990 average yields per passenger mile--the average of the fares that passengers actually paid--declined 30 percent in real, inflation-adjusted terms...the savings to travelers have been in the range of $ 5 billion to $ 10 billion per year" (Library of Economics and Liberty 2008). However, rising fuel costs through the summer of 2008 caused many airlines to increase their fares, which might not have been possible under greater regulation. "Jet fuel costs--up more than 80 percent over [2007]--are forcing the airlines to sharply raise some fares, and reinvent themselves to appeal to not just bargain hunters, but also the briefcase crowd that generally pays more for last-minute tickets" (The New York Times, June 20, 2008). Airline productivity has increased. Aircraft today have significantly more seats, and loads (the percent of seats that are full) were up to 79.9% on average for the 12 months ended May 2008 (Bureau of Transportation Statistics 2008). By contrast, loads averaged "52.6 percent in the ten years before 1978." (Library of Economics and Liberty 2008). Much of this success is tied to the rise of discount fares and an overall increase in air travel. "Decontrol of prices allowed airlines to fill their planes by offering large numbers of heavily discounted fares for seats that would otherwise go unused. Decontrol of routes permitted them to plan their operations as they [\*46] see fit. And deregulation has compelled improvements in efficiency through the intense pressures of the price competition it unleashed" (Library of Economics and Liberty 2008). Deregulation offered airlines the opportunity to better manage their fuel, fleet, route structure, labor productivity, and corporate culture, and marketing and finance, yet most airlines have not taken advantage of this (Harvard Business School 1984). Fuel costs in 1979 were a significant expense to airlines--25% of total operating costs (Harvard Business School 1984). This is an issue that continues to plague the industry. As mentioned above, fuel costs rose for much of 2008, up 80% from June 2007 to June 2008, and were a considerable percentage of costs (The New York Times, June 20, 2008). For U.S. Airways, for example, in the year 2008, fuel represented 39 percent of their total expenses, whereas in 2000, fuel represented only 14 percent of the airline's total expenses. (Regional Aviation News, June 16, 2008). Yet the structure of bookings that allow passengers to book flights as far as one year before the flight departs makes responding to changing market conditions difficult. As a result, airlines are beginning to find new ways to increase per passenger revenue. In April 2008, five airlines began charging passengers $ 25 to check a second bag. Some airlines added even steeper charges for additional checked baggage. US Airways, American and United Airlines announced that travelers would pay $ 15 to check their first suitcase (The New York Times, June 20, 2008). In terms of fleet, Southwest Airlines continues to prove to the industry the benefits of a fleet with a single aircraft type. This continuity has helped the airline achieve faster turnaround times and reduced labor and training costs. However, most airlines have not followed Southwest's lead, believing that the advantages of a variety of aircraft types outweigh the additional costs. There are some anti-competitive practices that have persisted since deregulation, including preferential arrangements between certain airlines and the airports wher they base their hubs, and restrictions that prevent foreign carriers from flying domestic routes (Library of Economics and Liberty, 2008). As such, it seems that while there have been changes in the past 30 years to the airline industry, the key issues (such as fuel costs, fleet, labor productivity, and route structure) remain the same.

#### Privatizing Airports Has no Effect on efficiency

Bijan Vasigh and Clara Vydyanath, Authors of journal for transportation literature for the embry-riddle aeronaut university Jan 2012, 294-826-1-PB.pdf

Subsequent studies that have incorporated a three-tier ownership system (100% public, private-public, or 100% private) have found similarly results. Among these, are Oum, Yu and Fu (2003) and Lin and Hong (2006). Oum et al. (2003) analyze 50 airports in the Asian Pacific, European and North American regions using a three-tier ownership system. Outputs include the number of passengers, cargo movements and non-aeronautical revenue. The results show no significant difference between airport ownership categories. Lin and Hing (2006) use a sample of 20 airports and a three level ownership structure (private, mixed private-public, and public) to analyze the effects of ownership on performance.' The methodology is based on DEA, with the number of passengers and the volume of cargo movements as output. The result show that private airports are no more efficient than mixed private-public or full publicly owned.

#### Privatization paired with federal interaction is best

Bijan Vasigh and Clara Vydyanath, Authors of journal for transportation literature for the embry-riddle aeronaut university ,Jan 2012, 294-826-1-PB.pdf

Studies conducted on airports have shown different results as to whether privatization increased efficiency, productivity and/or consumer welfare. The results show, that a mixture of private and public ownership, with strong intra-port competition, leads to the best results. The presence of strong regional effects, the relatively short history of privatization, the necessity for regulation given natural monopoly tendencies, and the impact of external factors such as economic downturns, the 2009 H1N1 flu pandemic, and the financial crisis of 2007, have significantly complicated the analysis. Further complications are added by the long-term nature of capital investments. For example, construction of a new runway may take several years, and the presence of very high capital expenditures during this period, complicate operational inefficiency.' Privatization paired with federal interaction is best

#### A permutation of privatization and state ownership is optimal

Bijan Vasigh and Clara Vydyanath, Authors of journal for transportation literature for the embry-riddle aeronaut university Jan 2012, mixed 294-826-1-PB.pdf

The results obtained in this paper indicate that ownership forms are less important than competitiveness and corporatization at the management level. In other words, ownership structures do not appear to influence airport efficiency to the same extent that management does. The same model, when implemented by Tongzon and Heng (2005) reveals an inverse U-shaped curve for privatization, with state-owned and completely privately owned seaports being systematically more inefficient than partially privatized seaports. We believe this is because the role of airport authorities in the United States is unique, and this ownership form does not existfor seaports. State-owned seaports tend to behave like other state-owned infrastructure and exhibit systematic inefficiency. However, U.S. airport authorities behave more like private enterprises, with a great degree of competition, which exhibit systematic efficiency. We believe this is driven by two characteristics of airport regions in the United States The sheer number of different airports in a given airport region, and the fiscal independence of government-owned airport authorities. Due to the number commercial airports in the United States, airlines and passengers have a wide variety of feasible choices when making transportation decisions. Airport authorities are owned by local governments but are managed with the principle of fiscal independence from state government funds, which sets up profit maximizing (or at the very least, cost-covering) incentives very similar to private enterprises.

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## Case Neg

### Solvency Frontline

#### 1. Only focusing on NextGen INCREASES congestion because it doesn’t expand capacity or give airports flexibility.

Barkowski, ’10 (Justin T. "Managing Air Traffic Congestion Through the Next Generation Air Transportation System: Satellite- Based Technology, Trajectories, and - Privatization?," Pepperdine Law Review: Vol. 37: Iss. 1, Article 3. <http://digitalcommons.pepperdine.edu/plr/vol37/iss1/3>)

 [\*250] The fundamental goal of NextGen is to "establish an agile air traffic system that accommodates future requirements and readily responds to shifts in demand from all users." n8 As such, the system will be designed specifically to "respond to market elasticity, having the flexibility to deliver capacity and efficiency improvements, and ensuring that equipment and personnel are able to support a wide range and number of operations tailored to customer needs." n9 Undoubtedly the technology needed to incorporate such a system is currently available. n10 But NextGen leaves one significant issue unaddressed, namely, the lack of governmental accountability needed to keep pace with rapidly changing technology. n11 As one author noted, the [\*251] FAA "develops capacity in terms of a 10-year time frame," while the airlines and consumers generating the demand "are changing decisions every three months." n12 Forming an increasingly accountable FAA to engineer a successful transition to NextGen, however, would only address part of the air traffic congestion issue, leaving government-operated airports to continue mismanaging access to the national airspace system. Given the relatively fixed amount of airport facilities available, n13 the fact that the demand from air carriers has continuously outpaced supply has resulted in significant flight delays that have rippled throughout the country. n14 Yet Congress continues to impose regulatory control over municipally-owned airports across the country, forcing them to provide non-discriminatory access to the airfield. n15 With the non-discriminatory access [\*252] requirement, airports are not allowed to use pricing as a method of allocating ground facilities, which, in turn, renders them unable to control access to the national airspace system. n16 Solely focusing on NextGen and expanding airspace capacity without corresponding corrections in these demand-management policies will only provide greater incentive for airlines to over-schedule in order to fill in the marginal increases in capacity. To avoid this escalation of congestion, the socially efficient solution is for local governments to transfer these "high-density airports" to the private sector on the condition that private owners focus on eliminating congestion. n17 The societal gains from eliminating congestion would outweigh any societal costs incurred from potential airport discrimination against airlines. n18 As a result, airport privatization may be the proper catalyst for exploiting the full potential of NextGen.

#### 2. NextGen increases dependence on GPS – this risks GPS collapse and intentional jamming attacks.

John **Sheridan, ‘12** (staff writer at ainonline)( http://www.ainonline.com/aviation-news/aviation-international-news/2012-04-02/rise-gps-interference-raises-concerns-nextgen)

Today, most of us would probably rate cellphones, ATMs and the Internet as the three most useful modern gadgets we use regularly. We likely wouldn’t rank GPS up there, and maybe not even in the top 10. Yet without GPS, those three wouldn’t work too well, if at all, and neither would a host of other things that we depend on (reliable electrical power; banking systems; national and worldwide telecommunications, including air traffic control; and car navigation, to name a few). And with NextGen slowly approaching, aviation’s dependence on GPS will grow exponentially. But their dependability is not assured for the future. Considering their importance, the GPS satellite signals are improbably weak: someone compared them to detecting a Christmas tree light bulb in New York, when viewed from Los Angeles. The reason is that in the 1970s USAF developers had classified technology that could hide them from adversary detection deep in the atmospheric “noise.” But parallel civil technology eventually caught up and public GPS access was granted in 1983. On Sept. 10, 2001, the Department of Transportation warned that the weakness of the signals made them vulnerable to deliberate jamming. Events the very next day demonstrated the reality of ill intent. Today, the worldwide GPS market and the system’s applications have expanded beyond anyone’s imagination, with the number of receivers in use estimated to be “close to half a billion.” Accompanying the rise in GPS usage have been ever increasing reports of signal interference and jamming. One UK report stated that over a six-month period in 2011, twenty dedicated GPS signal monitors spread across the country had recorded between 50 and 450 deliberate interference events *every day*. Of these, almost all were attributed to small, low-powered devices selling for around $50 on the Internet since, as in the U.S., GPS jammers are illegal in the UK. Nevertheless, several thousand are reportedly in use in Britain and more than100,000 in the U.S., their main purpose being to [defeat GPS tracking systems installed in trucks by their company owners](http://www.ainonline.com/aviation-news/aviation-international-news/2011-01-27/gpscellphone-jammers-also-snarl-aviation-navigation-systems). But their numbers are said to be steadily increasing and, unfortunately, their low power levels make them difficult to detect, especially in moving traffic. Last November, the Department of Homeland Security reportedly introduced a U.S. nationwide GPS monitoring project called Patriot Watch, similar to the system in the UK.What does GPS jamming mean for aviation? Because the most common jammers today are low powered, their main threat is to lower-altitude aircraft on a GPS, GPS/Waas or GPS/RNP approach and on the airport surface, where GPS-driven airport maps are being used. **AIN** reported last year on the collateral jamming of the ground-based augmentation system (GBAS) at Newark, which suffered random and unpredictable shutdowns that were eventually found to be caused by jammers in trucks travelling along the nearby New Jersey Turnpike. The only cure for the problem was to move the four GBAS antennas farther infield to a point out of range of the jammers. But this is unlikely to be a permanent cure. Inevitably, under a “bigger is better” mindset, some buyers will feel more protected with a more powerful, longer-range jammer, and these too are now available on the Internet. This of course raises the threat level since, depending on their antenna configuration, they increase the likelihood of higher-altitude interference, with a consequent impact on ADS-B.Unquestionably, GPS jamming will increase and, as we move further into a satellite-based NextGen environment, its interference will become more noticeable. This raises two key questions (not only for NextGen but also for all other critical GPS applications). For aviation, will GPS reach the point of no longer being totally dependable? Second, if so, are the backup systems proposed for NextGen adequate for the long-term future?

#### **3. The aff furthers bureaucratizes aviation – ensures inefficiencies.**

Morrison and Winston 08 – (Steven, Professor and Chair in the Department of Economics at Northeastern University, Editor in Chief of the Journal of Transport Economics and Policy, and Clifford, Senior Fellow of Economic Studies at Brookings, May 2008, “Delayed! U.S. Aviation Infrastructure Policy at a Crossroads”, Brookings, http://www.brookings.edu/research/articles/2008/05/aviation-winston)

Currently responsibility for basic aeronautical services in the United States—including terminals, gates, taxiing areas, and runways—lies with local governments that operate airports either directly, as in the case of small airports, or through airport authorities, as in the case of medium and large airports. The Transportation Security Administration (TSA) is responsible for airport security, and the FAA provides air traffic control. In 2004 the FAA’s air traffic control function was reorganized into the Air Traffic Organization (ATO), a “performance-based” organization. Nonetheless, the ATO remains an agency within a civil aviation administration that is funded by annual budget appropriations from Congress. Congress has repeatedly criticized the FAA for the excessive delays and cost overruns it has experienced in trying to develop a technologically up-to-date air traffic control system that would reduce U.S. airborne delays by expanding usable airspace capacity. Some members of Congress have characterized the TSA as a bloated bureaucracy whose screening tasks could be performed better and more efficiently by private screeners. Congress has not singled out airport authorities for criticism, but before September 11,Rudolph Giuliani, then the mayor of New York City, advocated privatization of the airports managed by the Port Authority of New York and New Jersey. Despite complaints by elected officials and an increasingly frustrated flying public, delays seem to be an inescapable part of air travel. Finally, in September 2007, President George W. Bush invited aviation officials and U.S. Department of Transportation secretary Mary Peters to the Oval Office to discuss solutions to air travel delays, proclaiming, “We’ve got a problem, we understand there’s a problem, and we’re going to address the problem.” In our view, excessive travel delays are—to a significant extent—a manifestation of the failure of publicly owned and managed airports and air traffic control to adopt policies and introduce innovations that could greatly improve the efficiency of the U.S. air transportation system. Given little economic incentive and saddled with institutional and political constraints, major airports and the air traffic control system have not exhibited any marked improvement in their performance for decades despite repeated assurances that they would do so, and they have provided little reason for policymakers and travelers to expect such improvements to ever occur. Some observers believe that delays would be reduced if the nation invested more money in airports and air traffic control. However, the returns from such spending would be compromised by the system’s vast inefficiencies. Thus, the key to reducing delays efficiently is to rid the system of its major inefficiencies. We believe that can be accomplished only by privatizing the nation’s aviation infrastructure. The aim of this chapter is to argue that by operating in a less constrained and a more competitive environment, privatized airports and air traffic control would have the potential to improve service to travelers and reduce the cost of carrier operations while maintaining the nation’s outstanding record of air travel safety in the face of an ever greater volume of traffic. In addition, privatized airports could facilitate greater competition among airlines that would lead to lower fares. We recognize that privatization of public aviation facilities does not guarantee that monopolies will not be formed. Thus,we call for carefully designed privatization experiments to preview the extent of competition that is likely to develop among airports and the resulting economic effects and to alleviate concerns that public airports will be replaced by private monopoly airports. We also recognize that privatization faces strong resistance from entrenched interests who benefit from current policies. At the same time, as indicated by President Bush’s recent attention to the problem, policymakers cannot ignore the political costs of periodic crises related to increasing travel delays. It is our view that the impasse in reforming aviation infrastructure policy would be broken if experiments reveal that the flying public would realize large benefits from privatization.

#### 4. Nextgen means training gap in ATC, turns case.

David Perera, executive editor of the FierceMarkets Government Group, 1-30-2012, “Air traffic control training gaps will be exacerbated by NextGen, says OIG”, Fierce Government IT, <http://www.fiercegovernmentit.com/story/air-traffic-control-training-gaps-will-be-exacerbated-nextgen-says-oig/2012-01-30>.

Auditors say critical facilities lack training support and places the blame largely on training slot methodology used by the Air Traffic Control Optimum Training Solution program office. The FAA awarded in 2008 an at least $437 million contract to Raytheon to manage ATCOTS. Auditors in the past have suggested that Raytheon's staffing methodology may need examination, and in this report they point to a training resource allocation tool launched by the ATCOTS program office in February 2011. As a result of it, the Dallas TRACON saw its training capacity go down from two shifts a day to one after the ATCOTS program office reduced the number of hours provided by contract instructors by 20 percent, the report says. "We also found critical facilities that have a high volume of trainees but not enough contract instructors to take full advantage of training simulators," auditors add. The FAA training mission will become only more challenging as it begins to implement NextGen, since the entire controller workforce will require re-training to utilize it, the report says. At critical facilities where large numbers of new hires are also being trained to replace retirees, simultaneously retraining veterans "will be particularly difficult."

#### **5. Airport expansion does not solve congestion.**

Jeffrey Cohen. [Federal Reserve Bank of St. Louis] Coughlin Cletus. “Economics of Airport Expansion”. Federal Reserve Bank of St. Louis: May 2003. Web. Accessed June 19, 2012. http://research.stlouisfed.org/publications/review/03/05/Cohen\_Coughlin.pdf

A congestion tax, however, is not the only policy option. An alternative policy, shown in Figure 3, is to expand the airport at which the congestion is present. Airport expansion shifts the private and social marginal cost curves rightward. In addition, the congestion “threshold” occurs at a larger number of passenger trips, increasing from QT to QTX. Whether congestion persists depends not only on the size of the expansion, but also on the elasticity of air travel demand.12 If travel demand is relatively inelastic, then it is likely that the expansion leads to a new equilibrium level of passenger trips, QI , below the congestion threshold. In this hypothetical example, the relatively inelastic demand implies that consumers of air travel are not very responsive to the lower cost of travel, so quantity demanded does not increase by enough to create additional congestion. If demand is relatively elastic, however, then it is possible that the new equilibrium, QE , will occur above the congestion threshold, and the social marginal cost will be greater than the private marginal cost. Because consumers are relatively responsive to changes in the trip cost, the expansion leads to a relatively large increase in the quantity of passenger trips demanded; thus, congestion persists.13

### XTN #1 – NextGen Fails

#### NextGen fails – lack of accountability and no incentives for equipage overwhelm solvency.

Barkowski, ’10 (Justin T. "Managing Air Traffic Congestion Through the Next Generation Air Transportation System: Satellite- Based Technology, Trajectories, and - Privatization?," Pepperdine Law Review: Vol. 37: Iss. 1, Article 3. <http://digitalcommons.pepperdine.edu/plr/vol37/iss1/3>)

The nation's air transportation system is nearing insolvency, and with air traffic expected to double or triple in the next fifteen years, the government's attempts to create a more efficient system will have increasing impact. The FAA and local governments' bifurcated approaches in managing airport congestion and fueling competition in the aviation industry have had minimal effect. Congress's ambitious efforts to assist through the implementation of NextGen will promulgate much-needed capacity in many of the nation's airports. However, the FAA's liability-escape maneuvers - throwing the "discretionary function" flag - do not maximize the potential [\*335] safety and flexibility needed throughout the airspace system. Without accountability reform within the FAA and ATO, the revolutionary system will fall behind immediately after it clears the starting gates. Even with the proper adjustments to NextGen, a system with the cost of nearly twenty billion dollars in the end still misses the mark in dealing with the core problem: congestion at high-density airports. If the current airport policies are not addressed, the multi-billion dollar taxpayer investment will fail to solve those costly and irritating flight delays. As the social costs proliferate from misallocating valuable airport facilities, a relatively unknown and underutilized privatization pilot program becomes more appealing - and against much opposition, necessary.

### XTN #2 – Cyber Jamming

#### NextGen can’t protect against certain software hacks

Robert G. Wood, Master of Science in Information Technology, May 2009, A SECURITY RISK ANALYSIS OF THE DATA COMMUNICATIONS NETWORK PROPOSED IN THE NEXTGEN AIR TRAFFIC CONTROL SYSTEM, Submitted to the Faculty of the Graduate College of Oklahoma State University, <http://digital.library.okstate.edu/etd/Wood_okstate_0664D_10245.pdf>

The ADS-B portion of the proposed NextGen Active Network has both strong points and weaknesses when faced with common computer network threats. When faced with a Denial of Service attack, the UAT data link is fairly robust and more difficult to overrun, however, the 1090-ES data link contains not only ADS-B but other transponder traffic including Mode S and legacy ATCRBS traffic. In areas of high traffic density, the number of messages received on the 1090 MHz frequency may be more than the total bandwidth available and packet loss will occur. The Denial of Service attack could also be induced through malicious interference which would effectively disable ADS-B in localized vicinity of the attack. NextGen design specifications call for the 1090-ES data link to be used primarily by 19-seat or larger transport aircraft, and/or aircraft operating at or above 24,000 feet. The weakest data link in this case is supporting aircraft with the largest payloads and therefore the highest need for safety. Session Hijacking is much more difficult to induce in an all-RF environment such as the airborne portion of the NextGen Active Network. None of the engineers interviewed could determine a reasonable method to induce this effect because the transmissions on ADS-B are not connection or session based. There is a risk that ground communications which traverse computer networks could be effected, however, they are outside of the scope of this study. The concept of Network Eavesdropping takes on a life of its own in the NextGen Active Network. While computer networks are designed to insure that only the intended recipient of a message is able to receive and interpret it, the ADS-B network is designed to insure that all ADS-B equipped vehicles are able to receive and interpret all messages. ￼86 The proposed design has the unfortunate side effect of also allowing reception of all ADS-B traffic by anyone with an appropriate radio and decoder. The raging debate in the aviation community surrounds the ability of the public to obtain ADS-B data and know all aircraft tracks and destinations. This becomes a sensitive issue with general aviation aircraft used for personal or corporate travel. Several participants discussed the use of anonymous mode, which is only presently available on the UAT data link, to allow individual aircraft to transmit a VFR-like code rather than their 24-bit ICAO designator which may be mapped back to the aircraft’s tail number. This is not truly a security issue, but an issue of privacy.

### XTN #3 – Bureaucracy

#### FAA increases regulation to hamper effective solutions.

Morrison and Winston 08 – (Steven, Professor and Chair in the Department of Economics at Northeastern University, Editor in Chief of the Journal of Transport Economics and Policy, and Clifford, Senior Fellow of Economic Studies at Brookings, May 2008, “Delayed! U.S. Aviation Infrastructure Policy at a Crossroads”, Brookings, http://www.brookings.edu/research/articles/2008/05/aviation-winston)

Instead of using the price mechanism at congested airports to curb delays efficiently, the FAA has instituted arbitrary quantity controls, namely, takeoff and landing slots, at some airports. Since 1969 limits—called slots—have been set on the number of takeoffs and landings per hour at New York LaGuardia, New York Kennedy, Washington Reagan National, and Chicago O’Hare airports. Although it is theoretically possible to design a slot system that has the same welfare properties as efficient tolls, no evidence exists that slot controls at U.S. airports have been designed optimally while evidence does exist that slots have tended to reduce competition and raise fares.18 Congress has acted in the past to eliminate slots, but the FAA has countered by imposing administrative controls in response to traffic growth. Recently, the FAA has dealt with congestion at O’Hare by getting hub carriers together in a room and allowing American Airlines and United Airlines to agree to reduce flights, and it has proposed a new rule at New York LaGuardia that would discourage the use of small jets by imposing an average plane size of 105 to 122 seats for all gates at the airport. Both actions exemplify the FAA’s preference for an (inefficient) administrative solution over a potentially efficient market solution.

### Econ Adv Frontline

#### 1. Airline industry resilient

David Grizzle, Chief Operating Officer Air Traffic Organization Federal Aviation Administration, August 2011, “The Economic Impact of Civil Aviation on the U.S. Economy” , www.faa.gov/air\_traffic/.../FAA\_Economic\_Impact\_Rpt\_2011.pdf

Even during tough times, the efficiency of our air transport network serves commerce and supports jobs that maintain and revitalize the strength of the U.S. economy. Today, despite the lingering effects of the recent recession, there is cautious optimism in the air transport sector of the U.S. economy. The industry continues to be flexible, developing new, innovative ways to lower costs and increase revenues. • For example, as the price of jet fuel climbs, air carriers are finding innovative ways to conserve fuel and lower costs by: replacing old, heavy drink carts with new lighter versions, removing seat back telephones, installing lighter seats and TV monitors, applying new coating on airframes to improve airflow, and purchasing more tugs to reduce engine fuel use.

#### INSERT Econ Impact Defense from NIB File

### XTN #1 – Resilience

**Airlines resilient.**

**Bowens ’09** (Thella F. Bowens President & CEO San Diego County Regional Airport Authority, “Downturn is Prime Time for Airport Infrastructure Projects”, Friday, 13 Nov 2009, <http://www.cnbc.com/id/33907668/Downturn_is_Prime_Time_for_Airport_Infrastructure_Projects>)

In these challenging economic times, it’s more important than ever to be aware that, historically, **air travel has always been a growth industry**. True – it may not be growing at this very moment. But, rest assured it will bounce back and continue to grow. You need only look at history to be reminded of the industry’s resiliency – **take the SARS outbreak and the profound impacts of 9/11. While things slowed down for a little while, demand rebounded and the industry continued on its upward trajectory.**

### Science Diplomacy Adv Frontline

#### Science diplomacy fails- science and government control are incompatible

COSEPUP and PGA 5 (Committee on Science, Engineering and Public Policy, and Policy and Global Affairs, http://www.nap.edu/catalog.php?record\_id=11289#orgs, 7/9/11)

An aspect of S&E strength deserving brief mention is the challenge in integrating scientific research and educational policies with foreign policy. A familiar, if only occasional, overlap between scientific and foreign policy has been seen in the realm of “big science” such as the multinational particle accelerators and detectors at CERN, large telescopes, and international ocean and geophysical projects. Negotiating big science is seldom easy, partly because of the obvious differences between the realms of science and large-scale political structures. Among the most obvious is that many intergovernment research activities are “top-down,” established and monitored by government officials, whereas most research collaborations are “bottom-up,” with scientists choosing partners and applying to government for research support. Traditional research linkages create what were long ago called “invisible colleges”97 of practitioners, below the radar of policymakers. As the globalization of S&E progresses, a better understanding of how to integrate top-down and bottom-up cooperation is needed if nations are to maximize the benefits of their investments in S&E.98 Scientists and engineers trained to work between cultures may be increasingly important as these negotiations proceed, and US students may benefit from overseas postgraduate training and research experience.

#### Science diplomacy doesn’t solve their impacts

Dickson 10 (David, director of SciDev, June 28 http://scidevnet.wordpress.com/category/science-diplomacy-conference-2010/ 7/9/11)

The broadest gaps in understanding the potential of scientific diplomacy lay in the third category, namely the use of science as a channel of international diplomacy, either as a way of helping to forge consensus on contentious issues, or as a catalyst for peace in situations of conflict. On the first of these, some pointed to recent climate change negotiations, and in particular the work of the Intergovernmental Panel on Climate Change, as a good example, of the way that the scientific community can provide a strong rationale for joint international action. But others referred to the failure of the Copenhagen climate summit last December to come up with a meaningful agreement on action as a demonstration of the limitations of this way of thinking. It was argued that this failure had been partly due to a misplaced belief that scientific consensus would be sufficient to generate a commitment to collective action, without taking into account the political impact that scientific ideas would have. Another example that received considerable attention was the current construction of a synchrotron facility SESAME in Jordan, a project that is already is bringing together researchers in a range of scientific disciplines from various countries in the Middle East (including Israel, Egypt and Palestine, as well as both Greece and Turkey). The promoters of SESAME hope that – as with the building of CERN 60 years ago, and its operation as a research centre involving, for example, physicists from both Russia and the United States – SESAME will become a symbol of what regional collaboration can achieve. In that sense, it would become what one participant described as a “beacon of hope” for the region. But others cautioned that, however successful SESAME may turn out to be in purely scientific terms, its potential impact on the Middle East peace process should not be exaggerated. Political conflicts have deep roots that cannot easily be papered over, however open-minded scientists may be to professional colleagues coming from other political contexts. Indeed, there was even a warning that in the developing world, high profile scientific projects, particular those with explicit political backing, could end up doing damage by inadvertently favouring one social group over another. Scientists should be wary of having their prestige used in this way; those who did so could come over as patronising, appearing unaware of political realities. Similarly, those who hold science in esteem as a practice committed to promoting the causes of peace and development were reminded of the need to take into account how advances in science – whether nuclear physics or genetic technology – have also led to new types of weaponry. Nor did science automatically lead to the reduction of global inequalities. “Science for diplomacy” therefore ended up with a highly mixed review. The consensus seemed to be that science can prepare the ground for diplomatic initiatives – and benefit from diplomatic agreements – but cannot provide the solutions to either.

#### Science diplomacy fails – political motivates corrupt its effectiveness.

Dickson 09 [David Dickson, director of SciDev.net, “The Limits of Science Diplomacy”, June 4, 2009, http://www.scidev.net/en/editorials/the-limits-of-science-diplomacy.html ]

But — as emerged from a meeting entitled New Frontiers in Science Diplomacy, held in London this week (1–2 June) — using science for diplomatic purposes is not as straightforward as it seems. Some scientific collaboration clearly demonstrates what countries can achieve by working together. For example, a new synchrotron under construction in Jordan is rapidly becoming a symbol of the potential for teamwork in the Middle East. But whether scientific cooperation can become a precursor for political collaboration is less evident. For example, despite hopes that the Middle East synchrotron would help bring peace to the region, several countries have been reluctant to support it until the Palestine problem is resolved. Indeed, one speaker at the London meeting (organised by the UK's Royal Society and the American Association for the Advancement of Science) even suggested that the changes scientific innovations bring inevitably lead to turbulence and upheaval. In such a context, viewing science as a driver for peace may be wishful thinking. Conflicting ethos Perhaps the most contentious area discussed at the meeting was how science diplomacy can frame developed countries' efforts to help build scientific capacity in the developing world. There is little to quarrel with in collaborative efforts that are put forward with a genuine desire for partnership. Indeed, partnership — whether between individuals, institutions or countries — is the new buzzword in the "science for development" community. But true partnership requires transparent relations between partners who are prepared to meet as equals. And that goes against diplomats' implicit role: to promote and defend their own countries' interests. John Beddington, the British government's chief scientific adviser, may have been a bit harsh when he told the meeting that a diplomat is someone who is "sent abroad to lie for his country". But he touched a raw nerve. Worlds apart yet co-dependent The truth is that science and politics make an uneasy alliance. Both need the other. Politicians need science to achieve their goals, whether social, economic or — unfortunately — military; scientists need political support to fund their research. But they also occupy different universes. Politics is, at root, about exercising power by one means or another. Science is — or should be — about pursuing robust knowledge that can be put to useful purposes. A strategy for promoting science diplomacy that respects these differences deserves support. Particularly so if it focuses on ways to leverage political and financial backing for science's more humanitarian goals, such as tackling climate change or reducing world poverty. But a commitment to science diplomacy that ignores the differences — acting for example as if science can substitute politics (or perhaps more worryingly, vice versa), is dangerous.

#### Science diplomacy has limited effectiveness-the Middle East proves

Dickson 09 [David Dickson, director of SciDev.net, “The Limits of Science Diplomacy”, June 4, 2009]

Only so much science can doRecently, the Obama administration has given this field a new push, in its desire to pursue "soft diplomacy" in regions such as the Middle East. Scientific agreements have been at the forefront of the administration's activities in countries such as Iraq and Pakistan. But — as emerged from a meeting entitled New Frontiers in Science Diplomacy, held in London this week (1–2 June) — using science for diplomatic purposes is not as straightforward as it seems. Some scientific collaboration clearly demonstrates what countries can achieve by working together. For example, a new synchrotron under construction in Jordan is rapidly becoming a symbol of the potential for teamwork in the Middle East. But whether scientific cooperation can become a precursor for political collaboration is less evident. For example, despite hopes that the Middle East synchrotron would help bring peace to the region, several countries have been reluctant to support it until the Palestine problem is resolved. Indeed, one speaker at the London meeting (organised by the UK's Royal Society and the American Association for the Advancement of Science) even suggested that the changes scientific innovations bring inevitably lead to turbulence and upheaval. In such a context, viewing science as a driver for peace may be wishful thinking.

### Air Power Adv Frontline

#### Airpower creates a mentality of casualty aversion that increases intervention—this destroys U.S. credibility

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Evocations of the casualty-aversion assertion by national leaders can, as we have seen, cause serious problems. They can embolden adversaries and cause themto overestimate the strategic value of inflicting casualties. They can undermine the deterrent effect of American threats that otherwise might have averted the use of force. Casualty aversion can also give the impression that the United States is trying to shift to allies casualty risks that it is unwilling to accept itself. Technology has significant drawbacks here; the technology/casualty trade-off debate has been a long one.Again, it is perfectly laudable to pursue methods that minimize casualties; arguing the converse would be ludicrous.More important, however, are the strategic effectiveness and opportunity costs that accrue from the use of various military instruments in singular, sequential or synchronized ways. The casualty-aversion issue can become a surrogate for decades-old interservice arguments between airpower and ground-power advocates. Such often-misdirected disputes focus on the special interests and constituencies of particular means at the expense of national strategic ends. That an option is ostensibly cheaper should not relieve it from the ultimate tests of military effectiveness in achieving national ends. The conviction that technology can ormust substitute for risk to human life has a pernicious tendency to distort the consideration of risks and rewards. Cheaper, less risky means may also make more likely the use of force in situations of marginal importance—in which the prestige and effectiveness of the United States and its allies may require escalation to achieve success.50

#### That causes aggression and kills diplomacy

Lieutenant Colonel Richard A. Lacquement, Jr., U.S. Army, Director of Military Strategy at the U.S. Army War College, professor of strategy and policy on the faculty of the Naval War College, M.A. in National Security and Strategic Studies from the Naval War College, M.A. in Strategic Studies from the U.S. Army War College, M.P.A., Ph.D. in International Relations from Princeton University, strategist in the Office of the Secretary of Defense, 2004, “THE CASUALTY-AVERSION MYTH,” Naval War College Review, Winter 2004, Vol. LVII, No. 1, [http://www.usnwc.edu/getattachment/82192134-8122-404a-a139-2fcc2de2fe38/Casualty-Aversion-Myth,-The---Lacquement,-Richard-](http://www.usnwc.edu/getattachment/82192134-8122-404a-a139-2fcc2de2fe38/Casualty-Aversion-Myth%2C-The---Lacquement%2C-Richard-)

Another negative effect of embracing the unsupported conventional wisdomon casualty aversion is that it needlessly encourages American adversaries. With respect to the 1999 war in Kosovo, the NATO commander, General Wesley Clark, observed, There was continuous commentary on the fear of NATO to accept military casualties. This, unfortunately, is unlikely to be unique to this operation. Of course, using friendly personnel on the ground risks friendly casualties. Neither political nor military leaders will want to take these risks. But our adversaries will exploit our reluctance by facing us with the dilemma of either inflicting accidental injuries to civilians or risking our own people on their territory.31 There are numerous examples of the perception by foreigners that the United States is unwilling to risk casualties.32 This perception has been a factor in the considerations of the nation’s enemies. Saddam Hussein before the 1991 Gulf War, SlobodanMilosevic before the KosovoWar in 1999, and Osama Bin Laden and al-Qa‘ida generally in 2001 all appear to have had great confidence that the United States lacked the moral courage to face a deadly military confrontation. This assurance made them less susceptible to diplomatic maneuvers or military threats. They seem to have considered the prospect of U.S. military action, particularly the use of ground troops, a bluff.

#### Air power directly trades off with diplomatic solutions to regional conflicts

USAF Captain David Willard PARSONS, teaches strategy at the Air War College, 1997 “British Air Control: a Model for the Application of Air Power in Low-Intensity Conflict?” Sept 15, <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA329097&Location=U2&doc=GetTRDoc.pdf>

The most important characteristic of L1C, which is generally overlooked by policymakers and military planners, is that the conflict cannot be resolved solely with military power. As Sam Sarkesian asserts, The center of gravity of such conflicts is not on the battlefield per se, but in the political-social system of the indigenous state. Thus, the main battle lines are political and psychological rather than between opposing armed units.46 The concept of air control as conceived and employed by the British (and mirrored by the Clinton administration) ignores this basic tenet of LlC. In each case where Britain employed air control, overwhelming firepower did nothing more than temporarily suppress the overt manifestations of some underlying sociopolitical conflict. However, since this limited goal was sufficient for Britain's colonial needs, air control was heralded as a broad success. In 1920 Somalia, the RAF did not succeed in resolving Britain's dispute with Sayyid Muhammad; it merely drove him into a neighboring country. The resentment of British intrusion into the lives of Somali natives, which Sayyid Muhammad had embodied, remained. In Iraq, the colonial government could not comprehend that what they considered as just a matter of "law and order" involved significant political issues for native tribes. In Aden, discontent sown by the Imam Yahya and his successor-son Imam Ahmed, could be subdued by RAF bombers, but it merely lay dormant until the territory gained independence and became the source of a strong nationalist movement in the 1950s and 1960s. Peter Slugett, a British historian of Iraq, summed up the posture that air control eventuated: The most serious long-term consequence of the ready availability of air control was that it developed into a substitute for administration .... The speed and simplicity of air attack was preferred to the more timeconsuming and painstaking investigation of grievances and disputes. (Emphasis added)47 This same posture threatens to subsume the American application of air power, especially with respect to the complex situations that are indicative of the low-intensity environment.

#### Air power causes tech obsession—kills relations with china and Russia

Thomas H. Henriksen, associate director and senior fellow at the Hoover Institution, 2k, “Stanford Institute Says Covert Operations Needed,” Orbis

Lord Acton's famous maxim about the corruptive influence of power is just as true with regard to "absolute" military force as it is with regard to power in the domestic political realm. He might even have added that command of un-matched technological prowess can blind policymakers to lower-profile, lower-cost ways to achieve their nation's goals. Some security problems can be solved with a sledgehammer or only with a sledgehammer. But far more common are those foreign policy challenges that can be solved—or prevented altogether—by measures short of violent conflict, even where routine diplomatic instruments prove ineffective. As the reigning superpower, the United States must not eschew forceful diplomacy or violence in extremis when its strategic interests are at stake. But Washington's current overreliance on aerial bombardment as the weapon of second (if not first) resort diminishes America's prestige, sullies its espousal of a liberal-democratic new world order, and endangers its strategic relations with other major powers. Less-confrontational options can achieve U.S. goals without the harmful side effects that include a strained Western alliance and strained relations with China and Russia, not to mention civilian deaths and material destruction. That less-confrontational option is covert or indirect action abroad, and it offers today, no less than during the Cold War, an effective alternative to the unacceptable risks and costs of military operations.

#### Air power causes political backlash that prevents solutions to low intensity conflict

USAF Captain David Willard PARSONS, teaches strategy at the Air War College, 1997 “British Air Control: a Model for the Application of Air Power in Low-Intensity Conflict?” Sept 15, <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=ADA329097&Location=U2&doc=GetTRDoc.pdf>

Air strikes in Bosnia may indeed bring the situation on the ground to a standstill, but what will this really accomplish? Like the application of air control in the British colonies, air power may bring about an immediate "peace" on our terms. This would allow American policymakers to declare that they had somehow contributed to stability in the area. This "solution" would also satisfy American legislators if it could be accomplished with little cost in American dollars and lives. However, past efforts to employ offensive air operations, within the low-intensity environment, to provide a temporary cessation of the conflict so that long-term efforts could be made to win the "hearts and minds of the people" have proven counterproductive. 48 The use of military firepower to quell disturbances associated with low-intensity threats consistently generates a political backlash that does nothing but further inflame the conflict. 49 The adoption of an air control strategy in Bosnia would be a mistake because foreign military intervention aimed at changing the behavior of "unruly natives" would at best impose a short break in the fighting and would ultimately aggravate the situation by generating resentment on all sides. The nature of the conflict in Bosnia is such that it cannot be solved in a few days, weeks, or even months. It will take years to heal the sociopolitical ills that exist in the Balkans.50 Furthermore, resolution of this conflict will prove impossible without the use of ground forces.51 The lesson to be learned from the British experience of air control is not that it is a model for the application of air power in the modern low-intensity arena, but quite the opposite-any application of military power in LlC that ignores the underlying sociopolitical nature of the conflict is, in the long run, a waste of time, lives, and resources. Low-intensity conflict, by its very nature, demands patience and durability, neither of which is characteristic of the concept of air control.

### Aerospace Adv Frontline

#### China will inevitably overtake the US – labor costs, tech leapfrogging and government spending

MacPherson ’09 – American patent attorney, Juris Doctor degree from Harvard Law School [Alan, “The emergence of a new competitor in the commercial aircraft sector: the China syndrome,” www.elsevier.com/locate/futures]

Even with infant-industry status, there is good reason to suspect that China’s commercial aerospace sector will become internationally competitive in a relatively short space of time (e.g. 10 years or less). There are several reasons for this. First, China’s labor costs are at least 4 times lower than those that prevail in Europe and North America [14]. This is especially important in light of the labor-intensive nature of certain aspects of the airframe production process. Second, China will be starting its production effort with state-of-the-art machine tools and fixtures, new materials handling processes, Western design software, and advanced engineering procedures. In effect, the first fully operational set of Chinese production facilities will technologically leapfrog comparable facilities in the West. Third, the Chinese government has the investment capital and political determination required for massive and sustained industry support. Fourth, Western components are readily available to install on Chinese airframes—engines, avionics, hydraulics, fly-by-wire systems. The net result will be Chinese aircraft that are endowed with proven Western and/or Russian systems, cheap Chinese airframes, and performance characteristics that match US Federal Aviation Authority (FAA) and EU Joint Aviation Authority (JAA) technical and safety standards. Finally, China will be able to pump-prime its domestic aerospace industry by mandating the purchasing behavior of Chinese airlines. This would represent a non-tariff trade barrier of immense significance at the global level. Pulling these five strands together, it would appear that China will soon be in a position to serve both domestic and international markets. Eventually, for example, Western airlines will find it hard to ignore Chinese aircraft that are fully FAA/JAA compliant— especially if they sell at a fraction of the cost of Western alternatives.

**1NC US Decline Inevitable**

#### Multiple factors make Chinese aerospace industry rise inevitable

Cliff, Ohlandt, and Yang, 11 (Roger, Chad J. R, and David, “Ready for Takeoff: China’s Advancing Aerospace Industry,” 2011, Cliff was the Assistant for Strategy Development, Office of the Secretary of Defense, Ohlandt is an aerospace engineer at RAND specializing in Chinese space policy, and Yang is and assistant political scientist at the RAND institute specializing in Chinese security studies)

However, it is difficult to quantify the extent to which improvements in China’s civilian aerospace capabilities in general, and international cooperation in the civilian aerospace sector in particular, are driving improvements in China’s military aerospace capabilities. China’s defense spending has quintupled in real terms since 1995, a greater than 12 percent annual growth rate. This means that vastly more resources are now available for the development of aerospace and other defense capabilities than were available just 15 years ago. Moreover, China’s military aerospace industry has benefited from direct technical assistance from Russian, Israeli, and other foreign firms and technical experts. With China being one of the world’s largest trading nations, China’s military aerospace industry can purchase state-of-the-art parts and technologies from throughout the world. The industry also has the ability to tap into expertise in firms outside of the aerospace sector and in Chinese universities, which themselves are increasingly integrated into the world scientific and engineering community. Finally, China is engaged in large-scale espionage efforts to acquire key aerospace and other military technologies. The technologies being transferred to Chinese firms are in most instances not cutting-edge. Leading aerospace firms are generally reluctant to share their best technologies, because those technologies are the source of their competitive advantage. As an example, RollsRoyce is unwilling to share its technology for forging unitary turbine rings (known as bladed-rings, or “blings”) with its own wholly owned subsidiary in Indianapolis, preferring instead to keep this “crownjewel” technology at its facility in the United Kingdom. 2 Out-of-date Western technologies, however, can still be new technologies to China, which, for example, has yet to master the technology for turbo- fan engines, which first entered production 50 years ago in the West (Younossi et al., 2002, pp. 9–24). But the nature of the aerospace technologies being transferred to China and the range of alternative technology sources available make the U.S. security policy implications opaque. Since it is difficult to quantify the degree to which international cooperation in civil aerospace is assisting the development of military aerospace capabilities in China, whether even a complete cutoff of such cooperation would substantially slow that development is equally unclear. A complete cutoff, moreover, would be impractical. Russia in particular is unlikely to go along with a U.S.-organized ban on cooperation in civil aerospace with China, and whether European and other Asian countries would do so is also questionable. A U.S.-only ban would likely slow the development of China’s military aerospace capability by only a small amount while handing business opportunities to European and Asian companies and aggravating relations with Beijing. At a minimum, a smart U.S. policy would limit restrictions to cooperation in technology areas that are not available from other countries or in which other countries that also possess those technologies are willing to coordinate with the United States in imposing restrictions.

### Pollution Adv Frontline

#### Aviation only counts for a small portion of total emissions. Cutting these emissions will only have a small impact.

Gerald Dillingham, Ph.D., Director of Physical Infrastructure Issues at the GAO, June 2009, “Aircraft Emissions Expected to Grow, but Technological and Operational Improvements and Government Policies Can Help Control Emissions”, Government Accountability Office, <http://www.gao.gov/assets/300/290594.pdf>

According to IPCC, aviation currently accounts for about 2 percent of humangenerated global carbon dioxide emissions, the most significant greenhouse gas—and about 3 percent of the potential warming effect of global emissions that can affect the earth’s climate, including carbon dioxide. IPCC’s mediumrange estimate forecasts that by 2050 the global aviation industry, including aircraft emissions, will emit about 3 percent of global carbon dioxide emissions and about 5 percent of the potential warming effect of all global human-generated emissions. Gross domestic product growth is the primary driver in IPCC’s forecasts. IPCC also made other assumptions about future aircraft fuel efficiency, improvements in air traffic management, and airport and runway capacity. IPCC’s 2050 forecasts for aviation’s contribution to global emissions assumed that emissions from other sectors will continue to grow. If other sectors make progress in reducing emissions and aviation emissions continue to grow, aviation’s relative contribution may be greater than IPCC estimated; on the other hand, if other sectors do not make progress, aviation’s relative contribution may be smaller than estimated.

### CMR Adv Frontline

#### CMR is resilient – past decade of conflict proves

Hoffman, ’11

[Frank Hoffman, Senior Research Fellow with the Institute for National Strategic Studies at the National Defense University, Director of NDU Press, “Effective Civil-Military Relations in the 21st Century,” April 26th 2011, <http://smallwarsjournal.com/jrnl/art/effective-civil-military-relations-in-the-21st-century>]

Protracted and indecisive conflict often generates serious fissures between policy makers and military leaders. It can also lead to profound cracks between societies and the military institutions they raise up and sustain to defend themselves. The United States has been at war for about a decade against enemies whose fighting style and tactics confound us, challenge our view of warfare and thwart our traditional sources of power. Victory has been elusive, but the costs are tangible and growing. Against such a backdrop, one would have expected the oft conflicted elements inherent to American civil-military relations to have produced some crisis or dysfunctional undertow by now. In fact, even before the war, distinguished historians concluded that relations between our uniformed leaders and senior elected officials were “extraordinarily poor” and that the national fabric had been rent. There have been alleged crises; the purported Revolt of the Generals during the Bush Administration, Admiral “Fox” Fallon‟s apparent public policy disagreement with the White House over Iran, and the fallout from the Rolling Stones article where General Stan McChrystal‟s staff torched his career with what can only be charitably described as diarrhea of the mouth. Despite the elongated situation in Iraq and Afghanistan, and the extraordinary pressures that have been placed upon the Armed Services by its constant deployment cycle and the personal costs of the war, the supposedly rent fabric is holding up. Flawed operations and strategic missteps there have been, but the sort of crisis predicted even before 9/11 has not emerged. But war is both an arbiter of and influence upon societies and military institutions, and long wars, conclusive or not, generate pressures to national institutions. Thus, Dr. “Mac” Owens‟ refreshingly lucid book is well timed to explain the foundation and evolution of U.S. civil-military interactions over the past decade.

#### CMR clashes won’t escalate – relations remains resilient

Richard H. Kohn, Professor of History of Peace, War, and Defense at the University of North Carolina at Chapel Hill, World Affairs Winter ‘8, “Coming Soon: A Crisis in Civil-Military Relations” <http://www.worldaffairsjournal.org/articles/2008-Winter/full-civil-military.html>

However it begins, a clash between the next administration and the armed forces need not metastasize into a full-blown crisis. Military leaders should start to consider how they will react to civilian demands, and which of their traditions they will choose. Will they acquiesce after due advice and consultation, as the Constitution and our tradition of civilian control suggests? Or will they resist, employing techniques borne of decades of inside-the-beltway maneuvering? Will they confine dissent to the appropriate channels? Or will they go public, enlisting their allies in Congress, industry, and veterans groups? Will they collaborate with their new civilian superiors? Or will they work to thwart every recommendation harmful to their service? Much will depend on the capacity of military leaders to establish a workable relationship with their civilian superiors and to embrace their own tradition of professionalism. Civilians have equal obligations. Will they tackle thorny defense issues in a serious, nonpartisan way, or will they succumb to their own posturing? Will they box themselves in with their campaign promises? Will they apply Band-Aids to the Pentagon budget, or will they address the more fundamental problem of reorganizing a Cold-War military for an age of asymmetric threats? Will they consider seriously, if not always heed, the counsel of military expertise? A crucial intermediary here will be the next secretary of defense. Someone in the mold of Melvin Laird or James Schlesinger or William Perry will be indispensable—that is, someone knowledgeable and politically skilled who can gain and keep the confidence of the military, Congress, and the president. Whoever wins the job must wear his or her authority without bluster or arrogance, and lead firmly while holding the military to account. Above all, the secretary must act with courtesy, fairness, and decisiveness. A new administration might even ask Robert Gates to stay on; he has presided over the Pentagon with a calming, steady hand after Rumsfeld’s departure. Staffing decisions at less senior levels will be nearly as important. Neither party can afford to populate the Defense Department with politicians on the make, congressional staffers beholden to special interests, or young know-nothings looking to plus-up their résumés. These positions require knowledgeable people from the business community, the federal bureaucracy, and other professions who understand and respect the military but will not be awed by medals and campaign ribbons. The service secretaries have the closest relationship with the military leadership and have a critical say in picking senior leaders for advancement into the key commands and the Joint Chiefs. Finding the right individuals for these slots will be essential. The new secretary of defense would do well to assemble his deputy, under secretaries, and service secretaries into a cohesive executive committee that would formulate an agenda, rethink policy, and oversee its implementation. The next administration should also act quickly to insulate the military leadership from partisan politics. The first act will be, after due consideration, the reappointment of Admiral Mullen as chairman. Then there should be a concerted search within the services for loyal but independent thinkers who understand the American system of civilian control but also know how to be dead honest in their advice. The recent appointment of General James Mattis of the Marines to head Joint Forces Command sends exactly the right message. Whoever comes into office in January 2009, in turn, needs to make clear up front that he or she will not hide behind the military, that he or she will not compromise the military’s professional ethos by delivering partisan speeches in front of uniformed audiences or trotting out the brass to market administration policies. Last of all, the new president ought to reach out to the armed forces in their own communities: visiting bases, praising the military with genuine sincerity, addressing veteran’s care, making certain that as troops are withdrawn from Iraq, no blame falls unfairly on them for what follows. The political leadership will have to consult widely about changes, cuts, consolidations, and other modifications to the defense establishment. The next administration will need to establish a precedent for strict civilian control from the outset, all the while spending political capital on national defense and boosting the morale of what will likely be an anxious force. Consistent and vocal praise for military (and public) service would go a long way—easy for a Republican who abandons the demonization of government, difficult for a Democrat accustomed to ignoring or criticizing the military.

#### No impact – explicit tension over goals and missions just causes the military to give in to civilian commands.

Yoo, 9

[John Yoo, Fletcher Jones Distinguished Visiting Professor of Law, Chapman University School of Law; Professor of Law, School of Law, University of California, Berkeley; Visiting Scholar, American Enterprise Institute, May 2009, “Thirty-Ninth Annual Administrative Law Issue: Administrative Law Under The George W. Bush Administration: Looking Back And Looking Forward: Article: Administration Of War,” Duke Law Journal, 58 Duke L.J. 2277, p. lexis ]

Applied to the military context, it is worth identifying how the Bush and Clinton administration and civilian preferences may have diverged from those of the armed forces. Unlike the Clinton administration, both the civilian and military leadership were on the same page in the area of budget and personnel. Under the Bush administration, military spending rose sharply, both in absolute terms and as a share of the federal budget. As a percentage of the federal budget, Defense Department spending rose from 15.6 percent in 2001 ($ 290 billion) to 21 percent in 2008 ($ 651 billion). n104 Civilian and military leaders may very well have disagreed, however, over how that money should be spent. As noted earlier, President Bush and Secretary Rumsfeld favored a restructuring of the Army to emphasize smaller, lighter, and more lethal units that could deploy more quickly [\*2296] to fight in smaller conflicts. n105 Army officers may well have favored keeping the focus on the large armored units designed for a broad conflict against a major power such as Russia or China n106 - hence the conflict over the Crusader artillery system and the Comanche attack helicopter. n107 This tension signaled a larger difference over the nation's strategic goals in the wake of the Cold War's end. Civilians wanted a force shaped for the smaller conflicts, civil wars, nation building, and humanitarian missions that characterized the 1990s. Military leaders preferred the conflicts envisioned by the "Powell doctrine," n108 which emphasized defeating an enemy quickly with overwhelming force, defined goals, and a clear exit strategy. n109 The pressure of external events may have exacerbated these differences. The actual combat phases of both the Afghanistan and Iraq wars were relatively short and involved few casualties for American forces. Whereas the latter was a regular international conflict between two conventionally armed forces, the former involved special forces, covert units, air power, and irregular allies fighting a mixture of loosely organized militia units and terrorist groups. Afghanistan required the United States to pivot quickly from defeating the Taliban and al Qaeda units to rebuilding a national government in cooperation with the Northern Alliance victors - a task still unfinished. Nation building is at odds with the Powell doctrine, because it requires military units to perform a police function over the civilian population, with goals that are hard to measure and difficult to achieve, and with no preset exit date. Iraq called for yet a different kind of strategy, that of counterinsurgency, which also deviated from the preferred focus on high-technology weapons systems, armored units and air superiority fighters, and [\*2297] large-scale conventional warfare. Instead, the armed forces eventually had to surge in large numbers of ground troops who patrolled in urban environments, cooperated with local leadership structures, and relied on intelligence to defeat al Qaeda operatives and Sunni resistance fighters. The Army had engaged in counterinsurgency operations in South Vietnam, sometimes to great effect, but had since lost its expertise in favor of the tactics and strategies needed for a conventional conflict. n110

### Miscalculation Answers

#### No risk of accidents

Michael Quinlan, Consulting Senior Fellow for South Asia International Institute for Strategic Studies, 2009, “Thinking About Nuclear Weapons,” amazon

Similar considerations apply to the hypothesis of nuclear war being mistakenly triggered by false alarm. Critics again point to the fact, as it is understood, of numerous occasions when initial steps in alert sequences for US nuclear forces were embarked upon, or at least called for, by indicators mistaken or misconstrued. In none of these Instances, it Is accepted, did matters get at all near to nuclear launch—extraordinary good fortune again. critics have suggested. But the rival and more logical inference from hundreds of events stretching over sixty years of experience presents Itself once more: that the probability of initial misinterpretation leading far towards mistaken launch is remote. Precisely because any nuclear-weapon possessor recognizes the vast gravity of any launch, release sequences have many steps, and human decision is repeatedly interposed as well as capping the sequences. To convey that because a first step was prompted the world somehow came close to accidental nuclear war is wild hyperbole, rather like asserting, when a tennis champion has lost his opening service game, that he was nearly beaten in straight sets. History anyway scarcely offers any ready example of major war started by accident even before the nuclear revolution imposed an order-of-magn itude increaw In caution. It was occasionally conjectured that nuclear war might be triggered by the real but accidental or unauthorized launch of a strategic nuclear-weapon delivery system in the direction of a potennal adversay)’. No such launch is known to have occurred In over sixty years. The probability of it is thcrcfore very low. But even if it did happen, the further hypothesis of its initiating a general nuclear exchange is far-fetched. It fails to consider the real situation of decision-makers, as pages 6—4 have brought out. The notion that cosmic holocaust might be mistakenly precipitated In this way belongs to science fiction. one special form of miscalculation appeared sporadically in the speculations of academic commentators, though it was scarcely ever to be encountered—at least so far as my own observation went—in the utterances of practical planners within government. This is the idea that nuclear war might be erroneously triggered, or erroneously widened, through a state under attack misreading either what sort of attack it was lwing subjected to, or where the attack came from. One special form of miscalculation appeared sporadically in the speculations of academic commentators, though it was scarcely ever to be encountered—at least so far as my own observation went—in the utterances of practical planners within government. This is the idea that nuclear war might be erroneously triggered, or erroneously widened, through a state under attack misreading either what sort of attack It was being subjected to, or where the attack came from. The postulated misreading of the nature of the attack referred in particular to the hypothesis that if a delivery system—normally a missile—that was known to he capable of carrying either a nuclear or a conventional warhead was launched in a conventional role, the target country might, on detecting the launch through its early. warning systems, misconstrue the mission as an imminent nuclear strike and immediately unleash a nuclear counter-strike of its own. This conecture was voiced, for example, as a criticism of the pro- lls (or giving the US Trident SL11M long associated with nuclear missions, a capability to deliver conventional warheads. Whatever the nwrit of those proposals (it Is not explored here), It is hard to regard this particular apprehension as having any real-life credibility. The flight time of a ballistic missile would not exceed about thirty minutes, and that of a cruise missile a few hours, before arrival on target made its character—conventional or nuclear—unmistakable. No government will need, and no non- lunatic government could wish, to take within so short a span of time a step as enormous and irrevocable as the execution of a nuclear strike on the basis of early-warning Information alone without knowing the true nature of the incoming attack. The speculation tends moreover to be expressed without reference either to any realistic political or conflict-related context thought to render the episode plausible, or to the manifest interest of the launching country, should there be any risk of doubt, in ensuring—by explicit communication if necessary—that there was no misinterpretation of its conventionally armed launch. It may he oblected to this analysis that in the cold war the two opposing superpowers had concepts of launch-on-warning. That seems to be true, at least in the sense that successive US administrations declined to rule out such an option and indeed included In their contingency plans Lxth this and the possibility of launch- under-attack (that is launch after some strikes had been suffered and while the sequence of them was evidently continuing). The Soviet Union was not likely to have had more relaxed practices. But the colossal gravity of activating any such arrangements must always have been recognized. It could have been contemplated only in circumstances where the entire political context made a pre-emptive attack by the adversary plainly a serious and imminent possibility. and where niowover the available information unmistakably mdi- cated that a massive assault with hundreds or thousands of missiles was on the way. That was a scenario wholly unlike that implicit in the supposition that a conventional missile attack might he briefly mIstaken for a nuclear one. The other sort of misunderstanding conjectured—that of misread- ing the source of attack—envisaged. typically. that SLBMs launched by France or the United Kingdom might erroneously be supposed to be coming from US submarines, and so might initiate a super- power exchange which the United States did not in fact intend. (An occasional variant on this was the notion that ‘triggering in this way might actually be an element in deliberate French or IlK deterrent concepts. There was never any truth in this guess in relation to the United Kingdom, and French thinking Is unlikely to have been different.) The unreality In this category of conlecture lay In the Implication that such a scenario could develop without the US government making the most determined efforts to ensure that Soviet (or now Rus.sian leaders knew that the United States was not responsible for the attack, and with those leaders for their part resorting, on unproven suspicion. to action that was virtually certain to provoke nuclear counter-action from the United States. There used occasion- ally to be another speculation, that if the Soviet Union suffered heavy nuclear strikes known to come from France or the United Kingdom, it might judge its interests to be best wrvcd by ensuring that the United States did not remain an unscathed bystander. But even if that were somehow thought marginally less implausible, it would have been a different matter from misinterpretauon of the initial strike. As was nOted earlier In this chapter, the arrangements under which nudear-weapon inventories arc now managed rc in several iniportant respects already mudi less open to concern than they were during much of the cold war. Worries voiced more recently sometimes relate to ‘cyher-attack’----hostile Interference, whether by states or by other actors such as terrorists, with Information systems used in the control of armouries. It is highly unlikely, though details are (again understandably) not made public, that regular reviews of control arrangements are oblivious to any such risks. Perceptions of them do however reinforce the already-strong case that whatever arrange. ments still remain in place for continuous high readiness to launch nuclear action at short notice should be abandoned. Chapter 13 returns to this.

#### Accidents don’t escalate and nuclear weapons create global peace.

Kenneth Waltz, The Spread of Nuclear Weapons: A Debate, 1995, p. 93-94

“Love is like war,” the chaplain says in Bertolt Brecht’s Mother Courage, “it always finds a way.” For half a cen­tury, nuclear war has not found a way. The old saying, “accidents will happen,” is translated as Murphy’s Law holding that anything that can go wrong will go wrong. Enough has gone wrong, and Scott Sagan has recorded many of the nuclear accidents that have, or have nearly, taken place. Yet none of them has caused anybody to blow anybody else up. In a speech given to American scientists in 1960, C. P. Snow said this: “We know, with the certainty of statistical truth, that if enough of these weapons are made—by enough different states—some of them are going to blow up. Through accident, or folly, or madness—but the motives don’t matter. What does mat­ter is the nature of the statistical fact.” In 1960, statistical fact told Snow that within “at the most, ten years some of these bombs are going off.” Statistical fact now tells us that we are twenty-five years overdue. But the novelist and scientist overlooked the fact that there are no “statistical facts.”’ Half a century of nuclear peace has to be explained since divergence from historical experience is dramatic. Never in modern history, conventionally dated from 1648, have the great and major powers of the world en­joyed such a long period of peace. Scott Sagan empha­sizes the problems and the conditions that conduce to pessimism. I emphasize the likely solutions and the conditions that conduce to optimism, bearing in mind that nothing in this world is ever certain.

## Off-Case Links

### Spending Links

#### Full NextGen implementation would cost billions.

Bourgeois, ’10 (Daniel, Rochester Institute of Technology, “The Next Generation Air Transportation System: An Answer To Solve Airport Efficiency?,” Masters of Science and Public Policy Thesis, 8/9/2010, Proquest)

The costs associated with the implementation of NextGen and all of its proposed changes is quite large. In fact it is so large that it is too much for any one aviation firm to accomplish on its own. To see the true price tag of NextGen see attached Appendix B: Financial Section. The current air traffic control system limitations have significant costs on our society in general, as well as the airline industry in particular. ―The Joint Economic Committee estimates air travel delays impose a staggering $41 billion annually in costs on the U.S. economy (May, 2009).‖ In the 12-month period ending September 2008, ―138 million system delay minutes drove an estimated $10 billion in direct operating costs for scheduled U.S. passenger airlines and cost airline passengers an estimated $4.5 billion in lost wages and productivity (May, 2009).‖ These figures do not capture the total cost foregone. There are still the costs of extra gates and ground crews to passenger airlines and also the direct costs incurred by cargo airlines and their customers. If the airline industry does not look like it will survive, then the public will not invest in it, if these conditions remain. Then it will only be up to the government to invest in saving the airlines to keep the public investors from pulling out. Looking into the future, these problems will only compound themselves unless change occurs.

#### Cost overruns magnify the link.

Morrison and Winston 08 – (Steven, Professor and Chair in the Department of Economics at Northeastern University, Editor in Chief of the Journal of Transport Economics and Policy, and Clifford, Senior Fellow of Economic Studies at Brookings, May 2008, “Delayed! U.S. Aviation Infrastructure Policy at a Crossroads”, Brookings, http://www.brookings.edu/research/articles/2008/05/aviation-winston)

An ongoing challenge for the FAA has been to adopt and implement the latest technological advances to expand the airspace where planes can fly safely and to reduce controller error and aircraft encounters with dangerous weather that contribute to accidents. For example, during the early 1980s the FAA announced plans to develop an advanced automation system to provide flexible, computer-oriented air traffic control capable of handling greater traffic volumes at reduced manpower. The system also included significant improvements in detecting wind shear, the primary cause of several crashes, including two major ones in the 1980s. Although some progress has certainly been made in implementing that system, ongoing assessments by the U.S. General Accounting Office (GAO) indicate that delays and inefficiencies have characterized its development. Scheduled to be completed by 1991 for $12 billion, the fully upgraded system is more than a decade late, billions of dollars over budget, and still nowhere in sight. As of 2007, the cost of the modernization was expected to climb to $51 billion.

### Econ Collapse Turns Case

#### Econ key to aviation industry

David Grizzle, Chief Operating Officer Air Traffic Organization Federal Aviation Administration, August 2011, “The Economic Impact of Civil Aviation on the U.S. Economy”

Economic recovery in the air transportation industry depends heavily on the economic recovery of the rest of the economy, the willingness and financial ability of individuals and businesses to undertake travel, and the need for air-freight services. As the overall economy improves and as more individuals and businesses are willing and able to travel, more arrangements are made for trips to be completed at a future date. Therefore, economic movements in the air transportation industry generally lag movements in the rest of the economy. The recent growth in the economy is leading to increases in airline operating revenues and RPM, but not industry employment. Airline industry employment is in decline and could continue to fall even as the industry recovers. Airline employment has fallen since reaching a peak in 2000, before the onset of the U.S. recession in 2001 and the ensuing terrorist attacks on September 11. The decrease in airline employment may reflect longrun changes within the industry, as the structure of the industry changes and airlines seek to increase productivity. In recent years industry output and employment began to move independently of one another. Airline industry employment peaked in the fourth quarter of 2000 at over 557,000 employees and fell sharply to about 376,000 employees by the third quarter of 2010 (Figure 7), a decrease of 32.5 percent over 10 years, or approximately 3.9 percent per year.22 Over the same period, RPM rose 1.4 percent per year, from 710.6 billion to 811.4 billion.23 Why is employment declining so drastically while output is rising? There are three reasons for this apparent contradiction. The first reason is that many airlines are replacing directly employed workers with workers supplied through contracts with outside firms. According to annual data from BTS, maintenance employment fell 33 percent from 64,248 in 2000 to 42,774 in 2009 (Table 1). The drop in employment stemmed mainly from changes in employment at the network carriers. Among seven network airlines, employment decreased from 55,715 to 31,448.24 At these carriers, the average number of maintenance workers per aircraft fell from 16.6 in 2000 to 12.4 in 2009, and the percentage of maintenance expenses outsourced to other firms rose from 24.3 to 38.9.25 Second, low-cost carriers (LCC), which employ far fewer maintenance employees per aircraft and outsource a higher percentage of maintenance expenses, grew as a share of the industry during this period. In 2009, the number of LCC workers was 3,300 while the number of maintenance employees per aircraft and the percent of maintenance expenses outsourced stood at 3.2 employees and 55.6 percent, respectively (Table 1). LCC’s maintenance activity is lower because these carriers utilize newer aircraft. According to calculations using the Aircraft Inventory data from BTS, the average age of LCC’s aircraft was 9.4 years versus 14.8 years for network carriers in 2009. Also noteworthy is the increase in LCC industry share of domestic flight operations. According to BTS, the annual number of domestically scheduled flights by network airlines fell from 4.2 to 2.5 million between 2000 and 2009, while the number of flights among LCCs increased from 1.3 to 1.8 million. Furthermore, in response to the recent recession, airlines employed fewer maintenance workers and reduced outsourced maintenance expenses. Comparison of the 2008 and 2009 data shows a 7.2 percent decline in the employment of maintenance workers, all attributable to a decrease in employment at network airlines (Table 1). The data also show a 1.8 percentage-point decrease in the share of maintenance expenses that were outsourced. The third reason for the fall in industry employment is the substitution of technology for tasks previously handled by employees. For example, more travelers are using the Internet instead of contacting airline ticket agents to book, price-compare or check in for flights. Digital technology also has brought about greater efficiencies in handling airline tickets and luggage at airports.

### Politics Links

#### Even if NextGen is bipartisan, funding is unpopular.

Ashley Halsey, staffwriter for Washington Post, 11-17-2011, “Lawmaker predicts Congress will reach accord on aviation funding”, Washington Post, <http://www.washingtonpost.com/local/commuting/lawmaker-predicts-congress-will-reach-accord-on-aviation-funding/2011/11/17/gIQAZWCgUN_story.html>

Without confidence that Congress has committed to pay for the program, which has a long-term rollout, airlines have been reluctant to install equipment that will cost them up to $10 billion. Despite bipartisan agreement on the need for the system, known as NextGen, Congress has been deadlocked on a spending plan, approving 22 extensions of current FAA funding since the last major spending authorization expired in 2007. The holdup, which has endured since the days when Democrats had control of both houses, is largely over issues that are without a strong partisan taint. Only one — Republican desire to overturn a labor ruling that would make it easier for unions to organize Delta Air Lines — is rooted in political philosophy.

#### Tech transitions cause political resistance.

Steven Morrison, Professor and Chair in the Department of Economics at Northeastern University, Editor in Chief of the Journal of Transport Economics and Policy, May 2008, “Delayed! U.S. Aviation Infrastructure Policy at a Crossroads”, Brookings, http://www.brookings.edu/research/articles/2008/05/aviation-winston

Unfortunately, the delays that the FAA has experienced with implementing experimental satellite-based systems suggest that NextGen will take more than the projected twenty-five years to become fully operational and that the current system may eventually have to impose additional delays on aircraft to handle growing traffic volumes safely. The GAO has concluded that the FAA has failed to provide the expertise to make the transition to NextGen and has urged it to seek assistance from a third party.41 In addition, because the old equipment continues to consume vast amounts of money for operations and maintenance, it will need to be shut down to implement new navigational procedures. Eventually, all the facilities associated with the current system will be eliminated or consolidated as NextGen is managed and operated with fewer and more technologically up-to-date facilities. Such disinvestment and consolidation will undoubtedly face political resistance that slows the implementation of NextGen because members of Congress will attempt to keep navigational aids and jobs in their districts.42

### K Links

#### The aff’s focus on airport infrastructure is a techno-scientific discourse that destroys human experience and objectifies knowledge production.

Faburel & Levy, ‘9 (Guillaume Faburel Senior Lecturer - University Paris XII Centre for Research on Planning: Land use, Transport, Environment and Local Governments. Lisa Levy PhD Student Centre for Research on Planning: Land use, Transport, Environment and Local Governments “Science, expertise and local knowledge in airport conflicts : Towards a cosmopolitical approach,” Aeromobilities, ed. by Saulo Cwerner, pg. 214-2-18)

The model that has enjoyed predominance over the past two decades could be termed technological legitimation. This model is based on techno-scientific discourses, focusing on the validity of research and expertise, and tends to reject a number of aircraft noise impacts on principle. With side effects that are ‘not proven’ and studies that are not ‘convincing’, this model considers social cost evaluations of minor interest at best, highlighting the uncertainties that afflict such assessments. Even nuisance, the only effect of aircraft noise that has recently been universally accepted as harmful to individual health. is swiftly put into perspective as ‘complex’, ‘subjective’, ‘emotional’ or ‘irrational’. This model, supported chiefly by stakeholders in the air travel industry and central authorities, relies on objectification through technology, backed up by a particular representation of the validity of knowledge that singularizes disciplines that are ‘pertinent’ to the subject (e.g. psycho-acoustics) as well as relevant scientific methods (e.g. multivariate statistics, econometric analysis, modeling techniques). This objectification is politically productive: in the face of local ‘passionate reactions’, it rationalizes the debate by legitimizing certain arguments and modes of action and delegitimizing others. For example, these stakeholders believe that measurement outcomes for energy and exposure to sound are much more ‘practical’ and ‘acceptable’ than internalizing taxes that could affect the evolution of the air transport industry differently. The separation maintained between these two airtight compartments is a necessary condition for the ‘objectivity’ of both data and measures. Conversely, this political vision of science considers socio political compromise as a form of surrender: ‘In this scheme of things, science is part of the solution of the political problem. the solution of which it renders impossible by continuously threatening to disqualify human assemblies’ (Latour 1999: 59). Supported by this technological legitimation, traditional airport expertise has disqualified local stakeholders by delegitimizing the study of local impacts of aviation noise, making it harder for these to become subjects of both observation and debate.

#### Techno-scientific discourse dooms productive policy making and sacrifices local communities.

Faburel & Levy, ‘9 (Guillaume Faburel Senior Lecturer - University Paris XII Centre for Research on Planning: Land use, Transport, Environment and Local Governments. Lisa Levy PhD Student Centre for Research on Planning: Land use, Transport, Environment and Local Governments “Science, expertise and local knowledge in airport conflicts : Towards a cosmopolitical approach,” Aeromobilities, ed. by Saulo Cwerner, pg. 214-2-18)

While the techno-scientifìc model generally overrides particular spatial contexts, cultural specificities and modes of governance, the territorial model demands impact indicators that are more in line with the lived experiences of local residents, questioning the emphasis on acoustic metrics and the relative absence of social costs from representations of the environmental impact of aviation. This evolving politics of knowledge provides a key element for understanding the emergence of airport conflicts during the past few decades. In opposition to the hegemonic model, local stakeholders suggest new ideas and analytical categories (e.g. social equity, environmental justice) as well as alternative research methods (e.g. surveys) that are more likely to represent the ordinary, local experiences of aircraft noise. During a mediation process at Frankfurt International airport, representatives of local associations vented their frustrations with existing expertise about the airport’s local impacts: ‘[the experts] come here, they look around and deliver their results three days later ... while declaring that their work is scientific.’ In contrast, new evaluation ... while declaring that their work is scientific.’ In contrast. new evaluation instruments can provide bases for dialogue, especially if local residents participate in the processes of evaluation and monitoring (see Kesseiring (Chapter 2), in this volume). One particular knowledge strategy of local groups consists in providing ‘anti-expert opinions’ through detailed analyses of the conditions under which the expertise sponsored by the champions of airport expansion is produced. In Amsterdam. for instance, environmental and residents’ associa tions from several international airport areas ¡n Europe, especially London and Amsterdam, got together to commission such a counter-opinion from a research and policy outfit ¡n Delfi. In Frankfurt, the Rhein-Main institute, with the support of the Zukunft Rhein-Main association, brought together a group of eight researchers ¡n September 2006 in order to evaluate the methodology used for a study that central authorities have used to justify the construc tion of a new runway. However, the critique of official expertise and the emergence of counter-opinions are not devoid of contradictions and difficulties. Many local stakeholders. especially in local authorities, hesitate between fighting aircraft noise and capitalizing on the tangible tax income that airports generate. The constitution of the territorial model of evaluating the environmental impact of aviation provides expertise with an alternative source of legitimacy, namely new forms of local knowledge and know-how. It produces new spatial representations and introduces new experts into the field of airports and air transport, especially from the human and social sciences. These new forms of knowledge allow for alternative modes of expression and representation by local stakeholders. beyond the limitations of protest and direct action. However, the territorial model has encountered difficulties in establishing itself as a real alternative. Historically, because it has had to react to the logic of technical objectivization and reification of effects that are at the same Lime social, and to the uniformity of regulatory norms over different territorial contexts, the consequence is that the hegemonic techno-scientific discourse remains the major reference in debates and conflicts over airport expansion and construction. The reactive nature of the territorial model is illustrated by the reception of debates sponsored by the Commission Consultative de l’Environnement at Roissy CDG (Leroux ci al. 2002) and the Regional Dialog Forum in Frankfurt (Sack 2001; Gels 2003: Lévy 2005: Kesselring 2007). Residents’ associations have described studies such as these. which aimed to nourish debate and defuse latent conflicts, as technocratic and devoid of deeper interest in territories and their experience. One of the consequences of this is that, despite the alternative discourses of local stakeholders such as residents’ groups. who call for greater territorialization of knowledge and modes of intervention, the impact of aircraft noise on airport surroundings remains largely under-investigated, while local identitles find it hard to establish themselves as legitimate issues. This lag derives in part from methods of pricing the local costs of aircraft noise. Myths about the structuring effects of mobility and transportation (Offner 1993) separate what should be kept together (namely, airports and their host communities) and perpetuate the strictly functional representation of airport infrastructure, equipment and surroundings, consolidated in notions such as ‘hub’, ‘gateway’ and hinterland’. This particular coding, which links systems of knowledge and value, has contributed to a collective blindness to the potentially complex and multiple effects of noise on local people.