

LIFE IN THE “NEW NORMAL” IN THE USA

Carl Burleson

Director, Office of Environment & Energy, FAA

I'm here this morning to talk a little bit about Life in the “New Normal” of aviation and by way of introduction let me start with a story about my sons. A few years ago I was sitting outside on the porch of my house witnessing a wonderful, typical Washington summer thunderstorm and I brought out my two sons. I actually disconnected them from their Playstation and I said come on out and see this. We sat there, and my older son says “Dad, this is incredible, man this is wonderful, can I go out?” I said “No, just stand on the porch, I think that's fine.” My younger son sat at my lap and he was relatively quiet and I finally said “Will, everything okay?” And he goes “Dad, is this any way for a seven year old to die?”

I share this because I think when we talk about the topic of aviation and the environment, we tend to find these two polar opposites. Where you have one group that lauds the incredible wonder and majesty of aviation and how it's transformed our world. And then others oftentimes bring a perspective like “Oh my god, this thing is going to kill us.” And I think the issue for us in aviation is how do we find a way to balance those views and go forward. So this morning I'd like to talk about finding that balance and I just briefly want to cover aviation and the environment, and specifically I'll look at the US. So let me talk about what we've seen in the US and then, convey what I mean by Life in the New Normal, because clearly since September 11th, at least in the US, the aviation industry has gone through some really profound changes, and then I want to offer a few thoughts about moving forward, with the proviso of having been trained as an economist and one of my professors telling me that the reason economic forecasters were invented was to make astrologers look good, so one has to be a little bit careful about forecasting the future.

So first, progress. Again, probably many of you have seen Slide 3. Nothing really new here, you've seen this before, the path of technology and the improvement on noise. Obviously the issue we face now is that we have a flattening of the curve in terms of technology progress despite the past tremendous success we've had in reducing by about 20db over 30 years.

Slide 4 shows the US situation. Since 1975, when we had a little over 7 million people exposed to significant noise, that's now down as of 2000 to about 440,000. At the same time we've had the passenger growth go up by a factor of 2.5 from 200 million to 700 million. You're really talking about one tenth of 1% of the US population that is currently exposed to noise, quite a remarkable achievement.

So let me look at air quality. The GAO Accounting Report, that Professor Clift mentioned earlier, is an interesting starting point. One of the things that it conveys is that in terms of what we call Criteria Pollutants, the ones that we regulate in the US, aviation accounts for less than one half of 1%. One of the things that I don't think they got quite right is NOx. They did do a good job of looking at engine data but they made a strange division in terms of the generation of engines and mixed up CFM and JT8. If you adjust it for the generation of engines, you really don't have a 40% increase in NOx, it's about

10%. That said, Slide 5 is an interesting picture showing aviation's contribution. Again you see that in terms of PM10, not much, volatiles, not much, and you can see NOx, again a very small share of transport is due to aircraft.

Slide 6 is another way of looking at it. This is based on a study that was done for Logan Airport in Massachusetts. It tried to set an airport in the context of regional emissions, and here you see volatiles are less than 1% on a regional basis. And in terms of NOx, again it was less than 1% on a regional basis. So, clearly on a local air quality side, aviation doesn't have a tremendous contribution, although, again we don't want to diminish the fact that it does contribute. Now on the greenhouse gas side, you've already seen pretty standard numbers about the 12% of transport, 2-3% of CO2. I just wanted to share a slightly different chart (Slide 7), which again in the US, we really think of planes and cars as way of transporting people. And again here if you look at the BTU, Energy Consumption by Mode, here aviation and cars from the 70s to 2000, and aviation does increase from about 12% vis-à-vis cars to about 21% of energy usage.

Slide 8 shows Energy Intensity, and this is really quite an interesting change because if you look in 1970, aircraft were a little over 200 times the energy intensity of passenger cars in the US, and now it's about 11% more. So, it's really quite a dramatic change in terms of energy intensity. That's a brief snapshot of noise, local air quality, and contribution in energy and greenhouse gasses in the US system.

Let me talk about the "New Normal", at least from a US perspective, I've got to say that we live in the "New Normal" in the aviation world. The primary focus for the US Government and the aviation industry has been improving security and responding to the threat levels in the country. Most time, money, and staff has been focussed on this immediate goal of reducing the threat and frankly aviation and environmental issues haven't been on the spotlight. And, I think not only because of the security emphasis, but because aviation's environmental footprint has decreased significantly in the US.

So what's life like in the "New Normal"? Slide 9 shows the characteristics you find. Security is definitely the dominant near term issue, there is an industry under tremendous financial stress, lots of operational and fleet changes, a lot more uncertainty and, as I said earlier, the environmental impact has gone down. So let me touch on each of these briefly.

The financial problems. As everyone in this room certainly knows, aviation is a cyclical industry, which means that sometimes it makes money and sometimes it doesn't. However, it's hard to overestimate how profound the impact has been at least on the US industry over the last couple of years. The numbers are quite staggering. The airline industry has lost about \$22 billion in two years. The news is not getting any better this year. Depending on which analyst you believe, we're en route to another \$6-10 billion this year. Passenger yields are down, fuel prices are up, the business traveller has disappeared. It's really quite a profound thing. Slide 10 shows the incremental pretax security costs to our industry, and it's quite extraordinary, all these costs that didn't exist a couple of years ago, have impacted the industry.

As I said earlier, here are some of the problems (Slide 11), the losses, passenger yields at 1988 levels, passenger revenue is down 20%. The fuel price keeps changing so much it's hard to keep up with my slides. We've had one carrier go in and one carrier exit Chapter 11. But clearly at one point this year we had 25% of the US capacity in

Chapter 11, and depending how things go in the next few months we could have more. It's clearly a very different world. Just to give you some sense, compared to The Gulf War, there were about \$13 billion of losses in the four years after The Gulf War. Two years on we've already got \$22 billion and we could potentially be three years on and something like \$30 billion in losses. Clearly a very different situation.

Operations have changed. We have revenue passenger miles at 1998 levels. Again, we have emplanements down to levels of 1995, and at our contract towers which is probably at the margin of the system, we're back down almost a decade ago in terms of operational levels. These are really quite profound changes.

Now another way of looking at this is to look at not just the changes in overall operations but what's being operated. Slide 13 gives you the last three years (2000, 2001, and 2002) of scheduled operations in the US. What you'll see here in terms of a narrow body aircraft, a quite dramatic decrease, not much difference in wide bodies. You see in turbo prop, a quite dramatic decrease and in regional jets, a very strong growth. Actually regional jets is one of the most profound structural changes we see going on in the US, 800% growth in five years.

This has in turn produced real changes in the impacts on the environment. Boeing 727s have just about disappeared from passenger use, Fokker 28s are gone, DC9s, MD80s, all these decreases, so it's not hard to see that when you have these older aircraft that tend to be noisier disappearing from operations that there's not nearly the level of noise in our system.

The same thing on emissions. In order to have emission, you've got to burn fuel. As you see in Slide 16, we're down about 12% in terms of fuel burn in the commercial side, and my guess is that at the rate we're going, probably by the end of the year, we'll be down from 2000 levels somewhere about 16% or 17%. That's quite a dramatic decrease in terms of the environmental impact.

So this is a snapshot of what life is like in the US right now. We live in this "New Normal" where aviation is en route to losing \$30 billion. We've got debts in the industry of \$100 billion, with equity \$3 billion. Who would have thought we'd have lived to see airlines as penny stocks in the US. We've got about 10% of the commercial fleet on the ground, and as I've shown in the last two charts, in terms of noise and emissions, the impacts are much, much smaller.

Yet some things have not changed. Despite all these changes in the last few years, a few elements have remained constant. First of these is that Americans continue to want to travel by air, and not just in any way. They continue to want safety, convenience and value. In comparison to Europe, Americans tend to travel a lot more by air. So, we still want growth. Second, Americans clearly don't want the aviation system to damage the environment, especially around local communities that surround airports. And finally, despite the great strides which the charts at the beginning of my presentation showed, and despite the significant short term decline, the very success in aviation reshaping the nature and expectation of travel continues to mean we will have environmental challenges. As a GAO Report pointed out a couple of years ago, we continue to have a huge noise challenge. 29 of our 50 airports and surveys of officials still think noise is the number one issue. Despite the low contribution of aviation, there are increasing concerns that emission concerns could end up putting constraints on capacity growth.

So, given this, how do we move forward? Well here are some thoughts. First of all, ICAO works. I know at the beginning of this session I think it was Keith mentioned the coming together of a real cross-section of people to look at these issues as a first. Well actually it isn't. With apologies, ICAO is really the first, and CAEP is really what has produced tremendous bringing together of a full cross-section of governments, experts and environmental groups to look at these issues and try to set standards. I think it's really critical to acknowledge that we are this global industry and it's vital that we have a global standard setting body like ICAO. And I think, in fairness to ICAO, it's largely gotten it right by demanding environmental standards to be technically feasible, environmentally beneficial, and cost effective. Has it gotten it perfect? Of course not, no more than any member state has gotten it perfect. But I think what it has done is allow safe and efficient growth with all its benefits among the 189 countries with different economies, different values, all while reducing aviation's environmental impact. In recent years ICAO has really taken some very progressive steps. It's adopted a balanced approach of how do you manage noise around an airport, of identifying problems, of assessing a variety of measures, of selecting the most cost effective, and of making sure that all the stakeholders that have some part of this have a voice. We're about to, in my country and I think here, adopt a new NOX standard based on the work that ICAO did in '98 and there is going to be a new noise standard, a Chapter 4, that's going to be in effect January 1, 2006. Currently within ICAO we're working on a whole set of cost effective measures for reducing aviation emissions. We're studying new stringency standards for NOX, we're looking at market based options, which means voluntary agreements, emissions trading and charges, and we're looking at how to use operational measures to further reduce CO2 emissions. So based on the work that's ongoing at CAEP, by next year in February '04 when we meet, we're going to have another set of proposals that will further reduce aviation's impact on the environment.

The next thing that we think is really important is what we're calling in the US The Environmental Design Space (Slide 18). What this is really trying to convey is that FAA believes that there is a need to develop a better set of tools, databases, and models to understand the trade offs between noise and emissions. We think that one of the problems we face today is that traditionally things have been stove piped between emissions and noise. Even when I look at the CAEP structure, we have a working group on noise, we have a working group on emissions, and it's very hard to get the interrelationship, and yet if we look at some of the issues that we face, there are real trade offs that the manufacturers confront, even we the regulators, confront. NASA has done some work in the US looking at noise abatement approaches, and one of the interesting things they've found, in three airports they looked at in particular, because of the noise abatement approaches, the airlines were spending almost \$90 million more in fuel burn. So, in that sense, when we put a noise abatement approach in we made a choice, and that was, we were going to spend, or we were going to allow that many more emissions. Now that's three airports in the US, in a system that has over four hundred certified airports for commercial service. It's not hard to see how quickly you could get to large numbers, and yet we've made this choice without really looking at the trade offs. So, one of the things that we're trying to develop is how do we define the physics, the technology, and the trade offs between a variety of emissions, between emissions and noise, to have a good understanding of where we are today and where we're going. And the second thing we want to do is develop a set of tools, to look at a particular policy, whether it's standard, an operational procedure or a market-based option, in order to try those out and see what one or what combination will give you the most environmental benefit most cost effectively. At least from a US standpoint, we

think this cost benefit idea is vital because to the degree that we as a regulator are imposing costs for safety or imposing costs for security, we don't want to impose greater costs than need be to manage environmental issues. We want to make sure that we're getting the biggest bang for our buck. So, this is the process we are starting. Actually, it's going to take, we're probably five or seven years to develop all the elements.

So besides the fact that ICAO works and what I think we need in an environmental design space approach to looking at the issues going forward, the other thing that I'd proffer this morning are my thoughts on sustainability. I think it's always good to have at least one heretic at a meeting. So let me be the voice here to stimulate debate. I pose this, not as a conclusion but as a hypothesis that hopefully you will have some discussion about. Sustainability to me seems very difficult to get an objective or agreed definition. At least in the US when I've gone around to talk to different groups, it reminds me of the definition of beauty, it seems to be in the eye of the beholder. So, having flown in Sunday, I thought I would take advantage of the fact that I am in the home of the language I speak and I went to Waterstone's, and I went to the reference section and I went to look through a number of dictionaries to find out what does the English definition of sustainability say. And it's interesting because basically the sense is in most every dictionary says maintaining a set level. Now I have to say, that puzzled me in applying this to aviation because, do we mean maintaining a set level in terms of where aviation is in growth? Well from a US perspective we don't really see that as a positive way, we think aviation should grow. So, do we mean maintaining a set level of environmental performance? Well from a US perspective, we don't think that's particularly good because we think what the record shows is that aviation has actually improved in terms of its environmental performance. So again, I have difficulty getting my hands around exactly what sustainability means in this context. There does seem in some of the groups that I talk to, some presumption that there is this fixed limit of potential expansion of economic activity because of environmental effects. I have a problem with that assumption. It seems to go back to a writer based in this country called Thomas Malthus, and it seems to be that most of western history has given lie to that. It seems really the economic development that we've had over the last couple of hundred years has been a series of unsustainable endeavours for a period of time, but then you have a change in technology and a change in production, to the next unsustainable endeavour.

So maybe I can bring it home in terms of an aviation example. At the peak in 2000, the US system was moving about 700 million passengers through our national airspace. Now, assume for a second that we were doing this with Boeing 707s, 1970 vintage, clearly I think that would be unsustainable. The levels of noise, the levels of emissions, it would be terrible. However in 2000, we weren't moving people through our system in 707s, we were using 777s. So, as a national research council that studied aviation and the environment in our system reported, since the 1970s, the number of people affected by noise has been reduced by a factor of roughly 15, whereas the amount of travel services have been increased by a factor of 6. Yet, if we had set a limit based on 1970s understanding and technology, we never would have got there.

So, I guess to me the lesson and the issue for the aviation community, and by this I mean regulators, airlines, manufacturers, airports, local communities, all those who are involved, it seems to me that we would do better not to set arbitrary limits to growth. It would seem better that rather we should try to understand the science, understand the environmental impacts, drive the technologies, drive the operational practices, and work

on the policies to reduce the environmental effects in cost effective ways that don't sustain aviation, but actually allows it to continue to grow.

So let me just wrap up here. Aviation is an absolutely vital part of global transportation. The aviation industry, as other people have highlighted, is a generator of huge economic activity, jobs, and prosperity. And while aviation has experienced a clear significant setback, at least especially in the US in the last couple of years, we are confident that eventually growth will return. With growth returning that means environmental issues will return, and I think again because of the very success we've had in aviation we have some different issues today. We have greater challenges, we are farther up the technology curve. At least from what we see, and least as I understand from my chief scientists, we don't have any particular silver bullets right now on the technology side. From the US standpoint, we're taking a number of actions. I mentioned to you the environmental design space. Every few years the FAA has to get what we call reauthorized, which says "please Congress will you let us exist for a few more years?" So we're in process of doing that and we're in process of asking for in that legislation a few initiatives. One of the things we're going to try to do in setting the tone for going forward is to ask for noise disclosure. We're going to make it a federal requirement, or we hope to, depending on what our Congress says, that if you're living near an airport, that when you have a real estate transaction there is noise disclosure so you know exactly what you're buying in that property. We hope that that way you have a better self selection and reduce those who are more sensitive to aircraft noise from actually buying there. We are putting in place an initiative to incentivise conversion of airport infrastructure, to clean fuels. Again if you look at an airport environment in the contribution to local air quality, it tends to divide about a third by the aircraft, a third by the traffic to and from the airport, and a third of the equipment on an airport. So what we're going to seek to do is try to convert the infrastructure and all the ground service equipment to clean fuels at airports that are in our non-attainment areas. Another thing we're going to do is to try and rebalance R&D spending. The US spends a huge sum every year on improving the environment for communities. We spend something on the order of \$250-300 million a year to reduce noise impacts. This is all funded through passenger facility charges and airline taxes that we collect. What we're going to do is to try and rebalance it a bit. Our proposal is to take \$20 million of that and put it into source noise reduction research. Another thing we're going to do is to set up a centre of excellence. The FAA has this ability to set up centres of excellence to enlist academia, to enlist industry, to enlist others in creative partnerships in trying to push the envelope on noise research. We're putting \$2 million to set up this centre of excellence in initial funding and we hope to be able to really push the envelope especially on near term mitigation. One of the things we've tended to see in research efforts, at least with NASA, is that they do wonderful research but it tends to be for what's twenty and twenty-five years from now. What we want to try to do is drive more solutions nearer term. We've recently funded some activity at Louisville airport in the US about continuous descent approaches, and really quite amazingly, just for equipage of avionics and changing in procedures, we found that you can get a 3-6 db reduction in the approach procedures. That's extraordinary when you think of how many hundred of millions of dollars it's taken to produce a 2 db reduction with a chevron. So we think that there are a lot of opportunities out there to try to reduce the environmental impact of aviation nearer term and we hope to do that with our centre of excellence.

So in conclusion, we need to draw a lesson from 1944. Why I go back to 1944 is because 1944 was when the Chicago Convention happened, and when you think about

it, it was pretty extraordinary. Here we were in the middle of a world war and some people had enough foresight to sit down and say, "Look, commercial aviation is going to be extraordinary. It has a wonderful potential to reshape the world." Still in the middle of a war, they sat down, and we have to give great credit to this country to be partners with us, and actually creating a system which for the next fifty years has brought an amazing benefit and prosperity to the world in aviation. So I think, at least from a US standpoint we're in a similar situation. We're in an industry that is really on its back, that is losing huge amounts of money, that is going through restructuring, and clearly the last thing that people want to talk about right now is the environment. But, I do think longer term, environment will be a constraint on aviation's growth unless it is dealt with effectively. We need to take this window of opportunity when aviation's environmental impact is down and to chart out what are the courses, what are the policies, what are the approaches to set the long term foundations so there can be the same kind of growth, and hopefully we'll have the same type of vision as the folks in the Chicago Convention in 1944.