## \*\*\* 1AC

### 1AC – Aviation Advantage

#### Contention 1 --- Aviation

#### Airlines won’t equip NextGen technology because of lack of cash and confidence

Hinton 11 (Christopher, Reporter – MarketWatch, “Airlines Uneasy Over Costly Bid to Replace Radar”, MarketWatch, 5-19, http://www.marketwatch.com/Story/story/print?guid=D235C056-7D9A-11E0-915A-00212804637C)

Help was supposed to come by scrapping the 1950s-era ground-based air-traffic control system in favor of a 21st-century satellite-based tracking technology. GPS-assisted aircraft could then fly closer together, react faster to changing flight conditions and optimize their landing approaches.

It’s an upgrade that could save the airlines hundred of millions of dollars a year.

But the U.S. plan to achieve that, estimated to cost $40 billion, is stuck on the ground.

Poor planning and the politics of fiscal austerity have left the system only partially installed. Now, airline executives are so disillusioned that they’re balking at buying additional cockpit gear for a program they say isn’t delivering on its promise.

Even avionic suppliers with rich contracts at stake in the plan came up with a novel way of making their equipment more affordable, aircraft operators haven’t changed their position.

“Many carriers — Delta, Southwest, American, United — we have all made significant investments in equipage for our existing fleets that we are not using,” said Delta Air Lines (NYSE:DAL) Chief Executive Richard Anderson, during a recent conference call with reporters. “We want to leverage the technology we have today before we add more technology and more cost.”

For the Federal Aviation Administration, which is overseeing the so-called NextGen plan, the loss of confidence is another black eye for an agency still smarting from the furor over napping air-traffic controllers and a sharp rise in close calls of mid-air collisions.

In a watchdog report last week, the U.S. Department of Transportation’s inspector general criticized the FAA for not coming up with an “integrated master schedule” for NextGen, and highlighted design decisions that put the entire program’s cost and schedule targets at further risk.

Growth goals

In the long run, such uncertainty threatens to undermine the program and its broader economic benefits.

Local officials in the New York area have been hopeful that NextGen would not only drive down delay times, but also allow more aircraft to land at its airports and help spur more than $5 billion in growth by 2030.

For the FAA’s part, agency officials have shrugged off the concerns and defended NextGen phase-in as being on schedule since work began in 2004.

Once it’s online, NextGen is supposed to replace a radar system that first took shape in the aftermath of World War II.

Essentially a GPS system, NextGen is designed to be more accurate than radar and allow computers to track aircraft. Instead of flying in easy-to-monitor “skyways,” pilots could go “off road” and fly more efficient trajectories, supporters say.

The system would also help pilots plan their flight times and plot optimal landing approaches, and it allows dispatchers to narrow the space between arriving aircraft to less than a mile compared with the roughly three miles now maintained. Such optimizing is estimated to reduce flight delays by 35%, lowering fuel use and cutting pollution.

With the price for jet fuel up four-fold in the last decade, it’s a system the airlines can’t start using soon enough. But higher fuel prices have also squeezed profit margins, and some airlines say they can no longer stomach NextGen upgrades done haphazardly or subject to delay.

At the same time, the program’s potential $160 billion in build-out costs over 15 years represent a lucrative target for aerospace and avionics companies like ITT Corp. (USC:ITT) , Boeing Co. (NYSE:BA) , Lockheed Martin Corp. (NYSE:LMT) , Honeywell International Inc. (NYSE:HON) , and General Electric Co. (NYSE:GE) .

Last month, avionic companies acted to soften airlines’ hardened position by having Congressional allies propose a public-private partnership as part of an FAA funding bill. The arrangement aims to lease avionic equipment to aircraft operators, with options to buy.

Loan guarantees

Called the NextGen Equipage Fund, it would be financed with $1.5 billion in private capital, with ITT as the lead investor, and largely guaranteed by the federal government.

Backers say the fund’s advantage is that it can equip the airlines without a large cash outlay or taking on more debt, and payments would be deferred until the FAA delivers the related services, according to Russell Chew, managing partner of Nexa General Partnership Capital, which would manage the fund.

“The deferred payments are an important selling point to airlines that are short on cash, or have been burnt by the U.S. in past attempts to upgrade the traffic-control system,” Chew said.

Some of that equipment would include Automatic Dependent Surveillance-Broadcast, which gives pilots highly accurate data on an aircraft’s position in relation to others. That would allow pilots to fly more efficient trajectories between airports and closely line up their planes on final runway approaches, shortening the times between individual landings and saving fuel.

It could also include revamping communications with a data-exchange system between air traffic controllers and pilots, decreasing the reliance on voice communication and reducing the chance of error. It would also streamline departure clearances, airborne reroutes and taxiway information.

“The fund is enough to equip up to 75% of the retrofit-able aircraft,” Chew said. “And the airlines need the majority of other airlines to get equipped; otherwise you have a mix of planes that burdens air traffic control and reduces NextGen use.”

The House passed the FAA funding bill in April, and it now awaits reconciliation with a version cleared in the Senate.

“If the fund did pass, it would certainly benefit us significantly,” said Clay Jones, CEO of Rockwell Collins Inc. (NYSE:COL) , which builds some the cockpit equipment. “The fund would accelerate airlines’ move to NextGen.”

The ground equipment for Automatic Dependent Surveillance-Broadcast should be in place by 2013, the FAA says.

#### This undermines successful NextGen roll-out --- overall effectiveness depends on commercial upgrades

Dyment 11 (Michael J., General Partner – NextGen Equipage Fund, “Transitioning to Satellite-Based Air Traffic Control”, Geospatial Today, 9-15, Lexis)

The US airline position on NextGen

Airline scepticism of the FAA's ability to deploy, as well as implement, NextGen infrastructure remains high. Al-though FAA procurement reforms have produced significant improvements by using more solid contracting practices that better balance risks, airlines remain concerned about the long lead times between required capital investment, and net benefit realisation. While US airlines seek ATC modernisation and are generally supportive of the NextGen program, vexing challenges remain:

\* NextGen architecture requires an extensive investment in aircraft equipage, from antennas to black box avionics, displays, and ongoing software upgrades. It is widely accepted, for example, that the cost savings afforded by ADS-B "Out" reside primarily with the FAA and its ability to phase out expensive secondary radar systems, while airlines bear most of the cost. This comes when US airlines can little afford to make such nonproductive investments.

\* Major NextGen benefits can be delivered only when more than half of the air transport fleets are equipped and running the new systems. For example, enroute airspace congestion today causes delays from ATC workload saturation and radar-based separation standards. Capacity is limited by controllers' ability to handle multiple aircraft in a given congested enroute sector with delays from excessive miles-in- trail spacing, inefficient vectoring, and airborne holding. A substantial benefit of DataComm for airlines is the reduction in operating costs associated with reducing these delays. Regression analysis shows a 90 per cent correlation between capacity expansion and equipage level.

\* Aircraft equipage issues aside, FAA controllers will need ATC display changes, new procedures, and training in order to cut over to NextGen operations, to realise the benefits. But details remain in the cut-over to NextGen, and will require close cooperation between FAA and airlines.

\* Global interoperability with these new systems and architectures will be essential, and while many working groups are seeking solutions to harmonisation challenges, questions remain about the end-state architectures, requirements and investment costs for both airlines and ATC service providers.

NextGen equipage costs

While FAA infrastructure cost estimates have produced stable figures, not much is agreed upon with respect to exact aircraft equipage costs. Consequently, NextGen Equipage Fund conducted a detailed domestic turbine fleet forecast from 2009 through 2020 to provide estimated aircraft population and demographics as the foundation for the Fund's performance and capacity.

Accurate depiction of the equipage environment requires categorisation of the existing domestic fleet since there are various configurations of avionics within the aircraft fleet currently in service. The NextGen Fund developed a list of categories with the assistance of industry experts. These categories ("Families") are based on aircraft production year and the ARINC engineering standards in operation.

Target equipage segments in the turbine aircraft category and associated unit costs range in estimated cost from about $100,000 to as much as $1 million per aircraft. These estimates are subject to continued equipage cost updates from the analysts at NEXA in surveys of the supply chain vendors hoping to sell into the market in coming years. Assuming that fully NextGen-equipped aircraft from OEMs are not expected to be available until about 2017, it is expected that nearly all deliveries over the next few years will still require some form of retrofit, update, or up-grade.

The forecast used these Families to construct an equipage cost outlook with each existing avionics configuration and the new equipment required to achieve NextGen DataComm, ADS-B, and Air-SWIM capability, including varying com-binations of required equipment.

The NextGen Fund prepared this information to project the cost of equipage for eligible retrofit aircraft within the domestic US fleet. The results from this fleet and cost forecasting process show that the NextGen Fund is expected to equip up to 75 per cent of the commercial air transport retrofit fleet. To address this total cost, the Fund antic-ipates a mix of investment proceeds from the debt and equity raise and future cash flows generated from NextGen Fund operations.

Equipage risk sharing partnership

A plan to share the capital investment risks among key stakeholders is the best way to ensure NextGen equipage targets are met. Figure 5 summarises costs and benefits of participation and risk-sharing by the major stakeholder groups.

Discussions with airlines and FAA have pointed to the need for the parties to enter into agreements to memorialise these shared risks. It is anticipated that a Memorandum of Agreement ("MOA") would commit the three parties to certain obligations and to incur costs as certain capabilities come online, and by extension can begin to produce benefits such as reduced delays, lower fuel costs, greater aircraft utilization, and related incremental new revenues.

Conclusion

Without a large and well-funded equipage financing solution capable of addressing key stakeholder risks, there will be no NextGen system for the United States.

The NextGen Fund intends to remove barriers to equipage that could impede or threaten the long-term success of NextGen program, and to otherwise accelerate airline equipage through a carefully designed financial incentive pack-age , and a business infrastructure to administer equipment purchases and inventories. With the ground-based NextGen infrastructure build-out proceeding, stakeholders now recognise that properly equipping the nation's aircraft fleet stands on the critical path to realising the benefits of a fully functioning NextGen system.

#### Current ATC is extremely outdated. Air traffic will double by 2025, crashing the system.

Williams 9 (Genevra, J.D. Candidate – Southern Methodist University Dedman School of Law and B.B.A. –University of Iowa, “GPS For The Sky: A Survey of Automatic Dependent Surveillance-(ADS-B) and its Implementation in the United States”, Journal of Air Law and Commerce, Spring, 74 J. Air L. & Com. 473, Lexis)

DESPITE ALL of the modern technological advances that everyday consumers enjoy, the United States' air traffic infrastructure is relatively antiquated. A typical college student very well may carry a cell phone with a broadband internet connection, email, a camera, and Global Positioning (GPS) technology, 1 and yet air traffic controller technology is so basic that it can only get an accurate read on an aircraft's position once every six to twelve seconds. 2 "Your child's Xbox video game system is more advanced than the air traffic control system that has been guiding aircraft in and out of increasingly crowded airspace since the 1950s." 3 Demand for air travel is on the rise. The Federal Aviation Administration (FAA) expects passenger traffic to double by 2025, and the World War II-era radar technology that currently manages air traffic in the national air space (NAS) will be incapable of handling it. 4 The ineffectiveness [\*474] of radar impacts air safety, 5 air capacity, and the environment. 6 The solution is Automatic Dependent Surveillance-Broadcast (ADS-B), the central component to the U.S. government's planned overhaul of the entire aviation infrastructure. 7 ADS-B promises to improve safety by allowing aircraft to be precisely and continuously located in the sky, both by air traffic controllers and by other aircraft. 8 This greater precision in air traffic monitoring may lead to improved air capacity by allowing planes to takeoff, fly, and land in tighter formation and in a greater range of weather conditions. 9 This, in turn, will lead to less fuel waste and, consequently, fewer emissions polluting the environment. 10 These benefits have already been proven in both passenger and cargo aircraft, and today we stand at the brink of mandatory use of ADS-B in most U.S. aircraft. 11

This survey of ADS-B technology aims to give aircraft owners and their counsel a comprehensive understanding of current air traffic control challenges and of the FAA's push to implement ADS-B nationwide. Section I discusses today's problems with air traffic management and safety, how ADS-B could solve those problems, and the ways that ADS-B has already been deployed. The FAA expects aircraft passengers to double in the next twenty years. 12 The environment in which our current radar technology operates is chaotic, at best. Air traffic congestion problems are compounded by runway shortages. 13 Air traffic [\*475] controllers, who are stretched thin 14 and embroiled in a bitter labor dispute, 15 rely on World War II 16 radar technology that is simply not equipped to handle such an increase. 17 By utilizing ADS-B, the aviation community can improve situational awareness both on the ground and in the cockpit, increase air capacity, 18 and improve safety. 19 Additionally, this improved efficiency may reduce fuel consumption and consequently reduce greenhouse gas emissions. 20 These benefits have already been demonstrated in Alaska, where there has been a forty-seven percent drop in fatal accidents among aircraft equipped with ADS-B, 21 and at United Parcel Service (UPS), which has enjoyed an increase in flight efficiency and a reduction in fuel costs. 22 Section II discusses ADS-B in the context of the FAA's much larger program to overhaul all aspects of the aviation infrastructure. The project, called Next Generation Air Transportation System (NextGen), aims to transform the aviation infrastructure by integrating all parts of air transportation into a unified information system. 23 Because it will bring air traffic surveillance into the 21st century and provide substantial improvements to the accuracy of air traffic monitoring, ADS-B is a key piece of the broader NextGen program. 24 However, the FAA's poor track record with modernization 25 and an uncertain funding [\*476] future for the FAA 26 mean that NextGen's success is less than certain. At a minimum, it is likely that the ADS-B portion of NextGen will be funded and implemented. Section III analyzes the FAA's proposed regulation to require ADS-B in most U.S. aircraft by 2020. The proposed rule, first released in October 2007, was met with an overwhelming volume of comment and criticism. 27 In response, the FAA convened a panel of stakeholders who analyzed and synthesized the comments into thirty-six recommendations. 28 The panel's recommendations cover a very broad range of topics. 29 Section III focuses on three of their key concerns, including congestion on the radio frequency over which ADS-B will operate, 30 a weak business case for adoption by the general aviation community, 31 and the need for the FAA to develop incentives which will encourage early, voluntary adoption of ADS-B. 32 The Aviation Rulemaking Committee's (ARC) recommendations are discussed with an eye towards how the final rule might be impacted or altered by the feedback. 33 And finally, Section Three discusses the new administration of President Barack Obama, and his newly appointed Secretary of Transportation Ray LaHood. 34 This section makes inferences about how President Obama's nascent administration may impact the ADS-B mandate and whether there will be funding for the program. Based on the Secretary's testimony during his confirmation hearing, 35 and based on the fact that installation [\*477] of the ground system is already in progress, 36 one can be optimistic that funding for ADS-B will be supported by his department.

I. A STORM IS BREWING: CROWDED SKIES, RUNWAY SHORTAGES, AND A LABOR CRISIS PUSH THE U.S. AVIATION INFRASTRUCTURE TO THE BRINK OF BREAKDOWN

Delays at the airport have been the media story de jure for the past two years, 37 but the issues that challenge the most basic components of the U.S. aviation infrastructure are no passing problem. The number of aircraft passengers is expected to double by 2025 - up from 740 million today. 38 This will be fueled both by an increase in commercial aviation passengers and in the number of private aircraft. 39 Huge technological improvements are happening in the realm of private air travel; expansions in the charter plane and fractional ownership sectors have made private flight easier and dramatically more affordable. 40 While this is great news for consumers, it will further tax an already stressed air traffic control system. 41 "A shift of 2 percent of today's commercial passengers to very light jets that seat 4-6 passengers would result in triple the number of flights necessary [\*478] to carry the same number of passengers." 42 "The current system cannot handle the projected traffic demands expected by 2015. Absent modernization, the consequences will be a total system collapse." 43

#### Even if the system survives, delays will escalate, bringing the economy to a stand-still

Toner 12 (Dr. Karlin, Director and Senior Staff Advisor to the Secretary of Transportation for NextGen, Joint Planning and Development Office, “NextGen Topics”, http://www.jpdo.gov/Nextgen\_Topics.asp)

650 Million Passengers and Growing

The demand placed on America's air transportation system has grown significantly over the past 30 years. In 1980, the system carried 281 million passengers. In 2008, it handled nearly 650 million passengers, according to the Department of Transportation. One of the most important benefits of the Next Generation Air Transportation System (NextGen) will be the increase in airspace capacity. Many of the core technologies used in today’s system were first developed during World War II. If the system is to adjust to future demands, new aircraft types, and changing business models, then it has to be updated and transformed to make it more scalable and flexible.

Aviation is Vital to the Economy

Our nation’s economy relies on an air transportation system that moves both people and goods from domestically and throughout the world safely and efficiently. In fact, 5.6% of our economy is represented by the aviation industry, according to the Federal Aviation Administration (FAA). In an October 2008 report entitled “The Economic Impact of Civil Aviation on the U.S. Economy”, the FAA estimates that by 2022, the failure to implement the Next Generation Air Transportation System (NextGen) would cost the US economy $22 billion annually in lost economic activity. Even as early as 2015, an FAA simulation shows that without some of the initial elements of NextGen, there will be far greater air traffic delays than currently experienced, according to the “NextGen Q & A” fact sheet at www.faa.gov.

#### Independently, NextGen is key to ATC reliability --- otherwise, local failures will cause rippling disruption

Williams 9 (Genevra, J.D. Candidate – Southern Methodist University Dedman School of Law and B.B.A. –University of Iowa, “GPS For The Sky: A Survey of Automatic Dependent Surveillance-(ADS-B) and its Implementation in the United States”, Journal of Air Law and Commerce, Spring, 74 J. Air L. & Com. 473, Lexis)

It is against this backdrop that radar technology from World War II currently manages flight traffic in U.S. airspace. 60 Radar works by line of sight and, consequently, an air traffic control center can only manage a plane for as long as it can see it. 61 Like a game of hot potato, air traffic controllers must pass an airplane from control station to control station across the country until it reaches its destination. 62 The technology is further limited in that it can take up to thirty-six seconds to accurately identify an aircraft's position, 63 and sometimes it is difficult to distinguish between planes and other "clutter" like birds or heavy weather. 64 Furthermore, pilots do not even possess the situational awareness, albeit flawed, that controllers have. 65 In general, pilots in radar-controlled airspace must be steered by air traffic control, both to the necessary navigational direction and to the required horizontal position in the airspace. 66 They must ask "Mother may I?" if they ever want to deviate from their prescribed path. 67

The uncertainty and limitations of radar mean that air traffic controllers must build in a wide cushion between aircraft in flight; a minimum of five miles must be maintained between planes flying at the same horizontal level. 68 These "wide safety buffers" 69 reduce the number of planes that are allowed to travel in a given section of air space and slow down the takeoff and landing process. 70 This also means that pilots are confined to a [\*481] network of "highways in the sky." 71 Rather than flying the most direct route between destinations, they must navigate our air space via a web of flight paths designed to keep airplanes separated, both vertically and horizontally. 72 Pilots generally must stick to these predetermined flight paths, and thus have little flexibility to fly a more direct route or to navigate around traffic jams. 73

These factors contribute to a flying environment which feels like it teeters at the brink of chaos every day. 74 For example, in August 2008, a computer breakdown at an FAA facility which processes flight plans caused hundreds of flights to be delayed, impacting all forty of the nation's major airports. 75 In another example from September 2007, the system that feeds radar data into the Air Route Traffic Control Center in Memphis, TN, brought a halt to all air traffic within a 250-mile radius, causing a "ripple effect in several airports" including Dallas, TX, and Nashville, TN, among others. 76 In July 2006, a vehicle crashing into a power pole caused a power outage at the Palmdale, CA, air traffic control facility, whose backup generator then malfunctioned, silencing the center for eighty minutes. 77 This caused an hour long delay of flights into and out of Southern California and triggered flight delays throughout the western United States and Canada. 78

#### That collapses the global economy --- NextGen solves

AIA 11 (Aerospace Industries Association, “Civil Aviation – Second to None”, http://www.aia-aerospace.org/assets/ip\_civil\_2011.pdf)

ISSUE: The U.S. civil aviation industry plays a vital role in the health of the world’s economy. BACKGROUND The most recent data show that the sale of goods and services tied directly or indirectly to civil aviation constituted $1.3 trillion, or about 5.6 percent of the nation’s total gross domestic product in 2009. Our industry directly and indirectly sustains nearly 12 million jobs. The U.S. aerospace industry remains the single largest contributor to the nation’s balance of trade, with $87 billion in exports and a $57.4 billion trade surplus in 2011. The global recession of the past few years has reduced demand for leisure and business travel and the shipment of just-in-time goods. Many of our nation’s aging aviation infrastructure limitations have been masked by the economic slowdown. Delays are down; aircraft CO2 emissions are 10 percent below 2005 levels. Yet, our 1960s-era air traffic control system will not be able to handle demand when it returns. Unless we invest in sorely needed transformational aviation infrastructure now, civil aviation generated economic growth will be stunted and the economic cost of system delay will likely eclipse $40 billion annually by 2012. FAA has already invested more than$3 billion in the Next Generation Air Transportation System and plans to spend up to $20 billion more. The contract to install ADS-B ground stations throughout the country is on time and on budget and should be completed by 2013. The economic and environmental benefits of NextGen, when fully implemented, are impressive. Routing and delay-reducing efficiencies will save billions of dollars annually and save more than a billion gallons of fuel. Those are conservative estimates which will provide an economic return on government investment in less than three years and will be the environmental equivalent of removing 2.2 million cars off the road. The global aviation industry has committed to improve overall fuel efficiency by 1.5 percent per year through 2020; achieve carbon neutral growth from 2020; and cut aviation’s net CO2 emissions in half by 2050 compared to 2005 levels. One of the biggest impediments to confidence in the country’s commitment to implement NextGen expeditiously is that our National Airspace System has been operating without an updated program and funding authority (a FAA Reauthorization Bill) for nearly four years. This unprecedented delay in modernizing the statutes that govern the oversight and operation of the most complex aviation authority in the world has had numerous deleterious effects. New starts are prohibited. Programs are not anchored to long-term financial authority. And new concepts and technologies such as unmanned aircraft systems are held back while other nations march forward. AIA RECOMMENDATIONS Like our national defense, funding for the safety and efficiency of our nation’s aviation infrastructure should never be shortchanged. The safe and fiscally sensible course of action is to accelerate, not delay, the implementation of NextGen. By doing so, we invigorate the economy, generate jobs, save fuel, reduce CO2 emissions and, most importantly, improve system safety. To do this most effectively, AIA recommends that:  The Transportation Department swiftly review and implement the 23 recommendations of the Future of Aviation Advisory Committee;  Congress pass a multi-year FAA Reauthorization Bill as soon as possible; and  Congress ensure NextGen implementation stays on schedule by fully funding FAA’s capital and RE&D accounts

#### Global nuclear war

**Auslin 9** (Michael, Resident Scholar – American Enterprise Institute, and Desmond Lachman – Resident Fellow – American Enterprise Institute, “The Global Economy Unravels”, Forbes, 3-6, http://www.aei.org/article/100187)

What do these trends mean in the short and medium term? The Great Depression showed how social and global chaos followed hard on economic collapse. The mere fact that parliaments across the globe, from America to Japan, are unable to make responsible, economically sound recovery plans suggests that they do not know what to do and are simply hoping for the least disruption. Equally worrisome is the adoption of more statist economic programs around the globe, and the concurrent decline of trust in free-market systems. The threat of instability is a pressing concern. China, until last year the world's fastest growing economy, just reported that 20 million migrant laborers lost their jobs. Even in the flush times of recent years, China faced upward of 70,000 labor uprisings a year. A sustained downturn poses grave and possibly immediate threats to Chinese internal stability. The regime in Beijing may be faced with a choice of repressing its own people or diverting their energies outward, leading to conflict with China's neighbors. Russia, an oil state completely dependent on energy sales, has had to put down riots in its Far East as well as in downtown Moscow. Vladimir Putin's rule has been predicated on squeezing civil liberties while providing economic largesse. If that devil's bargain falls apart, then wide-scale repression inside Russia, along with a continuing threatening posture toward Russia's neighbors, is likely. Even apparently stable societies face increasing risk and the threat of internal or possibly external conflict. As Japan's exports have plummeted by nearly 50%, one-third of the country's prefectures have passed emergency economic stabilization plans. Hundreds of thousands of temporary employees hired during the first part of this decade are being laid off. Spain's unemployment rate is expected to climb to nearly 20% by the end of 2010; Spanish unions are already protesting the lack of jobs, and the specter of violence, as occurred in the 1980s, is haunting the country. Meanwhile, in Greece, workers have already taken to the streets. Europe as a whole will face dangerously increasing tensions between native citizens and immigrants, largely from poorer Muslim nations, who have increased the labor pool in the past several decades. Spain has absorbed five million immigrants since 1999, while nearly 9% of Germany's residents have foreign citizenship, including almost 2 million Turks. The xenophobic labor strikes in the U.K. do not bode well for the rest of Europe. A prolonged global downturn, let alone a collapse, would dramatically raise tensions inside these countries. Couple that with possible protectionist legislation in the United States, unresolved ethnic and territorial disputes in all regions of the globe and a loss of confidence that world leaders actually know what they are doing. The result may be a series of small explosions that coalesce into a big bang.

#### NextGen maximizes efficiency, solves congestion, and boosts airport capacity --- certain investment’s key

ACI 11 (Airports Council International – Global Association of Airports, “Air Traffic Modernization”, 11-12, http://aci-na.org/static/entransit/Air%20Traffic%20Modernization%20Fact%20Sheet.pdf)

THE NEED FOR AIR TRAFFIC MODERNIZATION IS AN AIRPORT PRIORITY

Maximizing the safe and efficient use of the airspace and airports is critical to accommodating future aviation demand. If the aviation industry is to meet the challenge of Federal Aviation Administration (FAA) forecasts that predict one billion passengers by 2015 and a doubling of today’s passenger levels by 2025, it will require substantial improvements and investments in the air traffic control system, just as it will require federal and local capital investments in airport infrastructure. Airports believe that these investments require that the FAA have a stable and predictable funding system to ensure sufficient capital resources are available.

WHAT IS NEXTGEN?

The Next Generation Air Transportation System (NextGen) includes a set of FAA initiatives that will apply new technologies, set standards and develop new procedures that together will transform today’s ground-based air traffic control system to a system based on a combination of ground and satellite navigational capabilities having far greater precision and capability. Once the core elements of NextGen are in place, air carriers, general aviation and the military will be able to use the airspace and airport operating environments in a safer, more sustainable and efficient manner, helping to enable the FAA and aviation industry to continuously improve performance and meet the challenges of the future.

HOW DOES NEXTGEN ADDRESS AIRPORT NEEDS?

NextGen would increase capacity in the enroute and terminal environments, particularly in weather conditions that today cause en route and terminal airspace capacity to drop, resulting in delays and cancellations and less than desirable passenger experiences. If investments are not made, and the full benefits of NextGen are not realized, airspace capacity will be insufficient to meet forecasts and system disruptions will become routine.

Following are three areas where air traffic modernization and NextGen can play important roles:

• Airport Safety: As aircraft traffic increases, surface movements of aircraft and other vehicles on the airfield grows significantly. This raises the potential for accidents and equipment damage on runways and taxiways as well as for traffic gridlock on the airfield. It is vital that both air traffic controllers and air crews have updated information available to them that accurately determines the position and identification of aircraft and surface vehicles so that safety and airfield throughput can be maintained.

• Airspace: Today, much of the airspace surrounding our nation’s most intensively used airports is congested, limiting system capacity. Without modernization, this challenge will only increase as the projected numbers of commercial and general aviation aircraft accessing congested airspace is forecast to grow significantly. By reducing aircraft spacing and separation requirements and better managing traffic in, out and within busy terminal airspace, NextGen will safely permit more aircraft to operate in these areas and be routed to the appropriate airports in the region.

• Airport Capacity: Many of busiest airports today have runway configurations that do not permit independent arrival and departure streams when aircraft are operating under Instrument Meteorological Conditions (IMC) and flight minimums must be raised. As a result under IMC conditions aircraft spacing and separation must be increased, airport arrival and departure rates drop, and the system is forced to queue, divert, delay or cancel flights. By enabling pilots and controllers to more accurately identify the exact position of aircraft, more precise routes in and out of airports can be flown, increasing throughput during almost all weather conditions.

#### NextGen boosts general aviation

Toner 12 (Dr. Karlin, Director and Senior Staff Advisor to the Secretary of Transportation for NextGen, Joint Planning and Development Office, “NextGen Topics”, http://www.jpdo.gov/Nextgen\_Topics.asp)

The Next Generation Air Transportation System (NextGen) will benefit the General Aviation (GA) community in the following ways:

Preservation of Small Airports

The JPDO recognizes the importance of the 5,000-plus airfields that support the GA community and the valuable capacity that they add to the National Airspace System (NAS).

Better Weather Information

Better weather information will help disseminate weather situational awareness and create a common weather picture for all pilots.

Equivalent Visual Operations in Marginal IMC

With NextGen, bad weather will have less of an adverse impact on flight. In most situations, pilots and controllers will collaborate in real-time to adjust routes and maneuver around storms.

Greater Access to Terminal Airspace

Flexible management of the airspace, coupled with improved weather forecast accuracy, new communications, and surveillance and navigational capabilities, allows access to more airspace, more of the time, with reduced impact on traffic flows. This will maximize access for all traffic, while rewarding those aircraft with advanced capabilities that support the air traffic management system. In addition, because of the reduced "footprint" required for these operations, classic Visual Flight Rules (VFR) operations will have more access around major airports.

Security Targeted to Risk

The assessment of risks under NextGen provides a prioritized list of vulnerabilities and potential mitigation. For example, external attacks on aircraft may be an issue at some airports, requiring mitigation. Fortunately, this means that most GA airports will not be as vulnerable to these risks.

#### It’s declining and ripples across the economy

NBAA 9 (National Business Aviation Association, “General Aviation Industry Hurting During Economic Downturn”, 3-30, http://www.nbaa.org/advocacy/issues/economic-downturn/recession.php)

General aviation is an essential economic generator directly or indirectly employing over 1.26 million people nationwide according a 2006 economic study by Merge Global. These jobs generate $150 billion in economic activity across the United States, including states like California ($18B), Texas ($11B), Georgia ($9B), and Kansas ($7B). Our industry is continuing to build a strong American manufacturing and employment base that contributes positively to our national balance of trade. Congress recognized just how fundamental general aviation is to our nation's transportation system, rural economies, manufacturing capability, and balance of trade when it passed the General Aviation Revitalization Act a little more than a decade ago.

There's no question that in communities across the country, general aviation means millions of jobs: jobs in aircraft manufacture (the U.S. industry leads the world), jobs for people in small towns (where companies use airplanes to reach new markets), and jobs in flight support (including schedulers, dispatchers, maintenance technicians, pilots, training professionals, and airport employees to name just a few examples).

Unfortunately, the people and businesses in general aviation are weathering one of the worst economic storms anyone has ever seen. The impact of the flagging economy on the companies and communities that rely on general aviation is visible in all parts of the country. Following are some examples:

GA Manufacturing has been hit hard by the economy

The general aviation industry supports highly skilled, well-paying jobs for engineers and manufacturing line workers who design and build aircraft in places like Savannah, Wichita, and Little Rock and for hundreds of component manufacturers such as GE, Honeywell, and Pratt and Whitney that supply them with parts including many small businesses. GA is an important national industry that contributes greatly to the economy and to local tax bases. These suppliers also contribute extensively to aircraft produced by foreign companies like Dassault, Embraer, and Bombardier. The collective direct earnings of general aviation exceed $53 billion.

Layoffs

The industry started feeling the effects of the downturn last fall and since then US members of the General Aviation Manufacturers Association (employing 144,000 people in the U.S.) have laid off over 12,155 people to adjust to the economy with thousands more among suppliers and additional layoffs pending. In addition, some general aviation manufacturers, including Adam Aircraft and Eclipse Aviation, have declared bankruptcy and ceased production.

Backlog and Loss of Orders

Our industry held a record backlog of $83 billion at the end of the third quarter 2008, but it is rapidly shrinking. Customers are not placing orders which results in the backlog shrinking by $6-7 billion each quarter. Customers are also cancelling or delaying orders as they manage their own finances and schedule for capital purchases.

At the same time, the used aircraft market is saturated with inventory levels for business jets reaching over 17%. Criticism of business aviation risks further flooding the used aircraft market and depressing prices.

Exports

Our industry is a strong contributor to U.S. exports with a total of 1,161 airplanes exported in 2008. The export billings reached $5.86 billion. The aggregate aviation industry, including GA has a positive impact on the US trade balance. Our exports accounted for 43.9 percent of the total value of U.S. manufactured general aviation airplanes in 2008.

GA Flight Activity is in Decline

According to FAA data, overall general aviation traffic volumes in January 2009 are down 23% compared to January 2008. The same data reports the change in business jet operations is a decline of 28.3 percent for January 2009 compared to January 2008 year-over-year.

Small airports are operating ‘in the red'

There are more than 5,000 public use airports located in communities across the country. Approximately 470 of these airports have commercial airline service – making general aviation a critical lifeline for smaller communities. Many of these smaller airports are seeing their revenues plummet as general aviation flight hours decrease. For example, Aviation International News recently reported that: "A decline of nearly 20 percent in jet fuel sales has helped drag the Salina Airport Authority's 2008 budget into the red. The airport authority gets 6.6 cents from every gallon of jet fuel sold at the airport. That surcharge provides almost an eighth of the authority's operating revenue. ‘It confirms that business jet use and travel is down,' said Tim Rogers, executive director."

The bottom line is that the people and businesses in general aviation are subject to the sluggish economy just like everyone else. And all the information available confirms that when a recession hits general aviation, the impact is felt all across America's economy.

#### Farm yields will plummet without general aviation

Maher 1 (Guy R., Business Owner and Aircraft Appraiser with 12,000 Flight Hours in General Aviation Airplanes and Helicopters, “Owner’s Handbook: Cream of the Crops”, General Aviation News, 1-1, http://www.generalaviationnews.com/2001/01/01/owners-handbook-cream-of-the-crops/)

Light aircraft are trainers, check-runners, news gatherers, ambulances, taxis, tour guides, fire fighters, police patrollers and family haulers. That’s what general aviation is all about.

As aviation enthusiasts, I am sure we all share the same disgust when we hear the uninformed (mainstream media, non-pilots, etc.) make generalizations about aviation that are incorrect. Well, over the past six months, I have gotten an incredibly up-close and personal look into another industry that puts aircraft to work — and hard work, at that. This is the agricultural industry. And I found that my generalized perceptions about agricultural aviation were way off the mark.

Like all modern industries, today’s farmers use technologically advanced methods, equipment and products. These tools assist in providing food and fiber for the world’s growing population and protecting our natural resources. As part of this, aircraft are used to apply crop protection products in a safe, efficient, economical and environmentally friendly manner.

Without crop protection products to control insects, weeds and diseases, crop yields per acre would drop by more than 50%, according to the National Agricultural Aviation Association. It’s more than 1,250 agricultural operator members who accomplish more crop protection in one hour than ground equipment can in a day, the association claims.

#### Extinction

Lugar 4 (Richard G., U.S. Senator – Indiana and Former Chair – Senate Foreign Relations Committee, “Plant Power”, Our Planet, 14(3), http://www.unep.org/ourplanet/imgversn/143/lugar.html)

In a world confronted by global terrorism, turmoil in the Middle East, burgeoning nuclear threats and other crises, it is easy to lose sight of the long-range challenges. But we do so at our peril. One of the most daunting of them is meeting the world’s need for food and energy in this century. At stake is not only preventing starvation and saving the environment, but also world peace and security. History tells us that states may go to war over access to resources, and that poverty and famine have often bred fanaticism and terrorism. Working to feed the world will minimize factors that contribute to global instability and the proliferation of weapons of mass destruction.
With the world population expected to grow from 6 billion people today to 9 billion by mid-century, the demand for affordable food will increase well beyond current international production levels. People in rapidly developing nations will have the means greatly to improve their standard of living and caloric intake. Inevitably, that means eating more meat. This will raise demand for feed grain at the same time that the growing world population will need vastly more basic food to eat.

Complicating a solution to this problem is a dynamic that must be better understood in the West: developing countries often use limited arable land to expand cities to house their growing populations. As good land disappears, people destroy timber resources and even rainforests as they try to create more arable land to feed themselves. The long-term environmental consequences could be disastrous for the entire globe.
Productivity revolution
To meet the expected demand for food over the next 50 years, we in the United States will have to grow roughly three times more food on the land we have. That’s a tall order. My farm in Marion County, Indiana, for example, yields on average 8.3 to 8.6 tonnes of corn per hectare – typical for a farm in central Indiana. To triple our production by 2050, we will have to produce an annual average of 25 tonnes per hectare.

Can we possibly boost output that much? Well, it’s been done before. Advances in the use of fertilizer and water, improved machinery and better tilling techniques combined to generate a threefold increase in yields since 1935 – on our farm back then, my dad produced 2.8 to 3 tonnes per hectare. Much US agriculture has seen similar increases.

But of course there is no guarantee that we can achieve those results again. Given the urgency of expanding food production to meet world demand, we must invest much more in scientific research and target that money toward projects that promise to have significant national and global impact. For the United States, that will mean a major shift in the way we conduct and fund agricultural science. Fundamental research will generate the innovations that will be necessary to feed the world.

The United States can take a leading position in a productivity revolution. And our success at increasing food production may play a decisive humanitarian role in the survival of billions of people and the health of our planet.

### 1AC – Environment Advantage

#### Contention 2 --- Environment

#### Warming’s anthropogenic and accelerating

Rahmstorf 8 (Richard, Professor of Physics of the Oceans – Potsdam University, “Anthopogenic Climate Change?”, Global Warming: Looking Beyond Kyoto, Ed. Zedillo, p. 42-49)

It is time to turn to statement B: human activities are altering the climate. This can be broken into two parts. The first is as follows: global climate is warming. This is by now a generally undisputed point (except by novelist Michael Crichton), so we deal with it only briefly. The two leading compilations of data measured with thermometers are shown in figure 3-3, that of the National Aeronautics and Space Administration (NASA) and that of the British Hadley Centre for Climate Change. Although they differ in the details, due to the inclusion of different data sets and use of different spatial averaging and quality control procedures, they both show a consistent picture, with a global mean warming of 0.8°C since the late nineteenth century. Temperatures over the past ten years clearly were the warmest since measured records have been available. The year 1998 sticks out well above the longterm trend due to the occurrence of a major El Nino event that year (the last El Nino so far and one of the strongest on record). These events are examples of the largest natural climate variations on multiyear time scales and, by releasing heat from the ocean, generally cause positive anomalies in global mean temperature. It is remarkable that the year 2005 rivaled the heat of 1998 even though no El Nino event occurred that year. (A bizarre curiosity, perhaps worth mentioning, is that several prominent "climate skeptics" recently used the extreme year 1998 to claim in the media that global warming had ended. In Lindzen's words, "Indeed, the absence of any record breakers during the past seven years is statistical evidence that temperatures are not increasing.")33 In addition to the surface measurements, the more recent portion of the global warming trend (since 1979) is also documented by satellite data. It is not straightforward to derive a reliable surface temperature trend from satellites, as they measure radiation coming from throughout the atmosphere (not just near the surface), including the stratosphere, which has strongly cooled, and the records are not homogeneous' due to the short life span of individual satellites, the problem of orbital decay, observations at different times of day, and drifts in instrument calibration.' Current analyses of these satellite data show trends that are fully consistent with surface measurements and model simulations." If no reliable temperature measurements existed, could we be sure that the climate is warming? The "canaries in the coal mine" of climate change (as glaciologist Lonnie Thompson puts it) ~are mountain glaciers. We know, both from old photographs and from the position of the terminal moraines heaped up by the flowing ice, that mountain glaciers have been in retreat all over the world during the past century. There are precious few exceptions, and they are associated with a strong increase in precipitation or local cooling.36 I have inspected examples of shrinking glaciers myself in field trips to Switzerland, Norway, and New Zealand. As glaciers respond sensitively to temperature changes, data on the extent of glaciers have been used to reconstruct a history of Northern Hemisphere temperature over the past four centuries (see figure 3-4). Cores drilled in tropical glaciers show signs of recent melting that is unprecedented at least throughout the Holocene-the past 10,000 years. Another powerful sign of warming, visible clearly from satellites, is the shrinking Arctic sea ice cover (figure 3-5), which has declined 20 percent since satellite observations began in 1979. While climate clearly became warmer in the twentieth century, much discussion particularly in the popular media has focused on the question of how "unusual" this warming is in a longer-term context. While this is an interesting question, it has often been mixed incorrectly with the question of causation. Scientifically, how unusual recent warming is-say, compared to the past millennium-in itself contains little information about its cause. Even a highly unusual warming could have a natural cause (for example, an exceptional increase in solar activity). And even a warming within the bounds of past natural variations could have a predominantly anthropogenic cause. I come to the question of causation shortly, after briefly visiting the evidence for past natural climate variations. Records from the time before systematic temperature measurements were collected are based on "proxy data," coming from tree rings, ice cores, corals, and other sources. These proxy data are generally linked to local temperatures in some way, but they may be influenced by other parameters as well (for example, precipitation), they may have a seasonal bias (for example, the growth season for tree rings), and high-quality long records are difficult to obtain and therefore few in number and geographic coverage. Therefore, there is still substantial uncertainty in the evolution of past global or hemispheric temperatures. (Comparing only local or regional temperature; as in Europe, is of limited value for our purposes,' as regional variations can be much larger than global ones and can have many regional causes, unrelated to global-scale forcing and climate change.) The first quantitative reconstruction for the Northern Hemisphere temperature of the past millennium, including an error estimation, was presented by Mann, Bradley, and Hughes and rightly highlighted in the 2001 IPCC report as one of the major new findings since its 1995 report; it is shown in figure 3\_6.39 The analysis suggests that, despite the large error bars, twentieth-century warming is indeed highly unusual and probably was unprecedented during the past millennium. This result, presumably because of its symbolic power, has attracted much criticism, to some extent in scientific journals, but even more so in the popular media. The hockey stick-shaped curve became a symbol for the IPCC, .and criticizing this particular data analysis became an avenue for some to question the credibility of the IPCC. Three important things have been overlooked in much of the media coverage. First, even if the scientific critics had been right, this would not have called into question the very cautious conclusion drawn by the IPCC from the reconstruction by Mann, Bradley, and Hughes: "New analyses of proxy data for the Northern Hemisphere indicate that the increase in temperature in the twentieth century is likely to have been the largest of any century during the past 1,000 years." This conclusion has since been supported further by every single one of close to a dozen new reconstructions (two of which are shown in figure 3-6). Second, by far the most serious scientific criticism raised against Mann, Hughes, and Bradley was simply based on a mistake. 40 The prominent paper of von Storch and others, which claimed (based on a model test) that the method of Mann, Bradley, and Hughes systematically underestimated variability, "was [itself] based on incorrect implementation of the reconstruction procedure."41 With correct implementation, climate field reconstruction procedures such as the one used by Mann, Bradley, and Hughes have been shown to perform well in similar model tests. Third, whether their reconstruction is accurate or not has no bearing on policy. If their analysis underestimated past natural climate variability, this would certainly not argue for a smaller climate sensitivity and thus a lesser concern about the consequences of our emissions. Some have argued that, in contrast, it would point to a larger climate sensitivity. While this is a valid point in principle, it does not apply in practice to the climate sensitivity estimates discussed herein or to the range given by IPCC, since these did not use the reconstruction of Mann, Hughes, and Bradley or any other proxy records of the past millennium. Media claims that "a pillar of the Kyoto Protocol" had been called into question were therefore misinformed. As an aside, the protocol was agreed in 1997, before the reconstruction in question even existed. The overheated public debate on this topic has, at least, helped to attract more researchers and funding to this area of paleoclimatology; its methodology has advanced significantly, and a number of new reconstructions have been presented in recent years. While the science has moved forward, the first seminal reconstruction by Mann, Hughes, and Bradley has held up remarkably well, with its main features reproduced by more recent work. Further progress probably will require substantial amounts of new proxy data, rather than further refinement of the statistical techniques pioneered by Mann, Hughes, and Bradley. Developing these data sets will require time and substantial effort. It is time to address the final statement: most of the observed warming over the past fifty years is anthropogenic. A large number of studies exist that have taken different approaches to analyze this issue, which is generally called the "attribution problem." I do not discuss the exact share of the anthropogenic contribution (although this is an interesting question). By "most" I imply mean "more than 50 percent.” The first and crucial piece of evidence is, of course, that the magnitude of the warming is what is expected from the anthropogenic perturbation of the radiation balance, so anthropogenic forcing is able to explain all of the temperature rise. As discussed here, the rise in greenhouse gases alone corresponds to 2.6 W/tn2 of forcing. This by itself, after subtraction of the observed 0'.6 W/m2 of ocean heat uptake, would Cause 1.6°C of warming since preindustrial times for medium climate sensitivity (3"C). With a current "best guess'; aerosol forcing of 1 W/m2, the expected warming is O.8°c. The point here is not that it is possible to obtain the 'exact observed number-this is fortuitous because the amount of aerosol' forcing is still very' uncertain-but that the expected magnitude is roughly right. There can be little doubt that the anthropogenic forcing is large enough to explain most of the warming. Depending on aerosol forcing and climate sensitivity, it could explain a large fraction of the warming, or all of it, or even more warming than has been observed (leaving room for natural processes to counteract some of the warming). The second important piece of evidence is clear: there is no viable alternative explanation. In the scientific literature, no serious alternative hypothesis has been proposed to explain the observed global warming. Other possible causes, such as solar activity, volcanic activity, cosmic rays, or orbital cycles, are well observed, but they do not show trends capable of explaining the observed warming. Since 1978, solar irradiance has been measured directly from satellites and shows the well-known eleven-year solar cycle, but no trend. There are various estimates of solar variability before this time, based on sunspot numbers, solar cycle length, the geomagnetic AA index, neutron monitor data, and, carbon-14 data. These indicate that solar activity probably increased somewhat up to 1940. While there is disagreement about the variation in previous centuries, different authors agree that solar activity did not significantly increase during the last sixty-five years. Therefore, this cannot explain the warming, and neither can any of the other factors mentioned. Models driven by natural factors only, leaving the anthropogenic forcing aside, show a cooling in the second half of the twentieth century (for an example, See figure 2-2, panel a, in chapter 2 of this volume). The trend in the sum of natural forcings is downward. The only way out would be either some as yet undiscovered unknown forcing or a warming trend that arises by chance from an unforced internal variability in the climate system. The latter cannot be completely ruled out, but has to be considered highly unlikely. No evidence in the observed record, proxy data, or current models suggest that such internal variability could cause a sustained trend of global warming of the observed magnitude. As discussed, twentieth century warming is unprecedented over the past 1,000 years (or even 2,000 years, as the few longer reconstructions available now suggest), which does not 'support the idea of large internal fluctuations. Also, those past variations correlate well with past forcing (solar variability, volcanic activity) and thus appear to be largely forced rather than due to unforced internal variability." And indeed, it would be difficult for a large and sustained unforced variability to satisfy the fundamental physical law of energy conservation. Natural internal variability generally shifts heat around different parts of the climate system-for example, the large El Nino event of 1998, which warmed, the atmosphere by releasing heat stored in the ocean. This mechanism implies that the ocean heat content drops as the atmosphere warms. For past decades, as discussed, we observed the atmosphere warming and the ocean heat content increasing, which rules out heat release from the ocean as a cause of surface warming. The heat content of the whole climate system is increasing, and there is no plausible source of this heat other than the heat trapped by greenhouse gases. ' A completely different approach to attribution is to analyze the spatial patterns of climate change. This is done in so-called fingerprint studies, which associate particular patterns or "fingerprints" with different forcings. It is plausible that the pattern of a solar-forced climate change differs from the pattern of a change caused by greenhouse gases. For example, a characteristic of greenhouse gases is that heat is trapped closer to the Earth's surface and that, unlike solar variability, greenhouse gases tend to warm more in winter, and at night. Such studies have used different data sets and have been performed by different groups of researchers with different statistical methods. They consistently conclude that the observed spatial pattern of warming can only be explained by greenhouse gases.49 Overall, it has to be considered, highly likely' that the observed warming is indeed predominantly due to the human-caused increase in greenhouse gases. ' This paper discussed the evidence for the anthropogenic increase in atmospheric CO2 concentration and the effect of CO2 on climate, finding that this anthropogenic increase is proven beyond reasonable doubt and that a mass of evidence points to a CO2 effect on climate of 3C ± 1.59C global-warming for a doubling of concentration. (This is, the classic IPCC range; my personal assessment is that, in-the light of new studies since the IPCC Third Assessment Report, the uncertainty range can now be narrowed somewhat to 3°C ± 1.0C) This is based on consistent results from theory, models, and data analysis, and, even in the absence-of any computer models, the same result would still hold based on physics and on data from climate history alone. Considering the plethora of consistent evidence, the chance that these conclusions are wrong has to be considered minute. If the preceding is accepted, then it follows logically and incontrovertibly that a further increase in CO2 concentration will lead to further warming. The magnitude of our emissions depends on human behavior, but the climatic response to various emissions scenarios can be computed from the information presented here. The result is the famous range of future global temperature scenarios shown in figure 3\_6.50 Two additional steps are involved in these computations: the consideration of anthropogenic forcings other than CO2 (for example, other greenhouse gases and aerosols) and the computation of concentrations from the emissions. Other gases are not discussed here, although they are important to get quantitatively accurate results. CO2 is the largest and most important forcing. Concerning concentrations, the scenarios shown basically assume that ocean and biosphere take up a similar share of our emitted CO2 as in the past. This could turn out to be an optimistic assumption; some models indicate the possibility of a positive feedback, with the biosphere turning into a carbon source rather than a sink under growing climatic stress. It is clear that even in the more optimistic of the shown (non-mitigation) scenarios, global temperature would rise by 2-3°C above its preindustrial level by the end of this century. Even for a paleoclimatologist like myself, this is an extraordinarily high temperature, which is very likely unprecedented in at least the past 100,000 years. As far as the data show, we would have to go back about 3 million years, to the Pliocene, for comparable temperatures. The rate of this warming (which is important for the ability of ecosystems to cope) is also highly unusual and unprecedented probably for an even longer time. The last major global warming trend occurred when the last great Ice Age ended between 15,000 and 10,000 years ago: this was a warming of about 5°C over 5,000 years, that is, a rate of only 0.1 °C per century. 52 The expected magnitude and rate of planetary warming is highly likely to come with major risk and impacts in terms of sea level rise (Pliocene sea level was 25-35 meters higher than now due to smaller Greenland and Antarctic ice sheets), extreme events (for example, hurricane activity is expected to increase in a warmer climate), and ecosystem loss. The second part of this paper examined the evidence for the current warming of the planet and discussed what is known about its causes. This part showed that global warming is already a measured and-well-established fact, not a theory. Many different lines of evidence consistently show that most of the observed warming of the past fifty years was caused by human activity. Above all, this warming is exactly what would be expected given the anthropogenic rise in greenhouse gases, and no viable alternative explanation for this warming has been proposed in the scientific literature. Taken together., the very strong evidence accumulated from thousands of independent studies, has over the past decades convinced virtually every climatologist around the world (many of whom were initially quite skeptical, including myself) that anthropogenic global warming is a reality with which we need to deal.

#### Extinction

Cummins 10 (Ronnie, International Director – Organic Consumers Association and Will Allen, 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."

#### Airline emissions are key

Hodgkinson 7 – David Hodgkinson et al, June 2007, Associate Professor in the Law School at UWA; Special Counsel with Clayton Utz, a national Australian law firm; and a principal of The Hodgkinson Group, a consulting firm with advisors located around the world. David is the co-author of the book Global Climate Change: Australian Law and Policy (2008) and the general editor of Australian Climate Change Law and Policy (2009). As executive director of EcoCarbon, a non-profit organisation, he manages an industry partnership which is building capacity in mechanisms designed to reduce greenhouse gas emissions. He also leads an international project team working on a draft convention for persons displaced by climate change, “STRATEGIES FOR AIRLINES ON AIRCRAFT EMISSIONS AND CLIMATE CHANGE: SUSTAINABLE, LONG - TERM SOLUTIONS”, <http://www.hodgkinsongroup.com/documents/Hodgkinson_airline_emissions.bak.pdf>

A number of organisations such as the Intergovernmental Panel on Climate Change (IPCC), Oxford University, the Massachusetts Institute of Technology (MIT) and the Tyndall Centre, for example, have studied the impacts of aviation on the global atmosphere. These studies, together with reports from Royal Commissions and other inquiries, make the following points clear: the climate change impacts of aviation are significantly worse than those of its carbon dioxide emissions alone. Further, reference to aviation being responsible for 2% of global carbon dioxide emissions is misleading as the figure (a) is based on total anthropogenic carbon dioxide emissions in 1992 (as determined by the IPCC), not 2007; (b) does not take into account aviation’s non-CO2 greenhouse gas (GHG) emissions which significantly contribute to the climate change impacts of aviation; and (c) ignores growth in air travel; air travel demand is growing at unprecedented rates, yet substantial reductions of aviation GHG emissions are not possible in the short to medium term; not only are emissions from air travel increasing significantly in absolute terms but, against a background of emissions reductions from many other sources, their relative rate of increase is even greater. Put another way, “if the [recommended] reductions in carbon dioxide emissions from groundlevel activities … are achieved, and the growth in air transport projected by the IPCC materialises, then air travel will become one of the major sources of anthropogenic climate change by 2050;”development of alternative jet fuels and aircraft technological developments, together with the development of more efficient operational practices and more efficient air traffic management systems and processes, will only partially offset the growth in aviation emissions; there is presently no systematic or compulsory incentive to reduce international aviation emissions; 􀁸 without government action to significantly reduce aviation growth within the UK, for example, aviation emissions may be greater than those forecast for all other sectors of the economy. As a result, aviation may exceed the carbon target for all sectors by 2050.

#### Flight efficiency is critical to slow the rate of warming --- airlines’ impact is unique

Capoccitti 10 (Sam, Aviation Consultant, et al., “Aviation Industry - Mitigating Climate Change Impacts through Technology and Policy”, Journal of Technology Management & Innovation, 5(2), http://www.scielo.cl/scielo.php?pid=S0718-27242010000200006&script=sci\_arttext)

Environmental impact of Flight

The main environmental concerns associated with aircraft are climate change, stratospheric ozone reduction (leading to increased surface UV radiation, regional pollution, and local pollution. During flight, aircraft engines emit carbon dioxide, oxides of nitrogen oxides of sulphur, water vapour, hydrocarbons and particles - the particles consist mainly of sulphate from sulphur oxides, and soot. These emissions alter the chemical composition of the atmosphere in a variety of ways, both directly and indirectly (RCEP, 2002).

While much of the CO2 is absorbed on Earth in plants and the ocean surface, a huge amount goes into the atmosphere, where it and other gases create a kind of lid around the globe --the so-called greenhouse effect. Heat that would normally escape into space is thus reflected back to Earth, raising global temperatures (Lehrer, 2001). Nitrogen oxides (NOx) and H2O vapor from aircraft increase the formation of cirrus clouds and create contrails, which are visible from the ground.

The combination of " contrails and cirrus clouds warm the Earth's surface magnifying the global warming effect of aviation. Together, NOx and water vapour account for nearly two-thirds of aviation's impact on the atmosphere (IPCC estimated that radiative forcing from all aircraft greenhouse gas emissions is a factor of 2 to 4 times higher than that from its CO2 emissions alone). Hence any strategy to reduce aircraft emissions will need to consider other gases and not just CO2" (GreenSkies, n.d.; pg.1).

The environmental issues associated with flight are also correlated with the altitude at which the carbon dioxide is emitted, the higher the attitude the greater damage to the ozone layer. Research has shown that the majority of flights fly at an altitude between 29,500 ft and 39,400 ft (9-12 km). Figure 1 (Federal Aviation Administration, 2005; pg. 32 ) highlights the distribution to total fuel burn and emissions by 1 km altitudes for the year 2000.

The lower spike in fuel burn and emissions in the 0-1 km range is attributed to aircraft emissions from the ground when aircraft are idling or taxiing. It was noticed after the events of 9/11 (when there was a temporary halt to all commercial flights) that the Earth's temperature was 1 to 2 degrees Celsius colder, which coincides with the theory that aircraft emissions do impact the environment.

Figure 1. Altitude distribution of fuel burn and emissions

Approaches to Mitigating Environmental Impacts

The aviation sector these days is buzzing with talks about aviation emissions. There is a call for aviation emissions by the airlines to be included in climate change pacts (Fogarty, 2009). Talk is now turning to ways of mitigating air travel's future impact on climate change, and these "generally fall within two spheres: technology development, and policy mechanisms" (GLOBE-Net, 2007).

Engine Technology, Aerodynamic Body and Weight

It is estimated that the aircraft we fly today are 70% more efficient than those 10 years ago. IATA predicts that by 2020, another 25% efficiency will be added to the present day fleet (GLOBE-Net, 2007). Improvements in aerodynamics, engine design and weight reduction are the main areas of improvement to counter the dependence on fossil fuel. Though the replacement of fossil fuel is being vigorously pursued with some limited success, fossil fuels will not expect to be replaced in the near future.

Apart from engine efficiency, finding an alternative fuel is part of the challenge for the aviation industry.

GLOBE-Net (2007) reports that the majority of efficiency improvements over past aircraft have been achieved through the development and improvements in engine technology. Engine improvements, as in the case of automobiles, must increase fuel efficiency (and therefore, decrease CO2 emissions) with reductions in NOx, water vapour, and other air pollutants. Some technological advancement in engine technology uses high pressure ratios to improve efficiency but this worsens the problem with NOx. If new control techniques for NOx are developed to keep within regulatory compliance limits, high pressure ratios will likely be the path pursued by aircraft manufacturers.

Further reduction in emissions can be achieved by matching the advancements in engine technology with better aerodynamic shape and use of light weight material to reduce drag. This certainly contributes to reducing the impact on environment and also can be promoted as a cost-saving measure (e.g., savings in fuel costs).

Boeing (2007; pg. 1) indicated that "four key technologies contribute to an impressive 20% improvement in fuel use for the 787 Dreamliner as compared to today's similarly sized airplane. New engines, increased use of light weight composite materials, more-efficient systems applications and modern aerodynamics each contribute to the 787's overall performance."

Aircraft manufacturers are also exploring the benefits of other technologies such as the use of winglets, fuselage airflow control devices and weight reductions. These could "reduce fuel consumption by a further 7% says the IPCC, although some have limited practicability" (GLOBE-Net, 2007). In the long term, new aircraft configurations (such as a blended wing body) may achieve major improvements in efficiency.

Alternate Energy Solutions

The time for zero emission aircraft is still far away. The technologies that may make that possible are still in early stages of development and evaluation. Second-generation biofuels, solar power and fuel cells are all being investigated by the aviation industry as well as the automobile industry.

The more fuel aircraft burns, the more emissions emitted into the atmosphere thereby increasing its environmental footprint. The aviation industry has come a long way with fuel technology and with the help of Boeing and Airbus (the world's largest aircraft manufacturers). Today aircraft are lighter, quicker and more fuel efficient.

Boeing has an ongoing legacy of integrating environmental performance improvements through technology advancements. Over the last 40 years, airplane CO 2 emissions have been reduced by around 70% and the noise levels have been reduced by approximately 90 percent. The noise footprint of the new 787 Dreamliner is 60% lower than any similar aircraft (Boeing 1998-2007; pg. 14).

That legacy continues today with every airplane they design and build (Boeing, 1998-2008; pg. 16). One of the many initiatives supported by Boeing is its search for alternative energy solutions. This initiative will lead to reducing greenhouse gas emissions and at the same time Boeing is pioneering three key environmental advancements:

• Advanced-Generation Biofuels - Boeing, Virgin Atlantic and GE Aviation conducted the first commercial flight using a biofuel mix with traditional kerosene-based fuel in February 2008.

• Solar Cells - Converting sunlight into electricity

• Fuel Cells - Convert hydrogen into heat & electricity without combustion, reducing the need for conventional fuels and eliminating emissions.

Like Boeing, Airbus has partnered with Honeywell Aerospace, International Aero Engines and Jet Blue Airways in pursuit of developing a sustainable second-generation bio-fuel for commercial jet use, with the hope of reducing the aviation industry's environmental footprint. Alternative fuel research is a core tenet of Airbus' eco-efficiency initiatives (Airbus, 2008).

Airbus research has also lead to test flights using gas to liquid kerosene, which is similar to jet fuel but results in lower emissions and is a much cleaner fuel source. Airbus has also researched other types of alternative fuels; for example, bio-mass to liquid and coal to liquid. On February 1, 2008 an Airbus 380 (in collaboration with Shell International and Rolls Royce) conducted a test flight using gas to liquid kerosene in one of the A380 engines.

Over the last year, four airlines have flight tested on biofuel: Virgin Atlantic (in February 2008), Air New Zealand (in December 2008), Continental Airlines and Japan Airlines (in January 2009). They have "already flown on routes with one engine part-powered by a range of biofuels including algae and jatropha. Jatropha, a poisonous plant that produces seeds that can be refined into biofuels, is being touted as a good alternative fuel and a potentially powerful weapon against climate change. Experts say the perennial plant can grow on marginal land with limited rainfall, and does not compete with other food crops or encourage deforestation. Following its flight using jatropha in late December, Air New Zealand has set a goal to have 10 percent of fuel coming from biofuel sources by 2013, while Virgin is aiming for 5 percent by 2015" (Szabo et al., 2009).

Pew (2009) reports that "the push in development of biofuels continues with a recent $25 million contract awarded by the Defense Advanced Research Projects Agency to SAIC. The company is being tasked to lead a team in development of an integrated process for producing JP-8 from algae at a cost target of $3/gal." The two-phase program aims to conclude with the design and operation of a pre-pilot scale production facility. But another project that involves Boeing, Honeywell, and CFM hopes to see biofuel production levels in the hundreds of millions of gallons per year by 2012 (Pew, 2009).

The International Air Transportation Association (IATA) feels that any alternative fuel should be tested for performance and environmental impact before introducing into the marketplace. IATA researched has shown that the conservative nature of the industry will foster alternative fuels that originally are combined with conventional jet fuel. According to IATA (2008a), alternative fuel systems derived from biomass sources have the potential to lower the carbon footprint and lower other emissions as well. New technologies and more economic integration of alternative fuels along with government subsidies will accelerate the acceptance of these fuels in the market place (IATA, 2008a).

In "Are bio-fuels really an alternative?" Jeff Gazzard (2009), a board member of the Aviation Environment Federation contends that the biofuel issue may not be as clear as it seems. The jury is still out as to whether either synthetic or biofuels are yet capable of being either entirely fail-safe for aviation use or environmentally sustainable in the longer term. According to Gazzard (2009) alternate fuels looked attractive when oil was marching towards $147 a barrel, but now that oil has fallen back to below $50 a barrel, $75-$85 a barrel for biofuel is not as attractive. He points out that another issue is that aviation consumes approximately 240 million tones of kerosene a year. Replacing the current aviation fuel with bio-fuel from productive arable land that does not compete with food production would take almost 1.4 million square kilometers, which is greater than twice the area of France.

Gazzard (2009) is not convinced that aviation would be the best end-user even if biofuels could be produced sustainably. The industry has also followed with increasing interest in algae as a potential source of aviation fuel but is unconvinced that any cost-effective algae-derived aviation fuel could be produced within a practical timeframe that would allow such fuels to make any substantial contribution to climate change policies of today. Regardless of the skepticism, more and more airlines are testing alternative fuel sources and as global warming continues to escalate in the minds of the consumers.

The assessment of GLOBE-Net (2007) is similar - "biofuels could mitigate some aircraft emissions, but the production of biofuels to meet the aviation industry's specifications and quantity demands is currently untested. Ethanol and biodiesel both have properties that make them currently unsuitable for jet fuel, but companies such as Virgin are pursuing biofuels research, investigating possibilities including the use of microorganisms."

Further, the option of solar power is still in its infancy and largely unexplored. Boeing (1998-2008; pg. 16) is working with their wholly-owned subsidiary Spectrolab in this area. Spectrolab is one of the world's leading manufacturers of solar cells, powering everything from satellites and interplanetary missions.

However, without the commercialization of these and other novel new technologies, annual air traffic growth is expected to outstrip efficiency improvements, resulting in a net rise in CO2 emissions of around 3-4% per year, along with increases in NOx and water vapour emissions.

Better Traffic Management

One possible contributor to greater aircraft efficiency is improved air traffic management. According to the IATA (2007), there is a 12% inefficiency in global air traffic management which could largely be addressed by three 'mega-projects': a Single Sky for Europe, an efficient air traffic system for the Pearl River Delta in China and a next generation air traffic system in the United States. However, there has not been much progress on these initiatives much to the disappointment of IATA and its leadership.

Scientists and aviation experts worldwide are investigating improved air traffic management, lower flight speeds, reducing idling and other efficiencies, searching for areas of potential emissions reductions.

Policy Mechanisms

In February 2009, four leading airlines and an airport authority - Air France/KLM, British Airways, Cathay Pacific, Virgin Atlantic and airport operator BAA - called for aviation emissions to be included in a broader climate pact. This can be seen as a move to ward off criticism from environmental groups and to probably have a negotiated deal instead of a one that is imposed upon them. Even with only 2% of global pollution coming from airlines, the pressure of the aviation industry has been mounting to participate in emission reduction initiatives (Fogarty, 2009).

This call was a prelude to the 2009 Copenhagen Summit on Climate Change where nations are expected to find an agreement around a climate pact that replaces the Kyoto Protocol whose first phase ends in 2012. To date "international air travel is exempt from carbon caps under the Kyoto Protocol. Neither do airlines pay tax on fuel. Understandably, lawmakers are wary of disrupting aviation since air travel represents a cash cow for governments. In the US, for example, the average tax on a $200 ticket is 26%, amounting to about $15bn a year. And the air travel industry picks up the tab for its own infrastructure, an annual bill of about $42bn, according to IATA" (Balch, 2009).

In recent years, governments and international organizations have looked at policy options that could create incentives or impose requirements on aircraft operators and manufacturers to reduce emissions. At the forefront of this push is the European Union, which has proposed that aircraft be covered under the region's Emissions Trading Scheme (ETS). Under the proposal, emissions from all flights within the EU will be covered in 2011, with international flights to be included in 2012. The EU hopes to serve as a model for other countries (GLOBE-Net, 2007). An Ernst & Young (2007) study commissioned by the airline industry projects the system would cost airlines more than 40 billion Euros from 2011 to 2022.

The IATA states in its climate change strategy that it prefers emissions trading to a carbon tax or other charges, but would rather participate in a worldwide voluntary scheme instead. "The challenge is for the International Civil Aviation Organization (ICAO) and its 190 member States to deliver a global emissions trading scheme that is fair, effective and available for all governments to use on a voluntary basis" (IATA, 2007).

Short-term Measures

In recent times some airlines have started offering passengers a chance to purchase carbon offsets to neutralize/minimize their carbon emission footprint. Air Canada partners with ZeroFootprint while Westjet has partnered with Offsetters.ca. In 2009, Japan airlines joined hands with Recycle One to help its passengers offset the carbon caused by their flight. "The total emissions figure is based on factors such as distance of travel, aircraft type, baggage and passenger to cargo ratios" (Balch, 2009). Continental, SAS, Qantas, British Airways, JetStar, Virgin Atlantic and Virgin America and some other airlines offer similar programs.

Such programs are leading the way now but stronger action may be required to bring a significant reduction in GHG emissions.

Long-term Thinking

To address the problem of Climate Change, like all other industries, airlines will also have to re-think their business model. They will have to probably agree to be part of a network that moves people and goods from one place to another in an efficient and timely manner. To achieve this goal, they will have to collaborate and network with other transport operators like the railways. "In the Netherlands, airlines and rail companies have a history of cooperation. Long before its merger, KLM had already cancelled several short-haul flights on routes where fast train links existed. Many of KLM's international flights to Dutch cities also finish with a final leg by train" (Balch, 2009).

The "Flight" Ahead

As demonstrated, the aviation industry plays a vital role in the global economy and provides economic and social benefits. It is also apparent that global temperatures continue to rise while the aviation industry continues to grow. The combination of aviation growth and climate change leads us to believe that CO2 emissions from the aviation industry is one of the many other factors impacting global warming. It has to be addressed even though its impact today is limited to a very low percentage. But with a potential to grow, it cannot go unattended. With this in mind, the following main areas have been identified in order to help reduce aviation emissions.

• Strengthen the global leadership strategy (for example, add aviation emissions to Kyoto protocol; revisit fuel surcharge (taxation) issue; create an emissions charge; implement an emissions cap on aviation emissions; enforce Carbon offset programs for all airlines; etc.)

• Increase Alternative Fuel technology/implementation (for example, increase biomass fuel technology; etc.)

• improvements in Aircraft Technology Efficiency (for example, reduce aircraft fuel consumption and CO2 emissions by replacing older, less fuel efficient aircraft with aircraft using latest fuel efficiency technology and navigation equipment; reduce aircraft noise - mitigate inefficient noise procedures; reduce oxides of nitrogen - try to go beyond compliance limits; etc.)

• Improvements in Air Traffic Management (for example, cut inefficiency in current flight patterns - more fuel efficient approaches and overall routing; encourage flight patterns that minimize the impact of non CO2 emissions; optimize aircraft speed; etc.)

• Improvements in Operational Efficiencies (for example, increase load factors; eliminate non-essential weight - reassess the value of onboard materials; limit auxiliary power (APU) use by reducing engine idle times and by shutting down engines when taxiing to reduce APU use and fuel burn; reduce taxiing time of aircraft; etc.)

All these suggestions require stimulating technology advancements and innovation. Holliday et al. (2002) state that innovation is critical for any organization and industry if it wants to operate in a new global business environment which puts emphasis on environmental alignment of business goals.

The aviation industry (airlines, governments, non government organizations, suppliers, manufactures) must work together and create technology advancements that catapult the industry into the future. The innovation created must not only look at how the aviation industry can improve on their CO2 emissions but also how it can change the CO2 emissions landscape. Improving current practices is not good enough. The aviation industry must change the way they operate in order to reduce CO2 emissions. Governments must get involved and work with airlines to spur innovation and remove obstacles for airlines leading the environmental movement.

#### NextGen cuts airline emission by boosting efficiency

Johnson 9 (Keith, Reporter – WSJ, “Cleared for Takeoff: Obama Budget’s Green Take on Air Travel”, Wall Street Journal, 5-8, http://blogs.wsj.com/environmentalcapital/2009/05/08/cleared-for-takeoff-obama-budgets-green-take-on-air-travel/)

The $865 million allocated to the next-generation of air navigation systems—creatively called NextGen—is a way to modernize the way commercial airliners take off, fly, and land at the nation’s increasingly crowded airports. Designed to improve safety and efficiency of the antiquated air-traffic control system through 2025, NextGen has some surprising environmental benefits: It promises to cuts fuel consumption, and emissions, from airliners.

The idea is basically to do for air travel what dashboard GPS devices have done for cars: Put high-tech satellite navigation to work in the cockpit. Some of the new technology, developed by companies like ITT Corporation, is slowly being rolled out. Last month, Miami joined airports Atlanta and Dallas-Fort Worth that have started using a new way to keep airliners in communication with the ground and with each other.

All of that helps safety, of course. And makes it easier for busy airports to safely juggle lots of airliners, improving efficiency and cutting down on delays. That was the main reason freight carriers such as UPS have been experimenting with new navigation technology—it helps the bottom line in a time-sensitive business.

But when it comes to the environment, little things add up. The new system lets aircraft fly straighter routes, for starters. And by allowing aircraft to glide in for landing in a gentle path, using practically no throttle, the new systems can cut fuel consumption around airports, traditionally one of the areas where fuel burn is heaviest. Other airlines like Southwest have already been experimenting with juiced-up navigation systems to boost efficiency.

Since early 2008, UPS has been using one of the new technologies developed by ITT, called automatic dependent broadcast surveillance, on flights into its Louisville hub. The new technology cuts emissions of its big Boeing 757 aircraft by 38%, UPS says.

“It improves safety, reduces delays, reduces fuel burn, and the attendant environmental impacts,” says John Kefaliotis, ITT’s vice-president for NextGen.

Overhauling the air traffic control system may not be the high-profile stuff President Obama’s green revolution is made of. But it does show, once again, that making things more efficient makes things work better, saves money—and can help the environment.

#### Plan quickly lowers airline pollution --- emerging R+D solves in the long-run

Dillingham 8 – Dillingham, 05-06-2008, Gerald L. Dillingham, Ph.D. Director, Physical Infrastructure Issues, “NextGen and Research and Development Are Keys to Reducing Emissions and Their Impact on Health and Climate”, <http://www.gao.gov/new.items/d08706t.pdf>

Aviation contributes a modest but growing proportion of total U.S. emissions, and these emissions contribute to adverse health and environmental effects. Aircraft and airport operations, including those of service and passenger vehicles, emit ozone and other substances that contribute to local air pollution, as well as carbon dioxide and other greenhouse gases that contribute to climate change. EPA estimates that aviation emissions account for less than 1 percent of local air pollution nationwide and about 2.7 percent of U.S. greenhouse gas emissions, but these emissions are expected to grow as air traffic increases. Two key federal efforts, if implemented effectively, can help to reduce aviation emissions—NextGen initiatives in the near term and research and development over the longer term. For example, 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. Federal research and development efforts—led by FAA and NASA in collaboration with industry and academia—have achieved significant reductions in aircraft emissions through improved aircraft and engine technologies, and federal officials and aviation experts agree that such efforts are the most effective means of achieving further reductions in the longer term. Federal R&D on aviation emissions also focuses on improving the scientific understanding of aviation emissions and developing lower-emitting aviation fuels. Next steps in reducing aviation emissions include managing NextGen initiatives efficiently; deploying NextGen technologies and procedures as soon as practicable to realize their benefits, including lower emissions levels; and managing a decline in R&D funding, in part, by setting priorities for R&D on NextGen and emissions-reduction technologies. Challenges in reducing aviation emissions include designing aircraft that can simultaneously reduce noise and emissions of air pollutants and greenhouse gases; encouraging financially stressed airlines to purchase more fuel-efficient aircraft and emissions-reduction technologies; addressing the impact on airport expansion of more stringent EPA air quality standards and growing public concerns about the effects of aviation emissions; and responding to proposed domestic and international measures for reducing greenhouse gases that could affect the financial solvency and competitiveness of U.S. airlines.

#### No alt causes --- NextGen solves other transportation emissions and improves international efficiency

NEXA 11

(NEXA Advisors, A NEXA Capital Company, April 2011, NEXA Capital Partners provides corporate and strategic financial advisory services, and capital investment, to the aerospace, transportation, logistics and homeland security sectors (Venture Capitalist). “NextGen Equipage Fund Job Creation, Economic Benefits, and Contribution to Federal Revenues” p. 12 <http://www.nextgenfund.com/files/downloads/NEF_Economic_Study.pdf>) MJA

In 2008 GAO advocated accelerated deployment of NextGen to realize environmental benefits. xv More efficient operations will lower unit emissions per passenger through lower fuel burn per passenger. Aviation emissions, like other combustible emissions, include pollutants that affect public health. The FAA estimates that NextGen could reduce aircraft greenhouse emissions by as much as 12 percent, which is equivalent to removing 2.2 million cars from the roads. xvi Additionally, improved air transportation will reduce the number of passengers diverted to their cars on the U.S. roadways and thereby reduce air pollution from cars and reduce congestion on the highways. NextGen procedures will reduce communities’ exposure to noise through better air traffic management. For example, Continuous Descent Arrivals will allow aircraft to remain at cruise longer as they approach destination airports, use lower power levels, and thereby lower noise and emissions during landing. These environmental benefits will also improve international flight efficiencies, further reducing emissions and greenhouse gasses.

#### Air pollution causes extinction

Driesen 3 (David, Associate Professor – Syracuse Univeristy Law, 10 Buff. Envt'l. L.J. 25, Fall/Spring, Lexis)

Air pollution can make life unsustainable by harming the ecosystem upon which all life depends and harming the health of both future and present generations. The Rio Declaration articulates six key principles that are relevant to air pollution. These principles can also be understood as goals, because they describe a state of affairs that is worth achieving. Agenda 21, in turn, states a program of action for realizing those goals. Between them, they aid understanding of sustainable development's meaning for air quality. The first principle is that "human beings. . . are entitled to a healthy and productive life in harmony with nature", because they are "at the center of concerns for sustainable development." 3 While the Rio Declaration refers to human health, its reference to life "in harmony with nature" also reflects a concern about the natural environment. 4 Since air pollution damages both human health and the environment, air quality implicates both of these concerns. 5

#### Aviation contrail residue falls to the earth --- causing immuno-suppression

Ambilac 00 – Ambilac Corporation, 2000, http://www.greenspun.com/bboard/q-and-a-fetch-msg.tcl?msg\_id=003bmw

We observe in our skies, jet aero planes constructing fancy designs ultimately spreading out to become cloud-like formations. Dubbed "chemtrails", (http://www.island.net/~wilco ) these formations consist of long-chain polymers in which can be embedded other organic or inorganic compounds, such as viruses and bacteria. On days when the atmospheric conditions are less than ideal, the mixture does not break into small particles as it falls from the planes, but falls as if spider webs are falling from the sky. See http://www.sightings.com/general2/sticky.htm These chemtrails (3) work on several levels. The first, and most direct, level is a lowering of the immune system by constant bombardment of the body by bacteria and viruses in the mix. To be taken into consideration in this direct attack, is the fact that some people are allergic to various compounds in the mix. The human body, already immune-lowered due to pollutants in our environment, is unable to cope with this extra bombardment and will eventually succumb to illness and perhaps even death. A lowered immune system is a lowered vibrational rate.

#### Immuno-suppression causes extinction

Fieger 4 – Leslie Fieger, Author – The End of the World. “The Precipice”, 2004 http://www.lesliefieger.com/articles/precipice.htm

There is much, much more. The very real and growing dangers of using human created weapons of mass destruction in resource wars (oil now, water tomorrow); looming viral and prion pandemics ravaging chemically weakened immune systems all help to define the precipice we stand on, the crisis point we face. Ignoring the reality of it or avoiding the difficult choices that must be made will only serve to accelerate the end of human society as we know it and probably, even human existence.

### 1AC – Solvency

#### Plan – The United States Federal Aviation Administration should make available long-term contract loan guarantees for commercial equipage of Next Generation Air Transportation System technology.

#### Federal loan guarantees overcome cost barriers and jump-start NextGen implementation

Carey 11 (Bill, Senior Editor – AIN Online, Former Editor in Chief – Avionics Magazine and Masters in Journalism and Public Affairs – American University, “Public-Private Partnerships Among Proposals to Advance NextGen”, AIN Online, 7-27, http://www.ainonline.com/aviation-news/aviation-international-news/2011-07-27/public-private-partnerships-among-proposals-advance-nextgen)

The vision of the satellite-based, data-centric, network-enabled transformation of the ATC system known as the Next Generation Air Transportation System (NextGen) has entered mainstream discourse in the U.S., but so too has the realization of its formidable cost.

The July 4 issue of The Washington Post led with the headline, “Modernization of air traffic control may be delayed,” bringing into public focus what the airlines and other airspace users have been sweating now for years: NextGen will cost upward of $42 billion by 2025, with government shouldering half of that amount for infrastructure and airspace users paying the remainder for equipment and training.

Private Sector Involvement

That imposing bill and the increasing likelihood that a federal government $14 trillion in debt can’t be counted on for major subsidies have given rise to novel funding proposals, including a provision for “NextGen Public-Private Partnerships” contained in FAA reauthorization legislation the House of Representatives passed in April. One such “PPP,” the NextGen Equipage Fund, pledges to “bring substantial private-sector capital to overcome the investment barriers.”

Reauthorization language in the Senate bill directs the FAA Administrator to provide a financing proposal “that uses innovative methods” to fund NextGen and “takes into consideration opportunities for involvement by public-private partnerships.” The Senate bill also proposes a State ADS-B Equipage Bank pilot program, modeled after a program in Colorado that deployed wide area multilateration (Wam) to support airports in mountainous terrain with radar gaps.

The long-delayed FAA reauthorization bill was still pending before Congress, with a 20th extension due to expire July 22.

Separate from legislation, the FAA has specified a “Data Communications Avionics Equipage Initiative” in a request for offers for the Data Communications Integrated Services acquisition, posted July 8. The “FAA’s goal is to induce into operation the greatest number of Data Comm-compatible equipped aircraft for the funding provided for this initiative,” expected to be $80 million, the solicitation states. The winning contractor will administer the program based on certain aircraft requirements. No more than 10 percent of the funding may be used to equip Part 135 commuter and on-demand aircraft, with the balance used for carriers operating under Part 121, according to FAA.

Former FAA acting administrator Bobby Sturgell, now Rockwell Collins senior vice president of Washington operations, said examples of public-private partnerships involving the FAA already exist, such as contract ATC towers and automated flight service stations. That approach is even more widespread in surface transportation, he said.

“Successful implementation of NextGen does not require public-private financing because certainly the FAA could go the mandate path and eventually get there that way,” Sturgell told AIN. “But if we’re talking about accelerating the benefits and capabilities so we can all start benefitting much earlier, I think you have to have some kind of public-private partnership or financing mechanism to support that.”

The federal government’s fiscal predicament “opens the door even further to public-private partnership types of funding and more creative financing,” Sturgell said. “I think there’s a big opportunity here for people to start thinking out of the box and to do things a little differently.”

Operators Reluctant To Equip

Although there is consensus about its ultimate benefits, NextGen faces a cost conundrum. Airlines emerging from years of recession and coping now with high fuel prices are reluctant to invest in the necessary suite of airborne equipment–costing an estimated $150,000 to $1 million per aircraft–without proof of a timely return on investment in the form of fuel savings and operational efficiencies made available by the FAA. Some contend government should pay for the equipment. “We have an ATC system today that is largely ground based. All we’re doing when we’re talking about NextGen is we’re taking a known technology, GPS technology, and moving part of the equipment in the air and part of the equipment will be on the ground,” said Will Ris, senior vice president of government affairs for American Airlines, speaking at the FAA Forecast Conference earlier this year. “It is our view that that ATC system should continue to be financed and supported by the federal government because that’s, after all, where all the ticket taxes are going.”

The FAA is advancing on one major pillar of NextGen. The agency awarded a contract to ITT in August 2007 to deploy the ground infrastructure for automatic dependent surveillance-broadcast (ADS-B) nationwide by 2013, and last year mandated that aircraft operators equip for ADS-B out position reporting by 2020. A rulemaking on ADS-B in equipage–the ability to display air traffic in the cockpit–is in the works, with initial recommendations of an Aviation Rulemaking Committee due this fall. The FAA’s investment in ADS-B and other infrastructure will languish, however, until a “tipping point” is reached of properly equipped aircraft that can benefit from NextGen system efficiencies.

The NextGen Equipage Fund aims to kick-start NextGen by assisting airlines in acquiring some of the necessary equipment. The fund would leverage $1.5 billion raised through commercial borrowing and private equity to finance new avionics for an estimated 75 percent of the U.S. airline fleet. It also reportedly is seeking $150 million in federal loan guarantees.

In the works since about 2009, the fund was revealed at an RTCA conference last fall by Steve Loranger, ITT chairman, president and CEO. While “other aerospace companies” are referenced in background material, ITT to date is the only named strategic investor of the fund, which is managed by Nexa Capital Partners, of Washington, D.C. Principals of ITT and Nexa Capital provided an overview of the fund at the Paris Air Show in June.

Russell Chew, managing partner with Nexa Capital Partners and a general partner of the NextGen fund, said the fund would procure “a basic NextGen suite of avionics,” enabling functions such as ADS-B and data communications, which airlines would lease. They would make payments on the equipment based on the FAA’s achieving agreed milestones for supporting infrastructure. In turn, the FAA would be bound by performance guarantees “in a contractual way.”

Participating airlines would realize a return on their investment sooner as a result of airspace system efficiencies such as preferred routings delivered by the FAA on the principle of “best equipped, best served,” closing the equipage “business case” that confronts NextGen. “The NextGen Equipage Fund was founded to bring real money to bear on the problem,” Chew said. “It will allow airlines to afford, in spite of their weakened balance sheets, the actual investment in avionics they need to put together to take advantage of this new system [which] requires that all airplanes be equipped with new avionics. So the airlines in their equipage decisions have become the gatekeepers of this function.” The fund was negotiating “participation agreements” with several airlines, which he declined to identify.

While a loan guarantee from the government technically is not necessary, Chew said, “in a public/private partnership…the loan guarantee is a perfect place for government to say, given the right amount a risk, I could really kick start this by lowering the cost of capital.”

#### Current funding isn’t sufficient --- only long-term loan guarantees can attract private investment

Carey 12 (Bill, Senior Editor – AIN Online, Former Editor in Chief – Avionics Magazine and Masters in Journalism and Public Affairs – American University, “Public-Private Partnerships Among Proposals to Advance NextGen”, Aviation International News Online, 6-6, <http://www.ainonline.com/aviation-news/blogs/ain-blog-rockwell-collins-ceo-urges-new-approach-nextgen>)

This isn’t a new theme for the former Air Force F-15 pilot. “Technology is light years ahead of policy,” Jones said during a panel discussion in April at the U.S. Chamber of Commerce Aviation Summit. “We’ve gone from no architecture to no implementation plan to no political will.” At the annual RTCA event June 5 in Washington, D.C., Jones recounted his own hopeful vision of an avionics-enabled future in the mid-1990s, when the dream was called “Free Flight.” Since then, he said he has been alternately discouraged and inspired by new developments.

The FAA reauthorization legislation passed by Congress and signed by the President in February after more than four years of delay and 23 temporary extensions is a good-news-and-bad news story, Jones said. The good news: it finally provides the FAA with funding stability of $63 billion over four years, with $11 billion directed to ATC modernization. It moves forward “discrete” NextGen programs such as ADS-B and DataComm, and provides a “first framework” for the introduction of unmanned aircraft into civilian airspace.

“The bad news,” Jones said, “is that out of the $11 billion designated for modernization of the ATC system in February, only about one-third, or $4 billion, will likely be dedicated to NextGen programs and will require four years of annual Congressional appropriations.” He then begged the question: did anybody in the room really believe our broken, ineffectual Congress could make that happen?

Jones advocates an approach to ATC modernization based on public-private partnerships, where industry assumes more of the responsibility and risk, backed by the good faith of the government. “The private sector certainly has the capability and capacity to make large multi-year financial commitments,” he said. “It has the human and computational assets to perform on a large system-of-systems integration task. And it has the proven ability to attract capital to fuel investments in growth. However, to attract this investment from private-equity sources, a reasonable return will be expected for the risk taken. This is where the government must step up to provide long-term contract loan guarantees.” Without a new approach, Jones said, “we are doomed to hear the same luncheon keynote speech like this one every year for the next 10 years.”

#### Loans align industry incentives and get airlines to equip NextGen technology at a low cost

Poole 11 (Robert, Director of Transportation Policy and Searle Freedom Trust Transportation Fellow – Reason Foundation, “Insufficient Controller Fatigue Decision, Equipage Fund Makes Progress, SESAR Challenges in Europe”, Air Traffic Control Reform Newsletter #82 – Reason Foundation #82, 4-26, http://reason.org/news/show/air-traffic-control-reform-news82)

On April 4, the NextGen Equipage Fund issued a news release, announcing the inclusion in the House FAA bill of provisions that will permit the Fund and the FAA to engage in a public-private partnership (PPP) approach to facilitating equipping the airlines and the high-end general aviation fleet with equipment for NextGen components such as ADS-B and DataComm. By encouraging what the Fund expects will be $1.5 billion in financing for such equipage, this PPP approach should help the FAA to stay on schedule in implementing key NextGen programs even as its budget gets squeezed by the ongoing fiscal crunch.

The Equipage Fund is a creative approach to solving what some have called the NextGen equipage paradox. For NextGen to deliver meaningful benefits to airspace users, a preponderance of planes need to be equipped. Early adopters will get only a small fraction of the benefits, while those who wait till the last minute will get the greatest benefit when most planes are finally equipped. This is illustrated on the Fund's website (www.nextgenfund.com) with a detailed DataComm example. That case study uses data from a MITRE study based on American Airlines. AA's yearly cost savings would be only 10% of its possible maximum if AA alone equips--$8.7 million per year versus $80.3 million per year in AA savings if all airlines equip.

The Fund's general partners, Mike Dyment and Russ Chew, have figured out a way to align the incentives of the three key players-airlines, the FAA, and the Fund's investors. Under their proposed Best-Equipped/Best-Served contractual model, an airline that finances, for example, DataComm equipage via the Fund does not have to make lease payments until the FAA delivers usable DataComm services.

Financially, the investors in the Equipage Fund (so far, ITT is the lead investor, with discussions under way with others) will put in equity and take on commercial debt to pay for large orders of the necessary gear to be installed in planes, taking advantages of economies of scale from large purchases. They will expect to make a return on those investments over time in the form of lease payments from the aircraft operators. To reduce, the PPP aspect of the program would permit the FAA to make loan guarantees available to the Fund (as opposed to individual aircraft operators). In contrast with federal grants, federal budget scoring rules would score a loan guarantee for $1 billion worth of equipment as having a credit risk premium of only about $125 million. Yet this very modest budgetary impact could leverage a total equipage investment of up to $2.3 billion.

This kind of leverage is already hard at work in surface transportation. Under the DOT's successful TIFIA program, federal subordinated loans (instead of grants) are made available for large highway and transit projects that have a dedicated funding source (e.g., tolls or dedicated local tax revenue) and can get an investment-grade rating on their senior debt. TIFIA is limited to 33% of the total project budget, and the credit risk is scored at 10% of the loan amount. Thus, for a $1 billion toll road project, the federal budget exposure is $33 million (10% of a maximum $330 million loan). That compares very favorably to traditional 80% to 90% federal grant for such projects.

## \*\*\* SOLVENCY

### Solvency – Loan Guarantee

#### Federal loan guarantees jump-start airline equipage --- government investment’s key

Halsey 11 (Ashley, Reporter – Washington Post, “Antidote To Air Gridlock May Not Get Off Ground”, Washington Post, 7-4, http://o.seattletimes.nwsource.com/html/boeingaerospace/2015510103\_airtraffic05.html)

Case for investing

Making the business case that will persuade airlines to take the financial plunge is at the core of the debate.

The single biggest incentive to airlines would be persuasive evidence of an immediate return on their investment in fuel savings and fewer delays. One suggestion has been to allow NextGen-equipped planes to land and take off first. Given that a jetliner can burn through $1,000 in fuel in less than a half-hour, circling the airport in a holding pattern becomes an expensive proposition.

With most U.S. airlines operating in the red, Chew says few will take the investment leap unless the government has more "skin in the game" than promises and deadlines.

Chew is leading an investment group that proposes to lend the airlines money to equip their planes, with a repayment plan that is deferred until the FAA delivers the system. The key, however, is that the federal government must agree to make loan payments if the FAA misses its deadlines.

"If the government OKs loan guarantees for equipage, it would jump-start the process," Chew said. "The airlines are not going to want to make any kind of payments until the FAA is ready to deliver. If they don't deliver by 2018, then the airlines are off the hook for these payments."

Chew says the FAA and Congress have been receptive to that form of loan guarantee, but so far without committing to it. With Congress in a cost-cutting mood, loan guarantees may provide a viable alternative to slashing a program that virtually everyone supports.

### Inherency / A2: Status Quo Solves

#### Loan guarantees have been authorized, but not implemented --- FAA action’s needed

Poole 12 (Robert, Director of Transportation Policy and Searle Freedom Trust Transportation Fellow – Reason Foundation, “FAA Reauthorization, Aviation Emissions Trading War, ATC User Fees, Europe's Next-Generation Milestones, ERAM Woes and FAA Shortcomings”, Air Traffic Control Reform Newsletter #90 – Reason Foundation, 2-24, http://reason.org/news/printer/air-traffic-control-reform-news-90)

One Cheer for the FAA Reauthorization

After 23 extensions since the nominal expiration of the last FAA authorization (Sept. 30, 2007), Congress finally enacted and the President signed the bill. Despite some blather by politicians about how the bill opens the door to ATC modernization by fully funding NextGen, the bill does nothing of the kind. In fact, it freezes for four years the FAA budget account (Facilities & Equipment) from which NextGen projects (and a lot of other capital expenditures) are paid for. All the other main accounts are also frozen for four years—airport grants (AIP), operations (mostly payroll), and research (tiny), making this the first FAA reauthorization ever that does not increase spending.

Actually, however, the impact is worse than flat. That’s because the largest budget category, the $9.6 billion per year Operations account, almost certainly will not remain at that level during the four-year period. Doing so would mean violating the terms of the FAA’s union contracts, which provide for annual increases in compensation. Hence, when Congress each year gets around to appropriating the money for FAA, if it sticks with the overall $15.9 billion per year FAA budget total, something else will have to be cut if Operations goes up each year. It won’t be AIP, because that is the one category that is on the “mandatory” side of the budget. The Research account is too small to matter. So the account that takes the hit will be—you guessed it-- Facilities & Equipment (a.k.a. NextGen). Just to illustrate the magnitudes, assume the Operations budget increases by 5% in each of FY2013, 2014, and 2015. By FY2015, it would have increased from $9.653 billion to $11.174 billion, and the four-year difference would be $3.024 billion. Subtracting that from the budget’s four-year total for F&E ($10.906 billion) would reduce F&E to $7.872 billion over four years. So FAA would have to defer some $3 billion of F&E projects into future years, further stretching out the transition to NextGen. (And this example ignores the possibility of across-the-board cuts in all federal discretionary spending as a future deficit-reduction measure.)

Given this dismal outlook, one of the few good elements of the bill is its approval of provisions aimed at facilitating equipage of aircraft to operate in a NextGen environment. For example, last year Nexa Capital Partners proposed an innovative NextGen Equipage Fund. This is a creative effort to resolve the conundrum faced by airlines when deciding when to make the capital expenditures to equip their planes with systems to interface with NextGen systems such as ADS-B, DataComm, etc. Airlines (and business jet operators) rightly fear that if they act too soon, FAA will fail to deliver operational programs that interface with their new onboard gear. So the Equipage Fund would buy the hardware from suppliers and get it installed on aircraft fleets, but the aircraft operators would not start making lease payments until the FAA capability was operational (i.e., they would start paying only when they started to get benefits from the new systems). That model would leave the Equipage Fund holding the bag in the event of FAA delays. Fortunately, the bill provides for equipage loan guarantees from the government. That should enable the Equipage Fund (and others) to get moving on NextGen equipage—assuming DOT and FAA make it a priority to get the loan guarantee provision up and running.

#### Loans received top level approval, but more action’s needed

Lynch 12 (Kerry, Reporter – Aviation Daily, “FAA Must Look Beyond Congress For NextGen Equipment Funding”, Aviation Daily, 6-7, Lexis)

The tough budget environment on Capitol Hill makes it highly unlikely that Congress will provide assistance for NextGen equipage beyond the approval for FAA to create a public-private loan guarantee program, a Senate aide told attendees of the RTCA 2012 Symposium.

Rich Swayze, a staff member on the Senate aviation operations, safety and security subcommittee, notes the loan guarantee program measure–included in the most recent FAA reauthorization bill– as «very difficult» politically because lawmakers had to justify any costs that may come with it.

FAA previously said it needs Congress to appropriate funding for the program, and also may need further legal authority. This will hinder its ability to move forward with a loan guarantee program, notes Jens Hennig, VP-operations for the General Aviation Manufacturers Association (GAMA).

#### The fund exists, but won’t move forward without government commitments

Schofield 12 (Adam, Reporter – Aviation Week, “NextGen Emerges”, Aviation Week & Space Technology, 5-14, Lexis)

On a broader scale, the equipage funding solution with the most potential is public-private partnerships, where government loan guarantees would help unlock private equity at reasonable rates.

One such initiative, called the NextGen Fund, has been proposed by Nexa Capital Partners, with the backing of ITT Exelis. The plan is for participating airlines to pay back equipage costs as the financial benefits of NextGen emerge.

While the outline of this plan was unveiled more than a year ago, there has been little movement since then. The NextGen Fund's managers have been waiting for the government to provide the commitments required for the program to work.

#### Funding’s needed

Lynch 12 (Kerry, Reporter – Aviation Daily, “FAA Considers Loan-Guarantee Options For NextGen Equipage”, Aviation Daily, 6-4, Lexis)

FAA must expedite the incentives and provide flexible loan-guarantee programs to persuade the aviation industry to make the large investments in aircraft equipment needed for NextGen, industry leaders told FAA officials last week.

The agency held the first of a series of meetings on possible incentives for commercial and general aviation operators.

Congress recently gave FAA the authority to establish an equipage incentive program for U.S.-registered aircraft, and FAA says it must examine «various methods of reducing the government’s risk» while determining industry interest.

The agency plans to weigh public input on such a program throughout the summer and expects to host future meetings before setting up a public-private program.

Agency officials also caution that Congress must still provide funding for the program through the appropriations process before FAA can move ahead with it.

## \*\*\* AVIATION ADVANTAGE

### Aviation Advantage – Inherency – No Equipage

#### NextGen implementation is stalled because no equipage

Mouawad 12 (Jad, Airline and Energy Reporter – NYT, “No More Circling Seattle”, New York Times, 4-4, Lexis)

But NextGen has also been slowed by disagreements between the airlines and federal regulators over which would pay the bill. Equipping a single plane with a GPS system can cost more than $340,000. That quickly adds up for airlines with hundreds of planes in their fleet, and with no immediate payoff for the upgrade. (New planes have the technology, but older models must be retrofitted.)

That is the sort of logjam that the Seattle experiment is seeking to break. It will use something called Required Navigation Performance, or R.N.P., which is like GPS in cars. The difference is that the plane's autopilot feature can guarantee that the flight will stay precisely on course, from takeoff to landing, even in bad weather or turbulence.

### Aviation Advantage – Yes Capacity Crisis

#### Capacity crisis now

Williams 9 (Genevra, J.D. Candidate – Southern Methodist University Dedman School of Law and B.B.A. –University of Iowa, “GPS For The Sky: A Survey of Automatic Dependent Surveillance-(ADS-B) and its Implementation in the United States”, Journal of Air Law and Commerce, Spring, 74 J. Air L. & Com. 473, Lexis)

Additionally, we are in the midst of an air capacity crisis. In 2007, U.S. commercial air passengers experienced the second-worst year on record in terms of flight delays. 79 Over twenty-six percent of all domestic flights either arrived late or were cancelled [\*482] altogether, 80 costing passengers and the airline industry almost $ 41 billion. 81 The following year was marginally improved, with 24.6% of flights delayed or cancelled. 82 According to Bobby Sturgell, then-deputy Administrator of the FAA, "the system we have today is essentially not scalable. You're going to hit a wall." 83 Clearly, something must be done and ADS-B appears to be the solution. 84

### Aviation Advantage – Certainty Key

#### Certainty’s key to equipage

Bradley 11 (Captain Mark, Chief Technical Pilot – Delta Airlines, “Building the Successful

Business Case for NextGen”, Aviation Week, May, [http://events.aviationweek.com/html/nextgen11/Day%2](http://events.aviationweek.com/html/nextgen11/Day%252) 02.%20Building%20a%20Successful%20Business%20Case%20BRADLEY.pdf)

The most effective method to close a business case for equipage is to ensure *certainty*. This will provide a less risky benefit. Certainty can be defined as an assurance by all stakeholders that implementation of procedures (and associated elements supporting those procedures) will be guaranteed based on a mutually agreed upon timeline. Failure to accomplish timely implementation should result in direct consequences for all participants. All stakeholders need to have “skin in the game.”

#### Certain investments are necessary to meet growing demand.

bin Salem 12 (Sakib, Fellow – Eno Center for Transportation, “NextGen: Aligning Costs, Benefits and Political Leadership”, April, http://www.enotrans.org/wp-content/uploads/wpsc/downloadables/NextGen-paper.pdf)

The aviation system that is part of the life-blood of our economy is poised to face rising demand with limited additional capacity and outdated technology. This could put considerable stress on the system in terms of congestion and efficiency. The Next Generation Air Transportation System (NextGen) represents a series of incremental policies, procedures, and technological changes to modernize the air traffic control (ATC) system into a more efficient, state-of-the-art satellite-based system.

On the technology side, NextGen is composed of two main components: aircraft based equipment that records and transmits the exact location of the aircraft using Global Positioning System (GPS), and ground based infrastructure that can receive and analyze the GPS data. Infrastructural improvements also entail devising more direct and fuel-efficient routes, and upgrading the computer and backup system used at 20 Federal Aviation Administration (FAA) air traffic control centers nationwide. The infrastructure implementation is currently in the hands of the FAA and funded by the Airport and Airway Trust Fund (AATF), while aircraft equipage is expected to be paid for by the operators.

On-board equipage could allow improved decision-making capabilities and accessibility during adverse weather, as well as better data communications between cockpit and ATC. This more precise system has the potential to reduce the minimum aircraft separation standard and allow more direct flight patterns, thus decreasing fuel consumption, carbon emissions, and congestion.

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. Testimony by the US Department of Transportation Inspector General 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, economic 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 infrastructure by itself is ineffective. The FAA has mandated equipage of Automated Dependent Surveillance-Broadcast Out (ADS-B) that allows the equipped aircraft to send transmission 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. 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 NextGen 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 Congressional 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. Furthermore, 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. This impact of the impasse on NextGen was also documented on the GAO report on the FAA’s NextGen cost-management.

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.

#### Strong, consistent government leadership is necessary to accelerate NextGen

ALPA 12 (Airline Pilots’ Association, “Leveling the Playing Field for U.S. Airlines and Their Employees”, White Paper, June, <http://www.alpa.org/publications/ALPA_White_Paper_Leveling_the_Playing_Field_June_2012/> ALPA\_White\_Paper\_Leveling\_the\_Playing\_Field\_June\_2012.html)

Invest in NextGen to Improve Safety and Increase Efficiencies While Decreasing Costs to Airlines

To maintain a competitive advantage in the international marketplace, the United States’ national airspace system (NAS)—which is composed of the entire air- and ground-based infrastructure, including air traffic control surveillance and communication, navigation, airports, aircraft, vehicles on the surface, and others—must be modernized. The current system of air traffic control and air traffic management is based on technologies, techniques, and processes that date back decades. The infrastructure continues to deteriorate, and the ability of the FAA and operators in the NAS to guarantee the safest possible travel is similarly being diminished.

Existing and emerging technologies hold the promise of significant increases in the ability to maintain or improve levels of safety while improving capacity and efficiency of our system, allowing our airlines to grow and ultimately save costs, resulting in a better business environment and more level playing field for U.S. airlines.

NextGen, in its mature state, will improve efficiency of operations, enhance both the accuracy and coverage of controllers’ ability to pinpoint the position of aircraft in flight and on the ground, increase capacity, reduce delays in the air and on the ground, and cut down greenhouse gas emissions. With the rising cost of fuel, less fuel will be consumed, resulting in immediate cost savings. Reduced taxi and flight time also translates into less noise and emissions. Better knowledge of exactly where the aircraft is on the ground translates into more efficient gate management, reduced tarmac delays, and fewer runway incursions. More accurate airborne position knowledge will allow the air traffic controller to arrange aircraft into more efficient streams. All of these benefits lead to profitability and growth of our airlines and our nation’s economy, as well as a better customer experience.

The upgrade from the current outdated system to a modern, more efficient one is as complex as the technologies themselves. It is simply impossible to “turn off” the current system while changes are made. Every major upgrade to the system must be undertaken while the system is in full operation, with the existing workforce. Thus, development of equipment and procedures, acquisition and deployment strategies, and training for pilots, controllers, and technicians must all be fully integrated.

Policy Recommendation: The U.S. government can help level the playing field for U.S. airlines and their employees by investing in NextGen to promote greater safety and efficiency.

The administration and Congress must work to accelerate the FAA’s NextGen plan. The scope, duration, and cost of NextGen require that decisions on critical aspects, such as funding and equipage, must be timely, accurate, and focused on the overall needs of the public. Strong government leadership, consistent long-term funding, and cooperative planning are all needed in establishing standards and requiring minimum levels of equipage.

### Aviation Advantage – Equipage Key NextGen

#### Equipage is key to NextGen implementation

Carey 11 (Bill, Senior Editor – AIN Online, Former Editor in Chief – Avionics Magazine and Masters in Journalism and Public Affairs – American University, “Paris 2011: Private Captial Fund Raises $1.5 Billion To Help Kick-start NextGen ATM in U.S.”, Aviation International News Online, 6-23, http://www.ainonline.com/aviation-news/paris-air-show/2011-06-23/paris-2011-private-captial-fund-raises-15-billion-help-kick-start-nextgen-atm-us)

The fund aims to kick-start the Next Generation Air Transportation System (NextGen) in the U.S., but also could serve as a financing model for the Single European Sky ATM Research (Sesar) program as well as air-traffic modernization efforts in other parts of the world, speakers said Wednesday during a Paris Air Show panel discussion at the ITT exhibit (Hall 3 D82).

Air traffic control modernization “cannot happen without equipage on aircraft,” said Russell Chew, managing partner with Nexa Capital Partners of Washington, D.C., and a general partner with the NextGen fund. “The new system requires that all airplanes be equipped with new avionics. The airlines in their equipage decisions have become the gatekeepers of this function.”

### Aviation Advantage – NextGen Key Capacity

#### NextGen’s key to ATC efficiency --- solves capacity crunch

Williams 9 (Genevra, J.D. Candidate – Southern Methodist University Dedman School of Law and B.B.A. –University of Iowa, “GPS For The Sky: A Survey of Automatic Dependent Surveillance-(ADS-B) and its Implementation in the United States”, Journal of Air Law and Commerce, Spring, 74 J. Air L. & Com. 473, Lexis)

IV. CONCLUSION

This discussion has illustrated how the limitations of the current air traffic infrastructure simply cannot meet the demand expected over the next twenty years. 242 Shortages of air traffic control staff, 243 airports, and runways, coupled with gross inefficiencies in radar technology are driving the U.S. aviation capacity towards a brick wall. 244 By utilizing GPS technology, a nationwide rollout of ADS-B promises to break through that wall. It will dramatically improve air traffic control monitoring capabilities, bring situational awareness in the cockpit into the twenty-first century, improve safety, and perhaps improve congestion, both in the sky and on the runway. 245 In these days of increased awareness of global warming, the secondary benefit of reducing jet fuel waste and emissions are also important. 246 Encouragingly, the benefits of ADS-B are not theoretical. The [\*500] FAA's Capstone project in Alaska has firmly demonstrated dramatic safety improvements, particularly for areas where radar coverage is limited. 247 Both Capstone and UPS have also shown the significant potential for cost savings by supporting more efficient flight management. 248

#### Congestion will escalate --- NextGen solves

Mouawad 12 (Jad, Airline and Energy Reporter – NYT, “No More Circling Seattle”, New York Times, 4-4, Lexis)

Planes using the new technology will cut 30 miles from their approach to the airport by taking a more direct path to the runway. They will no longer need to circle overhead awaiting clearance to land. And pilots will not have to push and pull at the throttles -- in effect, repeatedly stepping on the gas, then coasting -- to maintain the altitude assigned by air traffic controllers as they begin a stairlike descent. For passengers, landing will feel more like coming down a slide. ''This makes much better use of the airspace,'' Captain Adams said. ''It improves efficiency and reduces congestion. That's the holy grail we're all aiming for.'' The Seattle experiment is one of the first extensive applications of satellite technology after years of planning and political wrangling in Washington. Replacing the radar-based air traffic control system, which the nation's airports have relied on since the 1940s, is an enormous and expensive undertaking. By one official government estimate, the price tag could reach $42 billion by 2025. But the agency in charge of the program, the Federal Aviation Administration, has been hamstrung by political infighting that deprived it of a stable budget for five years. Congress finally approved a four-year budget for the agency in February, including $1 billion a year for the program, called the Next Generation Air Transportation System, or NextGen. The program has already confronted trouble. A government audit found in February that half of the 30 critical contracts needed to build the new system were delayed, and more than a third were over budget. And the airlines complain that the F.A.A. has been slow to create new landing procedures that make the most use of satellite guidance. It takes five to 10 years to create these procedures because of lengthy environmental and noise impact studies, and the difficulty of coordinating flights in busy airspaces. The F.A.A. is now trying to speed up that process to three years. The agency has approved tests using satellite-guided landings at Phoenix Sky Harbor International Airport, and experiments are planned this year in Washington, Atlanta, Dallas and Charlotte, N.C. Delta Air Lines, Southwest Airlines, JetBlue and American Airlines have been trying out aspects of satellite navigation. Given the expected growth in air traffic in the next decades, airlines and regulators say there is an urgent need to modernize the existing air traffic control system. The F.A.A. projects that the number of planes flown by domestic airlines will double in the next two decades, while the number of domestic passengers will reach 1 billion by 2024, up from about 732 million this year. Much of that growth will be concentrated in the biggest airports, most of which are already congested, particularly at peak hours. Radar has proved to be reliable over the years. But air traffic controllers can be sure of the precise location of the planes they are directing only when their radar sweeps once every six seconds. To make up for that uncertainty, controllers keep wide buffers between flights. Satellite technology will eventually change that equation and allow planes to fly much closer to one another because they will broadcast their locations with more accuracy. In effect, airports could increase capacity without building more runways because more planes could take off and land every hour. For airlines, more efficient approaches and landings could mean significant fuel savings. The F.A.A. projected that airlines using Hartsfield-Jackson International Airport in Atlanta, one of the world's busiest, would fly 1.2 million fewer miles each year, saving as much as 2.9 million gallons of fuel a year and allowing 10 more planes an hour to take off. But NextGen has also been slowed by disagreements between the airlines and federal regulators over which would pay the bill. Equipping a single plane with a GPS system can cost more than $340,000. That quickly adds up for airlines with hundreds of planes in their fleet, and with no immediate payoff for the upgrade. (New planes have the technology, but older models must be retrofitted.) That is the sort of logjam that the Seattle experiment is seeking to break. It will use something called Required Navigation Performance, or R.N.P., which is like GPS in cars. The difference is that the plane's autopilot feature can guarantee that the flight will stay precisely on course, from takeoff to landing, even in bad weather or turbulence. ''Today's planes are a lot smarter than a lot of the equipment on the ground,'' said Sherry Carbary, the vice president of Boeing Flight Services. Alaska Airlines has used satellite navigation for its planes since 1996 in Juneau, where bad weather had often forced flights to be canceled or diverted to Anchorage. The airline has spent $40 million in the last decade on both technology and pilot training. But it estimated the technology is saving $15 million to $20 million a year in allowing takeoffs and landings that would have been impossible before. The shift from radar to satellite navigation is similar to the move from analog to digital television, said Captain Adams, the Alaska Airlines pilot, and will allow more information to be shared through digital channels in the future. Airplanes, for instance, may be able to share weather conditions they encounter during flight, including wind speeds or even turbulence, and automatically relay that information to other planes. The data is currently recorded by each plane but is not shared.

#### NextGen reduces congestion and delay times

Patrick MEEHAN, Tuesday, Febuary 14, 2012, State Representative, 7th District of Pennsylvania, Meehan Says NextGen Air Traffic Control Investment Key to Regional Economy, <http://meehan.house.gov/latest-news/meehan-says-nextgen-air-traffic-control-investment-key-to-regional-economy/>

PHILADELPHIA – U.S. Rep. Patrick Meehan (PA-07) today urged President Obama to sign the Federal Aviation Administration reauthorization bill, saying key investments in the bill like the NextGen air traffic control system will boost our regional economy and improve the safety of our skies. Meehan made the comments while touring the air traffic control tower and meeting with controllers at the Philadelphia International Airport. [VIDEO: Watch Rep. Meehan discuss FAA reauthorization and NextGen technology.](http://www.youtube.com/watch?v=ioM-6dAUxOk) Meehan, a member of the House Aviation Subcommittee of the Transportation and Infrastructure Committee, was joined by Don Chapman, a facility representative with the National Air Traffic Controllers Association, and Mark Gale, CEO of the Philadelphia International Airport. **“This bipartisan bill means faster and safer travel, lower emissions, and an increase in private sector jobs,” said Meehan. “It will also advance badly needed modernization of our air traffic control system, which is essential in our congested mid-Atlantic airspace that sees one out of every six flights in the world.** This is particularly important here at Philadelphia International – no airport in the northeast sees more takeoffs and landings.” Meehan said the FAA reauthorization legislation will advance the modernization of the country’s air traffic control system to a GPS-based system known as NextGen. **This will help ease congestion, decrease delay times and reduce fuel waste. NextGen technologies are expected to bring a net $281 billion to the overall U.S. economy. The FAA authorization bill contains no earmarks and does not raises taxes or passenger facility charges. The bill provides long-term stability for the aviation industry, which accounts for $1.3 trillion in economic activity, and as much as 11 percent of GDP.**

#### NextGen would generate immediate effects on the economy

FAA, September 2011, NextGEN: Implementation Plan, http://www.faa.gov/nextgen/implementation/media/NextGen\_Implementation\_Plan\_2012.pdf

The overall health of the U.S economy is highly dependent on the aviation industry. As recently as 2009, civil aviation contributed $1.3 trillion annually to the national economy and constituted 5.2 percent of the gross domestic product. It generated more than 10 million jobs, with earnings of $394 billion. 1 Given the economic challenges faced by the country today, it is imperative that we protect and expand this vital economic engine. By implementing technologies and procedures that enable operators to burn less fuel and operate more efficiently and competitively, NextGen is intended to do just that. SUSTAINABILITY In addition to economic benefits, NextGen is helping to improve the global environment by reducing fuel burn and decreasing carbon dioxide and aircraft exhaust emissions that can adversely impact air quality. Some NextGen procedures also enable aircraft to operate more quietly, making airports better neighbors. These achievements are critical to sustaining the growth of aviation while protecting the environment.

#### Airline NextGen key to economic growth

FAA, August 2011,The Economic Impact of Civil Aviation on the U.S. Economy, http://www.faa.gov/air\_traffic/publications/media/FAA\_Economic\_Impact\_Rpt\_2011.pdf

From live traffic reports sent from helicopters to justin-time delivery of life saving organs for transplant, civil aviation has become an integral part of the U.S. lifestyle and commerce. In challenging economic times, the services that air transportation provides are essential among the building blocks for recovery and economic growth. The financial crisis and ensuing recent recession affected the whole world. Global real GDP growth slowed from 3.9 percent to 1.6 percent between 2007 and 2008, 4 while real GDP growth in the U.S. dropped from 1.9 to zero percent during the same period. 5 Although June 2009 marked the end of the recent recession in the United States, real GDP growth fell by 2.6 percent by the end of 2009 and unemployment rates reached double digits. However, despite the dramatic slowdown of the economy and impact on the aviation industry, the U.S. economy produced $14.1 trillion in value-added economic activity and sustained 140 million jobs. 6 At the same time, civil aviation economic activity: • Supported 10.2 million jobs • Contributed $1.3 trillion in total economic activity • Accounted for 5.2 percent of total U.S. GDP

#### NextGen curbs emissions and creates jobs- key to the slowing US economy

Karp ’12—Aaron Karp, Senior editor of Air Transport World (ATW) since 2006. Prior editor of World Airport Week, reporter for Flight International/ Air Transport Intelligence, and managing editor of Air Cargo World. Article accessible at http://atwonline.com/operations-maintenance/news/us-chamber-says-nextgen-atc-should-be-top-priority-0112, Retrieved 6-22-12

Financing for the NextGen system is tied up in long-stalled talks in Congress over FAA reauthorization; FAA's latest temporary funding extension expires Jan. 31 (ATW Daily News, Sept. 19, 2011). Donohue said that a "new NextGen air traffic control system ... will ease delays, conserve fuel, create jobs and save lives." Government creating certainty on ATC and other infrastructure funding would be helpful to a US business community dealing with a slow recovery from the 2008-09 financial downturn, he said. "Unfortunately, we think the economy will actually slow down in the early months of the year," he warned. "We expect [US GDP] growth to average about 2.5% in the first half and then work its way back to about 3% by the end of the year."

### Airlines Advantage – Fuel Costs

#### NextGen saves money from fuel prices

Sakib bin Salam, April 2012, Fellow at the Eno Center for Transportation, “NextGen Aligning Costs, Benefits and Political Leadership”, http://op.bna.com/der.nsf/id/sbay-8t2qlp/$File/NextGen%20paper.pdf

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). Fuel Cost Savings to Airlines The burden of increased fuel expenses is further exacerbated by airport congestion and existing inefficiencies in an aviation system that uses outdated technologies and protocols. Congestion is a problem, particularly at certain busy airports where the congestion is caused by capacity constraints, and will likely get worse as the economy recovers from the recession and travel demand rises.10 In 2010 major airlines reported that about 40 percent of arrivals and departures are delayed.11 Every additional minute spent by operators sitting on the tarmac or circling an airport awaiting clearance means additional fuel, equipment depreciation and maintenance, increased labor costs, employee fatigue, and a possible loss of customers. According to the latest FAA estimate, NextGen could save about 1.4 billion gallons of fuel through 2018.12 This estimate assumes continued benefits of some of the NextGen capabilities already in place at some airports and timely implementation of the FAA’s mid-term goals. This amounts to, on average, about 200 million gallons annually assuming full implementation of NextGen. Using the current jet fuel price of about $2.86/gallon in 2011, total fuel savings to operators would be about $600 million annually.

### Aviation Advantage – Jobs

#### NextGen creates jobs

Karp ’12—Aaron Karp, Senior editor of *Air Transport World* (ATW) since 2006. Prior editor of *World Airport Week,* reporter for *Flight International/ Air Transport Intelligence,* and managing editor of *Air Cargo World. Article accessible at* *http://atwonline.com/operations-maintenance/news/us-chamber-says-nextgen-atc-should-be-top-priority-0112, Retrieved 6-22-12*

Financing for the NextGen system is tied up in long-stalled talks in Congress over FAA reauthorization; FAA's latest temporary funding extension expires Jan. 31 (ATW Daily News, Sept. 19, 2011). Donohue said that a "new NextGen air traffic control system ... will ease delays, conserve fuel, create jobs and save lives." Government creating certainty on ATC and other infrastructure funding would be helpful to a US business community dealing with a slow recovery from the 2008-09 financial downturn, he said. "Unfortunately, we think the economy will actually slow down in the early months of the year," he warned. "We expect [US GDP] growth to average about 2.5% in the first half and then work its way back to about 3% by the end of the year."

### Aviation Advantage – Airlines Key Economy

#### Civil aviation drives the economy and will stall without NextGen --- loan guarantees are critical

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

The House and Senate have each declared passage of a new FAA Authorization bill a top legislative priority, very welcome news after more than three years of short-term extensions. Air transportation is a proven economic engine; passage of this bill is an investment in our nation’s economic recovery. 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.

#### Air Transportation is a key supporter for other industries

DoT 11

(U.S. Department of Transportation, Federal/Aviation Administration, August 2011. “The Economic Impact of Civil Aviation on the U.S. Economy” p. 36 <http://www.faa.gov/air_traffic/publications/media/FAA_Economic_Impact_Rpt_2011.pdf>) MJA

Air transportation is a key enabler for other industries such as tourism or industries that transport goods by air. Low fares and increased flight availability increase passenger travel, benefiting the tourism industry and other companies that require business travel, and also help industries that rely on air freight to transport high-value goods. As technology improves, relative fares and costs fall as flight availability rises, facilitating productivity and output gains in these industries. Transportation services provided by air carriers stimulate activity in other parts of the economy. For example, when air passengers reach their destinations, they spend money on hotel accommodations and food services, entertainment, sightseeing tours and so on. In addition, businesses that produce relatively high-value or perishable goods may prefer to ship their products to customers by air. 42 In 2008, the value of commodities shipped by air was $72,516 per ton, far higher than any other mode of transportation.

#### Economic success depends on aviation

DoT 11

(U.S. Department of Transportation, Federal/Aviation Administration, August 2011. “The Economic Impact of Civil Aviation on the U.S. Economy” p.3 <http://www.faa.gov/air_traffic/publications/media/FAA_Economic_Impact_Rpt_2011.pdf>) MJA

In 2009, civil aviation supported over 10 million jobs, contributed $1.3 trillion in total economic activity and accounted for 5.2 percent of total U.S. Gross Domestic Product (GDP). Civilian aircraft engines, equipment and parts also contribute $75 billion toward the U.S. trade balance. Civilian aircraft engines, equipment and parts have been the top net export for the past decade. Our economic success clearly depends on the success of aviation. So the Federal Aviation Administration (FAA) is committed to providing the safest, most efficient aerospace system in the world. As we move forward, the FAA will continue to invest in airports, and build the Next Generation Air Transportation System (NextGen). NextGen is a transformation of the National Airspace System. It will add a suite of 21st century technologies and procedures to make air travel more efficient and green. FAA’s Destination 2025 will provide the strategic bridge to accomplish the NextGen vision.

#### Commercial Aviation is heavily intertwined with the economy

ATA 10

(Air Transport Association, “When america flies, it works 2010 Economic Report” p. 5 <http://www.airlines.org/Documents/economicreports/2010.pdf>) MJA

The theme for this year’s economic report – When America Flies, It Works – was chosen to communicate the critical role that commercial aviation plays in virtually every facet of our economy and our daily lives. As the national and world economies begin to recover from the serious turmoil of the recent past, it is a particularly opportune time to focus on the contributions that a strong commercial aviation sector has, can and will make to a revitalized job market and a brighter future for everyone. Some of the most recent government data tells us that commercial aviation helps generate more than $1.2 trillion in economic activity and almost 11 million U.S. jobs. Remarkable, but like a lot of statistics, the raw data does not always connect us to the real story – the faces and families that numbers can never fully capture. The story is not just about the important business trip, the quick family vacation or the more than half a million jobs in the airline industry. Nor is it just about the travel and entertainment industry jobs or the jobs in the emerging market for sustainable alternative aviation fuels, which the airlines are leaders in pursuing, or the more than a million other jobs of every description that are generated with every aviation job. It is not just about the farm worker in California producing fresh lettuce for the New York market or the Alaskan boat captain delivering tomorrow’s salmon for the Florida restaurant trade. It is not just about the Internet-enabled catalog business that delivers products and supplies across the country with the click of a mouse – or the job multiplier that this economic activity produces. It is, in fact, about all of these and millions upon millions more jobs – and the faces and families they represent – that are created, fostered and powered by commercial aviation.

#### Airline industry is crucial to the US economy

Cambell 6 – Hill, CAMBELL 06, The Campbell Hill Aviation Group, Aviation and Research Consultants, “CommercialAviation and the American Economy,” March 2006,

<http://www.smartskies.org/NR/rdonlyres/E20C3048-9FD4-46D8-91F1-6303C4148C5A/0/CommercialAviationEconomyMar06.pdf>

The U.S. civil aviation sector (including air transportation, related manufacturing and air-based travel and tourism) wascollectively responsible for $1.37 trillion of national output in 2004, supporting 812.3 million U.S. employees and $418billion in personal earnings. Commercial aviation accounts for the majority of this impact with $1.2 trillion in output,$380 billion in earnings and 11.4 million jobs. U.S. Civil Aviation Economic Impact (2004) Commercial AviationGeneral Aviation Total Output (Billion $) 1,247 118 1,365 Earnings (Billion $) 380 38 418 Employment (000)11,393 956 12,349 The national economy is highly dependent on commercial aviation, which, in 2004, was directly orindirectly responsible for 5.8 percent of gross output (i.e., economic activity), 5.0 percent of personal earnings and 8.8percent of national employment. Commercial Aviation Impact as Share of U.S. Economy (2004) 8.8% 5.0% 5.8% Employment Personal Earnings Gross OutputThe direct impact of commercial air transportation and related industries in 2004 was estimated at $247 billion in gross output, $72 billion in earnings and over a million jobs.Commercial air transportation was the primary source of direct impacts, with $130 billion of output, followed by aircraft and related manufacturing ($75 billion), air expresscouriers ($24 billion) and air transportation support goods and services ($18 billion).The indirect impact of expenditures by commercial air travelers creates an additional $191billion of gross output, $67 billion of earnings and 3.3 million jobs. The lodging and food industries account for more than half of the total output impact, with retail shopping,recreation and entertainment and ground transportation spending also top-impact sectors. The direct and indirect impacts of commercial aviation generate additional “induced”impacts as industry revenues and employee earnings are used to purchase goods and services from other industries. The service sector accounts for nearly half of the $1.25 trillionin total national impact, both through travel and tourism services and support to both direct and indirect impact industries. 1 The total impact of commercial aviation is comparedto national aggregates of Gross Output and Personal Earnings (from the Bureau of Economic Accounts) and Total Covered Employment (from the Bureau of Labor Statistics) for the 50 states and the District of Columbia combined. Commercial Aviation Total Impacts = $1.25 Trillion of U.S. Economic Activity Transportation & Warehousing 18%Manufacturing 20% Services 47% Trade 11% All Other 4% The distribution of national impacts by state was determined by the location of airports, tourist destinations, businesstravel centers and aviation-related manufacturing plants, as well as the location of industries supporting the direct and indirect impact industries. California was the top-impactstate, with $203 billion of gross output impacts, followed by Texas, Florida, Georgia and New York. Top Five States in Total Impact (Billion $) $202.6 $126.9 $93.6 $72.7 $59.5California Texas Florida Georgia New York The distribution of impacts by congressional district was similarly based on local industrial patterns, with the top districts being either tourist destinations (Hawaii and Las Vegas area) or top aviation manufacturing centers (Western Washington). Top Five Congressional Districts in Total Impact (Billion $) $9.6$8.9 $8.7 $8.2 $7.8 District 1, Hawaii District 2, Hawaii District 3, Nevada District 8, Washington District 1, Nevada ii Introduction This report summarizes the estimated impactof commercial aviation on individual U.S congressional districts in 2004. The impact estimates are based on a model that allocates national and state-level impacts derived usingsecondary economic and transportation data sources of the federal government.[2](http://64.233.167.104/search?q=cache:0KSC4Ou2RWAJ:www.smartskies.org/NR/rdonlyres/E20C3048-9FD4-46D8-91F1-6303C4148C5A/0/CommercialAviationEconomyMar06.pdf+%22commercial+aviation+and+the+american+economy%22&hl=en&ct=clnk&cd=1&gl=us&client=firefox-a#7)The district-level estimates use Census of Population employment data for 2000 as allocated tothe 109 th congressional districts. The following describes the general concepts and methodologies used to measure the economic impact of the U.S. civil aviation sector, and provides summary results at the national, state and district level. Appendix A provides a detailed description of the impact methodologies. Appendices B and C summarize theresults at the state and congressional district levels, respectively. National Economic Impact of U.S. Civil Aviation The economic impact of any particular industry sector can bemeasured by the output, earnings and employment associated with that sector, plus any “induced” (or supporting) economic activity that results from any purchases made by thatsector’s firms and its employees. Total economic impacts of an industry combine both the first-level impacts (as related to the industry’s sales, revenue or output) and inducedimpacts (as related to purchases required to “produce” the sales or output and household spending by the industry’s employees). Civil aviation is a vital component of the U.S. passenger and cargo transportation sector and combines commercial and general aviation activities. The air transportation sector supports the travel and tourism industries, and issupported by the aircraft manufacturing sector. Each of these sectors also requires supporting goods, services and labor. The relative impact of civil aviation depends both on theabsolute demand for the output from these sectors, as well as the interdependence between those sectors and other U.S. industries. The primary impacts of commercial aviationon the U.S. economy are related to: (1) airlines and supporting services (commercial and non-commercial) (2) aircraft, engines and parts manufacturing (3) air-visitor travel andother trip-related expenditures The first two sectors (air transportation and aircraft manufacturing) create direct impacts through the production of air transportation services; thevisitor-related expenditures constitute an indirect impact that results from the primary transport activity. All of these sectors are directly affected andsupported by the U.S. civil aviation system, consisting of airports, airspace and supporting infrastructure. Directimpacts of civil aviation are created through transportation and other activities at airports as measured by theemployment, payroll and sales/output associated with the following industries/entities: Scheduled and non-scheduledcommercial airlines (passenger and cargo) and air couriers Airport and aircraft service providers (including FAA andother government services) Air cargo service providers General aviation (non-commercial) aircraft operators(including flight schools) 2 These results were based on methodologies similar to those developed in previous nationalimpact studies by the Federal Aviation Administration and other industry groups. [continues]The induced impacts of commercial aviation in 2004 are estimated at $808 billion in output, $241 billion in earnings and 7.0 million jobs. Mostof these induced impacts are attributed to the service sector, with the manufacturing and trade sectors also significantlyimpacted [continues] The commercial aviation sector has a significant impact on the U.S. economy, based on airtransportation and airport services, manufacturing of air transportation equipment and travel and tourism expendituresby air passengers. Including induced impacts, the U.S. commercial aviation sector drove $1.2 trillion in economicactivity (5.8 percent of U.S. total), $380 billion in earnings (5.0 percent) and 11.4 million jobs (8.8 percent).[14](http://64.233.167.104/search?q=cache:0KSC4Ou2RWAJ:www.smartskies.org/NR/rdonlyres/E20C3048-9FD4-46D8-91F1-6303C4148C5A/0/CommercialAviationEconomyMar06.pdf+%22commercial+aviation+and+the+american+economy%22&hl=en&ct=clnk&cd=1&gl=us&client=firefox-a#15)Thedirect impact of commercial air transportation and related industries was estimated at $247 billion in gross output, $72billion in earnings and over one million jobs, with commercial air transportation accounting for approximately half of the output impact. Commercial air-traveler expenditures created indirect impacts including $191 billion of gross output,$67 billion of earnings and 3.3 million jobs, mostly for the accommodations and food service sectors. The nationalimpact of commercial aviation extends to every congressional district and the District of Columbia. California was thetop-impact state, with $203 billion of gross output impacts followed by Texas, Florida, Georgia and New York. The top congressional districts are either major tourist destinations (Hawaii and Las Vegas area) or top aviation-manufacturingcenters (Western Washington), although every district has a significant level of impact.

#### Airlines makes up the largest sector of economy

Kelly 8 – Gary, KELLY 08, Chief Executive Officer of Southwest Airlines, CEOpinion: Airline Inudstry Very Fuel-Efficient, <http://www.thecro.com/node/620>

The problem of greenhouse gas (GHG) emissions and the resulting climate change is one that faces all of us—as individuals, but also as corporations. The backbone of the aviation industry is helping individuals go, see and do in a time-effective manner. If we don’t address the problem of GHG emissions, there will not be natural places to go, a world to see or things to do. We, as an industry, are highly motivated to preserve the natural world around us. Southwest Airlines and the entire airline industry have a great story to tell about improving fuel efficiency and reducing GHG emissions. Compared to other industries, and even other modes of transportation, the airline industry is incredibly fuel-efficient and continues to improve efficiency with investments in new technology and by adopting new operational procedures. We are driven to be as fuel efficient as possible because, not only is it the right thing to do, frankly, it’s good business. Fuel accounts for an incredibly large portion of any airline’s operating costs. And thus, we have every reason in the world to be as fuel (and carbon) efficient as possible. We are constantly searching for ways to reduce our fuel costs. When we reduce our fuel consumption, we help both the environment and our bottom line. Any government solution to climate change should leverage this economic reality. According to a recent study, “Commercial Aviation and the American Economy,” the airline industry, which includes both passenger and cargo carriers, is a major driver of economic activity, especially in the United States, where the airline industry is directly responsible for 5.8 percent of gross economic output and 8.8 percent of national employment. Despite our role in being a major generator of economic activity, airlines account for only about 2 percent of GHG emissions in the United States and 3 percent worldwide. Again, the airline industry delivers more value to the economy while maintaining a low carbon footprint because we are constantly improving our fuel efficiency. The industry has already contributed to the reduction of emissions through technology and efficiency. The industry has improved its fuel efficiency—and hence GHG efficiency—by 103 percent between 1978 and 2006.

### Aviation Advantage – Economy Impacts

#### Extinction

Kemp 10 (Geoffrey, Director of Regional Strategic Programs – Nixon Center and Former Director of the Middle East Arms Control Project – Carnegie Endowment for International Peace, The East Moves West: India, China, and Asia’s Growing Presence in the Middle East, p. 233-234)

The second scenario, called Mayhem and Chaos, is the opposite of the first scenario; everything that can go wrong does go wrong. The world economic situation weakens rather than strengthens, and India, China, and Japan suffer a major reduction in their growth rates, further weakening the global economy. As a result, energy demand falls and the price of fossil fuels plummets, leading to a financial crisis for the energy-producing states, which are forced to cut back dramatically on expansion programs and social welfare. That in turn leads to political unrest: and nurtures different radical groups, including, but not limited to, Islamic extremists. The internal stability of some countries is challenged, and there are more “failed states.” Most serious is the collapse of the democratic government in Pakistan and its takeover by Muslim extremists, who then take possession of a large number of nuclear weapons. The danger of war between India and Pakistan increases significantly. Iran, always worried about an extremist Pakistan, expands and weaponizes its nuclear program. That further enhances nuclear proliferation in the Middle East, with Saudi Arabia, Turkey, and Egypt joining Israel and Iran as nuclear states. Under these circumstances, the potential for nuclear terrorism increases, and the possibility of a nuclear terrorist attack in either the Western world or in the oil-producing states may lead to a further devastating collapse of the world economic market, with a tsunami-like impact on stability. In this scenario, major disruptions can be expected, with dire consequences for two-thirds of the planet’s population.

#### Economic decline causes global war

Royal 10 (Jedediah, Director of Cooperative Threat Reduction – U.S. Department of Defense, “Economic Integration, Economic Signaling and the Problem of Economic Crises”, Economics of War and Peace: Economic, Legal and Political Perspectives, Ed. Goldsmith and Brauer, p. 213-215)

Less intuitive is how periods of economic decline may increase the likelihood of external conflict. Political science literature has contributed a moderate degree of attention to the impact of economic decline and the security and defence behaviour of interdependent states. Research in this vein has been considered at systemic, dyadic and national levels. Several notable contributions follow. First, on the systemic level, Pollins (2008) advances Modelski and Thompson's (1996) work on leadership cycle theory, finding that rhythms in the global economy are associated with the rise and fall of a pre-eminent power and the often bloody transition from one pre-eminent leader to the next. As such, exogenous shocks such as economic crises could usher in a redistribution of relative power (see also Gilpin. 1981) that leads to uncertainty about power balances, increasing the risk of miscalculation (Feaver, 1995). Alternatively, even a relatively certain redistribution of power could lead to a permissive environment for conflict as a rising power may seek to challenge a declining power (Werner. 1999). Separately, Pollins (1996) also shows that global economic cycles combined with parallel leadership cycles impact the likelihood of conflict among major, medium and small powers, although he suggests that the causes and connections between global economic conditions and security conditions remain unknown. Second, on a dyadic level, Copeland's (1996, 2000) theory of trade expectations suggests that 'future expectation of trade' is a significant variable in understanding economic conditions and security behaviour of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectations of future trade decline, particularly for difficult to replace items such as energy resources, the likelihood for conflict increases**,** as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states.4 Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write: The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession tends to amplify the extent to which international and external conflicts self-reinforce each other. (Blomberg & Hess, 2002. p. 89) Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg, Hess, & Weerapana, 2004), which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. "Diversionary theory" suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to fabricate external military conflicts to create a 'rally around the flag' effect. Wang (1996), DeRouen (1995). and Blomberg, Hess, and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997), Miller (1999), and Kisangani and Pickering (2009) suggest that the tendency towards diversionary tactics are greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DeRouen (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak Presidential popularity, are statistically linked to an increase in the use of force. In summary, recent economic scholarship positively correlates economic integration with an increase in the frequency of economic crises, whereas political science scholarship links economic decline with external conflictat systemic, dyadic and national levels.5 This implied connection between integration, crises and armed conflict has not featured prominently in the economic-security debate and deserves more attention.

### Aviation Advantage – Agriculture Impacts

#### Ag collapse spills over – tanking overall growth, free trade, and crushing small farms

Francl 98 (Terry, Senior Economist and Commodity Specialist – American Farm Bureau Federation, Et al., “Impact of the Kyoto Protocol on Agriculture”, The American Council fore Capital Formation, October, http://www.accf.org/publications/reports/sr-impact-kyoto-ag.html)

Agriculture's Impact on the U.S. Economy No single study can capture the **ripple effect** that a decline in farm income would have on **other aspects of the** agricultural and non-agricultural **economy**. A 1998 study by the Sparks Companies, using data from Standard and Poor's DRI and based on the commitments agreed to by the United States in Kyoto, found significant economic effects: Consumer food prices would rise. A 2 percent decline in GDP resulting from the Kyoto Protocol would in turn cause a 0.7 percent decline in domestic demand for food. This would create a mild, short-term, downward pressure on food prices, counterbalanced by the inflationary pressures of higher energy costs. On net, food consumption expenditures would rise 2.6 percent. This would have only minor effects on the average U.S. consumer, whose food costs account for 11.9 percent of disposable income. But the impact on poor families would be considerable. The 37.4 percent of U.S. households earning under $20,000 after taxes spend between 21.4 and 100 percent of their income on food. Public assistance demand and costs would rise. The U.S. Department of Agriculture allocates more than $39 billion annually to six food programs, most notably the child nutrition programs and food stamps. Reduced employment could add roughly 500,000 to the food stamp rolls and raise costs of USDA food programs 5 percent annually, or by $2 billion. Agricultural exports would fall. By increasing the energy costs of farm production in America while leaving them unchanged in developing countries, the Kyoto Protocol would cause U.S. food exports to decline and imports to rise. Reduced efficiency of the world food system could add to a **political backlash against free trade** policies at home and abroad. Farm consolidation would increase. "The higher energy costs," wrote DRI/McGraw-Hill, "together with the reduced domestic and export demand, could lead to a very severe decline in investment in agriculture, and a sharp increase in farm consolidation. Small farm numbers likely would decline much more rapidly than under baseline conditions, while investment even in larger commercial farms likely would stagnate or decline."

#### Agriculture is vital to overall growth

Fitzgerald 99 (Senator Peter G., (R-Ill.), February 28, “Illinois Needs Sound Farm Policy,” http:// fitzgerald.senate.gov/index.cfm?FuseAction=Articles.Detail&Article\_id=69&Month=2&Year=1999)

Agriculture is critical to both the economy of America and Illinois. Including related industries, agriculture is the nation's largest employer. Illinois' 76,000 farms cover more than 28 million acresCnearly 80 percent of our state's land---and Illinois farm product sales generate more than $9 billion annually. When I entered the U.S. Senate last month, I worked hard to secure a seat on the Senate Agriculture Committee so that our state and our farmers could have a strong voice in Washington. We need to focus on three areas: opening new overseas markets for farm products, reducing the federal tax and regulatory burden on farmers and rural businesses, and ensuring farmers have adequate risk management tools. Farmers need open overseas markets for farm and food products. Illinois farmers depend on foreign trade for their economic well-being. In 1997, Illinois exported $3.7 billion in agricultural commodities, ranking third among all states. But over the last three years, farm exports dropped nationwide, putting many Illinois farmers at risk. Congress and U.S. trade officials should work to ensure that American farmers are able to sell their products in the world market. In my first legislative act as Senator, I joined four colleagues to introduce legislation requiring U.S. trade officials to make eliminating agriculture trade barriers a top priority in U.S. trade negotiations, so that our farmers can compete on a level playing field and fight for a better share of retail agriculture sales. I support fast-track trade negotiating authority, so that the Administration can be in a better position to tear down international trade barriers. We must, at the same time, work to ensure that our trading partners adhere to all existing trade agreements. Farmers need lower taxes. Eliminating the estate tax on family farmers will ensure that farms can be passed on to the next generation. According to USDA figures, farmers are six times more likely to face inheritance taxes than other Americans. Family farmers work hard and pay taxes throughout their lives. They build a productive and successful family business, and hope eventually to pass it on to their children. A farm's value is stored overwhelmingly in illiquid assets---land, livestock, and physical capital. Farmers who don't have cash available to pay the estate tax are often forced to sell their farms to pay the government. Farmers need adequate risk management tools. Last year, the federal government provided a significant amount of money in emergency disaster assistance to farmers. Perhaps this would not have been necessary if farmers could access, in the first instance, well-designed risk management tools. This year, the Senate will examine the USDA's crop insurance system. We need to look at whether the current system provides adequate protection against risk and evaluate the development of new risk management tools. For farmers to prosper, our nation must have economic, farm, and trade policies that promote investment and growth in agricultural communities and agricultural states like Illinois. A healthy agricultural economy has ripple effects through many industries and is critical for the economic prosperity of both Illinois and America. As your new Senator, I look forward to addressing these issues in the coming years.

#### Agricultural decline collapses the overall economy

Kugler 98 (Lane, Columnist, “American Farmers Are Struggling”, Journal of Commerce, 12-31, Lexis)

U.S. agriculture prices have reached lows not seen in 10, 20 or even 30 years, while the costs of living, labor and machinery are at record highs. The only thing missing that was present 70 years ago is a stock-market plunge and massive unemployment. If this country continues to allow its agriculture to sink to Depression-era levels, how can it keep the stock market from tumbling, too? Think about the stock market's falling to levels of 30 years ago, say around 700, instead of flirting with 9,000. Impossible? In just over two years, cash grain prices have dropped over 70 percent from the high posted in July 1996. Hog prices also reflect a near-70 percent decline since 1990. Many things have contributed to this dramatic decline of commodity prices. Some have directly benefited the consumer, like lower petroleum prices that were passed on at the gas pump. However, this has not been the case with meats and other commodities in 1997 and 1998. Processors and retailers decided they could increase their margins rather than passing on the savings to the consumer (which would have cleaned up the oversupply). Supplies continue to build, benefiting only processors and retailers, not consumers. Free markets have been stymied. I am not trying to tell you we are heading for a sequel of the Great Depression. But why is the greatest production machine in the world, American agriculture, going through such difficult times? Why should a minority, those who produce the majority of our food, be subjected to cost inflation and price deflation at the same time? U. S. taxpayers coughed up $6 billion dollars this year to help the farmer. Along with next year's Freedom to Farm payments, the extra cash is helping us through the crisis. Thank you, it is just what we needed: another Band-Aid. Government policy for the past 60 years has been to intravenously feed farmers the ""antibiotic'' of farm subsidies and price supports. But the wound has never healed. The Freedom to Farm Act attempts to wean agriculture from subsidies and supports by initiating a ""withdrawal'' process. The problem is, other grain-producing countries around the world don't see it that way. They continue to subsidize their producers. The livestock producer gets no help from taxpayers. But if these prices continue, it is a pretty sure bet the banks holding his notes will get bailed out. We can make our products much more affordable to foreign buyers by devaluing the dollar. But, you say, that will cause inflation. Maybe investors should rethink inflation. Maybe a little inflation is much better than another Depression. If you look at government money-supply figures, it would appear that Washington may have started to print money (which, in hindsight, could have prevented the Great Depression). I hope this is the case. The enormous power of the hedge funds that continuously short commodity futures - the pricing mechanism of the world these days - is staggering. If agriculture dies an economic death, the rest of the economy is sure to follow.

### Aviation Advantage – Famine Impacts

#### World War 3 results

Calvin 2 (William H., Professor of Biology – University of Washington, “A Brain for All Season”, http://WilliamCalvin.com/BrainForAllSeasons/ NAcoast.htm)

The population-crash scenario is surely the most appalling. Plummeting crop yields will cause some powerful countries to try to take over their neighbors or distant lands – if only because their armies, unpaid and lacking food, will go marauding, both at home and across the borders. The better-organized countries will attempt to use their armies, before they fall apart entirely, to take over countries with significant remaining resources, driving out or starving their inhabitants if not using modern weapons to accomplish the same end: eliminating competitors for the remaining food. This will be a worldwide problem – and could easily lead to a Third World War – but Europe's vulnerability is particularly easy to analyze.The last abrupt cooling, the Younger Dryas, drastically altered Europe's climate as far east as Ukraine.  Present-day Europe has more than 650 million people.  It has excellent soils, and largely grows its own food.  It could no longer do so if it lost the extra warming from the North Atlantic.

#### Food shortages cause extinction

Klare 6 (Michael, Professor of Peace and World Security Studies – Hampshire College, “The Coming Resource Wars”, 3-11, http://www.waterconserve.org/shared/reader/welcome.aspx?linkid=53710&keybold=water%20 land%20conflict)

"As famine, disease, and weather-related disasters strike due to abrupt climate change," the Pentagon report notes, "many countries' needs will exceed their carrying capacity" -- that is, their ability to provide the minimum requirements for human survival. This "will create a sense of desperation, which is likely to lead to offensive aggression" against countries with a greater stock of vital resources. "Imagine eastern European countries, struggling to feed their populations with a falling supply of food, water, and energy, eyeing Russia, whose population is already in decline, for access to its grain, minerals, and energy supply." Similar scenarios will be replicated all across the planet, as those without the means to survival invade or migrate to those with greater abundance -- producing endless struggles between resource "haves" and "have-nots." It is this prospect, more than anything, that worries John Reid. In particular, he expressed concern over the inadequate capacity of poor and unstable countries to cope with the effects of climate change, and the resulting risk of state collapse, civil war and mass migration. "More than 300 million people in Africa currently lack access to safe water," he observed, and "climate change will worsen this dire situation" -- provoking more wars like Darfur. And even if these social disasters will occur primarily in the developing world, the wealthier countries will also be caught up in them, whether by participating in peacekeeping and humanitarian aid operations, by fending off unwanted migrants or by fighting for access to overseas supplies of food, oil, and minerals. When reading of these nightmarish scenarios, it is easy to conjure up images of desperate, starving people killing one another with knives, staves and clubs -- as was certainly often the case in the past, and could easily prove to be so again. But these scenarios also envision the use of more deadly weapons. "In this world of warring states," the 2003 Pentagon report predicted, "nuclear arms proliferation is inevitable." As oil and natural gas disappears, more and more countries will rely on nuclear power to meet their energy needs -- and this "will accelerate nuclear proliferation as countries develop enrichment and reprocessing capabilities to ensure their national security." Although speculative, these reports make one thing clear: when thinking about the calamitous effects of global climate change, we must emphasize its social and political consequences as much as its purely environmental effects. Drought, flooding and storms can kill us, and surely will -- but so will wars among the survivors of these catastrophes over what remains of food, water and shelter. As Reid's comments indicate, no society, however affluent, will escape involvement in these forms of conflict.

#### Eliminating famine is a moral obligation – even if it causes extinction

Watson 77 (Richard, Professor of Philosophy – Washington University and Former Visiting Fellow at the Center of International Studies – Princeton University, World Hunger and Moral Obligation, p. 122)

That is, as stated early in this essay, morality essentially has to do with relations among people, among persons. It is nonsense to talk of things that cannot be moral agents as having responsibilities; consequently, it is nonsense to talk of whatever is not actually a person as having rights. It is deceptive even to talk of legal rights of a corporate entity. Those rights (and reciprocal responsibilities) actually pertain to individual human beings who have an interest in the corporate entity. The State or the human species have no rights at all, let alone rights superior to those of individuals. The basic reason given for preserving a nation or the human species is that otherwise the milieu of morality would not exist. This is false so far as specific nations are concerned, but it is true that the existence of individuals depends on the existence of the species. However, although moral behavior is required of each individual, no principle requires that the realm of morality itself be preserved. Thus, we are reduced to the position that people’s interest in preserving the human species is based primarily on the interest of each in individual survival. Having shown above that the principle of equity is morally superior to the principle of survival, we can conclude again that food should be shared equally even if this means the extinction of the human race.

### Aviation Advantage – Competitiveness Impact

#### NextGen key to competitiveness

NEXA Capital 11

(NEXA Advisors, A NEXA Capital Company, April 2011, NEXA Capital Partners provides corporate and strategic financial advisory services, and capital investment, to the aerospace, transportation, logistics and homeland security sectors (Venture Capitalist). “NextGen Equipage Fund Job Creation, Economic Benefits, and Contribution to Federal Revenues” p. 13 <http://www.nextgenfund.com/files/downloads/NEF_Economic_Study.pdf>) MJA

Improved air transportation results in more efficient business operations, reduced costs, and increased U.S. international competitiveness. xviii NextGen will improve U.S. competitiveness by lowering the travel time and therefore the costs for both passengers and cargo. Just‐in‐time inventory management facilitated by efficient air cargo operations plays an important role in the U.S. maintaining global competitiveness. The aerospace industry provides a significant positive contribution to the U.S. balance of trade. xix The U.S. competitive position can be reinforced by taking leadership in aircraft equipage for NextGen technologies. This leadership applies to both the U.S. air transport sector, and the aerospace manufacturing sector, OEM and component alike.

## \*\*\* ENVIRONMENT ADVANTAGE

### Environment Advantage – NextGen Solves

#### NextGen key to environmental protection

JPDO 6

(Joint Planning and Development Office, 2006, Congress created the Joint Planning and Development Office (JPDO) to manage the partnerships designed to bring NextGen online. These partnerships include private-sector organizations, academia, and the following government departments and agencies: Department of Transportation (DOT) Department of Commerce (DOC) Department of Defense (DOD) Department of Homeland Security (DHS) Federal Aviation Administration (FAA) National Aeronautics and Space Administration (NASA) White House Office of Science and Technology Policy (OSTP) Office of the Director of National Intelligence (ODNI) – (Ex Officio), “Next Generation Air Transportation In Brief” <http://www.jpdo.gov/library/in_Brief_2006.pdf>) MJA

A key NextGen objective is to “develop environmental protection that allows sustained aviation growth.” In this regard, JPDO and its agency and industry partners are focusing on three primary environmental concerns. They are aviation noise, air quality, and fuel consumption. Several aspects of NextGen have substantial environmental returns. The NextGen vision involves a significant reduction in flight time. Reduced flight times mean that aircraft engines operate less, burn less fuel, and generate less noise and fewer emissions. Recent flight trials have tested new aircraft descent procedures for airport approaches that dramatically reduce fuel consumption, noise and emissions. Precision navigation procedures further allow for the design of airport departure and arrival paths that will reduce noise over populated areas.

#### NextGen is projected to reduce 14 million metric tons of CO2 and reduce fuel consumption

FAA 12 (Federal Aviation Authority, Executive Summary, “NextGen Implementation Plan”, March 2012, http://www.faa.gov/nextgen/media/executive\_summary\_2012.pdf)

NextGen will provide a number of benefits for NAS users, our environment and our economy. We estimate that NextGen improvements will reduce delays 38 percent by 2020, compared with what would happen if we did not implement planned NextGen improvements. These delay reductions will provide an estimated $24 billion in cumulative benefits through 2020. NextGen delay reductions are in addition to any reduction from future runway construction or expansion. We estimate 14 million metric tons in cumulative reductions of carbon dioxide emissions through 2020. For the same period, we estimate 1.4 billion gallons in cumulative reductions of fuel use. To achieve timely NextGen benefits, the FAA needs to synchronize its investments with those of aviation stakeholders. To encourage operator equipage and validate concepts, the FAA conducts simulations, demonstrations, trials and flight evaluations as part of developing NextGen systems and procedures.

#### NextGen systems reduce emissions from planes – Southwest tests prove reductions

Ascanio 11 (Joe, a full time web designer, developer and marketing guy working in the online travel technology marketplace and TerraCurve.com is his personal project, “Way to go: Southwest Airlines cuts costs and emissions with NextGen air traffic systems”, 1-18-11, TerraCurve.com, http://www.terracurve.com/2011/01/18/way-to-go-southwest-airlines-cuts-costs-and-emissions-with-nextgen-air-traffic-systems/)

Southwest Airlines has begun flying advanced navigation procedures at 11 airports in an effort to reduce emissions while cutting expenses; for every minute of time saved on each flight, the annual savings add up to 156,000 metric tons in emissions and $25 million in fuel savings per year. Southwest Airlines has officially begun flying Required Navigation Performance (RNP) efficient procedures at 11 US airports; providing the ability to fly shorter flight paths and idle-thrust descents while reducing fuel consumption and lowering both emissions and community noise levels. This marks a major milestone in environmental impact reduction and a significant step in the future of the US NextGen air traffic management system. Sky’s the limit RNP is satellite-based navigation that brings together the accuracy of GPS (Global Positioning System), the capabilities of advanced aircraft avionics and new flight procedures. Southwest has modified 345 Boeing 737-700 aircraft with new flight display software and trained more than 5,900 pilots in the procedures. GE Aviation is providing the onboard technology through its TrueCourse flight management system. Annual savings of $16 million are projected from using the procedures at the 11 airports, with an anticipated saving of over $60 million once all airports served by Southwest have efficient RNP procedures in place. The airline calculates that for a single minute of time saved on each of its flight, the annual savings add up to 156,000 metric tons in emissions and $25 million in fuel savings per year. The initiative is the culmination of a four-year project with partners Boeing, GE and Honeywell. Southwest is estimated to have invested $175 million in equipping its fleet with the technology. “RNP sets the stage for Southwest to continue doing its part to conserve fuel, improve safety, and reduce carbon emissions and greenhouse gases, while simultaneously taking advantage of the high-performance characteristics that exist in an airline’s fleet,” said the airline’s Vice President of the Operations Coordination Center. “The efficiencies RNP introduces help Southwest be a good neighbour while also maintaining our low fares.” The GE Aviation TrueCourse flight management system controls the aircraft track to an accuracy of 10 meters and the time of arrival to within 10 seconds to any point in the flight plan. In June 2010, GE Aviation was awarded funding as part of the FAA’s Continuous Lower Energy, Emissions and Noise (CLEEN) program to help further develop Flight Management System – Air Traffic Management (FMS-ATM) technologies. The program is focused on meeting NextGen environmental goals and to enable greater mobility. The aim is to enable the technologies to enter the fleet beginning in 2015. As part of CLEEN, GE is working with industry partners Lockheed Martin, AirDat and Alaska Airlines. GE will develop advanced FMS functionality that will be installed on Alaska Airlines Boeing 737 aircraft to demonstrate the environmental benefits. Work with Lockheed Martin, the prime contractor for the En Route Automation Modernization (ERAM) system, will demonstrate integration between the airborne FMS and the ground-based air traffic system. Alaska Airlines, which pioneered RNP precision flight-guidance technology during the mid-1990s to help its planes land at remote and geographically challenging airports, has been conducting advanced RNP procedures as part of its Greener Skies project, including trialling continuous descent approaches at Seattle-Tacoma International Airport. Compared to a conventional landing, Alaska found that fuel consumption and emissions could be reduced by 35%. The airline estimates the new procedures at Sea-Tac will lead to cuts in fuel consumption of 2.1 million gallons annually and reduce carbon emissions by 22,000 tonnes. The FAA’s latest estimates show that by 2018, NextGen (Next Generation Air Transportation System) will reduce total flight delays by about 21% while providing $22 billion in cumulative benefits to the travelling public, aircraft operators and the FAA. In the process, more than 1.4 billion gallons of fuel are expected to be saved during this period, cutting carbon dioxide emissions by nearly 14 million tons.

#### Tests are currently proving NextGen’s capabilities to reduce CO2 and fuel costs

Stock et Al. 12 (Stephen, Jeremy, and Kevin, award winning career journalist and two staff writers, “FAA Moves Towards NextGEN”, 5-4-12, http://www.nbcbayarea.com/news/local/FAA-ANOUNCES-NextGEN-143416166.html)

A $5 million pilot project that is supposed to make the skies safer, cheaper and more efficient took off today at Oakland International Airport. It's called NextGEN and eventually it will replace older technology nationwide. Right now the project will be tested at Oakland, San Francisco, San Jose and Sacramento's airports. The FAA says the news system uses satellite technology coordinated with ground based tracking. They say the new system will enable air traffic controllers to land airplanes more precisely. The result should allow planes to fly closer together and they will do it with less noise. This will save time, jet fuel and money for both the airlines and passengers, according to the FAA. “NextGEN is right now. There are things that we are doing that are improving the use of the air space that will result in a lot of benefits right away,” FAA Acting Administrator Michael Huerta told NBC Bay Area. “It's one of the nation's busiest. Oakland sits about eight miles from San Francisco and San Jose is about 20 miles to the south. But we've got the group to do it. It's time for these procedures to be changed." said Steve Hefley with the National Air Traffic Controller Association. Once implemented, the FAA estimates annual savings for the NextGEN Program will total 2.3 million gallons of fuel, $6.5 million in reduced fuel cost, 23,000 metric tons in reduced CO2 and 1.5 million fewer miles flown.

### Environment Advantage – Yes Warming

#### The rate is increasing and risks crossing invisible tipping points that make catastrophic climate change inevitable

Brown 8 (Lester E., Director and Founder – Global Institute of the Environment, Plan B 3.0: Mobilizing to Save Civilization, p. 3-5)

During the late summer of 2007, the news of accelerating ice melting arrived at a frenetic pace. In early September, the *Guardian* in London reported, "The Arctic ice cap has collapsed at an unprecedented rate this summer, and levels of sea ice in the region now stand at a record low." Experts were "stunned" by the loss of ice, as an area almost twice the size of Britain dis­appeared in a single week. 1 Mark Serreze, a veteran Arctic specialist with the U.S. National Snow and Ice Data Center, said: "It's amazing. If you asked me a couple of years ago when the Arctic could lose all of its ice, then I would have said 2100, or 2070 maybe. But now I think that 2030 is a reasonable estimate."? A few days later, the Guardian, reporting from a symposium in Ilulissat, Greenland, said that the Greenland ice cap is melt­ing so fast that it is triggering minor earthquakes as pieces of ice weighing several billion tons each break off the ice sheet and slide into the sea. Robert Corell, chairman of the Arctic Climate Impact Assessment, reported that "we have seen a massive acceleration of the speed with which these glaciers are moving into the sea. The ice is moving at 2 meters an hour on a front 5 kilometers [3 miles] long and 1,500 meters deep.":' Corell said that when flying over the Ilulissat glacier he had "seen gigantic holes (moulins) in it through which swirling masses of melt water were falling." This melt water lubricates the surface between the glacier and the land below, causing the glacier to flow faster into the sea. Veli Kallio, a Finnish scientist who had been analyzing the earthquakes, said they were new to northwest Greenland and showed the potential for the entire ice sheet to break up and collapse." Corell noted that the projected rise in sea level during this century of 18-59 centimeters (7-23 inches) by the Intergovern­mental Panel on Climate Change was based on data that were two years old. He said that some scientists now believe the increase could be as much as 2 meters ' In late August, a *Reuters* story began with "a thaw of Antarctic ice is outpacing predictions by the U.N. climate panel and could in the worst case drive up world sea levels by 2 meters (6 feet) by 2100, a leading expert said." Chris Rapley, head of the British Antarctic Survey said, "The ice is moving faster both in Greenland and in the Antarctic than the glaciologists had believed would happen. Several months earlier, scientists had reported that the Gan­gotri glacier, the principal glacier that feeds the Ganges River, is melting at an accelerating rate and could disappear entirely in a matter of decades. The Ganges would become a seasonal river, flowing only during the monsoon season? Glaciers on the Tibet-Qinghai Plateau that feed the Yellow and Yangtze rivers are melting at 7 percent a year. Yao Tandong, one of China's leading glaciologists, believes that at this rate, two thirds of these glaciers could disappear by 2060.8 These glaciers in the Himalayas and on the Tibet-Qinghai Plateau feed all the major rivers of Asia, including the Indus, Ganges, Mekong, Yangtze, and Yellow Rivers. It is the water from these rivers that irrigates the rice and wheat fields in the region. We are crossing natural thresholds that we cannot see and violating deadlines that we do not recognize. Nature is the time keeper, but we cannot see the clock. Among the other environ­mental trends undermining our future are shrinking forests, expanding deserts, falling water tables, collapsing fisheries, dis­appearing species, and rising temperatures. The temperature increases bring crop-withering heat waves, more-destructive storms, more-intense droughts, more forest fires, and, of course, ice melting. We can see from ice melting alone that our civilization is in trouble. If the Greenland ice sheet melts, sea level rises 7 meters (23 feet). If the West Antarctic Ice Sheet breaks up, and many scientists think it could go before Greenland, it adds another 5 meters to the increase, for a total of 12 meters (39 feet). 9 The International Institute for Environment and Develop­ment has studied the likely effects of a 10-meter (33-foot) rise . Their 2007 study projected more than 600 million refugees from rising seas. More people than currently live in the United States and Western Europe combined would be forced to migrate inland to escape the rising waters. 10 Now that we are belatedly recognizing these trends and the need to reverse them, time is running out. We are in a race between tipping points in the earth's natural systems and those in the world's political systems. Which will tip first? Will we reach the point where the melting of the Greenland ice sheet is irreversible? Or will we decide to phase out coal-fired power plants fast enough to avoid this wholesale ice melting? A rise in temperature to the point where the earth's ice sheets arid glaciers melt is only one of many environmental tipping pointsneeding our attention. While the earth's temperature is rising, water tables are falling on every continent. Here the chal­lenge is to raise water use efficiency and stabilize population before water shortages become life-threatening. I 1

#### -- Indicators prove:

#### A) Satellites

Meglin and Dickinson 2 (Jin, Professor of Meteorology – University of Maryland and Robert E., Professor of Earth and Atmospheric Sciences – Georgia Tech, “New Observational Evidence For Global Warming From Satellite”, 5-23, http://climate.eas.gatech.edu/dickinson/publications/jin-grl2002-warming.pdf)

We have developed procedures for removing the effects of changing satellite orbits and cloud contamination from skin temperatures estimated from AVHRR channels 4 and 5, and so provide a first estimate of the trends of land surface skin temperature over the last two decades. The estimated land temperature increase is not only much greater than that for the atmosphere but also apparently somewhat larger than the estimates of surface air temperature increase from in situ measurement. Data from the AVHRR satellite indicate that the temperature of land surface has **warmed substantially** in most regions over the last two decades and globally at a rate of about 0.43 ± 0.2\_C per decade, consistent with the increase of global land air temperature but apparently somewhat larger. The data set providing the diurnal cycle of land temperature also gives a decrease in the diurnal range of 0.16 ± 0.05\_C per decade. The skin temperature climatology estimated from the data show considerable spatial and temporal structures. Some of these structures are known to be real as established by correlation with the SAT change [Jin et al., 1997], and some either result from changes in the land temperature difference or artifacts in the temperature estimates caused by volcanic aerosol, unknown physics, or retrieval uncertainties.

#### B) Aggregate data

MSNBC 7 (News, “Experts Issue New Climate Warning”, 4-6,

http://www.heatisonline.org/contentserver/objecthandlers/index.cfm?id=6342&method=full)

An international global warming conference approved a report Friday warning of dire threats to the Earth and to mankind from increased hunger in Africa and Asia to the extinction of species unless the world adapts to climate change and halts its progress. Africa will be hardest hit, the report concluded. By 2020, up to 250 million people are likely to exposed to water shortages. In some countries, food production could fall by half, it said. Agreement came after an all-night session during which key sections were deleted from the draft and scientists angrily confronted government negotiators who they feared were watering down their findings. It has been a complex exercise, said Rajendra Pachauri, chairman of the Intergovernmental Panel on Climate Change. Several scientists objected to the editing of the final draft by government negotiators but in the end agreed to compromises. However, some scientists vowed never to take part in the process again. The climax of five days of negotiations was reached when the delegates removed parts of a key chart highlighting devastating effects of climate change that kick in with every rise of 1.8 degrees Fahrenheit, and in a tussle over the level of scientific reliability attached to key statements. There was little doubt about the science, which was **based on 29,000 sets of data**, much of it collected in the last five years. For the first time we are not just arm-waving with models, Martin Perry, who conducted the grueling negotiations, told reporters.

### Environment Advantage – Yes Anthropogenic

#### Warming is real and anthropogenic. Scientific consensus is clear.

Oreskes 4 (Naomi, Professor of History and Science Studies – University of California, San Diego, “The Scientific Consensus on Climate Change”, Science Magazine, 12-3, [http://www.sciencemag.org/cgi/content/full/306/5702/16 86](http://www.sciencemag.org/cgi/content/full/306/5702/1686))

Policy-makers and the media, particularly in the United States, frequently assert that climate science is highly uncertain. Some have used this as an argument against adopting strong measures to reduce greenhouse gas emissions. For example, while discussing a major U.S. Environmental Protection Agency report on the risks of climate change, then-EPA administrator Christine Whitman argued, "As [the report] went through review, there was less consensus on the science and conclusions on climate change" ([1](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref1)). Some corporations whose revenues might be adversely affected by controls on carbon dioxide emissions have also alleged major uncertainties in the science ([2](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref2)). Such statements suggest that there might be substantive disagreement in the scientific community about the reality of anthropogenic climate change. This is not the case. The scientific consensus is clearly expressed in the reports of the Intergovernmental Panel on Climate Change (IPCC). Created in 1988 by the World Meteorological Organization and the United Nations Environmental Programme, IPCC's purpose is to evaluate the state of climate science as a basis for informed policy action, primarily on the basis of peer-reviewed and published scientific literature ([3](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref3)). In its most recent assessment, IPCC states unequivocally that the consensus of scientific opinion is that Earth's climate is being affected by human activities: "Human activities ... are modifying the concentration of atmospheric constituents ... that absorb or scatter radiant energy. ... [M]ost of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations" [p. 21 in ([4](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref4))].IPCC is not alone in its conclusions. In recent years, all major scientific bodies in the United States whose members' expertise bears directly on the matter have issued similar statements. For example, the National Academy of Sciences report, Climate Change Science: An Analysis of Some Key Questions, begins: "Greenhouse gases are accumulating in Earth's atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise" [p. 1 in ([5](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref5))]. The report explicitly asks whether the IPCC assessment is a fair summary of professional scientific thinking, and answers yes: "The IPCC's conclusion that most of the observed warming of the last 50 years is likely to have been due to the increase in greenhouse gas concentrations accurately reflects the current thinking of the scientific community on this issue" [p. 3 in ([5](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref5))]. Others agree. The American Meteorological Society ([6](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref6)), the American Geophysical Union ([7](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref7)), and the American Association for the Advancement of Science (AAAS) all have issued statements in recent years concluding that the evidence for human modification of climate is compelling ([8](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref8)). The drafting of such reports and statements involves many opportunities for comment, criticism, and revision, and it is not likely that they would diverge greatly from the opinions of the societies' members. Nevertheless, they might downplay legitimate dissenting opinions. That hypothesis was tested by analyzing 928 abstracts, published in refereed scientific journals between 1993 and 2003, and listed in the ISI database with the keywords "climate change" ([9](http://www.sciencemag.org/cgi/content/full/306/5702/1686#ref9)). The 928 papers were divided into six categories: explicit endorsement of the consensus position, evaluation of impacts, mitigation proposals, methods, paleoclimate analysis, and rejection of the consensus position. Of all the papers, 75% fell into the first three categories, either explicitly or implicitly accepting the consensus view; 25% dealt with methods or paleoclimate, taking no position on current anthropogenic climate change. Remarkably, none of the papers disagreed with the consensus position. Admittedly, authors evaluating impacts, developing methods, or studying paleoclimatic change might believe that current climate change is natural. However, none of these papers argued that point. This analysis shows that scientists publishing in the peer-reviewed literature agree with IPCC, the National Academy of Sciences, and the public statements of their professional societies. Politicians, economists, journalists, and others may have the impression of confusion, disagreement, or discord among climate scientists, but that impression is incorrect. The question of what to do about climate change is also still open. But there is a scientific consensus on the reality of anthropogenic climate change. Climate scientists have repeatedly tried to make this clear. It is time for the rest of us to listen.

### Environment Advantage – A2: Negative Feedbacks

#### Feedbacks are net positive – additional emissions cause runaway warming

Hanson 8 (James E., Head – NASA Goddard Institute for Space Studies and Adjunct Professor of Earth and Environmental Science – Columbia University, “Tipping point: Perspective of a Scientist”, April, http://www.columbia.edu/~jeh1/2008/StateOfWild\_20080428.pdf)

Fast feedbacks—changes that occur quickly in response to temperature change—amplify the initial temperature change, begetting additional warming. As the planet warms, fast feedbacks include more water vapor, which traps additional heat, and less snow and sea ice, which exposes dark surfaces that absorb more sunlight. Slower feedbacks also exist. Due to warming, forests and shrubs are moving poleward into tundra regions. Expanding vegetation, darker than tundra, absorbs sunlight and warms the environment. Another slow feedback is increasing wetness (i.e., darkness) of the Greenland and West Antarctica ice sheets in the warm season. Finally, as tundra melts, methane, a powerful greenhouse gas, is bubbling out. Paleoclimatic records confirm that the long-lived greenhouse gases— methane, carbon dioxide, and nitrous oxide—all increase with the warming of oceans and land. These positive feedbacks amplify climate change over decades, centuries, and longer. The predominance of positive feedbacks explains why Earth’s climate has historically undergone large swings: feedbacks work in both directions, amplifying cooling, as well as warming, forcings. In the past, feedbacks have caused Earth to be whipsawed between colder and warmer climates, even in response to weak forcings, such as slight changes in the tilt of Earth’s axis.2 The second fundamental property of Earth’s climate system, partnering with feedbacks, is the great inertia of oceans and ice sheets. Given the oceans’ capacity to absorb heat, when a climate forcing (such as increased greenhouse gases) impacts global temperature, even after two or three decades, only about half of the eventual surface warming has occurred. Ice sheets also change slowly, although accumulating evidence shows that they can disintegrate within centuries or perhaps even decades. The upshot of the combination of inertia and feedbacks is that additional climate change is already “in the pipeline”: even if we stop increasing greenhouse gases today, more warming will occur. This is sobering when one considers the present status of Earth’s climate. Human civilization developed during the Holocene (the past 12,000 years). It has been warm enough to keep ice sheets off North America and Europe, but cool enough for ice sheets to remain on Greenland and Antarctica. With rapid warming of 0.6°C in the past 30 years, global temperature is at its warmest level in the Holocene.3 The warming that has already occurred, the positive feedbacks that have been set in motion, and the additional warming in the pipeline together have brought us to the precipice of a planetary tipping point. We are at the tipping point because the climate state includes large, ready positive feedbacks provided by the Arctic sea ice, the West Antarctic ice sheet, and much of Greenland’s ice. Little additional forcing is needed to trigger these feedbacks and magnify global warming. If we go over the edge, we will transition to an environment far outside the range that has been experienced by humanity, and there will be no return within any foreseeable future generation. Casualties would include more than the loss of indigenous ways of life in the Arctic and swamping of coastal cities. An intensified hydrologic cycle will produce both greater floods and greater droughts. In the US, the semiarid states from central Texas through Oklahoma and both Dakotas would become more drought-prone and ill suited for agriculture, people, and current wildlife. Africa would see a great expansion of dry areas, particularly southern Africa. Large populations in Asia and South America would lose their primary dry season freshwater source as glaciers disappear. A major casualty in all this will be wildlife.

### Environment Advantage – Warming Impacts

#### Warming is real, anthropogenic, and causes extinction

Deibel 7 (Terry L, Professor of IR @ National War College, “Foreign Affairs Strategy: Logic for American Statecraft”, Conclusion: American Foreign Affairs Strategy Today)

Finally, there is one major existential threat to American security (as well as prosperity) of a nonviolent nature, which, though far in the future, demands urgent action. It is the threat of global warming to the stability of the climate upon which all earthly life depends. Scientists worldwide have been observing the gathering of this threat for three decades now, and what was once a mere possibility has passed through probability to near certainty. Indeed not one of more than 900 articles on climate change published in refereed scientific journals from 1993 to 2003 doubted that anthropogenic warming is occurring. “In legitimate scientific circles,” writes Elizabeth Kolbert, “it is virtually impossible to find evidence of disagreement over the fundamentals of global warming.” Evidence from a vast international scientific monitoring effort accumulates almost weekly, as this sample of newspaper reports shows: an international panel predicts “brutal droughts, floods and violent storms across the planet over the next century”; climate change could “literally alter ocean currents, wipe away huge portions of Alpine Snowcaps and aid the spread of cholera and malaria”; “glaciers in the Antarctic and in Greenland are melting much faster than expected, and…worldwide, plants are blooming several days earlier than a decade ago”; “rising sea temperatures have been accompanied by a significant global increase in the most destructive hurricanes”; “NASA scientists have concluded from direct temperature measurements that 2005 was the hottest year on record, with 1998 a close second”; “Earth’s warming climate is estimated to contribute to more than 150,000 deaths and 5 million illnesses each year” as disease spreads; “widespread bleaching from Texas to Trinidad…killed broad swaths of corals” due to a 2-degree rise in sea temperatures. “The world is slowly disintegrating,” concluded Inuit hunter Noah Metuq, who lives 30 miles from the Arctic Circle. “They call it climate change…but we just call it breaking up.” From the founding of the first cities some 6,000 years ago until the beginning of the industrial revolution, carbon dioxide levels in the atmosphere remained relatively constant at about 280 parts per million (ppm). At present they are accelerating toward 400 ppm, and by 2050 they will reach 500 ppm, about double pre-industrial levels. Unfortunately, atmospheric CO2 lasts about a century, so there is no way immediately to reduce levels, only to slow their increase, we are thus in for significant global warming; the only debate is how much and how serious the effects will be. As the newspaper stories quoted above show, we are already experiencing the effects of 1-2 degree warming in more violent storms, spread of disease, mass die offs of plants and animals, species extinction, and threatened inundation of low-lying countries like the Pacific nation of Kiribati and the Netherlands at a warming of 5 degrees or less the Greenland and West Antarctic ice sheets could disintegrate, leading to a sea level of rise of 20 feet that would cover North Carolina’s outer banks, swamp the southern third of Florida, and inundate Manhattan up to the middle of Greenwich Village. Another catastrophic effect would be the collapse of the Atlantic thermohaline circulation that keeps the winter weather in Europe far warmer than its latitude would otherwise allow. Economist William Cline once estimated the damage to the United States alone from moderate levels of warming at 1-6 percent of GDP annually; severe warming could cost 13-26 percent of GDP. But the most frightening scenario is runaway greenhouse warming, based on positive feedback from the buildup of water vapor in the atmosphere that is both caused by and causes hotter surface temperatures. Past ice age transitions, associated with only 5-10 degree changes in average global temperatures, took place in just decades, even though no one was then pouring ever-increasing amounts of carbon into the atmosphere. Faced with this specter, the best one can conclude is that “humankind’s continuing enhancement of the natural greenhouse effect is akin to playing Russian roulette with the earth’s climate and humanity’s life support system. At worst, says physics professor Marty Hoffert of New York University, “we’re just going to burn everything up; we’re going to heat the atmosphere to the temperature it was in the Cretaceous when there were crocodiles at the poles, and then everything will collapse.” During the Cold War, astronomer Carl Sagan popularized a theory of nuclear winter to describe how a thermonuclear war between the Untied States and the Soviet Union would not only destroy both countries but possibly end life on this planet. Global warming is the post-Cold War era’s equivalent of nuclear winter at least as serious and considerably better supported scientifically. Over the long run it puts dangers from terrorism and traditional military challenges to shame. It is a threat not only to the security and prosperity to the United States, but potentially to the continued existence of life on this planet.

#### Extinction

Tickell 8 (Oliver, Climate Researcher and Author – Kyoto2, “On a Planet 4C Hotter, All We Can Prepare For is Extinction”, The Guardian, http://www.guardian.co.uk/commentisfree/2008/aug/11/climatechange)

We need to get prepared for four degrees of global warming, Bob Watson told the Guardian last week. At first sight this looks like wise counsel from the climate science adviser to Defra. But the idea that we could adapt to a [4C rise](http://www.guardian.co.uk/commentisfree/2008/aug/07/carbonemissions.climatechange) is absurd and dangerous. [Global warming](http://www.guardian.co.uk/environment/climatechange) on this scale would be a catastrophe that would mean, in the immortal words that Chief Seattle probably never spoke, "the end of living and the beginning of survival" for humankind. Or perhaps the beginning of our extinction. The collapse of the polar ice caps would become inevitable, bringing long-term [sea level rises](http://www.guardian.co.uk/environment/gallery/2007/dec/05/climatechange.flooding?picture=331454811) of 70-80 metres. All the world's coastal plains would be lost, complete with ports, cities, transport and industrial infrastructure, and much of the world's most productive farmland. The world's geography would be transformed much as it was at the end of the last ice age, when sea levels rose by about 120 metres to create the Channel, the North Sea and Cardigan Bay out of dry land. Weather would become extreme and unpredictable, with more frequent and severe droughts, [floods](http://www.guardian.co.uk/environment/2008/aug/08/climatechange.flooding) and hurricanes. The Earth's carrying capacity would be hugely reduced. Billions would undoubtedly die. Watson's call was supported by the government's former chief scientific adviser, Sir David King, who warned that "if we get to a four-degree rise it is quite possible that we would begin to see a runaway increase". This is a remarkable understatement. The climate system is already experiencing significant feedbacks, notably the summer [melting of the Arctic sea ice](http://www.guardian.co.uk/environment/2008/aug/10/climatechange.arctic). The more the ice melts, the more sunshine is absorbed by the sea, and the more the Arctic warms. And as the Arctic warms, the release of billions of tonnes of methane – a greenhouse gas 70 times stronger than carbon dioxide over 20 years – captured under melting permafrost is already under way. To see how far this process could go, look 55.5m years to the Palaeocene-Eocene Thermal Maximum, when a global temperature increase of 6C coincided with the release of about 5,000 gigatonnes of carbon into the atmosphere, both as CO2 and as methane from bogs and seabed sediments. Lush subtropical forests grew in polar regions, and sea levels rose to 100m higher than today. It appears that an initial warming pulse triggered other warming processes. Many scientists warn that this historical event may be analogous to the present: the warming caused by human emissions could propel us towards a similar hothouse Earth. But what are we to do? All our policies to date to tackle global warming have been miserable failures. The Kyoto protocol has created a vast carbon market but done little to reduce emissions. The main effect of the EU's emissions trading scheme has been to transfer about €30bn or more from consumers to Europe's biggest polluters, the power companies. The EU and US foray into [biofuels](http://www.guardian.co.uk/environment/biofuels) has, at huge cost, increased greenhouse gas [emissions](http://www.guardian.co.uk/environment/carbonemissions) and created a world [food crisis](http://www.guardian.co.uk/environment/food), causing starvation in many poor countries. So are all our efforts doomed to failure? Yes, so long as our governments remain craven to special interests, whether [carbon traders](http://www.guardian.co.uk/environment/2008/aug/10/emissionstrading.utilities) or fossil fuel companies. The carbon market is a valuable tool, but must be subordinate to climatic imperatives. The truth is that to prevent runaway greenhouse warming, we will have to leave most of the world's fossil fuels in the ground, especially carbon-heavy coal, oil shales and tar sands. The fossil fuel and power companies must be faced down. Global problems need global solutions, and we also need an effective replacement for the failed Kyoto protocol. The entire Kyoto system of national allocations is obsolete because of the huge volumes of [energy](http://www.guardian.co.uk/environment/energy) embodied in products traded across national boundaries. It also presents a major obstacle to any new agreement – as demonstrated by the 2008 [G8 meeting](http://www.guardian.co.uk/world/2008/jul/08/g8) in Japan that degenerated into a squabble over national emission rights.

#### Warming destroys all life on earth

Brandenberg 99 (Dr. John, Physicist, Dead Mars, Dying Earth, p. 232-233)

The world goes on its merry way and fossil fuel use continues to power it. Rather than making painful or politically difficult choices such as inventing in fusion or enacting a rigorous plan of conserving, the industrial world chooses to muddle through the temperature climb. Let’s imagine that America and Europe are too worried about economic dislocation to change course. The ozone hole expands, driven by a monstrous synergy with global warming that puts more catalytic ice crystals into the stratosphere, but this affects the far north and south and not the major nations’ heartlands. The seas rise, the tropics roast but the media networks no longer cover it. The Amazon rainforest becomes the Amazon desert. Oxygen levels fall, but profits rise for those who can provide it in bottles. An equatorial high pressure zone forms, forcing drought in central Africa and Brazil, the Nile dries up and the monsoons fall. Then inevitably, at some unlucky point in time, a major unexpected event occurs—a major volcanic eruption, a sudden and dramatic shift in ocean circulation or a large asteroid impact (those who think freakish accidents do not occur have paid little attention to life on Mars), or a nuclear war that starts between Pakistan and India and escalates to involve China and Russia… Suddenly, the gradual climb in global temperatures goes on a mad excursion as the oceans warm and release large amounts of dissolved carbon dioxide from their lower depths into the atmosphere. Oxygen levels go down as oxygen replaces lost oceanic carbon dioxide. Asthma cases double and then double again. Now a third of the world fears breathing. As the oceans dump carbon dioxide, the greenhouse effect increases, which further warms the oceans, causing them to dump even more carbon. Because of the heat, plants die and burn in enormous fires which release more carbon dioxide, and the oceans evaporate, adding more water vapor to the greenhouse. Soon, we are in what is termed a runaway greenhouse effect, as happened to Venus eons ago. The last two surviving scientists inevitably argue, one telling the other, “See, I told you the missing sink was in the ocean!” Earth, as we know it, dies. After this Venusian excursion in temperatures, the oxygen disappears into the soil, the oceans evaporate and are lost and the dead Earth loses its ozone layer completely. Earth is too far from the Sun for it to be a second Venus for long. Its atmosphere is slowly lost – as is its water—because of the ultraviolet bombardment breaking up all the molecules apart from carbon dioxide. As the atmosphere becomes thin, the Earth becomes colder. For a short while temperatures are nearly normal, but the ultraviolet sears any life that tries to make a comeback. The carbon dioxide thins out to form a thin veneer with a few wispy clouds and dust devils. Earth becomes the second Mars – red, desolate, with perhaps a few hardy microbes surviving.

#### Unchecked warming will obliterate the ecosystem and kill billions

Milbrath 94 (Lester, The Futurist, Climate and Chaos: Societal Impacts of Sudden Weather Shifts, p. 27-28)

Another scenario suggests that there could be an extended period, perhaps a decade or two, when there is an oscillation-type chaos in the climate system. Plants will be especially vulnerable to oscillating chaos, since they are injured or die when climate is too hot or too cold, too dry or too wet. And since plants make food for all other creatures, plant dieback would lead to severe declines in agricultural production. Farm animals and wildlife would die in large numbers. Many humans would also starve. Several years of climate oscillations could kill billions of people. The loss of the premise of continuity would also precipitate collapse of world financial markets. That collapse would lead to a sharp decline in commodity markets, world trade, factory output, retail sales, research and development, tax income for governments, and education. Such nonessential activities such as tourism, travel, hotel occupancy, restaurants, entertainment, and fashion would be severely affected. Billions of unemployed people would drastically reduce their consumption, and modern society's vaulted economic system would collapse like a house of cards.

#### Extinction

Battisti 6 (David, Professor of Atmospheric Sciences – University of Washington, Et al., Brief of Amici Curiae, 5-15, [http://docket.medill.northwestern.edu/archives/ Mass-v-EPAAmicusScientists.pdf](http://docket.medill.northwestern.edu/archives/%20Mass-v-EPAAmicusScientists.pdf))

4. It is virtually certain that what has been observed so far is only the beginning, and that continued greenhouse gas emissions along current trajectories will cause additional warming of the earth system as a whole, and very likely that such perturbation would cause the rate of surface warming and sea level rise in the 21st century to be substantially larger and faster than that experienced in the 20th century and without precedent in the past 10,000 years. 5. Although the general link between increased greenhouse gases in the atmosphere and increased warming of the earth system is virtually certain, the complexity of the climate system means that predictions of specific details that follow from this general link are subject to varying degrees of certainty. Among the more certain future predictions are the following: a. It is likely, based on both models and on data from the ice ages over the last 400,000 years, that if atmospheric carbon dioxide doubled from pre-industrial times, and then rose no further, the long-term warming response of global average surface temperature (the "climate sensitivity") would be in the range of 1.5° to 4.5° C (2.7° - 8.1° F). b. In the absence of emissions reductions, however, carbon dioxide and other greenhouse gases in the atmosphere are very likely to much more than double, and the consequent rise in global average temperature during the 21st century, projected to be 2.5° to 10° C (4.5° to 18° F), will likely continue rising well beyond 2100. c. This amount of warming is very likely to drive steady melting of arctic ice sheets and further increases in global average sea level, which is projected to reach an additional 0.1 - 0.9 meters (1/3 - 1 foot) by 2100, and to continue rising to much higher levels in the decades to millennia following 2100. d. This amount of sea level rise, especially when combined with likely increases in hurricane intensities, would exacerbate storm surges and have negative impacts on health and welfare in the United States, and globally. These negative impacts would be concentrated in low-lying coastal regions, such as Boston or Cape Cod, Massachusetts, the Louisiana/Mississippi Gulf coast, and southern Florida. e. Rising temperatures are also likely to lead to increases in extreme weather events (e.g. heat waves) and altered patterns of rainfall (e.g. droughts) that will disrupt natural and agricultural ecosystems, and increase the risk of extinction of animal and plant species. f. Ocean acidity is likely to increase by several tenths of a pH unit due to continued uptake of carbon dioxide, and this acidification is likely to cause substantial stress to key marine organisms, and hence to whole marine ecosystems, particularly in cold water regions. 6. The possibilities of the above-mentioned climate changes have been carefully and extensively assessed, and there is a broad scientific consensus that these changes are likely or very likely. The exact timing of the climate change and the exact magnitude of the impact are harder to determine, because the climate system has a great deal of inertia (especially in the ice sheets and oceans), and greenhouse gases already in the atmosphere will continue to contribute to future warming. This inertia heightens the threat to human welfare because continuing unregulated greenhouse gas emissions commit us to large-scale, long-term (centuries) climate change consequences before the exact nature of those consequences can be known with greater certainty. 7. Apart from the likely, very likely, and virtually certain gradual climate changes outlined in points 4 and 5, there is also an as yet unquantifiable probability that continued greenhouse gas emissions will trigger abrupt climate change surprises that could very rapidly impose large impacts on ecosystems and human societies.15 We know that such abrupt climate changes (e.g. large local cooling or warming, widespread droughts, shifts in hurricane intensity or flood regimes that occur in only a decade or so) are possible because they have happened in the past, before recorded human history began. Such abrupt shifts were triggered when gradual changes pushed the earth system across a threshold, abruptly switching the climate system into a new state. We do not understand these switches very well, but it is very likely that they exist within the climate system, and there is a significant but unknown risk that continued emission of greenhouse gases will trigger some kind of climate change surprise.

#### Warming risks famine, disease, water shortages, species loss, and the death of billions --- adaptation’s key

McKewon 7 (Elaine, Citing a Report by the IPCC, “IPCC: Global Warming Highway to Extinction”, 4-1, http://elainemckewon.wordpress.com/2007/04/01/ipcc-global-warming-highway-to-extinction/)

Climate change is paving a “highway to extinction” which could see billions of people perish from hunger, malnutrition, disease, extreme weather events, heat-induced stress and lack of drinkable water by the year 2050, according to the latest report of the UN’s Intergovernmental Panel on Climate Change due to be released in Belgium next Friday.

Climate scientist Andrew Weaver of the University of Victoria in British Columbia told the Associated Press that the report maps out the consequences of climate change degree by degree, as temperatures rise. He said this presents a clear “highway to extinction, but on this highway there are many turnoffs. This is showing you where the road is heading. The road is heading toward extinction.”

Dr Weaver is one of the lead authors of the first IPCC report, issued in February. That report confirmed the strong scientific consensus that climate change is real and is caused by human activity related to greenhouse gas emissions.

If the global temperature rose by 1 degree Celsius (1.8 degrees Fahrenheit) up to 1.7 billion people would not have enough water. Infectious diseases and allergenic pollens would also substantially increase, and amphibians would begin to go extinct.

A further increase of 1 degree Celsius would see one-third of the world’s species approach extinction and at least 2 billion people facing death as a result of hunger, malnutrition, disease, extreme weather events, heat-induced stress and lack of drinkable water. Life on the planet would reach this threshold by the year 2050 if greenhouse gas emissions were not reduced substantially.

A further doubling of temperatures would see one-fifth of the world’s population affected by catastrophic flooding, up to 3.2 billion people facing extreme water shortages, and major extinctions around the globe.

Achim Steiner, the head of the UN Environment Program, told Reuters that “We are talking about a potentially catastrophic set of developments.” He believes the public, governments and businesses now realize that the substantive debate is over and that there is overwhelming consensus on climate change in the scientific community.

“We’ve passed the tipping point,” he said. “It’s no longer about whether climate change is happening – but about how we deal with it.” The next report of the IPCC, due out in October 2007, will assess the range of options for limiting greenhouse gas emissions and otherwise mitigating climate change.

### Environment Advantage – Aviation Key Air Pollution

#### Aviation emissions are a key contributor to air pollution

Dillingham, 05-06-2008, Gerald L. Dillingham, Ph.D. Director, Physical Infrastructure Issues, “NextGen and Research and Development Are Keys to Reducing Emissions and Their Impact on Health and Climate”, http://www.gao.gov/new.items/d08706t.pdf

Aviation emissions, like other combustible emissions, include pollutants that affect health. While it is difficult to determine the health effects of pollution from any one source, the nitrogen oxides produced by aircraft engines contribute to the formation of ozone, the air pollutant of most concern in the United States and other industrialized countries. Ozone has been shown to aggravate respiratory ailments. A National Research Council panel recently concluded that there is strong evidence that even short-term exposure to ozone is likely to contribute to premature deaths of people with asthma, heart disease, and other preexisting conditions. With improvements in aircraft fuel efficiency and the expected resulting increases in nitrogen oxide emissions, aviation’s contribution to ozone formation may increase. In addition, aviation is associated with other air pollutants, such as hazardous air pollutants, including benzene and formaldehyde, and particulate matter, all of which can adversely affect health. Data on emissions of hazardous air pollutants in the vicinity of airports are limited, but EPA estimates that aviation’s production of these pollutants is small relative to other sources, such as on-road vehicles. Nevertheless, according to EPA, there is growing public concern about the health effects of the hazardous air pollutants and particulate matter associated with aviation emissions. See appendix I for more detailed information on the health and environmental effects of aviation emissions.

### Environment Advantage – Ozone Impact

#### Ozone depletion causes extinction

Greenpeace 95 (Full of Holes: Montreal Protocol and the Continuing Destruction of the Ozone Layer -- A Greenpeace Report with contributions from Ozone Action, http://archive.greenpeace.org/ozone/holes/holebg.html)

When chemists Sherwood Rowland and Mario Molina first postulated a link between chlorofluorocarbons and ozone layer depletion in 1974, the news was greeted with scepticism, but taken seriously nonetheless. The vast majority of credible scientists have since confirmed this hypothesis. The ozone layer around the Earth shields us all from harmful ultraviolet radiation from the sun. Without the ozone layer, life on earth would not exist. Exposure to increased levels of ultraviolet radiation can cause cataracts, skin cancer, and immune system suppression in humans as well as innumerable effects on other living systems. This is why Rowland's and Molina's theory was taken so seriously, so quickly - the stakes are literally the continuation of life on earth.

## \*\*\* ADD ONS / OTHER ADVANTAGES

### Europe 2AC Add-On

#### SESAR needs to coordinate with NextGen to achieve full potential – plan helps Europe

SJU 11 (SESAR Joint Undertaking, the agency that is implementing Europe’s new ATC system, “SESAR and interoperability”, 6-4-11, http://www.sesarju.eu/programme/highlights/sesar-and-interoperability)

As the world’s two most complex airspace blocks – Europe and the United States – develop new, modernised ATM systems, the question of their interoperability becomes paramount. Global interoperability is an essential goal when planning the development of ATM air/ground applications and systems and is consequently one of the key requirements of SESAR. SESAR, Europe’s ATM modernisation programme takes place in the context of the International Civil Aviation Organisation’s (ICAO) Global ATM Operational Concept, which provides governments and industry with objectives for the design and implementation of ATM and supporting communication, navigation and surveillance systems. “Working together on a global scale early in the life-cycle of a new concept or technology is the only way to achieve effective and efficient coordination”, explains Peter Hotham, Chief for Technology and Innovation of the SESAR Joint Undertaking (SJU). “The SJU and its member organisations are already in close contact with ICAO and aviation authorities around the world, as well as standardisation bodies such as EUROCAE and RTCA, to inform them of the technology and procedures we are developing in the framework of SESAR. This is set to continue as SESAR development gathers pace.” Common standards It is evident that harmonisation is necessary to ensure the same aircraft can safely fly throughout the world with a single airborne equipment interoperable with any ground ATM system. This is also one of the key requirements towards new air traffic management systems from airspace users. Interoperability requires internationally agreed standards and SESAR will deliver the technical basis for defining them through ICAO SARPs (Standards and Recommended Practices) and coordinated industry standards. The existence of such common standards will also lower costs for the manufacturing industry which will be able to design equipment for a global market. During the ATCA Convention in October 2009, J. Randolph Babbitt, FAA administrator, underlined the importance of interoperability for the NextGen programme. “We must make sure that interoperability is at the order of the day”, said Mr. Babbitt and continued, “The Obama Administration and Secretary LaHood are enthusiastic about the potential for international linkage, such as the links between NextGen/SESAR.” Currently, a memorandum of cooperation between the FAA and the European Community on cooperation in basic ATM research is being prepared covering among others the areas of information management, trajectory management, CNS and airborne interoperability, environmental issues, etc. “We seek further meaningful alignments between NextGen and SESAR as we move forward, while at the same time we have already started to collaborate with other regions in the world facing similar ATM challenges – now or in the foreseeable future”, says Peter Hotham. The technical and operational dimension We have to recognise that different regions of the world can have very significant differences in the way they organise air traffic management. It thus may make little sense to try and have the same solutions applied everywhere. Interoperability must therefore be achieved in both the technical (system) and the operational (common procedures) dimensions.

#### SESAR is a key part of Europe’s strategy to reduce GHG emissions

Barrot 05 (Jacques, Vice-President of the European Commission and Commissioner for Transport will be at Eurocontrol tomorrow to launch the SESAR industrial project, “SESAR: Europe modernises air traffic control”, 11-16-05, http://europa.eu/rapid/pressReleasesAction.do?reference=IP/05/1435)

Growth forecasts for air traffic in Europe show that traffic is set to double by 2025, and even triple in some areas. This growth will not be possible without a complete overhaul of the air traffic control infrastructure to optimise air routes and eliminate congestion. SESAR will also enhance air transport safety, which today is hampered by ageing technologies and fragmented air traffic control. Lastly, SESAR will reduce greenhouse gas emissions by 4% to 6% per flight. SESAR is the technological part of the single European sky initiative, launched in 2004 to reform the organisation of air traffic control. It will introduce new communication, control and computing technologies between the ground and aircraft which will optimise the work of air traffic controllers and pilots. Today, while the cockpit is becoming increasingly automated, controllers and pilots still communicate by radio.

#### States cannot solve this Add-On because they cannot enter into compacts with foreign nations according to the Constitution. It is another internal link to global warming.

### Harmonize Efficient

#### NextGEN and SESAR need to harmonize to be cost effective and efficient

Avionics Intelligence 09 (PenWell Corporation news site dedicated to the aviation industry, “Avionics Europe conference keynote speaker says NextGEN and SESAR need to harmonize", 3-31-09, http://www.avionics-intelligence.com/articles/2009/03/avionics-europe-conference-keynote-speaker-says-nextgen-and-sesar-need-to-harmonize.html)

Technology development for the Next Generation (NextGEN) Air Traffic Management system in the U.S. and the Single European Sky ATM Research or SESAR program in Europe "needs to harmonize" to ensure the transition from current systems is efficient and cost effective, says the Federal Aviation Administration's (FAA's) Donald Ward. Ward, international representative to Europe for the FAA in Brussels, Belgium, made his remarks during the keynote address at the Avionics 2009 conference and exhibition held in Amsterdam, Netherlands, in March. It is essential to have commonality between the two systems because the technology is too complicated to try to develop independently, Ward says. The FAA is working with the European Union and groups such as EUROCONTROL to ensure an efficient transition, he adds. EUROCONTROL is the European Organization for the Safety of Air Navigation SESAR and NextGEN designers and planners need to align thier avionics roadmaps, have matching standards for trajectory management, and perform collaborative planning on airspace and network management, he notes. They need to come together on concepts, training, avionics and procedure, Ward continues. The basic goals of NextGEN are to "increase capacity, minimize the environmental impact of aviation, and improve safety and security." To accomplish this the FAA will need to change culturally as well. Ward says that the FAA has gotten bogged down in its own buearocracy over the years. The FAA is part of the U.S. government so "it can't really go commercial," but it can adapt a business perspective, Ward says. It is making efforts to become more business like and to understand the needs of industry and minimize the risk for early adopters of NextGEN technology. The FAA needs to focus on business models that work especially when dealing with the military, he says. It is critical to involve the military each step of the way or "there will be major problems down the road. The military is a big stakeholder in this process." Beneficial changes brought by NextGEN will include transitioning from ground-based surveillance and navigation to satellite-based navigation and surveillance and from voice communications to digital data exchange. Through the digital data exchange pilots will be given real-time information such as weather forecasting and moving maps of runways that show vehicles and other aircraft. These maps will be on electronic flight bags (EFBs), a big enabler of NextGEN, Ward says. The digital messages will also be delivered to the EFB. Ward says NextGEN will bring benefits to each stage of flight – pre-flight; push back taxi and departure; climb and cruise; descent and approach; and landing, taxi, and arrival. In pre flight, aircraft operators can access all information from a single course such as military airspace availability, weather constraints, status on closed runways and taxiways, he says.

### Europe – AT: States Solve

#### It is illegal for states to enter into Agreements or Compacts with foreign powers unless Congress approves it. That would link into any politics DA.

US Constitution 1787 (founding fathers, Article 1 Section 10, http://www.usconstitution.net/const.txt)

No State shall enter into any Treaty, Alliance, or Confederation; grant Letters of Marque and Reprisal; coin Money; emit Bills of Credit; make any Thing but gold and silver Coin a Tender in Payment of Debts; pass any Bill of Attainder, ex post facto Law, or Law impairing the Obligation of Contracts, or grant any Title of Nobility. No State shall, without the Consent of the Congress, lay any Imposts or Duties on Imports or Exports, except what may be absolutely necessary for executing its inspection Laws: and the net Produce of all Duties and Imposts, laid by any State on Imports or Exports, shall be for the Use of the Treasury of the United States; and all such Laws shall be subject to the Revision and Control of the Congress. No State shall, without the Consent of Congress, lay any duty of Tonnage, keep Troops, or Ships of War in time of Peace, enter into any Agreement or Compact with another State, or with a foreign Power, or engage in War, unless actually invaded, or in such imminent Danger as will not admit of delay.

### Europe – AT: Inevitable

#### Delays to NextGen hurt harmonization with Europe – Europe is hesitant after cuts

GAO 11 (Government Accountability Office, “FAA Has Made Some Progress in Implementation, but Delays Threaten to Impact Costs and Benefits”, 10-5-11, http://www.gao.gov/assets/590/585588.pdf)

Effect of delays on FAA’s ability to collaborate with Europe. Delays to NextGen programs, and potential reductions in the budget for NextGen activities, could delay the schedule for harmonization with Europe’s air traffic management modernization efforts and the realization of these benefits. FAA officials indicated that the need to address funding reductions takes precedence over previously agreed upon schedules, including those previously coordinated with Europe. For example, FAA officials responsible for navigation systems told us that FAA is restructuring plans for its ground-based augmentation system (GBAS) because of potential funding reductions. 7 While final investment decisions concerning GBAS have yet to be made, these officials said that FAA might have to stop its work on GBAS while Europe continues its GBAS development, with the result that Europe may have an operational GBAS, while FAA does not. 8 A delay in implementing GBAS would require FAA to continue using the current instrument landing system which does not provide the benefits of GBAS, according to these officials. Such a situation could again fuel stakeholder skepticism about whether FAA will follow through with its commitment to implementing NextGen, and in turn, increase airlines’ hesitancy to equip with NextGen technologies.

### Europe – AT: US EU Clash

#### NextGen and SESAR are aware of each other and are capable of working together – no international bureaucracy clash

GAO 11 (Government Accountability Office, “Collaborative Efforts with European Union Generally Mirror Effective Practices, but Near-Term Challenges Could Delay Implementation”, November 2011, http://www.gao.gov/assets/590/581393.pdf)

In 2006, FAA and the European Commission signed a Memorandum of Understanding (MOU) to ensure coordination between the aviation modernization programs in the United States and the EU. According to FAA officials in ATO’s International Office, 7 the primary purpose of the MOU was to allow joint participation on committees. FAA was allowed to participate as an observer at bimonthly meetings of the EU’s Industry Consultation Body. 8 FAA attends these meetings to hear the discussion taking place with industry regarding the Single European Sky and to remain up-to-date. The EU participated as an observer in RTCA’s Air Traffic Management Advisory Committee and now participates on the NextGen Advisory Committee. 9 Cross-participation in these meetings makes both parties aware of each other’s direction, operational plans, and solutions. Such awareness is one of the most significant enablers to developing interoperable systems, according to FAA officials. The MOU was updated in 2009 to take into account SJU’s role in the technical cooperation with FAA under the authority of the European Commission and to identify specific subjects of common interest to SESAR and NextGen. FAA and SJU officials also highlighted the Atlantic Interoperability Initiative to Reduce Emissions as an example of international collaboration. In 2007, the European Commission and FAA began collaborating to demonstrate how using NextGen/SESAR air traffic management techniques can lead to emissions and fuel savings. For example, demonstrations of the Optimized Profile Descent—a procedure whereby an aircraft descends as smoothly as possible, considering local limitations, rather than descending and leveling off in steps as is commonly done today—at Miami and Atlanta International airports saved between 40 and 60 gallons of fuel per flight and between 800 and 1,090 pounds of carbon dioxide (CO2) per flight. Tests at Honolulu and Anchorage International Airports showed that use of Optimal Profile Descent could save a total exceeding 8 million gallons of fuel and 167 million pounds of CO2 annually at those two airports. Having demonstrated the benefits in terminal procedures on transoceanic routes, NextGen and SESAR officials plan to eventually incorporate these procedures in their continental airspace. The 2006 MOU also encompassed and continued the ongoing collaborative efforts between FAA and EUROCONTROL that were established in a 1986 Memorandum of Cooperation (MOC). Under this MOC, FAA and EUROCONTROL collaborated on more than 20 action plans for research and development on topics of mutual interest. Collaborative work under the action plans formed a body of research that contributed to operational concepts that would become central to NextGen and SESAR, such as trajectory-based operations. In one action plan, FAA and EUROCONTROL focused on trajectory predictors—an automated decision-support tool that predicts the anticipated future path of an aircraft. 10 According to FAA officials, trajectory prediction is a fundamental underpinning of how NextGen and SESAR plan to manage air traffic. They said that the concept and techniques for exchanging information were first diagrammed under this action plan. In 2003, the action plan team identified similarities among the many disparate trajectory predictors in use and developed a structure for a generic version. Other action plans focused on developing technologies such as data communications and ADS-B—also prerequisites for trajectory-based operations. These action plan teams typically developed annual work plans that described ongoing activities’ progress and status, as well as planned research activities for the coming year. According to progress reports, these action plan teams evaluated new technologies, proposed actions, compared strategies and plans, and commented on white papers. The teams also sought input from the air traffic management community, including airlines, aircraft and avionics manufacturers, and standards bodies and stakeholder organizations, and emphasized the need for collaboration with European research bodies. Many of the action plans continued beyond 2006, after the MOU was signed, and formed the core of the efforts to ensure interoperability of the systems and components that would make up NextGen and SESAR. For example, the action plan on ADS-B continued, with the result that ADS-B applications gained international recognition as a means to improve future air traffic management operations. Another action plan on safety research, started in 2003, continued with its objective to enhance safety assurance in air traffic management. According to the action plan’s documents, safety culture is one of the main threads of the action plan work program, and this focus facilitates alignment among EUROCONTROL, FAA, and the Civil Air Navigation Services Organization, which represents the interests of air navigation service providers worldwide. With the signing of a new MOC in 2011 (see following section), work under the action plans was redirected to nearterm, procedural issues, while work under the MOC will focus on longterm air traffic management development. In March 2011, FAA and the European Commission signed a new MOC that replaced the 2006 MOU (updated in 2009) and provides more specific direction on collaboration and governance as NextGen and SESAR move forward.

### Europe – NextGen Key

Dillingham 11 (Gerald L. Dillingham, Ph.D. and Director of Physical Infrastructure Issues – United States Government Accountability Office, “Next Generation Air Transportation System: FAA Has Made Some Progress in Implementation, but Delays Threaten to Impact Costs and Benefits”, GAO Report – GAO-12-141T, 10-5, http://www.gao.gov/assets/590/585588.pdf)

Our past and ongoing work examining aspects of NextGen have highlighted several other challenges facing FAA in achieving timely and successful implementation. For this statement, we would like to highlight a few specific areas: the potential effect of program delays on international harmonization efforts, the need for FAA to ensure that it addresses human factors and workforce training issues to successfully transition to a new air transportation system, the need for FAA to continue to address potential environmental impacts, and the need for FAA to improve the management and governance of NextGen.

• Effect of delays on FAA’s ability to collaborate with Europe. Delays to NextGen programs, and potential reductions in the budget for NextGen activities, could delay the schedule for harmonization with Europe’s air traffic management modernization efforts and the realization of these benefits. FAA officials indicated that the need to address funding reductions takes precedence over previously agreed upon schedules, including those previously coordinated with Europe. For example, FAA officials responsible for navigation systems told us that FAA is restructuring plans for its ground-based augmentation system (GBAS) because of potential funding reductions.7 While final investment decisions concerning GBAS have yet to be made, these officials said that FAA might have to stop its work on GBAS while Europe continues its GBAS development, with the result that Europe may have an operational GBAS, while FAA does not.8 A delay in implementing GBAS would require FAA to continue using the current instrument landing system which does not provide the benefits of GBAS, according to these officials. Such a situation could again fuel stakeholder skepticism about whether FAA will follow through with its commitment to implementing NextGen, and in turn, increase airlines’ hesitancy to equip with NextGen technologies.

#### NextGen key to Global Harmonization

JPDO 6

(Joint Planning and Development Office, 2006, Congress created the Joint Planning and Development Office (JPDO) to manage the partnerships designed to bring NextGen online. These partnerships include private-sector organizations, academia, and the following government departments and agencies: Department of Transportation (DOT) Department of Commerce (DOC) Department of Defense (DOD) Department of Homeland Security (DHS) Federal Aviation Administration (FAA) National Aeronautics and Space Administration (NASA) White House Office of Science and Technology Policy (OSTP) Office of the Director of National Intelligence (ODNI) – (Ex Officio), “Next Generation Air Transportation In Brief” <http://www.jpdo.gov/library/in_Brief_2006.pdf>) MJA

NextGen is international in scope. There is an absolute need for the global harmonization of NextGen to allow operability across international lines. It is to our national benefit and also to that of the global economy that there be one seamless, global sky. Under this scenario, aircraft will operate with compatible equipment and procedures. To achieve a harmonized, global air transportation system, JPDO and the FAA are working with other international organizations to guarantee the cooperation necessary to make this dynamic a reality. In 2006, FAA Administrator Marion Blakey concluded an agreement with Jacques Barrot, Vice President of the European Commission (EC), which formalized cooperation between the Next Generation Air Transportation System initiative and its European counterpart, the Single European Sky Air Traffic Management Research (SESAR) program. Beyond Europe, JPDO and the FAA are seeking partnerships with other international counterparts. In 2006, steering groups were established with China, Japan, Canada and Mexico to facilitate cooperative activities on the design of compatible air transportation systems.

### UAVs 2AC Add-On

#### UAS access in NextGen is vital to the growth of the industry

Taggart, ‘12

Doug Taggart, Chair of Committee on Transportation and Aerospace Policy for IEEE-USA, the Institute of Electrical and Electronics Engineering, President of Overlook System Technologies, Past AAAS Congressional Fellow, 2/1/12, “Upgrading the National Airspace System”, <http://ieeeusa.org/volunteers/committees/grc/EAgenda/2012Feb/tab3c.pdf>

Support adequate funding for the FAA budget to accelerate applied research, advance development, and implement engineering solutions for NextGen technologies. In this research and development, FAA should also seek to limit any impact of NAS radio spectrum requirements on other federal and non-federal spectrum users through considering spectrum requirements in design and in aircraft equipment standards. In doing so FAA should consult with the National Telecommunications and Information Administration (NTIA), the federal government’s spectrum manager. Upgrade the Air Traffic Control (ATC) Centers. Accelerate replacement of outdated ATC systems in the Terminal Control centers. The lack of system automation imposes limits on U.S. airspace and airline efficiencies, and constrains technological advances. The absence of systems automation imposes heavy workloads on air-traffic controllers; potentially increases the risk of accidents in heavy traffic situations; and stifles the infusion of additional air-traffic management technologies. Upgrade computer language technology to reduce extraneous and dangerous complexity in safety sensitive software systems. Currently, all safety-related software has been developed using computer language technology that has poor simplicity of expression, compared to what was designed in the early 1970s, and implemented in the early 1980s, by leading computer vendors [1]. It seems there are no credentialed software safety experts anywhere who have working familiarity with comparably advanced language technology. The resulting deficiencies have probably already led to a few hundred deaths in aircraft mishaps. The prospective introduction of Unmanned Aircraft Systems into the National Airspace increases the risks. Support NextGen to handle new and emerging technologies, such as Unmanned Aircraft Systems (UAS). The Next Generation Air Transportation System must be able to support routine access by Unmanned Aircraft Systems in the NAS; this access is vital for the growth of this industry. Support the sharing of airline safety information in programs such as the FAA Aviation Safety Information Analysis and Sharing (ASIAS) system that enables users to perform integrated inquires across multiple databases, search an extensive warehouse of safety data, and display pertinent elements, in an array of useful formats to expanded access to shared data and to technological innovation.

### Impact- Terrorism/Drug Trafficking

#### UAS systems essential to managing terrorist threats and monitoring drug trafficking/violence in Mexico

Darnall, ‘11

Bart Darnall, “Unmanned Aircraft Systems: A Logical Choice for Homeland Security Support”, Naval Postgraduate School thesis, Dec. 2011, http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA556271

Despite the countless hours and billions of dollars spent by public and private institutions fortifying the nation’s security and resilience, criminal networks, violent extremist groups, insurgents, as well as mother nature, continue to threaten America’s homeland security. Hence, a capability that is effective, flexible, and affordable is needed to help bolster homeland security requirements. This capability can be found in UAS; specifically for border protection, law enforcement, and critical infrastructure protection. 1. Border Protection The concern for a more secure border has multiplied since 9/11 as many U.S. citizens fear that terrorists could enter the U.S. from Mexico or Canada.106 Trafficking illicit drugs along U.S. borders contributes to the threat of terrorist activity by supplying cash, creating instability, supporting corruption, providing a cover for sustaining infrastructures for illicit activity, and competing for law enforcement and intelligence attention.107 Demands for drugs and other contraband have grown in recent years boosting the violence in Mexico and along our borders. According to analysts, $19 to $29 billion each year flows from the U.S. into Mexico in money and weapons to fuel the violence.108 For this reason, it is no coincidence Americans are concerned that an increase in drug violence along U.S. borders could potentially lead to terrorist activity. The National Strategy for Homeland Security, the National Security Strategy, and the National Strategy for Counterterrorism each highlight a need for stronger land and maritime border protection. The U.S. border is a resourcethin environment despite the government’s efforts to increase the number of CBP agents and other security devices. The Department of Homeland Security, through CBP and the U.S. Coast Guard, are the primary custodians of border security, responsible for approximately 7,000 miles of land border and over 12,000 miles of maritime border.109 Filling the gaps in border security to prevent illegal trafficking of people, illegal drugs, weapons, and terrorist activity requires a layered approach. This approach can be realized with the use of UAS, which are well suited for the dull, dirty, and dangerous missions found within border protection and law enforcement. Customs and Border Protection recognized the utility in UAS for border security and started to experiment with the MQ-9 Predator B UAS along the southwestern border in 2005. The aircraft is an effective, low cost, and adaptable platform with a proven safety and performance record. These aircraft are able to conduct missions in areas that are difficult to access, or are considered too highrisk for manned aircraft or personnel on the ground. They help fulfill America’s homeland security strategy by performing surveillance coverage along porous sections of America’s borders. Their electro-optical sensors can provide precise and real-time imagery to ground control operators who can disseminate information to be used to deploy border patrol agents. Also, the UAS has a prolonged loitering capacity, ranging up to 20 hours without refueling that enables sustained air domain coverage improving border security.110 Not only do UAS offer operational advantages, but cost advantages as well. A UAS costs a fraction of what a manned aircraft costs with similar operational capabilities. A 2004 congressional report identified the unit procurement cost of a Predator B UAS at approximately $4.5 million in comparison to the unit procurement cost of a P-3 Orion manned aircraft, used by Immigration and Customs Enforcement, which costs $36 million.111 Also, the cost and operational advantages of UAS are significantly better than other manned aircraft, such as Blackhawk helicopters, that are frequently used for border protection support.

### Impact- Natural Disasters

#### UAS aids in prevention and response to disasters like hurricanes, earthquakes, floods, and wildfires.

Darnall, ‘11

Bart Darnall, “Unmanned Aircraft Systems: A Logical Choice for Homeland Security Support”, Naval Postgraduate School thesis, Dec. 2011, http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA556271

Within the last decade, the U.S. has faced several large-scale natural disasters. The 2004 hurricane season was estimated at causing over 3,000 deaths and approximately $50 billion in damages.121 Hurricane Katrina caused more than 1,330 deaths and impacted nearly 93,000 square miles along the Gulf Coast.122 In 2007, there were more than 85,000 wildfires destroying over 9 million acres in the U.S.123 Emergency management is a vital service entailing a comprehensive system that enables response and recovery efforts following the consequences of a manmade attack or natural disaster. It consists of disciplines from emergency management, emergency medical services, fire, hazardous material, law enforcement, bomb squads, tactical operations and special weapons assault teams, and search and rescue.124 Unmanned aircraft systems are well suited to provide support to first-responders working in any one of these key emergency management disciplines. In devastated areas where communications may be degraded or nonexistent, UAS can loiter overhead while providing a temporary bridge for which imagery and communications can be monitored and relayed. This type of support was provided to emergency response teams following the earthquake that flattened Haiti in 2010. A Global Hawk UAS operated over Haiti providing surveillance in the wake of the country’s 7.0 magnitude earthquake.125 It flew for 14 hours collecting and disseminating real-time imagery that helped determine the level of destruction. Unmanned aircraft systems are also uniquely capable of helping to support scientific research in helping to reduce the consequences of emergencies. For example, the National Oceanic and Atmospheric Administration (NOAA) began operating UAS in 2006 as a hurricane hunter. NOAA flies UAS into a hurricane and communicates near-real-time data directly to the National Hurricane Center. These unmanned aircraft fly closer to the water’s surface, collecting more accurate barometric pressure and temperature data than can safely be collected by manned aircraft. According to NOAA, “UASs can help meet its mission goals with a more advanced fleet capable of collecting data from areas that are currently inaccessible.”126 In addition, the video and synthetic aperture radar capabilities on UAS can be used to provide imagery of river basins in support of flood response efforts. In early 2011, a CBP Predator was flown from Corpus Christi, Texas, to North Dakota to support the U.S. Geological Survey and the U.S. Army Corps of Engineers in mapping areas affected by flooding along the Red River Valley. In places, such as California and Colorado, major forest fires are a common occurrence, destroying thousands of acres of land every year. Hence, the U.S. Forest Service has explored the use of UAS technology in an effort to aid wildfire imaging and mapping capabilities for these parts of the U.S. In 2009, it flew a modified Predator B UAS over a 40,200-acre fire near Palm Springs, California, for 16 hours.127 The aircraft circled at 43,000 feet transmitting imagery that enabled the fire management team to pinpoint the perimeter of a dangerous blaze that killed five firefighters. According to fire management experts, UAS capability will “go a long way toward helping the forest service understand the science of these giant fires.”128

### Impact- Econ

#### UAVs can monitor agriculture and energy infrastructure against attacks – forms the backbone of the US economy

Darnall, ‘11

Bart Darnall, “Unmanned Aircraft Systems: A Logical Choice for Homeland Security Support”, Naval Postgraduate School thesis, Dec. 2011, http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA556271

Agriculture and food infrastructure comprises of production, processing, and delivery systems. A disaster caused by an attack on this infrastructure could disrupt the food supply and pose a serious threat to public health, safety, welfare, or to the national economy.129 According to DHS, food and agriculture infrastructure “is almost entirely under private ownership and is composed of an estimated 2.1 million farms, approximately 880,500 firms and over one million facilities.”130 It accounts for approximately one-fifth of the nation's economic activity. The capabilities provided by UAS can facilitate the monitoring of farm and agriculture related features, such as the spread of crop destroying pests, status of crop production, identification of crop varieties, and loss of timber in areas threatened by timber theft. Using UAS for crop spraying and dusting greatly reduces the exposure of people to hazards associated with chemical contamination. The U.S. energy infrastructure fuels the nation’s economy. More than 80 percent of the country's energy infrastructure is owned by the private sector.131 It consists of three interrelated segments: electricity, petroleum, and natural gas. The electricity segment consists of a generating element consisting of more than 5,300 power plants and a distribution segment that uses over 211,000 miles of high-voltage transmission lines.132 The electricity infrastructure is highly automated and controlled by a regional grid system. Petroleum and natural gas segments consist of exploration, production, storage, transport, and refinement (in the case of oil). There are over 400,000 petroleum and gas wells within the U.S. and within its territorial waters, in addition to hundreds of refineries and processing plants. These electricity, petroleum, and natural gas areas and installations are difficult to guard. Damage caused by a terrorist attack or natural disaster can lead to enormous ecological damage and revenue losses, such as that experienced in the Deepwater Horizon oil spill in 2010. This critical infrastructure is dispersed throughout the U.S. and its territorial waters leaving it vulnerable in many locations. Unmanned aircraft systems are a formidable capability that can be used to patrol critical infrastructure on a regular basis. Their FLIR camera can detect the presence of attackers who may be trying to penetrate its vulnerabilities. experienced in the Deepwater Horizon oil spill in 2010. This critical infrastructure is dispersed throughout the U.S. and its territorial waters leaving it vulnerable in many locations. Unmanned aircraft systems are a formidable capability that can be used to patrol critical infrastructure on a regular basis. Their FLIR camera can detect the presence of attackers who may be trying to penetrate its vulnerabilities.

### Impact- Warming

#### Civil UAS systems are needed to improve gaps in current climate models

Schoenung ‘06

Susan Schoenung, Senior Research Scientist at the Bay Area Environmental Research Center at the NASA Ames Research Center, “Potential Use of UAS for Science and Operational Earth Observing Missions”, 6/5/06, NASA report, http://airbornescience.nasa.gov/sites/default/files/documents/SSP\_UAS\_for\_Sci%20\_Cong\_Report\_5.8.2006.pdf

It is likely that long-term, anthropogenically forced climate change will be a dominant issue for the 21 st century. Improved data and observations hold the key to saving lives, property and resources. From better hurricane track and intensity predictions and drought mitigation to understanding global climate systems, the quality of decisions made is in direct correlation with the quality of the data available. Several major types of UAS platforms are suitable for climate research. Long endurance (20 hours or more of flight time) UAS could possibly provide a major advantage over current manned research aircraft for climate research, because they offers the scientists more data opportunities over a longer range. Manned aircraft are limited to 8-10 hours maximum flight time due to aircraft capabilities. High altitude long-endurance (HALE) platforms operating at 18.2 km (60,000 ft) or higher offer the greatest internal payload 910 kg (2000 lb) and highest ground speed. However, they may not be able to do frequent dives for profiling the atmosphere with onboard instruments because of increased fuel consumption, which will limit range. Medium altitude long-endurance UAS (MALE), operating at 13.6-15.8 km (45,000-52,000 ft), offer medium size payloads and vertical profiling, but offer relatively low airspeeds. NOAA and NASA recently had success with the MALE platform, General Atomics-Aeronautical Systems, Inc. (GAASI) Altair UAS during the NOAA UAS demonstration which was conducted from April - November 2005. Low altitude long endurance (LALE) UAS platforms offer the best chance to study biological and transport processes involved in climate change, but have a low payload capacity (<45 kg or 100 lbs.). NOAA and NASA also had recent success with operating the LALE platform, Aerosonde, into the Tropical Storm Ophelia off the U.S. East Coast in September 2005. Full in-situ atmospheric profiles of major long-term greenhouse gases such as CO2, CH4, N2O, CFCs are incomplete. Full profiles are necessary for ongoing validation of satellite retrievals of the column mole fractions (in dry air). Note that column concentrations, depending primarily on temperature, pressure, and water vapor fraction, are useless for geochemical budgets. The stratospheric portion of such profiles, including SF6, will put strong constraints on large-scale atmospheric transport and mixing processes at high altitudes. One technique that looks promising is to obtain a continuous sample of the entire atmospheric profile while the UAS platform is descending with a very long, lightweight, coil of tubing, which we have called AirCore (patent pending). The tube can be analyzed after the flight for multiple stable species. A very different type of UAS platform could be small, low cost, lightweight, and used for probing throughout the atmospheric boundary layer and the adjacent free troposphere above. This could constrain models of the planetary boundary layer (PBL) and its exchange with the free troposphere. The deficiencies of current PBL models are a major impediment to constructing budgets of greenhouse gases on regional scales.

### Impact- Air Power

#### The future of air power is in the hands of UAVs

Gilmore ‘09

Gerry Gilmore, US Air Force, 7/23/09, “Unmanned aircraft take on increased importance”, http://www.af.mil/news/story.asp?id=123160247

The U.S. military's expanded overseas use of unmanned aircraft highlights the increased importance of such aerial platforms to current and future military operations, senior Air Force officers said here July 23. The Unmanned Aircraft Systems Flight Plan announced July 23 will serve as a template for how the Air Force will look in 2047 - the 100th anniversary of the U.S. Air Force -- Gen. William M. Fraser III, the Air Force's vice chief of staff, told reporters at a Pentagon news conference. "The future of our systems is really now," General Fraser said. "The Air Force today looks dramatically different than it did 35 years ago when I first came aboard on active duty." The flight plan, he explained, lays out the Air Force's "vision for maximizing our efforts in unmanned aerial systems" today and in the future. "We'll continue to push the UAS envelope," General Fraser said, adding that unmanned systems are unmanned in name only. "While there may be no Airmen onboard the actual vehicle, there indeed are airmen involved in every step of the process," General Fraser said, including the pilots who operate the vehicles' remote controls and sensors and maintenance personnel. Unmanned aircraft systems "represent an important addition to our comprehensive set of Air Force capabilities that actually define air power," General Fraser said. Lt. Gen. David A. Deptula, the Air Force's deputy chief of staff for intelligence, surveillance and reconnaissance, told reporters that unmanned aircraft systems have proven effective during aerial strike missions against insurgents in Afghanistan and Pakistan, while also performing surveillance and intelligence-gathering missions. Persistent flight capability, General Deptula said, is one of the advantages of employing unmanned aerial vehicles in military missions. "What UASs bring to the table," General Deptula explained, "is the ability to stay in position or maneuver over large areas for a long period of time - that's where a person in an aircraft becomes a limitation." UAS mission success rates have resulted in high demand for the unmanned aerial platforms, General Deptula said, noting that high- and medium-altitude UAS overseas combat missions have increased more than 600 percent during the past six years. "What the Air Force wants to do," General Deptula said, "is to get the most out of these systems to increase our joint warfighting capability, while promoting service interdependency and the wisest use of our taxpayer dollars." Yet, General Deptula said, the flight plan isn't just about how UASs are employed today, but also about how unmanned aerial technology could be applied in different mission realms in order to confront future challenges. For example, he said, UAS technology could one day be used in a modular platform that could perform a variety of tasks, such as cargo transport and aircraft refueling missions. General Deptula equated today's level of UAS development with the progress made in manned aircraft in the 1920s. There's "lots of potential" for expanding UAS technology across the military in the coming years, General Deptula said, but he also pointed out that replacing conventional fighter planes and pilots with unmanned aerial vehicles is a long way off. The flight plan doesn't provide specific solutions, but it does address "concepts and possibilities that will fill in and morph over time," said Col. Eric Mathewson, the director of the Air Force's UAS Task Force. The plan, Colonel Mathewson said, "allows us to reach out and talk to academia and industry, the other services, [Defense Department]-wide, our coalition and allied partners, and work together in a more efficient and synergistic way."

### Ext: NextGen k2 UAVs

#### NextGen is critical for overcoming challenges arising from an increase in unmanned aircraft

Montalbano, ‘12

Elizabeth Montalbano, professional journalist for 13 years, “NASA Tests Unmanned Flight with Next-Gen Air Traffic Technology,” Design News, 4/25/12, http://www.designnews.com/document.asp?doc\_id=242630&dfpPParams=ind\_184,industry\_aero,industry\_gov,aid\_242630&dfpLayout=article

With unmanned aerial vehicles (UAVs) expected to take to the skies alongside piloted crafts in the next year or so, NASA has completed its first test of the Next-Gen air traffic control system in a commercial-sized, unmanned aircraft. The agency’s Dryden Flight Research Center flew its Kihana MQ -- an aircraft with a 66-foot wingspan, a takeoff weight of more than 10,000 pounds, and a cruising altitude of 40,000 feet -- with an Automatic Dependent Surveillance-Broadcast, or ADS-B device, onboard, in March, according to NASA. ADS-B is air tracking technology that planes in the US airspace will use once the Federal Aviation Administration (FAA) implements its Next-Gen air traffic control system, a multibillion-dollar technology refresh of the system. All planes operating in certain US airspace must adopt the ADS-B devices by January 2020. The Kihana MQ’s flight also marked the first time NASA tested the system on its Unmanned Aircraft Systems Integration in the National Airspace System, (or UAS in the NAS research project). The project is aimed at dealing with technical-related safety and operational challenges that come with unmanned and commercial aircraft sharing the same airspace. While UAVs have mainly been used by the US military for intelligence, surveillance, and reconnaissance work, the space agency envisions new uses for them, including emergency and lifesaving activities. The ADS-B is far more sophisticated than the current air traffic control system and should help alleviate some of those challenges, according to NASA. Currently, planes use transponders to communicate with ground radar once every four to 12 seconds to determine an aircraft’s position, velocity, and altitude.

#### Capacity for UAS will increase once NextGen implementation is achieved

Culler, ‘12

Jessica Culler, Public Affairs specialist for NASA’s Ames Research Center, previously part of the Ames New Media Innovation Team and a NASA-ISU Assistant Project Manager, “8 Questions about NextGen”, 1/18/12, NASA, http://www.nasa.gov/topics/aeronautics/features/8q\_nextgen.html

The United States is undertaking the largest transformation of air traffic control ever attempted. Known as the Next Generation Air Transportation System, or NextGen, it is a multi-billion-dollar technology modernization effort that will make air travel safer, more flexible and more efficient. As the system gets better, its capacity will grow and the demand for different types of air transportation – even unmanned aircraft – will increase. NASA is one of several U.S. government agencies that play a crucial role in helping to plan, develop and implement NextGen. NASA's role is research and development of new ideas and technologies that will make NextGen a reality. We're working on software that reduces airport runway and surface congestion, new landing techniques that save fuel and time, computer models that predict more accurately the influence of weather on flight paths, and air traffic control solutions that allow more takeoffs and landings in the same amount of time. Because NextGen is not just about air traffic management, we're also working on the tools and scientific knowledge needed to advance engine and airframe technology for today's aircraft, and develop unconventional new vehicles that will fly faster, cleaner and quieter, and use less fuel.

#### Integrating UAVs into airspace requires new air transportation avoidance methods

Lincoln Laboratory, ‘08

Lincoln Laboratory, MIT, 4/10/08, “Unmanned Air Vehicle Airspace Access”, http://www.ll.mit.edu/mission/aviation/surveillanceandnav/unmannedavaa.html

The integration of Unmanned Aerial Vehicles (UAVs) into civil airspace requires new methods of ensuring collision avoidance. Concerns over command and control latency, vehicle performance, reliability of autonomous functions, and interoperability of sense-and-avoid systems with the Traffic Alert and Collision Avoidance System (TCAS) and Air Traffic Control must be resolved. Under funding from the Air Force and the Department of Homeland Security (DHS), Lincoln Laboratory has been developing the modeling and simulation capabilities (Figure 1) needed to robustly evaluate proposed collision avoidance systems for UAVs. This includes: Updating airspace encounter models to reflect current airspace usage and also to include aircraft that do not carry transponders. Bayesian statistical techniques are used to estimate the distribution over possible encounters based on radar data collected throughout the United States. Sampling from this distribution produces representative encounters to use as a basis for manned and unmanned aircraft safety analysis. Fast-time simulation capabilities using Lincoln’s parallel computing facility, LLGrid. The simulation tools include the ability to model TCAS surveillance and algorithms, human visual acquisition, and proposed sense-and-avoid systems for UAVs. Analysis is currently focusing on airborne radar and electro-optical sensor systems for Global Hawk. Modeling and evaluation to assess the potential use of existing ground radars to provide a comprehensive traffic situation picture to UAV operators. This includes consideration of aircraft radar cross section, terrain masking, and signal refraction, in addition to multiangulation techniques for aircraft altitude estimation. Analysis of the Beale AFB, CA region has been performed for Global Hawk, and future work may include studying the airspace in the vicinity of Ft. Huachuca, AZ for Army and DHS operations, and Patuxent River, MD for Navy operations of the Global Hawk Maritime Demonstrator. Developing advanced collision avoidance algorithms based on Partially Observable Markov Decision Processes (POMDPs) through collaboration with CSAIL at MIT. Major accomplishments Lincoln assessed the impact of command and control latency on TCAS performance on Global Hawk. This involved assessing millions of simulated encounters using several different airspace models. Latency budgets were defined for varying types of intruders and airspace altitudes. The analysis also considered the impact of flight performance characteristics of the UAV.Radar capabilities have been evaluated in the Beale AFB region near Sacramento, CA. Analysis at Lincoln determined the degree to which multiple sensors may detect and track small aircraft without transponders and provide traffic awareness to UAV operators.

#### UAS integration is impossible in the status quo—but NextGen solves collision problems

Roberts, ‘11

Glenn Roberts, Chief Engineer and director of the R&D programs in civil aviation and traffic management for the MITRE corporation, Associate Fellow of the American Institute of Aeronautics and Astronautics, for which he serves on the Emerging Technologies committee, Ph.D. in electrical and systems engineering from RPI, “Research Challenge: The Next Generation Air Transportation System”, 2011, The MITRE Corporation, http://www.mitre.org/work/tech\_papers/2011/11\_2464/11\_2464.pdf

Given projected increases in UAS utilization over the next 25 years, there is a compelling national need for a safe, secure, and scalable means of routinely integrating UAS into civil airspace. At present, UAS integration is neither routine nor scalable; it requires petitions to the FAA, issuance of FAA waivers, and the establishment, adherence to, and enforcement of segregated airspace and operational restrictions. While these temporary restrictions have succeeded in maintaining a high level of safety, the expected increase of both manned and unmanned aircraft in the NextGen timeframe suggests that seamless operation and integration of UAS and other aircraft within all domains of the NAS is a functional requirement that must be addressed. Present-day “sense-and-avoid” initiatives seek to mitigate collision risks through self-separation (i.e., the capability of UAS to remain “well clear” and safely separated from other traffic) and collision avoidance (i.e., the capability of both manned and unmanned aircraft to prevent collisions in cases where safe separation is lost by executing extreme maneuvers just prior to closest point of approach). Using sensors either on board the aircraft (i.e., airborne-based) or situated on the ground (i.e., ground-based), “sense and avoid” approaches obtain traffic-situational awareness information and then directly (via onboard automation) or indirectly (via remote pilot action) move to ensure self-separation and collision avoidance. This research explores the viability of cooperative airspace concepts through an initial focus on cooperative autonomous “sense-and-avoid” (CASA) applications. Through a progressive series of experiments and flight demonstrations, we intend to explore the technical and operational issues associated with autonomously ensuring a separation distance that both meets the “well clear” safety criteria and considers mission constraints and limitations in the presence of both cooperative and non-cooperative aircraft.

#### NextGen allows for seamless integration of unmanned aircraft systems

Atkins, ‘10

Ella M. Atkins, Associate professor in the Aerospace Engineering Dept of the University of Michigan, “Certifiable Autonomous Flight Management for Unmanned Aircraft Systems”, The Bridge on Frontiers of Engineering, Winter 2010, 40(4), http://www.nae.edu/Publications/Bridge/37526/37584.aspx

The next-generation air transportation system (NextGen) will achieve unprecedented levels of throughput1 and safety by judiciously integrating human supervisors with automation aids. NextGen designers have focused their attention mostly on commercial transport operations, and few standards have been proposed for the burgeoning number of unmanned aircraft systems (UAS).2 In this article, I describe challenges associated with the safe, efficient integration of UAS into the National Airspace System (NAS). Current Aircraft Automation. Although existing aircraft autopilots can fly from takeoff through landing, perhaps the most serious technological impediment to fully autonomous flight is proving their safety in the presence of anomalies such as unexpected traffic, onboard failures, and conflicting data. Current aircraft automation is “rigid” in that designers have favored simplicity over adaptability. As a result, responding in emergency situations, particularly following events that degrade flight performance (e.g., a jammed control surface, loss of engine thrust, icing, or damage to the aircraft structure) requires the intervention and ingenuity of a human pilot or operator.

#### Information from NextGen programs prevents improper flight separation involving manned and unmanned aircraft—solves current barriers to UAS

Atkins, ‘10

Ella M. Atkins, Associate professor in the Aerospace Engineering Dept of the University of Michigan, “Certifiable Autonomous Flight Management for Unmanned Aircraft Systems”, The Bridge on Frontiers of Engineering, Winter 2010, 40(4), http://www.nae.edu/Publications/Bridge/37526/37584.aspx

In the NextGen NAS, avionics systems onboard aircraft will be comprised of a complex network of processing, sensing, actuation, and communication elements (Atkins, 2010a). UAS, whether autonomous or not, must be certified to fit into this system. All NextGen aircraft will be networked through datalinks to ATM centers responsible for coordinating routes and arrival/departure times. The Federal Aviation Administration (FAA) and its collaborators have proposed a system-wide information management (SWIM) architecture (www.swim.gov) that will enable collaborative, flexible decision-making for all NAS users; it is assumed that all NextGen aircraft will be capable of accurately following planned 4-D trajectories (three-dimensional positions plus times), maintaining separation from other traffic, and sharing pertinent information such as GPS coordinates, traffic alerts, and wind conditions. Protocols for system-wide and aircraft-centric decision-making must be established to handle adverse weather conditions, encounters with wake turbulence, and situations in which other aircraft deviate from their expected routes. To operate efficiently in controlled NextGen airspace, all aircraft will be equipped with an onboard flight management system (FMS) that replicates current functionality, including precise following of the approved flight plan, system monitoring, communication, and pilot interfaces (Fishbein, 1995; Liden, 1994). Automatic Dependent Surveillance–Broadcast (ADS-B) systems will also communicate aircraft status information (e.g., position, velocity) to ensure collision avoidance. Without such equipment, it will be difficult to guarantee that traffic remains separated throughout flight, especially when manned and unmanned aircraft are involved.

#### NextGen key to managing UAS systems

Atkins, ‘10

Ella M. Atkins, Associate professor in the Aerospace Engineering Dept of the University of Michigan, “Certifiable Autonomous Flight Management for Unmanned Aircraft Systems”, The Bridge on Frontiers of Engineering, Winter 2010, 40(4), http://www.nae.edu/Publications/Bridge/37526/37584.aspx

Unlike traditional transport aircraft, the goal of surveillance unmanned aircraft may be to search a geographical region, to loiter over one or more critical sites, or to follow a surveillance target along an unpredictable route. A summary of potential commercial applications (Figure 1) that complement the myriad of military uses for surveillance flights, shows that surveillance and support are the primary emerging mission categories that will require the expansion of existing NAS protocols to manage dynamic routing and the presence of UAS in (1) uncontrolled, low-altitude airspace currently occupied primarily by general aviation aircraft and (2) congested airport terminal areas where traffic is actively managed (Atkins et al., 2009). This will mean that UAS will mix with the full fleet of manned operations, ranging from sports and recreational aircraft operated by pilots with limited training to jets carrying hundreds of passengers. UAS missions also will overfly populated areas for a variety of pur-poses, such as monitoring traffic, collecting atmospheric data over urban centers, and inspecting sites of interest. Even small unmanned aircraft have the capacity to provide support for communication, courier services, and so on.4 Unmanned aircraft can work in formations that can be modeled and directed as a single entity by air traffic controllers. This capability can give controllers much more leeway in sequencing and separating larger sets of traffic than would be possible if all UAS flights were considered distinct. UAS teams may also negotiate tasks but fly independent routes, such as when persistent long-term coverage is critical to a successful mission or when cooperative coverage from multiple angles is necessary to ensure that a critical ground target is not lost in an urban environment. Some activities may be scheduled in advance and prioritized through equity considerations (e.g., traffic monitoring), but activities related to homeland security or disaster response are unscheduled and may take priority even over airline operations. Although the effects of high-altitude UAS must be taken into account by NAS, low-altitude aircraft operating over populated regions or in proximity to major airports will be the most challenging to accommodate in the NextGen NAS. UAS must, of course, be safe, but they must also be fairly accommodated through the extension of NAS metrics (e.g., access, capacity, efficiency, and flexibility) so they can handle operations when persistent surveillance over a region of interest is more important than equitable access to a congested airport runway.

### Noise Pollution 2AC Add-On

#### The plan reduces noise pollution

Dillingham, 10-24-2007, Gerald L. Dillingham, Ph.D. Director, Physical Infrastructure Issues, “Impact of Aviation Noise on Communities Presents Challenges for Airport Operations and Future Growth of the National Airspace System”, <http://www.gao.gov/new.items/d08216t.pdf>
Key factors affecting the level of aviation noise that communities are exposed to include jet aircraft operations, land uses around airports, and aircraft flight paths. Jet aircraft operations are the primary source of aviation noise, particularly during takeoffs and landings, and people’s perceptions of aviation noise, which vary from one individual to another, can also influence communities’ views on aviation noise. As a result, even comparatively low levels of noise exposure can create concerns in communities surrounding airports. More stringent standards for aviation noise—imposed through legislation and regulation and enabled by advances in technology—have, together with the airlines’ response to the economic downturn following the terrorist attacks of September 11, 2001, led to the retirement or modification of older, noisier jet aircraft and their replacement with new, quieter jet aircraft. According to FAA, this change in the composition of the U.S. commercial fleet has been the most important factor in decreasing noise around airports. Local government decisions that allow communities to expand near airports may, however, erode the reductions in noise achieved through the introduction of quieter aircraft. FAA has issued guidance that discourages incompatible land uses, such as residences, schools, and hospitals, in areas with significant aviation noise, but communities face strong development pressures, and research suggests that federal land-use guidelines have had mixed results in deterring residential development in these areas. Finally, aircraft flight paths expose communities to aviation noise near airports, and changes in those flight paths may reduce or eliminate noise exposure in some communities and introduce or increase it in others. To date, FAA’s airspace redesign projects, which are intended to improve safety and efficiency while reducing congestion and delays, have generally involved changes in flight paths above 10,000 feet and have not greatly affected community noise levels. A planned project in the New York/New Jersey/Philadelphia area would, however, involve changes to flight paths at lower levels and has led to expressions of concern from communities that could experience higher noise levels. A number of efforts are underway or planned to address the impact of aviation noise on communities. First, more stringent noise standards, which are significantly lower than the prior standards, are being implemented as new aircraft are being designed, built, and integrated into the U.S. commercial fleet. However, the implementation of these new standards may not have a significant impact on aviation noise levels because many aircraft in the current fleet met the new standards before they were required, the new aircraft will be integrated into the fleet over time, and increases in air traffic are likely to offset the reductions in noise levels attributable to quieter aircraft. Second, noise mitigation measures can reduce the impact of aviation noise on communities. These measures, which are typically carried out by airports and funded primarily through FAA’s voluntary Part 150 Noise Compatibility program, include soundproofing buildings, acquiring noise-sensitive properties, and relocating people. Nearly 300 airports have participated in the Part 150 program and have both received and raised billions of dollars for mitigation measures. New FAA guidance, which is scheduled for release at the end of 2007, and the proposed FAA reauthorization legislation would respectively facilitate and expand airports’ noise mitigation options. Third, research has led to the development of technologies that have reduced aviation noise, and this research is continuing, although declines in federal funding may have slowed the pace of government efforts. Both the National Aeronautics and Space Administration (NASA) and FAA have sponsored aviation noise research, often in collaboration with industry or academia. Such collaboration, for example, has contributed to the development of a Boeing aircraft that is expected to produce 60 percent less noise than its predecessor. Fourth, the planning for NextGen includes an environmental focus because concerns about aviation noise and emissions, which will grow with the expected increase in air traffic, will constrain efforts to expand system capacity. New technologies are being designed to control aircraft more precisely during approach and descent, thereby enabling the use of procedures that will reduce communities’ exposure to aviation noise and emissions. Fifth, at an airport’s request, FAA can impose restrictions on the operation of certain types of aircraft to reduce the impact of noise in surrounding communities. Generally, however, airports and airlines negotiate such restrictions without involving FAA. Finally, airports are using additional studies of aviation activity, supplemental measures of the effects of exposure to aviation noise, and community outreach and education to respond to community concerns about aviation noise and gain support for projects to increase airports’ safety and efficiency. Major challenges and next steps for reducing or mitigating the effects of aviation noise include technological advances, substantial funding from government and the aviation industry, and cooperation on land-use issues. In the future, as in the past, technological advances through research and development will be the key to reducing aviation noise, but the timing of future advances is uncertain. Furthermore, additional federal funding for noise reduction research and development programs may be difficult to obtain without shifting funds from other federal noise reduction efforts, such as the Part 150 program. For the airlines, equipping new and existing aircraft with the NextGen technologies that will reduce communities’ exposure to aviation noise will also be challenging. FAA estimates that the costs of equipping the fleet to take full advantage of NextGen will be about $14 billion. Yet even with quieter aircraft and quieter and more efficient NextGen procedures, aviation noise will persist around airports, and incompatible land uses will pose challenges for airports and FAA. State and local officials can help to address these challenges through land-use planning and regulations that limit incompatible development, and FAA can complete and issue proposed guidance that will clarify the options available for airports to dispose of adjacent land previously purchased with federal grants to buffer surrounding communities from aviation noise. The options, which would require passage of the pending FAA reauthorization legislation, include selling the land and using the sale proceeds for environmental projects. Cooperation on land-use issues among officials at all levels of government and aviation stakeholders will also be necessary to reduce or mitigate aviation noise sufficiently to obtain public buy-in for the capacity enhancement projects that are critical to a safe and efficient national air transportation system.

#### Noise pollution has multiple systemic effects

Lisa Goines, RN and Louis Hagler, MD, March 2007, Southern Medical Journal, Volume 100: March 2007, pages 287-294, http://www.nonoise.org/library/smj/smj.htm

A growing body of evidence confirms that noise pollution has both temporary and permanent effects on humans (and other mammals) by way of the endocrine and autonomic nervous systems. It has been postulated that noise acts as a nonspecific biologic stressor eliciting reactions that prepare the body for a “fight or flight” response. 1, 2, 6 For this reason, noise can trigger both endocrine and autonomic nervous system responses that affect the cardiovascular system and thus may be a risk factor for cardiovascular disease. 1, 2, 6, 11, 33- 36 These effects begin to be seen with long-term daily exposure to noise levels above 65 dB or with acute exposure to noise levels above 80 to 85 dB. 1, 3 Acute exposure to noise activates nervous and hormonal responses, leading to temporary increases in blood pressure, heart rate, and vasoconstriction. Studies of individuals exposed to occupational or environmental noise show that exposure of sufficient intensity and duration increases heart rate and peripheral resistance, increases blood pressure, increases blood viscosity and levels of blood lipids, causes shifts in electrolytes, and increases levels of epinephrine, norepinephrine, and cortisol. 3 Sudden unexpected noise evokes reflex responses as well. Cardiovascular disturbances are independent of sleep disturbances; noise that does not interfere with the sleep of subjects may still provoke autonomic responses and secretion of epinephrine, norepinephrine, and cortisol. 29 These responses suggest that one can never completely “get used to” nighttime noise. Temporary noise exposure produces readily reversible physiologic changes. However, noise exposure of sufficient intensity, duration, and unpredictability provokes changes that may not be so readily reversible. The studies that have been done on the effects of environmental noise have shown an association between noise exposure and subsequent cardiovascular disease. 1, 2, 6, 33-36 Even though the increased risk for noise-induced cardiovascular disease may be small, it assumes public health importance because both the number of people at risk and the noise to which they are exposed continue to increase. 1, 2 Children are at risk as well. Children who live in noisy environments have been shown to have elevated blood pressures and elevated levels of stress-induced hormones. 2, 11, 18 5. Disturbances in Mental Health: Noise pollution is not believed to be a cause of mental illness, but it is assumed to accelerate and intensify the development of latent mental disorders. Noise pollution may cause or contribute to the following adverse effects: anxiety, stress, nervousness, nausea, headache, emotional instability, argumentativeness, sexual impotence, changes in mood, increase in social conflicts, neurosis, hysteria, and psychosis. Population studies have suggested associations between noise and mental-health indicators, such as rating of well-being, symptom profiles, the use of psychoactive drugs and sleeping pills, and mental-hospital admission rates. Children, the elderly, and those with underlying depression may be particularly vulnerable to these effects, because they may lack adequate coping mechanisms. 1 Children in noisy environments find the noise annoying and report a diminished quality of life. 10, 37 Noise levels above 80 dB are associated with both an increase in aggressive behavior and a decrease in behavior helpful to others. 38-40 The news media regularly report violent behavior arising out of disputes over noise; in many cases these disputes ended in injury or death. The aforementioned effects of noise may help explain some of the dehumanization seen in the modern, congested, and noisy urban environment. 2

### Terrorism Advantage Starter

### NextGen’s critical to airline security

Toner 12 (Dr. Karlin, Director and Senior Staff Advisor to the Secretary of Transportation for NextGen, Joint Planning and Development Office, “NextGen Topics”, http://www.jpdo.gov/Nextgen\_Topics.asp)

Securing America’s Air Transportation System

The Next Generation Air Transportation System (NextGen) technologies will substantially improve our nation’s ability to manage, monitor, and secure the nation’s air transportation system. NextGen will give those charged with this essential mission the tools to work in real time while relying on the same operational picture. This will create an entirely new paradigm for the way America manages the security of its airspace. The benefits will be substantial.

For example, with NextGen, it will be possible to immediately view data on the current operation and intent of any aircraft in the system. In the event an aircraft deviates from its flight plan or begins to operate in a suspicious manner, this information will be instantly available. NextGen’s rapid exchange of information and an integrated approach to security will make it possible to identify aviation workers, travelers, and cargo that pose a potential threat and prevent them from gaining access to the air transportation system through pre-screening/credentialing, on-site screening.

### Global Modeling Advantage Starter

### Lack of NextGen investment has ceded leadership in air traffic control to Europe --- this undermines the U.S. model of standards worldwide

AP 11 (Associated Press – via the Chesterton Tribune, “New Air Traffic Control System Would Be Safer, More Efficient, Good For The Environment, If It Is Ever Finished”, 7-6, <http://chestertontribune.com/Business/76119%20new_air_traffic_>control\_system\_w.htm)

The Federal Aviation Administration is creating a new air traffic system that officials say will be as revolutionary for civil aviation as was the advent of radar six decades ago. But the program is at a crossroads.

It’s getting harder to pry money out of Congress. The airline industry is hesitating over the cost of equipping its planes with new technology necessary to use the system. And some experts say the U.S. could lose its lead in the manufacture of high tech aviation equipment to European competitors because the FAA is moving too slowly.

Seventy-five years ago this week the federal government, spurred by the nascent airline industry, began tracking planes at the nation’s first air traffic control centers in Newark, N.J., Chicago and Cleveland.

The original group of 15 controllers, relying on radioed position reports from pilots, plotted the progress of flights using blackboards, maps and boat-shaped weights. Air traffic control took a technological leap forward in the 1950s with the introduction of radar. That’s still the basis of the technology used today by more than 15,000 controllers to guide 50,000 flights a day.

Under FAA’s Next Generation Air Transportation System program, known as NextGen, ground radar stations will be replaced by satellite-based technology. Instead of flying indirect routes to stay within the range of ground stations, as planes do today, pilots will use GPS technology to fly directly to their destinations.

Planes will continually broadcast their exact positions, not only to air traffic controllers, but to other similarly equipped aircraft within hundreds of miles. For the first time, pilots will be able to see on cockpit displays where they are in relation to other planes and what the flight plans are for those other aircraft. That will enable planes to safely fly closer together.

When planes approach airports, precise GPS navigation will allow them to use more efficient landing and takeoff procedures. Instead of time-consuming, fuel-burning stair- step descents, planes will be able to glide in more steeply with their engines idling. Aircraft will be able to land and take off closer together and more frequently, even in poor weather, because pilots will know the precise location of other aircraft and obstacles on the ground. Fewer planes will be diverted.

Pilots and airline dispatchers will be able get real-time weather information. Computers will spot potential weather conflicts well in advance so that planes can be rerouted. And, controllers will do a lot less talking to pilots. Many instructions now transmitted by radio will instead be sent digitally to cockpits, reducing the chance of errors.

Together, the suite of new technologies and procedures being phased in will significantly increase the system’s traffic capacity, FAA officials predict. That’s critical if the number of passengers traveling annually on U.S. airlines grows from an estimated 737 million this year to over 1 billion a year in the next decade, as the FAA forecasts.

And, the FAA predicts, NextGen will save significant time, fuel and money. It also will reduce greenhouse gas emissions and noise.

“It really is a revolution in air transportation,” Deputy FAA Administrator Michael Huerta said in an interview. “The decisions we’re making in the next several years will set the foundation for the next 75 years of air traffic control.”

Paying the tab for NextGen — estimated at as much as $22 billion for the government and another $20 billion for the airline industry through 2025 — may be FAA’s biggest hurdle. The program has widespread support in the Obama administration and Congress, but it isn’t immune to budget cuts in the current climate of austerity. The House wants to reduce FAA’s budget authority by $1 billion a year over the next four years, while the Senate has favored higher funding.

Even longtime NextGen supporters like Sen. Patty Murray, D-Wash., chairman of the Senate Appropriations Committee’s transportation subcommittee, warn that full funding is no longer automatic.

“We need to see a realistic strategy for funding NextGen,” she told FAA Administrator Randy Babbitt at a May hearing. “To date, the FAA has filled its budget request with a laundry list of programs and development activities, and a vague promise that somehow the agency will achieve its goals by 2018. But that approach is not enough this year.”

If funding is reduced, some elements of NextGen could be delayed. There is no date for completion of the entire program, which officials say is constantly evolving.

Airlines support NextGen, but they’re wary of FAA’s track record of changing directions after investments have been made. FAA began its modernization program in 1981. It was branded as NextGen in 2003.

“We want to leverage the technology we have today before we add more technology and more cost,” Delta Air Lines Inc. CEO Richard Anderson told reporters in April.

Airlines also want proof NextGen is ready to produce tangible benefits, that it “is not just a big sales program by the avionics (aircraft electronics) sales people,” he said.

And, airlines want the government to help underwrite the cost of equipment they’re going to be required to buy.

“This is not a cost the airlines can, or should, absorb,” Glenn Tilton, chairman of United Continental Holdings Inc. told an aviation luncheon in Washington in November.

Airlines should “recognize you as an industry get benefits from this,” Huerta said. “Those benefits are something you should be prepared to pay for.”

Yet, some sort of federal help — loan guarantees, for example — may be reasonable, he said.

“The very valid question they are asking is, shouldn’t the government have a stake in the game as well?” Huerta said. He heads an FAA-industry task force expected to develop a recommendation in September.

Some airlines are moving ahead. Alaska Airlines is using GPS precision landing procedures at Juneau International Airport, where mountainous terrain and frequent low visibility conditions were routinely forcing cancellations. The airline estimates it would have cancelled 729 flights last year into Juneau if not for the new approaches.

Results have been mixed elsewhere. Southwest Airlines has spent $175 million on equipment and pilot training so it could make use of optimized landing approaches. But so far only 11 of Southwest’s 72 U.S. destinations are set up for the advanced procedures. FAA hasn’t yet approved new procedures for the remaining airports. And there’s no timetable for when they will come online. It can take the agency as long as two years to approve a new procedure for a single runway.

Southwest wants to see more results before making further investments, spokeswoman Brandy King said.

The U.S. isn’t alone as it transitions to a new air traffic system. Much of the world is adopting GPS technology. But the U.S. accounts for nearly 40 percent of global air traffic and has a robust private aircraft community not found in most countries, adding complexity to the program.

The FAA has set a deadline of 2020 for airlines to install key equipment that will tell controllers and other aircraft the location of their planes. But the agency has been slow to set technical standards and a deadline for other equipment that will be necessary to realize the full benefits of NextGen, industry officials said.

The European Union is further along in developing equipment standards, industry officials said. As a result, the world may wind up adopting standards developed by the EU, rather than the U.S., said Hans Weber, president of TECOP International Inc., an aviation technology management firm in San Diego.

In the past, “we’ve basically set the standard worldwide for air traffic management. Our companies were always first to market, giving them better profit margins,” Weber said. “That’s what we’re at risk of losing. We are risking default to the Europeans.”

## \*\*\* OFF CASE ANSWERS

### Politics Answers

#### Loan guarantees aren’t controversial --- avoids spending concerns

Pasztor 11 (Andy, Reporter – WSJ, “New Way to Upgrade Air Control”, Wall Street Journal, 4-4, http://online.wsj.com/article/SB10001424052748704587004576240992301960976.html)

On Monday, ITT and Nexa Capital Partners LLC are expected to announce proposals to use about $150 million in federal loan guarantees as seed money to establish a larger, self-sustaining fund to pay for installing upgraded equipment on potentially thousands of U.S. airliners.

Controllers at work in LaGuardia Airport's new traffic-control tower, which will replace one that dates to 1964.

The goal is to help carriers fund their piece of a delay-plagued effort by the Federal Aviation Administration to create a satellite-based traffic control network. The new network would allow aircraft to fly shorter, more direct routes, thereby saving fuel and reducing congestion, and give pilots greater leeway in choosing routes and keeping their planes separated from nearby traffic.

The system, dubbed NextGen, is a satellite-based project slated to replace the nation's current air-traffic control system, which is based on decades-old ground-radar technology and doesn't make the most efficient use of airspace or runway capacity.

Expected to cost more than $40 billion overall, the next-generation solution has been stymied by a persistent reluctance by airlines to invest billions of dollars to upgrade airborne devices. Now, after years of delays and futile industry lobbying for direct federal aid, ITT and its partner believe they have found the key to overcoming airline resistance.

ITT's objective "was to put forward a positive alternative" for bridging the funding gap, said John Kefaliotis, the company's point man on the topic. In discussions with senior FAA officials, he said in a recent interview, "what we get is interest and agreement that it is a viable concept."

Executives at JetBlue Airways JBLU +2.15% Corp, Alaska Air Group Inc. ALK +0.20% and the United Airlines unit of United Continental Holdings Inc. UAL +0.72% have also expressed support for the idea, according to people familiar with the matter, and have engaged in detailed discussions with the fund's creators. No final agreements are in place, but airline executives generally like the concept because the equipment will be leased and therefore won't add debt to their balance sheets.

Senior FAA officials, including Hank Krakowski, who heads the agency's air-traffic control organization, have also been briefed about the prospective fund and informally endorsed the concept, according to the people familiar with the discussions.

The FAA's leadership looks favorably on ITT's initiative partly because it avoids adding substantially to the government's deficit. The FAA is reviewing various options, and on Sunday, an FAA spokeswoman declined to comment.

"It takes into account today's political realities" by focusing on a "private-enterprise approach instead of a grand government giveaway," said James May, a consultant advising ITT and a former head of the Air Transport Association, which represents the country's largest carriers.

Monday's announcement is particularly timely because as part of a broad FAA reauthorization bill, the House on Friday adopted a provision prodding the FAA to embrace such arrangements.

Lawmakers voted to require the agency to "leverage the use of private-sector capital" to "expedite the equipage of" NextGen technologies. Without a breakthrough, it could take until the end of the decade or longer for industry to purchase the equipment in traditional ways. ITT and its partner said the initiative could prod suppliers to cut costs by $1 billion over the life of the fund.

ITT Chairman Steven Loranger has championed the loan-guarantee fund despite initial disinterest—and sometimes even hostility—from various industry players. The most unusual aspect is that airlines would gradually repay the cost of equipping planes only after they start reaping fuel and schedule benefits.

Mr. Loranger's dream still faces huge challenges, including formal congressional approval amid heightened public and Capitol Hill opposition to launching any new federal program. But "the debate has matured to the point" that there is a political climate "making this kind of approach possible," according to former FAA chief Marion Blakey, who now heads the Aerospace Industries Association, a trade group representing major aerospace contractors.

#### Congress and the FAA support the plan

Halsey 11 (Ashley, Reporter – Washington Post, “Antidote To Air Gridlock May Not Get Off Ground”, Washington Post, 7-4, http://o.seattletimes.nwsource.com/html/boeingaerospace/2015510103\_airtraffic05.html)

Case for investing

Making the business case that will persuade airlines to take the financial plunge is at the core of the debate.

The single biggest incentive to airlines would be persuasive evidence of an immediate return on their investment in fuel savings and fewer delays. One suggestion has been to allow NextGen-equipped planes to land and take off first. Given that a jetliner can burn through $1,000 in fuel in less than a half-hour, circling the airport in a holding pattern becomes an expensive proposition.

With most U.S. airlines operating in the red, Chew says few will take the investment leap unless the government has more "skin in the game" than promises and deadlines.

Chew is leading an investment group that proposes to lend the airlines money to equip their planes, with a repayment plan that is deferred until the FAA delivers the system. The key, however, is that the federal government must agree to make loan payments if the FAA misses its deadlines.

"If the government OKs loan guarantees for equipage, it would jump-start the process," Chew said. "The airlines are not going to want to make any kind of payments until the FAA is ready to deliver. If they don't deliver by 2018, then the airlines are off the hook for these payments."

Chew says the FAA and Congress have been receptive to that form of loan guarantee, but so far without committing to it. With Congress in a cost-cutting mood, loan guarantees may provide a viable alternative to slashing a program that virtually everyone supports.

#### Obama’s already staked out support for the plan --- it’s a win

Williams 9 (Genevra, J.D. Candidate – Southern Methodist University Dedman School of Law and B.B.A. –University of Iowa, “GPS For The Sky: A Survey of Automatic Dependent Surveillance-(ADS-B) and its Implementation in the United States”, Journal of Air Law and Commerce, Spring, 74 J. Air L. & Com. 473, Lexis)

However the funding is structured, it is likely that ADS-B will get funded. There is relatively general consensus that radar technology must be replaced, and although there may not be complete agreement about how ADS-B should be implemented, there seems to be a tacit agreement among all the major stakeholders that ADS-B is the right technology to move towards. 153 Additionally, the FAA has already allocated considerable resources to the project. In August 2007, the FAA awarded ITT Corp. a $ 1.86 billion, eighteen-year contract to build the infrastructure [\*490] for ADS-B. 154 The first phase involves setting up the ground-based portion of the infrastructure and is worth $ 207 million. 155 The company has already installed the system in southern Florida. 156 It was validated by the FAA in December 2008, clearing the way for a nationwide installation. 157 Given the fact that, during his campaign, President Obama's transportation platform focused on modernizing air traffic control and on creating new jobs through investment in infrastructure, 158 it is likely that it will receive enough funding to be implemented in some form. 159 It seems that failing to implement ADS-B is simply not an option. 160

#### Business lobbies support loan guarantees --- no spending concern

Lowe 11 (Paul, “Chamber of Commerce Makes The Case For NextGen”, Aviation International News Online, 5-24, http://www.ainonline.com/aviation-news/aviation-international-news/2011-05-24/chamber-commerce-makes-case-nextgen)

Former FAA Air Traffic Organization COO Russell Chew, now with Nexa Capital Partners, told those at the summit that private investors would provide some of the initial funding for cockpit equipment under a $1.5 billion loan-guarantee fund. He said the airlines need to make a business case by lowering the cost of capital. “Nobody is going to borrow at 10, 11 or 12 percent in the hope something good will happen,” Chew explained.

When Blakey asked about the current political climate for NextGen, Chew said the federal government should allow aviation the same amount of stimulus that has already gone to railroads and maritime facilities. “Legislation is the key,” he said. “I think NextGen has the support of the [aviation] community at large.” He added that an advantage of loan guarantees is that they don’t score against the federal budget.

#### Momentum proves support is strong

Carey 11 (Bill, Senior Editor – AIN Online, Former Editor in Chief – Avionics Magazine and Masters in Journalism and Public Affairs – American University, “Paris 2011: Private Captial Fund Raises $1.5 Billion To Help Kick-start NextGen ATM in U.S.”, Aviation International News Online, 6-23, <http://www.ainonline.com/aviation-news/paris-air-show/2011-06-23/paris-2011-private-captial-fund-raises-15-billion-help-kick-start-nextgen-atm-us>)

The fund is negotiating “participation agreements” with several airlines, which Chew declined to identify. He also declined to identify other participating aerospace investors beyond ITT.

John Kefaliotis, ITT vice president of Next Generation Transportation Systems, said the deployment of ADS-B ground stations in the U.S. is an example of a successful public/private partnership like that proposed for the NextGen fund. The company has met all milestones since winning the ADS-B ground infrastructure contract from FAA in August 2007, having invested $200 million in the effort, Kefaliotis said.

Chew said language that would provide a government loan guarantee is contained within long-delayed FAA reauthorization legislation, moving closer to passage in the U.S. Congress. While the government loan guarantee technically is not necessary, “in a public/private partnership the loan guarantee is a perfect place for government to say, ‘Given the right amount a risk, I could really kick start this by lowering the cost of capital,’” he said.

Panel moderator Marion Blakey, president and CEO of the Aerospace Industries Association and formerly FAA administrator, remarked that the NextGen fund is “gaining a lot of traction in Washington.”

#### Broad Congressional support for the plan

DiMascio 12 (Jen, Reporter – Aviation Daily, “House Passes FAA Bill, Spurring NextGen Development”, Aviation Daily, 2-6, Lexis)

But a Senate aide contends that funding for NextGen is lower than previous recommendations because technical problems with elements of the program have slowed development.

Still, the bill enables the FAA to work with private industry to ease government cash crunches. It opens the door to public-private partnerships and loan guarantees that have been proposed by companies such as Nexa Capital Partners.

«Anything that allows the sharing of risk, that allows partnership between government agencies and the operator is helpful,» Elwell says, adding that the language by itself won’t speed up the process of equipage. «If you have the financing, plus the FAA commitment to implement on time, that’s the key.»

And while the details are yet to be figured out on the margins, the bill as a package is winning support both in industry and on Capitol Hill.

«The bill’s overall focus on acceleration of NextGen technologies and streamlined certification processes will help expedite implementation of key programs like Automatic Dependent Surveillance Broadcast (ADS-B), Required Navigation Performance (RNP), data communications and other technologies which will reduce congestion and delays, save fuel and, most importantly, increase safety,» says Bobby Sturgell, Rockwell Collins’ senior VP for Washington operations.

#### Bipartisan support for NextGen loan guarantees

Michaels 11 (Dave, Reporter – Dallas Morning News, “Private Fund Bids to Supply Costly Air-Traffic Gear to Airlines”, The Dallas Morning News (Texas), 6-8, Lexis)

Chew hopes a suddenly frugal Congress will like the idea of a public-private partnership.

The House's FAA bill, approved in April, contains a provision that would allow the plan, but Nexa and ITT are seeking more specific language that would compel it, Chew said.

The Senate's bill authorizes grants to fund the airlines' NextGen avionics. But analysts say that provision is unlikely to be accepted by the Republican-controlled House, which is trying to hold down the cost of the legislation.

Loan guarantees are an alternative to grant funding that could be acceptable to both parties, analysts say. Sen. Jay Rockefeller, chairman of the Senate Commerce, Science and Transportation Committee, supports financial incentives for carriers' NextGen needs, a Senate aide said.

"Obviously loan guarantees can cost taxpayers nothing if the underlying investment is sound," said Sen. Kay Bailey Hutchison, R-Texas, the top Republican on the transportation panel. "I would want to look at the risks and rewards to taxpayers in this proposal."

### Spending Answers

#### Plan costs nothing

Thisdell 11 (Dan, Business Editor – Flight Global Magazine, “Finance is About Risk As Much As Cash”, Space, Time, and Money, 7-4, http://thisdell.wordpress.com/2011/04/07/finance-is-about-risk-as-much-as-cash/)

The Federal Aviation Administration reauthorisation bill, passed by both House and Senate and likely to survive reconciliation, provides for public-private funding of the so-called “NextGen” overhaul of the air traffic management system.

The idea is to shift from long-standing radar-based traffic control to one based on GPS technology. The result would be much more accurate information about where all the aircraft flying actually are, so controllers could both allow them to fly closer together – which needs to happen if there’s any chance of making space for the forecast huge growth in flight demand – and also send them on more-direct routes – which is a good start for cutting fuel burn.

But the system is going to cost something like $40 billion – half in infrastructure and half in on-board equipment and software – and cost and political sloth has meant little has happened in a decade of trying to get it off the ground. Europe’s comparable SESAR system may be (a bit) closer to reality.

The new FAA bill, though, at least paves the way for novel approaches to financing the system. One – the NextGen Equipage Fund – is looking to raise $1.5 billion from strategic investors like ITT, which is to supply some of the ground infrastructure, to help airlines start fitting out their cockpits. Critically, airlines don’t want to spend the cash upfront when it might be years before the system is working.

But the financiers might have an answer. NextGen Fund general partner Russell Chew, a former FAA chief operating officer and former president of JetBlue Airways, says the deal is structured to lend operators the funds needed to outfit their fleets at attractive lease rates that defer payment until near to start of service.

The federal government doesn’t need to put up any cash – just loan guarantees, which would almost certainly only get tapped if the whole fund defaults, says Chew.

#### NextGen creates net savings

Jansen 12 — Bart Jansen, senior contributor to USA Today. Available online at http://travel.usatoday.com/flights/post/2012/04/nextgen/664954/1, retrieved 6-21-12

Improvements to the air-traffic control system could save hundreds of millions of dollars each year by consuming less fuel and reducing flight delays, according to an industry analyst's report released Wednesday. But airlines remain leery that the Federal Aviation Administration will follow through on improvements that justify buying more expensive equipment for planes, according to the report by Sakib bin Salam, a fellow at the Eno Center for Transportation, a nonpartisan Washington think tank. FAA has estimated that its program for improving air-traffic control, which is nicknamed NextGen, will make flight routes more precise by tracking planes with a satellite global-positioning system [gps]. Routes that are more precise could be shorter, reduce congestion and burn less fuel, saving airlines and passengers money. But according to bin Salam, FAA hasn't released how it estimated that the program would cost $15 billion to $20 billion to build through 2025, or how it estimated potential savings that eclipse those figures. To nail down estimates, bin Salam calculated that burning 1% less fuel would have saved U.S. airlines $229 million in 2010, when fuel was much less expensive than today. Reducing flight delays by 1% would save $39 million per year, based on the cost of flights and the length of delays, bin Salam said. The FAA projects much larger savings in fuel and delays. "Even at a minimum, the savings could be significant," bin Salam told industry experts at the Bipartisan Policy Center.

### Privatization CP Answers

#### Industry and airports hate the CP

Poole 10 (Robert W. Jr., Director of Transportation Policy and Searle Freedom Trust Transportation Fellow – Reason Foundation, and Chris Edwards, Director of Tax Policy Studies – Cato Institute, “Airports and Air Traffic Control”, June, http://www.downsizinggovernment.org/transportation/airports-atc)

Why has the United States resisted these types of airport reforms occurring around the world?15 One reason is that U.S. state and local airports have for decades received federal aid for development and construction. Federal law generally provides that governments that have received federal aid for an infrastructure facility have to repay previous federal grants if the facility is privatized. Moreover, the FAA has interpreted a legal provision requiring that all "airport revenues" be used solely for airport purposes to apply to any lease or sale proceeds, which prevents a city from selling its airport and using the proceeds for its general fund.

Another important factor is that state and local governments can issue tax-exempt bonds to finance airports because they are government-owned facilities. Thus, borrowing can be done at a lower cost than borrowing by private airport owners issuing taxable debt. However, this bias against private ownership can be overcome. The federal government could pursue tax reforms to reduce or eliminate the tax exemption on municipal bond interest. Alternatively, the government could permit private airport operators to make use of tax-exempt revenue bonds ("private activity bonds"), as it has done for companies involved in the toll road business.

A final hurdle to airport privatization in the United States has often been the airlines. For various structural reasons, they worry that their costs may be higher or they may face more airline competition if airports were privatized. Typically, major airlines are like an anchor tenant in a shopping mall. At U.S. airports, major airlines generally have long-term lease-and-use agreements, which often give them control over terminals or concourses and the right to approve or veto capital spending plans. That gives them the power to oppose airport expansion if it would mean more airline competition in that location.

#### Links to politics --- airlines backlash

Poole 10 (Robert W. Jr., Director of Transportation Policy and Searle Freedom Trust Transportation Fellow – Reason Foundation, and Chris Edwards, Director of Tax Policy Studies – Cato Institute, “Airports and Air Traffic Control”, June, http://www.downsizinggovernment.org/transportation/airports-atc)

In the 1990s, numerous state and local officials saw what Margaret Thatcher had done in Britain and were inspired to sell or lease their own airports. But the airlines and federal administrators objected for the reasons cited. So privatization proponents went to Congress, and it passed the very modest reform in 1996: the Airport Privatization Pilot Program. This program allows exemptions from the most onerous provisions of airport grant agreements for up to five U.S. airports. Cities whose airports are accepted for the pilot program do not have to repay previous grants and they are allowed to keep any airport sale or lease proceeds.16 However, the airlines lobbied hard to include a provision specifying that to keep sale or lease proceeds a city had to get the approval of 65 percent of the airlines serving an airport, which created a substantial hurdle to reform.

As a result, progress toward privatization has been very slow over the last decade. The only airport privatized under the 1996 Pilot Program—Stewart International Airport north of New York City—did not get the local airline's approval. Therefore, New York State was required to use its lease revenues for improvements to Stewart and other state-owned airports. The airport operated under a 99-year lease to the U.S. subsidiary of the U.K.-based National Express Group.17 But that lease was later terminated by mutual consent due to National Express's change in corporate strategy to focus on its intercity bus and rail business. The Port Authority of New York and New Jersey, a government agency, took over the remaining years of the lease. This change freed up that slot in the Pilot Program, making all five available as of 2010.

#### Congress hates the CP

Barkowski 10 (Justin T., J.D. Candidate – Pepperdine University, B.A. in Economics – University of California, Berkeley and Instrument-Rated Private Pilot Certificate, “Managing Air Traffic Congestion Through the Next Generation Air Transportation System: Satellite-Based Technology, Trajectories, and - Privatization?”, Pepperdine Law Review, 37 Pepp. L. Rev. 247, Lexis)

Though the mixed private-public corporation bears similarities to the current ATO, the main differences are precisely what the ATM system needs for successful implementation of NextGen. In a USATSC, the FAA would retain protection over ATM security functions and raise alternative forms of financing for NextGen, operating as much like a "business-run enterprise" as possible. 221 Although theoretical observations could arguably overestimate the benefits of increased efficiency for implementing new technologies, the above stated benefits certainly outweigh the current system, which is funded by passengers and a trust fund with limited accountability from its users. But along with nearly any policy recommendation, the biggest obstacle for ATC commercialization is Congress. 222 Indeed, the public tends to disfavor privatization efforts when there has been a backlash in the private sector, especially one as remarkable as the recent economic recession.

#### Perm: do both – best way to solve NextGen

JPDO 4

(Joint Planning and Development Office, 2004, Congress created the Joint Planning and Development Office (JPDO) to manage the partnerships designed to bring NextGen online. These partnerships include private-sector organizations, academia, and the following government departments and agencies: Department of Transportation (DOT) Department of Commerce (DOC) Department of Defense (DOD) Department of Homeland Security (DHS) Federal Aviation Administration (FAA) National Aeronautics and Space Administration (NASA) White House Office of Science and Technology Policy (OSTP) Office of the Director of National Intelligence (ODNI) – (Ex Officio), <http://www.jpdo.gov/library/ngats_v1_1204r.pdf>) MJA

The role of Government must shift to allow industry to provide the most cost eﬀective solutions within a performance-based set of security, safety, and environmental rules. This understanding will be reﬂected in planning, decision-making, and implementing institutional reform that is mandatory for successful transformation. There is also a need to improve incentives to produce air traﬃc and airport services eﬃciently - to make sure that these services are put to their highest and best use. This roadmap in no way implies that government can solve all the problems facing aviation. The goal is not to create an industrial policy by which the government tries to pick winning technologies, but instead to provide a framework to utilize the creative forces of the market. Market forces should play a role wherever possible. Sparked by this leadership, these agencies, working closely with the private sector, have deﬁned eight strategies for transformation, each individually signiﬁcant yet interdependent on the other seven. The eight strategies are the ﬁrst steps toward a roadmap to provide a credible and stable path forward. As the term implies, this roadmap can guide our eﬀorts to arrive at our destination if the paths and connections are clearly identiﬁed. With this roadmap, both public and private sectors can develop long-term investment plans and activities that result in the Next Generation Air Transportation System.

#### Government based action is a prereq

Sebastian and Piltz 07, Thea Sebastian, Director Climate Science Watch Rick Piltz, Director Climate Science Watch, July 2007, “NextGen Air Transportation System Progress Reports Ignore Climate Change”, <http://www.climatesciencewatch.org/file-uploads/NextGen_final_18jul07.pdf>

Furthermore, America is missing a key opportunity to vitalize its private sector. The aviation industry commands a substantial portion of the U.S. economy, generating 5.4% of the GDP – and more than 9% when aviation-related industries are also included. This figure encompasses 11 million jobs and $640 billion in revenues.29 If the government were to support a drive for cleaner, climate-friendly technologies, this could stimulate a massive upswing in private sector participation. Unlike things like “flat taxes on passengers or flat taxes on aircraft movements, aviation fuel taxes” (which are directly intended to “reduce the amount of flying we do but don't provide any incentives to make flying more efficient”), emissions caps could spark an economically energizing influx of private investment.30

### States CP Answers – 2AC

#### Federal oversight and resources are key

Herdman 94 (Roger C., United States Office of Technology Assessment, “Institutional and Management Issues for Civil Aviation Research and Technology”, Federal Research and Technology for Aviation, p. 35-36)

The federal government is involved in most aspects of a typical aircraft flight in the United States. The aircraft design, its flight and maintenance crew, and the public airport it operates out of must all be certified by the Federal Aviation Administration (FAA), under the U.S. Department of Transportation (DOT). On the infrastructure side, most of the pavement, lights, and navigation devices at the airport are financed with federal funds, and air traffic control (ATC) and airspace systems through which the aircraft flies are owned and operated by FAA.

The tremendous size of the air transportation system and its importance to the U.S. economy, the federal responsibility for ATC, and the lack of commercial market or profit potential for certain safety, environmental, and air traffic management research have propelled the federal government into the role of major provider of aviation research and development (R&D). Within the United States, only the federal government has the resources to support large-scale, applied R&D programs for aviation safety and infrastructure. This chapter describes the present organizational framework for aviation R&D and discusses management and technology issues of concern to Congress.

ORGANIZATIONAL FRAMEWORK

Federal involvement in aviation began shortly after the inception of powered flight. At the end of World War I, Congress created the National Advisory Committee for Aeronautics (NACA) as an advisory group for aviation research, thus intertwining the federal government’s interest in aviation for military and civil purposes from early on.

Many organizations hold prominent roles in U.S. civil aviation, especially in the areas of policy, regulation, and research and technology. This section looks at the roles of FAA, the National Aeronautics and Space Administration (NASA), and other organizations in providing the technical underpinnings for civil aviation. Federal Aviation Administration FAA promotes safety and fosters air commerce in three key areas—safety regulation, infrastructure development, and ATC system operation—and in the research and technology development to support them. FAA’s regulatory authority covers virtually every aspect of aviation, from airports and airways to aircraft and the people who work in and around them. The agency is responsible for the nation’s ATC system, a complex amalgam of people and equipment that must run 24 hours a day, every day of the year, in numerous locations across the United States and its territories.

#### FAA credibility ---

#### A) Only federal action puts the FAA’s skin in the game

DiMascio 11 (Jen, Reporter – Aviation Daily, “Babbitt: Administration Still Open To Cooperative Fund For NextGen”, Aviation Daily, 4-29, Lexis)

Administrator Randy Babbitt believes that while the administration is open to a public-private partnership to help finance the NextGen air traffic control modernization program, putting the structure in place is no simple undertaking, he told the U.S. Chamber of Commerce on April 27.

ITT and Nexa Capital are creating a $1.5 billion loan guarantee fund to help speed development of NextGen and bolster the business case for buying into the massive infrastructure investment. That kind of upfront investment is critical to get NextGen off the ground, Russell Chew, managing partner of Nexa Capital Partners, said during the day-long civil aviation discussion before the Chamber. «The key to any of these programs is the skin in the game,» Chew said, referring to a term coined by investor Warren Buffett to describe individuals who share a stake in a venture and are therefore equally concerned about its outcome, just like outside investors. Chew added that the fund will require enabling legislation on Capitol Hill as well.

#### B) FAA credibility is key to equipage

Dillingham 11 (Gerald L., Ph.D. and Director of Physical Infrastructure Issues – United States Government Accountability Office, Testimony Before the Subcommittee on Aviation, Committee on Transportation and

Infrastructure, House of Representatives, 10-5, http://www.gao.gov/assets/590/585589.html)

FAA Faces Several Ongoing Issues That Will Affect NextGen Implementation:

To maintain credibility with aircraft operators that NextGen will be implemented, FAA must deliver systems and capabilities on time so that operators have incentives to invest in the avionics that will enable NextGen to operate as planned. As we have previously reported, a past FAA program's cancellation contributed to skepticism about FAA's commitment to follow through with its plans. That industry skepticism, which we have found lingers today, could delay the time when significant NextGen benefits--such as increased capacity and more direct, fuel-saving routing--are realized. A number of NextGen benefits depend upon having a critical mass of properly equipped aircraft. Reaching that critical mass is a significant challenge because the first aircraft operators to equip will not obtain a return on their investment until many other operators also equip.

#### State action in aviation will be struck down

Weigand 1 (Tory A., Partner – Morrison, Mahoney & Miller, “Air Rage and Legal Pitfalls for State-Based Claims Challenging Airline Regulation of Passenger Conduct During Flight”, Boston Bar Journal, May / June, 45 B.B.J. 10, Lexis)

However, many courts, including the First Circuit, have found implied preemption over various aspects of air safety. n22 Indeed, the Second Circuit in Abdullah v. American Airlines, Inc. recently held that the Aviation Act's safety purpose and scheme preempts all state standards in the area of safety. According to the Court, "the evident intent of Congress that there be federal supervision of air safety and from the decisions in which courts have found federal preemption of discrete, safety related matters . . . [establishes] that federal law preempts the general field of aviation safety." n23 The Court in Abdullah found that only a federal standard of care could apply, although state law could provide for a damage remedy if one is not available under the federal scheme.

n22 French v. Pan Am Express, Inc., 869 F.2d 1 (1st Cir. 1989).

n23 Abdullah, 181 F.3d at 371.

Under Abdullah, a substantial argument can be made that the FAA regulatory scheme preempts any state action regulating or providing for a standard of care for the removal of passengers or diversion of flights based upon passenger conduct. The FAA has, in fact, enacted significant regulation granting considerable discretion to the airline, particularly the pilot, in controlling aberrant passenger behavior. The regulatory scheme includes:

- prohibiting anyone from interfering, intimidating or threatening a crew member or interfering with his or her duties;

- granting to the pilot's sole judgment the right to divert a flight due to concerns of safety;

- granting to the pilot complete control over and responsibility for all passengers and crew, "without limitation;"

- granting to the pilot final authority as to all aspects of the operation of the aircraft; and

- requiring the pilot to ensure that there is no "activity during a critical phase of a flight which could distract any flight crew member from the performance of his or her duties or which could interfere in any way with the proper conduct of those duties." n24

#### Credit markets ---

#### A) Federal loans are key to availability of funding

McCartney 8 (Scott, Reporter – WSJ, “Do Government Bailouts Work? Ask the Airlines”, Wall Street Journal, 9-22, http://blogs.wsj.com/middleseat/2008/09/22/do-government-bailouts-work-ask-the-airlines/)

But there’s little debate that the loan program did its intended job. By offering to guarantee loans to airlines, Congress sent a strong message that shored up airline finances. Many airlines that couldn’t get credit before the loan program were able to borrow more on their own after the program was approved. The psychology of the credit markets changed.

In the end, the Air Transport Stabilization Board only issued $1.6 billion worth of guarantees, and by the time that debt was retired, the board had earned a $300 million profit for taxpayers.

The board rescued America West Airlines and US Airways Group Inc. and helped facilitate a merger of the two. That move saved tens of thousands of jobs and kept a big competitor in the air. Without the loan guarantees, both airlines likely would have been liquidated before they got the chance to merge.

It’s worth noting that the loan board was quite stingy in handing out guarantees, and turned down seven airlines, including UAL Corp.’s United Airlines, which applied twice. The ATSB, made up of a representative from each of the Department of Transportation, Treasury and the Federal Reserve, insisted that carriers present viable business plans and show they couldn’t get loans on their own in commercial markets. The government also extracted a hefty price for its services, collecting $220 million in fees, and demanded airline stock in return for the financial support.

Not all the loans that were guaranteed were a success: the ATSB lost money on loan guarantees to now-defunct ATA Airlines. Aloha Airlines was another failed government loan guarantee recipient.

But the program achieved its goal – stabilizing an industry seemingly in a death spiral – and did it without costing taxpayers.

#### B) That means no equipage --- it’s so expensive that operators can’t justify without a federal commitment

NAM 11 (National Association of Manufacturers, “From NextGen to NowGen”, http://www.nam.org/~/media/9D17E31A28104FE69FBBE244FEEB59E9/NextGen\_to\_NowGen.pdf)

Encouraging Investment in Equipment: Investing in avionics and other equipment and training in support of the NextGen system is a multi-billion-dollar investment that airlines and operators are unable to justify when the government has not made a clear commitment that the supporting NextGen air traffic equipment and services will be deployed in the near-term. A federal program or initiative that would incentivize early purchase decisions for NextGen airbone capability will support a business case to equip by reducing investment risk and making NextGen a stronger certainty.

### States CP Answers – FAA Credibility Extensions

#### Federal commitment’s key to industry perception of certainty

Bradley 11 (Captain Mark, Chief Technical Pilot – Delta Airlines, “Building the Successful

Business Case for NextGen”, Aviation Week, May, [http://events.aviationweek.com/html/nextgen11/Day%2](http://events.aviationweek.com/html/nextgen11/Day%252) 02.%20Building%20a%20Successful%20Business%20Case%20BRADLEY.pdf)

The most effective method to close a business case for equipage is to ensure *certainty*. This will provide a less risky benefit. Certainty can be defined as an assurance by all stakeholders that implementation of procedures (and associated elements supporting those procedures) will be guaranteed based on a mutually agreed upon timeline. Failure to accomplish timely implementation should result in direct consequences for all participants. All stakeholders need to have “skin in the game.”

#### FAA is the focus for industry --- credibility gets them on board

Guzzetti 12 (Jeffrey B., Assistant Inspector General for Aviation and Special Program Audits, “Status of Transformational Programs and Risks to Achieving NextGen Goals”, 4-23, p. 11-12)

Due to this lack of clarity on whether and when these programs will deliver benefits, airspace users remain skeptical about FAA’s ability to deliver the technologies and are concerned about investing to equip aircraft. Without widespread equipage, however, FAA will be unable to begin markedly increasing safety and capacity or saving time and fuel through NextGen technologies. For example, aircraft will need advanced avionics to achieve these benefits through ADS-B and DataComm during nearly every phase of flight. Users’ concerns and a lack of clearly defined benefits have triggered debate among industry and FAA about whether to use equipage incentives, such as grants 12 or loan guarantees, since users are not likely to voluntarily equip. For example, users may be unwilling to fully commit up front to all ADS-B avionics. FAA published a rule in May 2010 mandating users to equip for ADS-B Out, which broadcasts position information from planes to ground systems. However, the most significant benefits rely on ADS-B In, which will display that information in the cockpit.12 Likewise, industry is concerned about FAA’s commitment to delivering DataComm and a timely return on investment, in part due to similar failed NAS acquisition efforts in the past. FAA expects that once users have invested in ADS-B Out, they will then voluntarily equip to realize the additional capabilities of ADS-B In. To demonstrate ADS-B benefits to users, FAA now has agreements with several U.S. airlines and is paying for new equipment. For example, FAA established an agreement with a major carrier in which FAA will pay $4.2 million for ADS-B Out avionics; in turn, the airline will equip as many as 35 aircraft over the next 2 years. This will enable the ADS-B-equipped aircraft to fly two major routes off the East Coast where traditional radar coverage is unavailable. The air carrier will pay for the aircraft downtime cost associated with installing ADS-B avionics and the necessary training for dispatchers and flight crews. However, it remains to be seen whether this incentive agreement will be effective and whether it will encourage other users to equip with ADS-B avionics. 13 To mitigate these concerns, FAA’s DataComm program office has proposed a three-prong strategy that includes financial incentives, improved service for equipped aircraft,14

#### Only a federal loan guarantee gets the FAA’s skin in the game

Gibbons 11 (Glen, Editor and Publisher – Inside GNSS, “Air Traffic Control Modernization: FAA, NextGen, GNSS, and Avionics Equipage”, Inside GNSS, May/June, http://www.insidegnss.com/node/2582)

Back to Congress

House and Senate bills for a NextGen Equipage Fund, if approved, could be a model for future funding of ATC modernization infrastructure

For the time being, the fortunes of the equipage fund — and probably the NextGen program as a whole — rests with Congress and the White House, all of which have differences of opinion about the FAA R&D legislation, although none of them have to do directly with NextGen.

“I’m pretty confident that Congress will do the right thing,” Dyment says. “There’s a lot of support in the House and Senate [for a PPP] It is a Tier 2 issue for Congress, which we prefer [because it’s not as subject to partisan politics].”

Both versions of the FAA R&D reauthorization legislation have common language addressing the issue of paying for equipage of aircraft:

“Not later than 120 days after the date of the enactment of this Act, the Administrator of the Federal Aviation Administration shall submit to Congress a report that contains (1) a financing proposal that (A) uses innovative methods to fully fund the development and implementation of technology for the Next Generation Air Transportation System in a manner that does not increase the Federal deficit; and (B) takes into consideration opportunities for involvement by public-private partnerships; and (C) recommends creative financing proposals other than user fees or higher taxes.”

An additional incentive for Congress: “The [federal loan guarantee] money at risk has no impact to the federal budget unless at the end FAA doesn’t perform,” Dyment says. Nonetheless, he adds, “We want the federal government to have some skin in the game.”

### Topicality Answers

#### Equipage loan guarantees are “investment”

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

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.

#### NextGen defined as part of infrastructure- FAA and Federal government agree

FAA 7—FAA fact sheet, accessible at http://www.faa.gov/news/fact\_sheets/news\_story.cfm?newsid=8145, retrieved 6-23-12

At this early stage of NextGen, it is critical to better define operational concepts and the technologies that will support them. For the first time, in FY08, FAA is requesting funding for these defining activities. This funding will support two demonstrations and a series of infrastructure development activities. The primary purpose is to refine aspects of the trajectory-based operations concept.